Guidelines for Presentation of

Engineering Drawings

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Jabatan Kerja Raya

Cawangan Jalan

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KERAJAAN MALAYSIA

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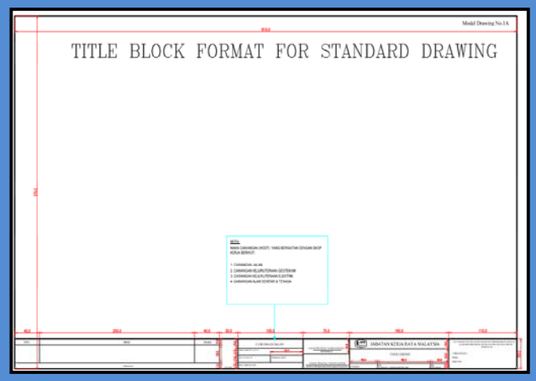

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PREFACE & ACKNOWLEDGEMENT

This is the second revision of Arahan Teknik (Jalan) 6/85 on *Guidelines for Presentation of Engineering Drawings*. Although it is basically similar in essence and format to both of those versions published in 1985 and 1988, various modifications have been made to suit current JKR requirements. These guidelines should be followed for the presentation of engineering drawings for all road projects under JKR Malaysia.

This Arahan Teknik (Jalan) 6/85 will continue to be updated from time to time and in this respect, any feedback regarding these guidelines will be most welcome. All comments should be sent to Cawangan Jalan, Ibu Pejabat JKR Malaysia. This guideline was prepared by a working committee comprising of the following members:

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Special thanks and appreciation to Ir. Mohd Azahar bin Don for his effort in proof reading the document.

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1. INTRODUCTION

The following guidelines have been prepared in order to standardise the presentation of engineering design drawings for road projects undertaken by JKR and which has complied to the relevant standards and requirements.

The objectives of setting these guidelines are:-

(a) to maintain a consistent standard in the production of engineering drawings that will clearly and concisely describe the works to be carried out;

(b) to simplify the draughting process, the checking of drawings and where possible reduce the draughting requirements without detraction from the completeness of the works;

(c) to produce drawings that can be readily modified with a minimum of redrafting to provide complete "as constructed" records for the project.

These guidelines have been compiled by incorporating the good features of design drawings prepared by JKR and those submitted by Consultants.

2. DRAWINGS REQUIREMENT

All drawings (master tracings) are to be A1 size 594mm, by 841mm with a 10mm, 12mm and 21mm border. There are several types of title block format as shown in Model Drawings No. 1A to 1D as below:

i) Drawing No. 1A – Title block format for standard drawing
ii) Drawing No. 1B – Title block format for design & build
iii) Drawing No. 1C – Title block format for in-house design
iv) Drawing No. 1D – Title block format for consultant design

General notes and legends are to be located on the right hand side of the title block.

Drawings shall be arranged so that the Northing Arrow is at the top right hand corner of the drawing. No other type of Northing Arrow is allowed.

All drawings submitted (including draft copies) must have Professional Engineer's (P.E.) chop and signature of at least a director of the consulting engineer's firm.

3. SEQUENCE OF DRAWINGS

Engineering data shall be prepared in a logical method starting from general information and scope of works to increasingly specific details or items and method of work. The recommended sequence for the Drawings is set out in Section 5.

4. SCALES OF DRAWING

The scales of drawings shall be selected to clearly illustrate the information that is to be relayed. Generally, to show more details, larger scales of drawing and greater number of drawings are required. However, the smaller the scale, the more limited the designer is in relaying the complete information on one drawing. Accordingly, information may have to be disaggregated so that one drawing may be limited to one subject at a time.

All scales are to be in metric system except for Land Acquisition Plans which have to be in accordance to the respective Land Office's requirement.

5. SEQUENCE AND SCALES OF DRAWINGS

5.1 The following illustrates the sequence of Tender Drawings and scales that are to be used in a typical road project:-

	Drawing Title	Scale
(a)	cover or title page	not applicable
(b)	list of drawings	not applicable
(c)	key plan	not applicable
(d)	location plan	not applicable
(e)	abbreviation, symbol and legend plan	not applicable
(f)	elements of curve plan	not applicable
(g)	superelevation details plan	not applicable
(h)	typical road cross sections and pavement details plan	suitable scale
(i)	alignment control plan	1:1,000 to 1:6,000
(j)	plan and longitudinal profile plan	Horizontal 1:1,000 Vertical 1:100
(k)	cross section plan	1:500 (recommended)
(l)	junction details plan	1:500 or 1:750
(m)	traffic control plan	1:1,000
(n)	traffic management plans	1:1,000
(o)	drainage plan	1:1,000
(p)	structure plan	stated in section 6.17
(q)	protection and relocation of services plan	1:1,000
(r)	environmental plan	1:1,000
(s)	geotechnical plan	stated in section 6.21 & model of drawings
(t)	road lighting plan	1:1,000

5.2 Land Acquisition plans will not form part of the Tender Drawings but have to be prepared for the purposes of Land Acquisition. The scale will be as that required by the Land Office, usually 1 inch to 4 chains or 8 chains. The details are given in JKR publication– "GARIS PANDUAN UNTUK PENYEDIAAN PELAN PENGAMBILAN BALIK TANAH BAGI PROJEK JALAN PERSEKUTUAN - ARAHAN TEKNIK (JALAN) 7/85 (PINDAAN 2014)". However, all matters relating to the acquisition of land must comply with the requirements set by the Land Office.

6. CONTENTS OF DRAWINGS

6.1 Cover or Title Page

The cover or title page shall follow Model Drawing No. 2A.

6.2 Drawing Index

This drawing lists all the titles and number of each drawing within the List of Contract Drawings. Please refer to Model Drawing No. 3A for guidance. A Drawing Numbering System has been drawn up and all drawings must follow this system. For all projects, whether designed departmentally or by Consultants, the project number must be obtained from the Documentation Unit. Please refer to Section 7 for full explanation of the system.

6.3 Key Plan

This drawing shall indicate:-

(a) project location with respect to other states in the country;

(b) state boundaries;

(c) name of states and main towns where the project is located;

(d) all the major Federal Routes;

(e) northing arrow;

(f) suitable scales - 1:2,000,000 to 1:3,000,000

The key plan can be combined with the location plan.

Please refer to Model Drawings No. 4A and 4B for guidance.

6.4 Location Plan

This drawing shows: -

(a) specific location of the project with respect to the surrounding areas, limit of project and kilometre post.

(b) the proposed alignment;

(c) other projects in the vicinity if any;

(d) local towns, villages, rivers, reservoirs, roads, railway tracks and other physical features, etc;

(e) route number;

(f) northing arrow;

(g) suitable scales - 1:250,000

Please refer to Model Drawings No. 4A and 4B for guidance.

6.5 Abbreviation, Symbol and Legend Plan

This drawing shall contain:-

(a) abbreviations, symbol and legends and their corresponding full words, details and representations.

The abbreviations, symbols and legends are standardised and shall not be changed.

Please refer to the Standard Drawings for guidance.

6.6 Elements of Curve Plan

This plan shall indicate the following:-

(a) typical horizontal curves' transitions; with or without transition;

(b) typical vertical curve - parabolic curve;

(c) clothoid formulae or other formulae used and their notations.

Please refer to the Standard Drawings for guidance.

6.7 Superelevation Details Plan

This plan shall contain the following:-

(a) superelevation for curves with or without transition;

(b) superelevation for the single carriageway and where applicable, dual carriageway too;

(c) typical shoulder treatment on superelevation.

Please refer to the Standard Drawings for guidance.

6.8 Typical Road Cross Section and Pavement Details Plan

This drawing shall indicate the following:-

(a) typical road cross section in embankment and cutting (for both flat and rolling terrain where applicable) showing width of carriageway, shoulders, camber, drainage features, etc;

(b) superelevated typical cross sections where applicable;

(c) typical cross sections for urban, rural carriageway with drainage details and access road, if applicable;

(d) typical cross section for ground treatment (where applicable)

(e) section details of pavement including details for the construction of new pavement over the existing pavement (where applicable);

(f) pavement design details such as design period, cumulative total equivalent standard axles, base year, and design subgrade CBR;

(g) concrete parameter details such as construction joints, contraction, reinforcement, etc.

6.8.1 Pavement Rehabilitation Detail

(a) Location of pavement rehabilitation method according to actual design

Please refer to Model Drawings No. 5A, 5B and 5C & the Standard Drawings for guidance.

6.9 Alignment Control Plan

This drawing is to indicate the bearings and distances of the various Intersection Points (I.P.'s) together with the details of the horizontal curves and I.P. points. The details shall include the following:-

(a) points of limit of project and horizontal alignment indicated by all the I.P. points;

(b) co-ordinates of all the I.P. points including the starting and finishing points, distances and bearing between all I.P. points in a table form;

(c) horizontal curve data for all I.P. points;

(d) location and chainages of all ST and TS points;

(e) location and chainages of all SC and CS points

(f) temporary bench marks with their levels;

(g) all relevant Survey Department's bench marks with their levels;

(h) all relevant references to boundary stone in setting out the first intersection point shall be indicated;

(i) northing arrow;

(j) suitable scales - 1:1,000 to 1:6,000.

More than one section of the horizontal alignment can be shown on the same plan using separator lines but the northing arrow shall be indicated for each section.

Please refer to Model Drawing No. 6A for guidance.

6.10 Plan and Longitudinal Profile Plan

6.10.1 Plan Profile

The details shall include the following:-

(a) horizontal alignment of centreline together with the limits of carriageway and shoulder;

(b) extent of R.O.W. to be acquired;

(c) running chainages (with 25 m interval or as required) along the centreline;

(d) extent of cut and fill areas and carriageway in distinct shades;

(e) location of any proposed culverts and its details (including catchments area and discharge figures) and any proposed stream deviation;

(f) location of all structures such as bridges and box culverts and their levels;

(g) locations of boreholes, temporary bench marks, bench marks and their levels;

(h) physical features such as existing roads, paths, tracks, public utilities etc. and contour lines;

(i) vegetation of the area passed through, such as rubber estate, paddy fields, swamps, etc.;

(j) existing buildings, property lines and types of buildings;

(k) match lines;

(l) existing stream, rivers (with names), culverts, sumps, side drains etc., their flow directions and levels;

(m) lot numbers and boundaries the proposed alignment passes through;

(n) northing arrow;

(o) scale - 1:1,000.

6.10.2 Longitudinal Profile

The presentation shall be on graphical format and shall include the following details:

(a) running chainages as per the horizontal alignment;

(b) existing ground and proposed finished levels;

(c) profile of existing ground and the proposed vertical alignment with the gradients;

(d) details of vertical intersection points, including the chainage and data on the vertical curve. Locations of the BVC and EVC are to be indicated too;

(e) locations of all proposed culverts, side drains and structures;

(f) details of the superelevation and the horizontal alignment along a linear scale is to be provided;

(g) scale - 1:100 or 1:200

Please refer to Model Drawing No. 7A for guidance.

6.11 Cross Section Plan

This plan shall show the cross sections of the proposed road at 25 m interval or as required along the horizontal alignment. The details shall include:-

(a) the existing ground's sectional profile;

(b) the proposed finished cross section indicating the extent and shape of cut and fill required;

(c) the proposed finished road level at the centreline;

(d) the proposed offsets and level

(e) the crossfall or superelevation of the carriageway (optional);

(f) any other details deemed useful for clarity;

(g) suitable scales - 1:100 or 1:200 (recommended).

Please refer to Model Drawing No. 8A for guidance.

6.12 Junction Details Plan

6.12.1 Junction details shall include the following:

(a) general layout plan showing details of carriageway widths, islands, limit of R.O.W., property lots, dwellings and its type, limit of project on minor roads, etc. The shoulder shall be shaded for better visual impact.

(b) setting out plan with sufficient details so as to enable the setting out of the junction;

(c) drainage and kerb details of the junction showing proposed type and position of drains and kerbs, culverts, etc. Proposed superelevations of various pavement and longitudinal sections can also be indicated;

(d) road marking and traffic sign plan showing the type and positions of the proposed road markings, traffic signs and signals (if applicable).

(e) suitable scales - 1:250 or 1:500.

Please refer to Model Drawings No. 9A, 9B and 9C for guidance.

6.12.2 Traffic signal details shall include the location of the traffic signal posts, the type of lantern and the proposed cycle times.

Schematic plans showing the various phases shall also be included.

6.13 Road Marking Plan

The plan shall show all details of the proposed lanes and pavement markings for the centerline, edge line, continuity line, chevron, give way marking, stop line, pavement direction arrows, etc.

All dimensions and details shall follow those given in JKR publication "MANUAL ON TRAFFIC CONTROL DEVICES – ROAD MARKINGS : ARAHAN TEKNIK(JALAN) 2D/85".

Please refer to Model Drawing No. 10A for guidance.

6.14 Traffic, Guide and Temporary Sign Plan

Adequate traffic guide and temporary signs shall be proposed and shall follow those approved for use by the Department.

The details are given in JKR publication "MANUAL ON TRAFFIC CONTROL DEVICES AND STANDARD TRAFFIC SIGNS - ARAHAN TEKNIK (JALAN) 2A/85 AND 2B/85", "MANUAL ON TRAFFIC CONTROL DEVICES - TEMPORARY SIGNS AND WORK ZONES CONTROL - ARAHAN TEKNIK (JALAN) 2C/85" and "GUIDE SIGNS DESIGN AND APPLICATION - ARAHAN TEKNIK (JALAN) 2E/87".

Please refer to Model Drawings No. 10A & Standard Drawings for guidance.

6.15 Drainage Plan

The drainage plans shall be sufficient enough to depict all details pertaining to drainage matters and shall include the following :

(a) details of interceptor drain, bench drain, roadside drain, shoulder drain, berm drain, toe drain, outfall drain, subsoil drain, etc;

(b) details of precast concrete slab, kerb, kerb inlet, catch pit, sump, stream deviation, piling (if needed), etc;

(c) details of culverts (whether reinforced concrete pipe or box) with details of headwall and wingwalls, including inlet and outlet treatments.

(d) all proposed drains shall indicate directions of flow with their types, invert levels and gradients to final discharge points.

(e) a culvert schedule with the relevant particulars as per standard drawing.

Please refer to Model Drawing No. 11A for guidance.

6.16 Traffic Management Plan

Traffic Management Plan details shall include and indicate, but not limited to, the following:

(a) stage of construction in plan view

(b) lane width and number of lanes

(c) cross Section

(d) types of barriers used, with notes relating to appropriateness of installation and application of traffic barriers; e.g. interlocking and filled with water/sand for plastic NJB and concrete barriers used at excavation works more than 1m depth.

(e) speed at work zone area (speed limit and advisory)

(f) adequate and appropriate temporary sign plans. Please refer to item 6.14 for details.

(g) engineering notes which apply to the overall traffic management plan.

Please refer to Model Drawings No. 12A, 12B, 12C, and12D for guidance.

6.17 Structure Plans

This drawing shall normally be applied to bridge structures:-

6.17.1 Bridge Structural Plans

(a) The general arrangement and layout shall include the following:

i) Location plan indicating the specific location of the bridge project with the proposed alignment, local town, villages, rivers, roads, railway tracks and other physical and geographical features. This shall include the latitude and longitude bearings, coordinates, spot levels, contours, individual land lots and the northing arrow (scale 1:10,000).

ii) Plan showing horizontal alignment of the centreline complete with limits of carriageway, borehole locations, direction of flow, bench marks, physical features such as public utilities, slope protection, drainage behind abutment, etc. Pile layout can also be included here.

Longitudinal profile showing running chainage as per horizontal alignment, existing ground and the proposed levels, extent of cut and fill, lower soffit level (LSL), high water level (HWL), normal water level (NWL) and limits of work for bridge construction.

iii) Detailed cross section showing arrangement of beams and girders in typical section and other deck details.

iv) Notes, legends, etc., which shall include the design criteria, relevant codes used and other useful information.

(b) Soil Profile

This shall include the borehole details e.g. SPT values, at various depths till end of boring. Other laboratory test results such as plasticity index, plastic limit and liquid limit shall also be incorporated if available.

(c) Piles

This shall include pile details and joints. The numbers and types of piles for abutment and piers and their capacities and estimated lengths shall be tabulated. For bored piles, the length of permanent or temporary casing and the required embedded length in hard soil (SPT >50) or the required socketed length in rock shall also be tabulated. The minimum length of concrete overfill is to be shown on the drawing. The notes shall include the materials, type of piles, (e.g. frictional or end bearing), working loads, test loads and other relevant information.

(d) Abutment and Wingwall Details

These shall include typical cross section, elevation and skew angles if any, showing details for bearings, pile layout showing principal dimensions and descriptions of all structural components. The notes shall normally include the required concrete strength, cover, etc.

A separate drawing showing reinforcement details shall be prepared with proper legends and notes.

(e) Piers

Similar requirements as for abutments.

(f) Beams

These shall include sectional drawings at the end and midspan, longitudinal and plan details indicating all dimensions and cable profiles. The reinforcement and end block details may be on the same or different drawings.

The notes shall include, among others, the design criteria, stages and sequence of stressing, jacking forces, brief material specifications, etc.

(g) Precast Segment

These shall include sectional, longitudinal and plan details indicating all dimensions. The horizontal and vertical cable profiles and the reinforcements are to be shown on separate drawings.

Separate drawings also to be provided showing the sequence of construction. These shall clearly indicate the sequence of activities at every stage of construction.

The notes shall include precamber monitoring and the design loads during construction (e.g. weight of form traveler, formwork, temporary works, construction live loads etc.).

(h) Diaphragms

These may be included in the drawings for beams, or drawings for abutments for integral bridges, or together with details of deck slab.

(i) Deck Slabs

These shall include plan and sectional details and reinforcement detail complete with relevant notes.

(j) Bearings

These shall include plan and sectional details showing the bedding and all dimensions and crossfalls, if any. The material properties (e.g. compressive and shear stiffness) and design capacity (e.g. vertical, transverse and longitudinal load, movements, rotation, etc.) is to be tabulated. Installation requirements and other relevant notes to be provided when necessary.

(k) Handrails/Parapet and Expansion Joints

These shall include plan, elevation and sectional details complete with relevant notes on material properties and installation requirements.

(l) Other Miscellaneous Details

Similar requirement as for item of New Jersey Barrier (NJB), guardrail, brass plaque, culvert marker and other miscellaneous details.

6.17.2 Culvert (3.0m and above)

The culvert (3.0m and above) plan shall be sufficient to depict all details pertaining to drain matters and shall include the following :-

(a) general arrangement and layout shall follow as per bridge structure plan;

(b) details of bedding or concrete slab, inlet & outlet structure, sump, stream deviation, piling (if needed), etc;

(c) all proposed culverts (3.0m and above) shall indicate direction of flow with the invert levels and gradients;

(d) details of culverts (3.0m and above) with details of headwall and wingwalls, including inlet and outlet structure.

6.17.3 Temporary Diversion/Crossing

(a) Temporary Diversion

The drawings for temporary road diversion shall be shown on the general arrangement drawing, showing the proposed location of the temporary diversion, the width of the temporary road diversion and also the width and span of the temporary bridge.

(b) Temporary Crossing

A separate drawing for temporary crossing shall be prepared for the details of the proposed temporary crossing, i.e. steel bridge, culvert, etc. showing all the relevant details for the proposed construction of the temporary crossing.

(c) Typical Temporary Traffic Control Devices & Signs

This drawing shall show the location of temporary road signages, barricades, temporary lightings, delineators, etc. in accordance with Arahan Teknik (Jalan) 2C/85 – "Manual on Traffic Control Devices – Temporary Signs and Work Zones Control."

6.17.4 Bridge Construction Method / Construction Sequence

The construction sequence used in the design shall be shown on the design drawings when the construction method and sequencing is incorporated into all its design processes.

6.17.5 Sequence and Scales for Bridge Structures

The following illustrates the sequence of drawings and scales that are to be used for a typical bridge structure:

	Drawing Title	Scale
(a)	general layout	1:100, 1:150, 1:200, 1:300
(b)	soil profile	suitable scale
(c)	pile details	1:5, 1:10, 1:20, 1:50
(d)	abutment - concrete details abutment - reinforcement details	1:20, 1:25, 1:30, 1:40, 1:50
(e)	pier - concrete details pier - reinforcement details	1:20, 1:25, 1:30, 1:40, 1:50
(f)	beams and diaphragms	1:5, 1:10, 1:20, 1:25, 1:30, 1:40
(g)	deck slab details	1:20, 1:25, 1:50, 1:100
(h)	handrails/parapet and expansion joints	1:5, 1:20

6.17.6 Requirement for Dimension

A typical requirement for dimension is shown below:

(a) all dimensions shall be expressed in metres or millimetres.

(b) units abbreviation shall be 'm' for metre and 'mm' for millimetres. Abbreviation shall always be given in description notes but not for normal dimensioning.

(c) normal dimensions of more than one metre shall be to three decimal places but with the point omitted.

(d) descriptive dimensions of more than one metre shall be written to three decimal places and unit abbreviation 'm' included. Thus, for normal water, level is written as such :- NWL 37.128m.

(e) dimensions expressed in millimetre shall be in whole numbers.

(f) dimension shall be written to be read from the bottom or right handside of the drawing.

Please refer to Model Drawings No. 13A, 13B and 13C for guidance.

6.18 Protection and Relocation of Services Plan

This plans shall show detail for the relocation of :-

(a) water mains;

(b) electrical posts and cables;

(c) telecommunication posts and cables;

(d) gas pipes

(e) sewerage lines

(f) others

The drawings shall show sufficient details to properly define the scope of works. They shall show the locations, sizes, types and quantities of the existing services and their proposed relocations. All design of protection and relocation of services shall be approved by the relevant authorities.

Please refer to Model Drawing No. 14A for guidance.

6.19 Electrical Plan

The numbering system for Electrical Plan shall be as follows:

(a) if electrical work is packaged into the main contract, the numbering system for Electrical Plan shall follow that of the main contract.

(b) if electrical work is separately tendered (NSC),- the Key and Site/Location Plan drawings shall remain. Numbering system for Electrical Plan shall be referred to *Cawangan Kejuruteraan Elektrik, JKR Malaysia*.

The Electrical Plan shall consist of the following items :-

	Items	References
i)	cover or title page	Model Drawing No. 15A
ii)	list of electrical plan	Model Drawing No. 15B
iii)	strip map showing significant landmarks (i.e: river, bridge, substation, etc) complete with limit of works and showing scope of electrical works	Model Drawing No. 15C
iv)	design criteria that indicates : - class of road, list of standards referred to in designing, type of light source, type of column, lighting class & parameters	Model Drawing No. 15D
v)	proposed block diagram of electrical distribution system. The block diagram shall have the endorsement from local utility supplier (TNB, SESB, SESCO, etc)	Model Drawing No. 15E
vi)	the dimensioned general arrangements, layout and positions of columns and luminaires, feeder pillars, cable routes (including crossing, circuit numbers and legend) and all others necessary for the complete road lighting installation	Model Drawings No. 15F and 15G
vii)	the schematic drawings of feeder pillar	Model Drawing No. 15H
viii)	typical cross-section of the road indicating road lighting's placement	Model Drawing No. 15I
ix)	corbel and pit details at bridge parapet (if required)	Model Drawing No. 15J
x)	the layout and location of traffic light poles, traffic light controllers, cable routes (including crossing & pits), phasing, arrangement of traffic light aspects and all others necessary for the complete traffic light installation.	Model Drawing No. 15K

	Traffic light system design based on timing and phasing assessment from *Bahagian Penilaian Kesan Trafik,Cawangan Jalan, JKR Malaysia*.	
xi)	the schematic drawings of traffic light controller	Model Drawing No. 15L

6.20 Environmental Protection Works Plan

Adequate and appropriate mitigation measures shall be proposed for the Environmental Protection Works.

The requirement for adherence to environmental protection work procedures shall be done accordingly as specified, in reference to the ARAHAN TEKNIK JALAN 16/03 (*Pindaan* 2015) - "A PRACTICAL GUIDE FOR ENVIRONMENTAL PROTECTION & ENHANCEMENT WORKS", such as :

(a) containment bund for skid tank.

(b) silt trap.

(c) wash trough for construction site at urban area.

(d) wash trough for construction site at rural area.

(e) silt fence.

(f) check dam.

(g) schedule waste storage shed.

(h) disposal of suitable cut material

(i) silt curtain

(j) unsuitable material disposal embankment.

All the drawings listed can be redesigned if necessary, depending on the needs of the site condition. The new design shall be sufficient and comply with current engineering requirements. The drawings shall show all the details including the locations for the proposed measures to be taken.

Please refer to Model Drawings No. 16A for guidance.

6.21 Geotechnical Plan

All drawings, tables, depth, length, height, spacing, duration, notes and other notations shown are as guidelines only. It is subjected to the changes made by the designer on the current design which will be shown in the detail drawings. The geotechnical drawings shall include the following :

6.21.1 Ground Treatment Schedule

The proposed geotechnical treatment shall be summarized in table form indicating location , type and details of ground treatment.

Please refer to Model Drawing No. 17A for guidance.

6.21.2 Location of Soil Profile on Plan and Longitudinal Profile

(a) The proposed location of soil investigation (i.e. Bore Holes, Mackintosh Probe, Piezocone, Hand Auger) shall indicate in coordinate location (X, Y), soil investigation legend in drawing scale of 1:1000.

(b) The chainage, reduced level and sub-surface profiles based on the S.I. report shall be indicated clearly in the longitudinal profile.

(c) Any confirmatory soil investigation (if required) for verification of soil condition to be carried out during construction shall be specified clearly in the drawing. (e.g., BH 1A)

(d) S.I legend and SPT guide for consistency, cohesive and non-cohesive soils shall be shown in the drawing.

(e) Location of proposed geotechnical works along the road alignment shall be indicated in the drawings. Chainages shall be clearly shown along the road alignment.

(f) Different types of treatment shall be clearly shown in the drawings.

(g) JKR Probe or Mackintosh Probe recorded shall be shown in graph format, i.e. number of blows against depth.

(h) JKR Probe or Mackintosh Probe shall be indicated as JP and MP respectively in the drawings.

Please refer to Model Drawing No. 17B for guidance.

6.21.3 Typical Details of Ground Treatment

(a) All ground treatment, indicating chainage, embankment height, and maximum depth of excavation, type of treatment, proposed treatments and remarks shall be shown in table form.

(b) Use number to categorize the type of soil treatment (e.g., Treatment Type 1), and letters for details (i.e., Detail A).

(c) Slope of embankment shall be 1 : 2 and not exceeding 6 berms and extent of treatment shall be clearly shown in the drawings.

(d) Benching details must be shown for road widening works.

(e) Non-woven separator and high strength geotextiles should be clearly shown in the drawings.

(f) The distance between the layers and its wrapping must be specified in the drawing.

(g) Drainage sand blanket shall be 500mm thick with sand and extent of treatment shall be clearly shown in the drawings.

(h) PVD specified shall indicate clearly the spacing, length and its pattern group.

(i) The completed PVD shall be cut off nearly 300mm above the working platforms or as otherwise specified in the Contract Drawings.

(j) Pile embankment treatment shall indicate pile spacing, working load, pile length, the length and width of pile embankment.

(k) Slab with concrete Grade 40 or higher for project site near the coastal areas and exposed to sea tides or sulphate attack.

(l) Transition slab interfacing between pile embankment and the road shall be within the allowable differential settlement and shown clearly in the drawing.

Please refer to Model Drawing No. 17C for guidance.

6.21.4 Instrumentation

Details of instrumentation, if any, shall include types of instruments, tentative location of instruments to be used, their duration and frequency.

Please refer to Model Drawing No. 17D for guidance.

7. DRAWING NUMBERING SYSTEM

7.1 The system used is as follows:-

KPKR/J/R/ __ __ __ __ __ __ / __ __ / __ __ __
1 2 3 4 5 6 7 8 9 10 11

(a) i) KPKR stands for Ketua Pengarah Kerja Raya;

ii) J stands for Jalan;

iii) R stands for Rekabentuk.

(b) The first six spaces is to be filled by six digits.

i) The first two digits (1st and 2nd spaces) indicate the State Code which shall be the same as those used by the JKR Headquarters Computer Centre. They are as follows:-

01 Johor

02 Kedah

03 Kelantan

04 Melaka

05 Negeri Sembilan

06 Pahang

07 Perak

08 Perlis

09 Pulau Pinang

10 Sabah

11 Sarawak

12 Selangor

13 Terengganu

14 Wilayah Persekutuan Kuala Lumpur

15 Wilayah Persekutuan Putrajaya

16 Wilayah Persekutuan Labuan

ii) The second two digits (3rd and 4th spaces) indicate the year the project was approved for design.

iii) The third two digits (5th and 6th spaces) indicate the series of the projects.

(c) The seventh space is to be filled up by a numeral which represents section component of a project. To standardise, numeral in the form of 1, 2, 3, etc. is used. Each numeral will represent a section of the project or component in a package deal project. This space will be 0 (zero) if there is no component within the project.

(d) The eigth space is to be filled up by capital alphabets A, B, C, D, etc. referring to components within the project package, if there are any.

(e) The ninth space is to be filled up by two capital alphabets representing each category of details as follows:

i)	AM	*umum*; represents general, which includes list of drawings, key and location plan, general layout, abbreviation, symbol and legend, element of curve, superelevation, guardrail, site office, all typical drawings, etc.
ii)	KB	*keratan membujur*; represents alignment control, plan and longitudinal profile plan.
iii)	KL	*keratan melintang*; represents cross section plan.
iv)	LP	*lukisan persimpangan*; represents junction layout plan, junction setting out plan, junction drainage and pavement superelevation details plan, junction road markings, traffic signs, traffic light, etc.
v)	KT	*kawalan trafik*; represents traffic control plans including road markings, traffic signs, guide signs, temporary signs, etc.
vi)	PP	*pelan perparitan*; represents drainage plans including subsoil drain, drains, culverts, etc.
vii)	ST	*struktur*; represents structural plans including bridges, flyovers, grade-separated interchange, retaining walls, etc.
viii)	PU	*pelan utiliti*; represents public utilities and relocation of service plans.

ix)	AS	*alam sekitar*; represents environmental protection works plans.
x)	PG	*pelan geoteknik*; represents geotechnical plans, soil investigation, subsoil profile, etc.
xi)	PE	*pelan elektrik*; represents electrical plans, road lighting, traffic light, etc.
xii)	PT	*pelan tanah*; represents land acquisition plans.

(f) The tenth space is for the series of drawings for the particular detail as described in 7.1 (e). This space will be changed accordingly if there are more than one number of intersection or structures in a project. For example, ST 1/1, ST 1 stands for structure No.1 and /1 for the series of drawings for structure No.1. For the first time of correction, it will be ST1/1A.

(g) The eleventh space with capital alphabets in sequence shall be used for the amendments of drawings; for example, 10C for third time of correction of the same drawing.

7.2 The system shall be used for all projects including all departmental and consultant designs. The recording of serial numbers of projects will be registered by the Cawangan Kontrak Ukur dan Bahan, Ibu Pejabat JKR, Kuala Lumpur.

Model Drawing No.1A

TITLE BLOCK FORMAT FOR STANDARD DRAWING

NOTA:

NAMA CAWANGAN (HODT) YANG BERKAITAN DENGAN SKOP KERJA BERIKUT:

1. CAWANGAN JALAN
2. CAWANGAN KEJURUTERAAN GEOTEKNIK
3. CAWANGAN KEJURUTERAAN ELEKTRIK
4. CAWANGAN ALAM SEKITAR & TENAGA

Tarikh	Butiran	Rujukan
PINDAAN		

UKURAN

CAWANGAN JALAN

DIREKABENTUK OLEH :

DILUKIS OLEH : DISEMAK OLEH :

DILULUSKAN OLEH :

(NAMA PENUH & TANDATANGAN)
PENGARAH

(NAMA PENUH & TANDATANGAN)
KETUA PENOLONG PENGARAH KANAN

JABATAN KERJA RAYA MALAYSIA

TAJUK LUKISAN

TARIKH:

BIL. LUKISAN : KPKR/J/R/STD AM

BIL. HELAIAN :

SAYA DENGAN INI TELAH MENYEMAK DAN MENGESAHKAN BAHAWA LUKISAN PIAWAI INI BOLEH DIGUNAPAKAI KE ATAS PROJEK BERKENAAN

TANDATANGAN :

NAMA :

JAWATAN :

Model Drawing No.1B

TITLE BLOCK FORMAT FOR DESIGN & BUILD

1) Bilangan lukisan perlu didapati daripada pihak HOPT Cawangan Jalan.

2) Susunatur lukisan perlu merujuk kepada Standard Drawings For Road Construction dan contoh List of Drawings yang disertakan.

NOTA :

Hendaklah ditandatangan oleh Pengarah Syarikat Perunding yang bertauliah dalam bidang berkaitan.

NOTA :

KEMENTERIAN KERJA RAYA/
LAIN- LAIN KEMENTERIAN/JABATAN

P.E STAMP & SIGNATURE

I ..... PROFESSIONAL ENGINEER (REG. NO. .....) HEREBY CONFIRM THAT THE DESIGNS SHOWN IN THIS CALCULATIONS/DRAWINGS/SPECIFICATIONS WAS DESIGNED BY ME OR UNDER MY DIRECTION AND SUPERVISION AND TO THE BEST OF MY KNOWLEDGE, COMPLY WITH THE RELEVANT ENGINEERING STANDARDS AND CODES OF PRACTICE, AND LOCAL AUTHORITIES BY LAW AND REGULATIONS.

NAMA
PELANGGAN

TARIKH	BUTIRAN	RUJUKAN
PINDAAN		

UKURAN

KONTRAKTOR:NAMA & ALAMAT

JURUUKUR
NAMA & ALAMAT

PERUNDING
NAMA & ALAMAT

DIREKABENTUK: NAMA	DILUKIS: NAMA
DISEMAK: NAMA	DILULUSKAN: NAMA

JURUAUDIT / INDEPENDENT CHECKER
NAMA
JURUAUDIT KESELAMATAN JALAN

NAMA
INDEPENDENT CHECKER (STRUKTUR)

NAMA
INDEPENDENT CHECKER (GEOTEKNIK)

CAWANGAN JALAN

NAMA
PENGARAH KANAN

NAMA
PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN

NAMA
KETUA PENOLONG PENGARAH KANAN (HODT)

NAMA
KETUA PENOLONG PENGARAH KANAN (HOPT)

JABATAN KERJA RAYA MALAYSIA

TAJUK PROJEK :
TAJUK LUKISAN :

KEMENTERIAN KERJA RAYA MALAYSIA

TARIKH:	BIL. LUKISAN: KPKR/J/R/_____	BIL. HELAIAN

Model Drawing No.1C

TITLE BLOCK FORMAT FOR IN-HOUSE DESIGN

1) Bilangan lukisan perlu didapati daripada pihak HOPT Cawangan Jalan.

2) Susunatur lukisan perlu merujuk kepada Standard Drawings For Road Construction dan contoh List of Drawings yang disertakan.

NOTA :

KEMENTERIAN KERJA RAYA/
LAIN- LAIN KEMENTERIAN/JABATAN

NOTA:

NAMA CAWANGAN (HODT) YANG BERKAITAN DENGAN SKOP KERJA BERIKUT:

1. CAWANGAN JALAN
2. CAWANGAN KEJURUTERAAN GEOTEKNIK
3. CAWANGAN KEJURUTERAAN ELEKTRIK
4. CAWANGAN ALAM SEKITAR & TENAGA

NAMA PELANGGAN

TARIKH	BUTIRAN	RUJUKAN		JURUKUR NAMA & ALAMAT	CAWANGAN JALAN			JABATAN KERJA RAYA MALAYSIA	
					NAMA PENGARAH KANAN			TAJUK PROJEK : TAJUK LUKISAN :	KEMENTERIAN KERJA RAYA MALAYSIA
PINDAAN			UKURAN		NAMA PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN				
					JURUAUDIT	NAMA KETUA PENOLONG PENGARAH KANAN (HODT)	NAMA KETUA PENOLONG PENGARAH KANAN (HOPT)		
					BAHAGIAN AUDIT KESELAMATAN JALAN / JURUAUDIT KESELAMATAN JALAN	DIREKABENTUK: NAMA	DILUKIS: NAMA	TARIKH:	BIL. LUKISAN: KPKR/J/R/_____
						DISEMAK: NAMA	DILULUSKAN: NAMA		BIL. HELAIAN

Model Drawing No.1D

TITLE BLOCK FORMAT CONSULTANT DESIGN

1) Bilangan lukisan perlu didapati daripada pihak HOPT Cawangan Jalan.

2) Susunatur lukisan perlu merujuk kepada Standard Drawings For Road Construction dan contoh List of Drawings yang disertakan.

NOTA :

Hendaklah ditandatangan oleh Pengarah Syarikat Perunding yang bertauliah dalam bidang berkaitan.

NOTA:

NAMA CAWANGAN (HODT) YANG BERKAITAN DENGAN SKOP KERJA BERIKUT:

1. CAWANGAN JALAN
2. CAWANGAN KEJURUTERAAN GEOTEKNIK
3. CAWANGAN KEJURUTERAAN ELEKTRIK
4. CAWANGAN ALAM SEKITAR & TENAGA

P.E STAMP & SIGNATURE

I ..... PROFESSIONAL ENGINEER (REG. NO. .....) HEREBY CONFIRM THAT THE DESIGNS SHOWN IN THIS CALCULATIONS/DRAWINGS/SPECIFICATIONS WAS DESIGNED BY ME OR UNDER MY DIRECTION AND SUPERVISION AND TO THE BEST OF MY KNOWLEDGE, COMPLY WITH THE RELEVANT ENGINEERING STANDARDS AND CODES OF PRACTICE, AND LOCAL AUTHORITIES BY LAW AND REGULATIONS.

TARIKH	BUTIRAN	RUJUKAN
PINDAAN		

UKURAN

JURUKUR
NAMA & ALAMAT

PERUNDING
NAMA & ALAMAT

DIREKABENTUK: NAMA	DILUKIS: NAMA	JURUAUDIT
DISEMAK: NAMA	DILULUSKAN: NAMA	NAMA JURUAUDIT KESELAMATAN JALAN

NAMA CAWANGAN

NAMA
PENGARAH

NAMA
KETUA PENOLONG PENGARAH KANAN (HODT)

CAWANGAN JALAN

NAMA
PENGARAH KANAN

NAMA
KETUA PENOLONG PENGARAH KANAN (HOPT)

JABATAN KERJA RAYA MALAYSIA

TAJUK PROJEK :
TAJUK LUKISAN :

KEMENTERIAN KERJA RAYA MALAYSIA

TARIKH:	BIL. LUKISAN: KPKR/J/R/_____	BIL. HELAIAN

Model Drawing No.2A

KERAJAAN MALAYSIA

Nama Jabatan

Logo Jabatan

PEMBAIKAN DAN PENEMPATAN SEMULA
JALAN MELAKA - KENDONG
KILOMETER 7.25 KE KILOMETER 9.50
MELAKA

Tajuk Projek

JILID III } Jilid / Seksyen

OGOS 2012 } Tarikh Tender Projek

KETUA PENGARAH KERJA RAYA
IBU PEJABAT JABATAN KERJA RAYA MALAYSIA
JALAN SULTAN SALHUDDIN
50582 KUALA LUMPUR

Alamat Ketua Pengarah Kerja Raya

AWAM
NAMA PENUH & TANDATANGAN
333

LOGO, NAMA, ALAMAT & NO. TELEFON PERUNDING
ATAU
NAMA & ALAMAT LEAD HODT (IN-HOUSE DESIGN)

Model Drawing No.3A

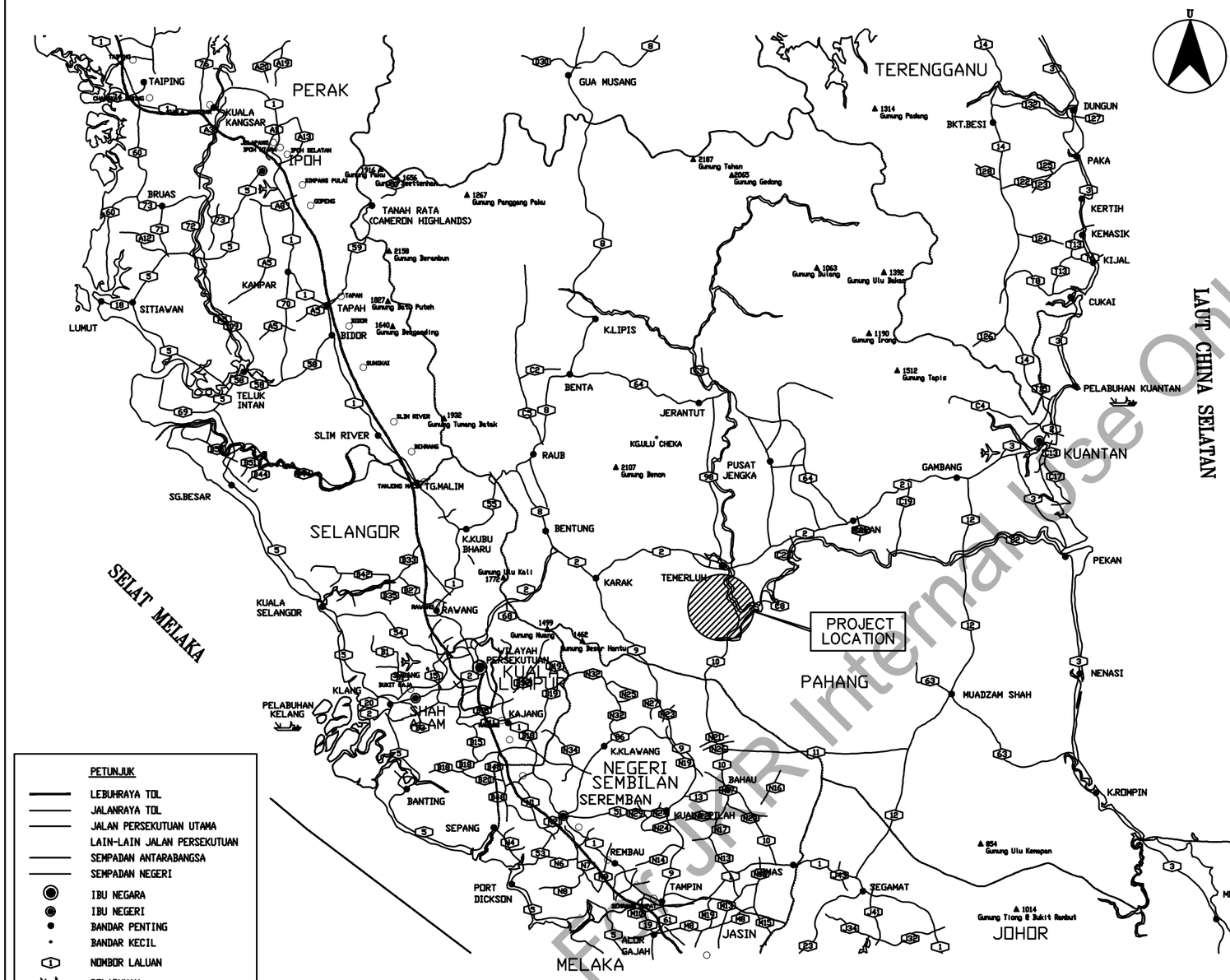
DRAWING NO. KPKR/J/R/ ☐☐☐☐☐☐ / ☐☐ / ☐☐☐		TITLE	SHEET NO.
		GENERAL	
		COVER PAGE	1
AM	1	DRAWING INDEX	2
AM	2	LOCATION AND KEY PLAN	3
AM	3	ABBREVIATION SYMBOL AND LEGEND	4
AM	4	ELEMENTS OF CURVE	5
AM	5	SUPERELEVATION DETAILS	6
AM	6	TYPICAL ROAD CROSS SECTION	7
AM	7	PAVEMENT DETAILS	8
AM	8	SITE OFFICE	9
		ALIGNMENT CONTROL PLAN AND LONGITUDINAL PROFILE	
KB	1	ALIGNMENT CONTROL PLAN FROM CH. 0.000m TO CH. 1005.84m	10
KB	2	ALIGNMENT CONTROL PLAN FROM CH. 1005.84m TO CH. 7483.39m	11
KB	3	PLAN AND LONGITUDINAL SECTION FROM CH. 0.00m TO CH. 600.00m	12
KB	4	PLAN AND LONGITUDINAL SECTION FROM CH. 600.00m TO CH. 1200.00m	13
KB	5	PLAN AND PROFILE FROM CH. 0.00m TO CH. 600.00m	14
KB	6	PLAN AND PROFILE FROM CH. 600.00m TO CH. 1200.00m	15
		CROSS SECTION	
KL	1	CROSS SECTION FROM CH. 0.00m TO CH. 500.00m	16
KL	2	CROSS SECTION FROM CH. 500.00m TO CH. 1200.00m	17
		JUNCTION LAYOUT	
LP	1	JUNCTION DETAILS - GENERAL LAYOUT	18
LP	2	JUNCTION DETAILS - SETTING OUT	19
LP	3	JUNCTION DETAILS - PAVEMENT	20
LP	4	JUNCTION DETAILS - SUPERELEVATION	21
		TRAFFIC CONTROL	
KT	1	ROAD MARKING, TRAFFIC SIGNS & PROPOSED TRAFFIC SIGNAL	22
KT	2	SIGN POST DETAILS	23
KT	3	TRAFFIC MANAGEMENT PLAN (STAGE 1)	24
KT	4	TRAFFIC MANAGEMENT PLAN (STAGE 2)	25
KT	5	TRAFFIC MANAGEMENT PLAN (STAGE 3)	26
		DRAINAGE	
PP	1	TYPICAL DRAINAGE DETAILS	27
PP	2	DRAINAGE CHANNEL DETAILS	28
PP	3	INLET PITS DETAILS	29
PP	4	DETAILS OF BLOCK DRAIN AND CULVERT	30
PP	5	HEADWALL AND CONCRETE PIPE DETAILS (1)	31
PP	6	CULVERT SCHEDULE AND BEDDING DETAILS	32
PP	7	DRAINAGE PLAN FROM CH. 0.00m TO CH. 600.00m	33
PP	8	DRAINAGE PLAN FROM CH. 600.000m TO CH. 1200.000m	34

DRAWING NO. KPKR/J/R/ ☐☐☐☐☐☐ / ☐☐ / ☐☐☐		TITLE	SHEET NO.
		STRUCTURE	
ST	1/1	BRIDGE NO. 1.0 - GENERAL ARRANGEMENT	35
ST	1/2	- BORED PILE	36
ST	1/3	- BEARING AND DOWEL BAR DETAILS	37
ST	2/1	BRIDGE NO. 2.0 - GENERAL ARRANGEMENT LAYOUT	38
ST	2/2	- BORED PILE	39
ST	2/3	- BEARING AND DOWEL BAR DETAILS	40
		PUBLIC UTILITIES	
PU	1	PROTECTION OF SERVICES PLAN	41
PU	2	RELOCATION OF SERVICES PLAN	42
		ELECTRICAL	
PE	1	STRIP MAP	43
PE	2	BLOCK DIAGRAM FOR ELECTRICAL DISTRIBUTION SYSTEM	44
PE	3	ROAD LIGHTING LAYOUT	45
PE	4	SCHEMATIC DIAGRAM FOR FEEDER PILLAR	46
PE	5	ROAD LIGHTING COLUMN DETAIL	47
PE	6	DETAIL OF CORBEL AND PIT	48
PE	7	TRAFFIC SIGNAL LIGHT LAYOUT	49
PE	8	SCHEMATIC DIAGRAM FOR TRAFFIC CONTROLLER	50
		ENVIRONMENTAL PROTECTION WORKS	
AS	1	ENVIRONMENTAL PROTECTION WORK PLAN FROM CH. 0.00m TO CH. 600.00m	51
AS	2	ENVIRONMENTAL PROTECTION WORK PLAN FROM CH. 600.00m TO CH. 1200.00m	52
		GEOTECHINICAL	
PG	1	GROUND TREATMENT SCHEDULE	53
PG	2	LOCATION OF SOIL PROFILE ON PLAN AND LONGITUDINAL PROFILE	54
PG	3	TYPICAL DETAILS OF GROUND TREATMENT	55

* TO REFER STANDARD DRAWING

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN			JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			UKURAN		PENGARAH KANAN				
					PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN				
					JURUAUDIT	KETUA PENOLONG PENGARAH KANAN			KEMENTERIAN KERJA RAYA
					JURUAUDIT KESELAMATAN JALAN	DIREKABENTUK:	DISEMAK:	KETUA PENOLONG PENGARAH KANAN (HOPT)	DRAWING INDEX
PINDAAN						DILUKIS:	DILULUSKAN:	TARIKH :	BIL. LUKISAN :

Model Drawing No. 4A



PETUNJUK

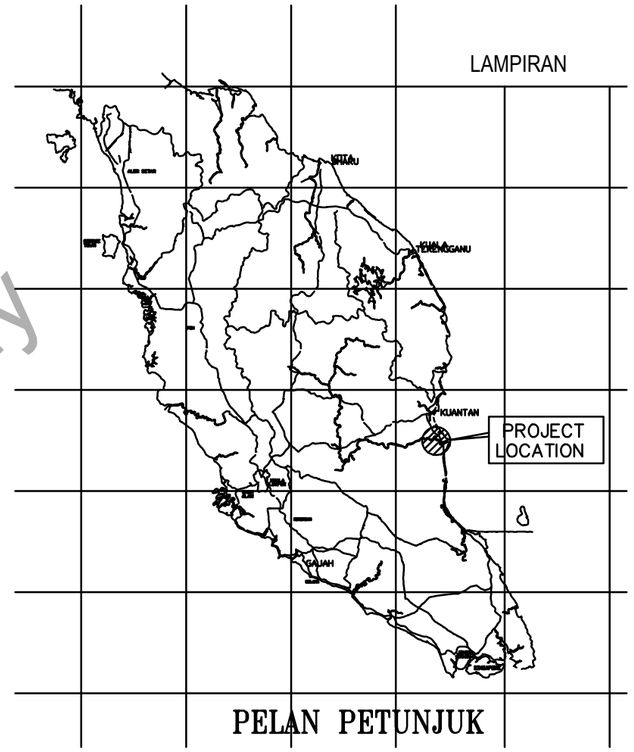
- LEBUHRAYA TOL
- JALANRAYA TOL
- JALAN PERSEKUTUAN UTAMA
- LAIN-LAIN JALAN PERSEKUTUAN
- SEMPADAN ANTARABANGSA
- SEMPADAN NEGERI
- IBU NEGARA
- IBU NEGERI
- BANDAR PENTING
- BANDAR KECIL
- NOMBOR LALUAN
- PELABUHAN
- LAPANGAN TERBANG
- TANDA TINGGI UKURAN METER

PELAN LOKASI

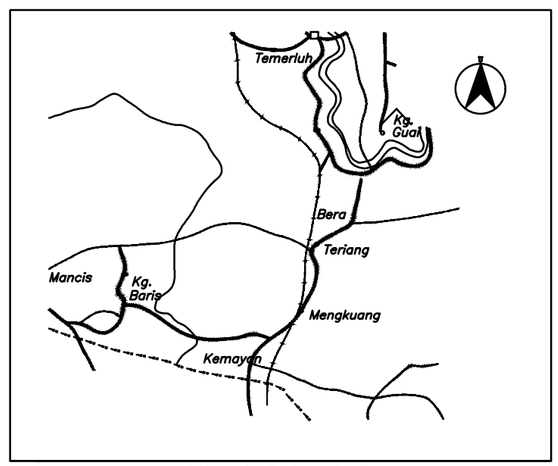
0 50 100Km

(SUMBER : PETA JALAN PERSEKUTUAN, SEMENANJUNG MALAYSIA, PENERBITAN J.K.R.)

LAMPIRAN



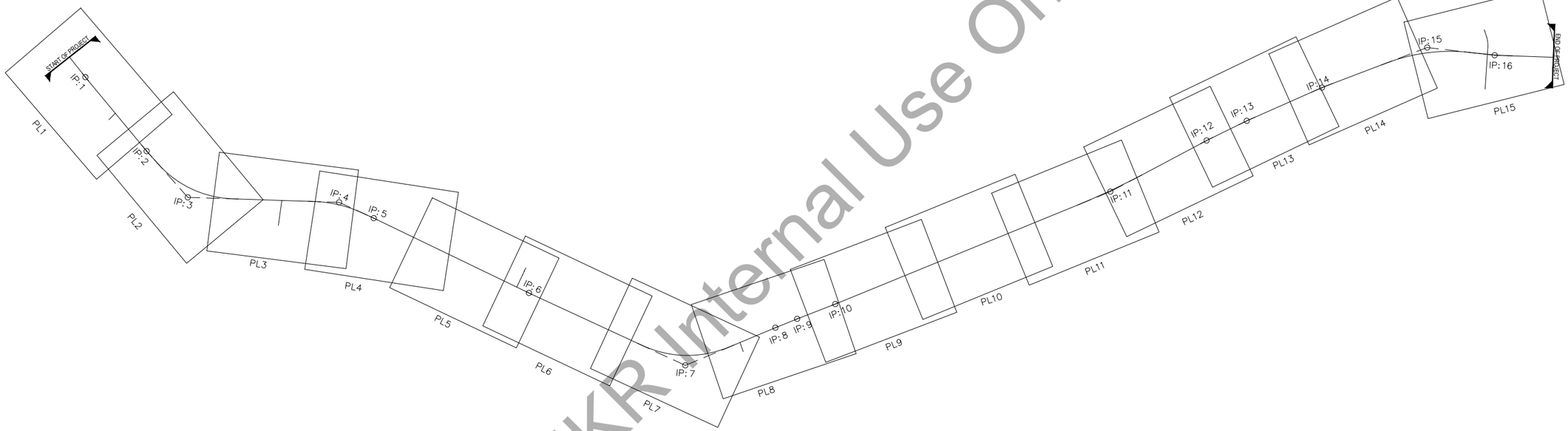
PELAN PETUNJUK



PELAN KUNCI

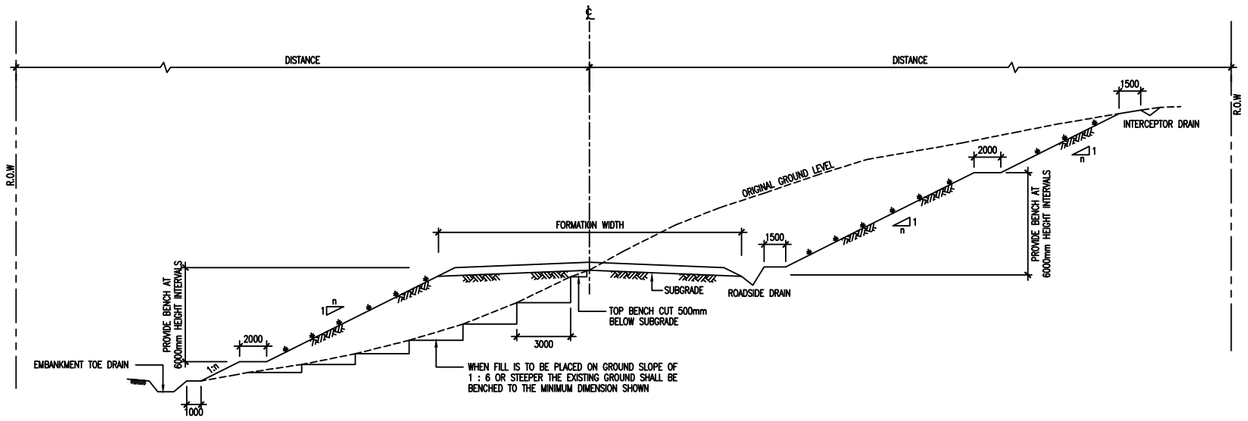
TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN			JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			N.T.S		PENGARAH KANAN				
					PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN				
					JURUAUDIT	KETUA PENOLONG PENGARAH KANAN (HODT)		KEY PLAN & LOCATION PLAN	KEMENTERIAN KERJA RAYA
			UKURAN		JURUAUDIT KESELAMATAN JALAN	DIREKABENTUK:	DISEMAK:	KETUA PENOLONG PENGARAH KANAN (HOPT)	
PINDAAN						DILUKIS:	DILULUSKAN:	TARIKH:	BIL. LUKISAN:

MODEL DRAWING 4B



TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN				JABATAN KERJA RAYA MALAYSIA	PELANGGAN
					PENGARAH KANAN					
					PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN			KETUA PENOLONG PENGARAH KANAN (HOPT)	DETAIL LOCATION PLAN	
PINDAAN			N.T.S UKURAN		JURUAUDIT UNIT KESELAMATAN JALAN JURUAUDIT KESELAMATAN JALAN No.Laporan Audit: CKJG/UKJ/000000000	KETUA PENOLONG PENGARAH KANAN (HODT) DIREKABENTUK:	DISEMAK:		TARIKH:	BIL. LUKISAN:
						DILUKIS:	DILULUSKAN:			

Model Drawing No. 5A
(Refer to Standard Drawing)



TYPICAL EARTHWORKS SECTION

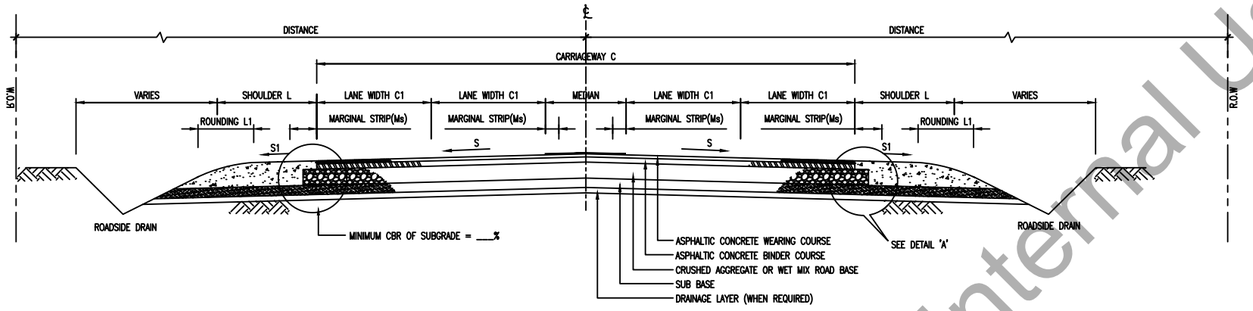
NOTES

1. ALL DRAIN TYPES AND LOCATIONS SHALL BE AS SHOWN ON THE PLAN AND LONGITUDINAL SECTION DRAWINGS OR AS DIRECTED BY THE S.O.
2. ALL UNITS ARE IN mm UNLESS SHOWN OTHERWISE.
3. CONCRETE SHALL BE GRADE 20/20 EXCEPT FOR CONCRETE BLINDING.
4. DETAILS OF CROSS-SECTION DIMENSION SHOULD FOLLOW ATJ 8/86
5. CUT SLOPE INCLINATION ANGLE SHOULD BE DESIGNED.
6. FILL EMBANKMENT DESIGN IS 1 : 2
7. IF THE GRADIENT OF THE FILL EMBANKMENT IS STEEPER, SLOPE INCLINATION ANGLE SHOULD BE DESIGNED.
8. ALL DETAILS OF THICKNESS OF PAVEMENT STRUCTURE SHALL BE DESIGNED ACCORDING TO ATJ 5/85 (PINDAAN 2013)

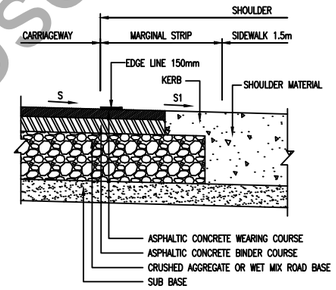
TABLE 1 : CROSS-SECTIONAL DIMENSIONS

ITEM \ STANDARD	R5	R4	R3	R2	R1	U5	U4	U3	U2	U1
C (m)	7.00	7.00	7.00	7.00	5.00	7.00	6.5	6.00	5.50	5.00
C1 (m)	3.5	3.25	3.00	2.75	2.50	3.50	3.25	3.00	2.75	2.50
L (m)	3.00	3.00	2.50	2.00	1.50	3.00	3.00	2.50	2.00	1.50
L1 (m)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
S (%)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
S1 (%)	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
q_{max} (ratio)	0.10	0.10	0.10	0.10	0.10	0.06	0.06	0.06	0.06	0.06
Ms (m)	0.50	0.25	0.25	0.00	0.00	0.50	0.25	0.25	0.00	0.00

ROAD DESIGN TO STANDARD _____



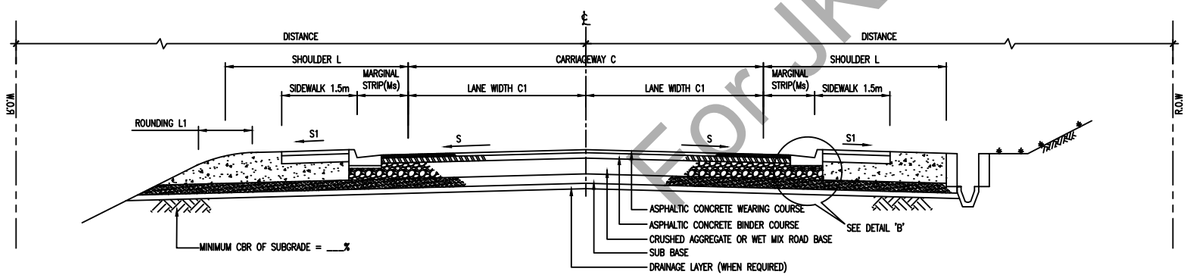
TYPICAL ROAD CROSS-SECTION FOR DUAL CARRIAGEWAY



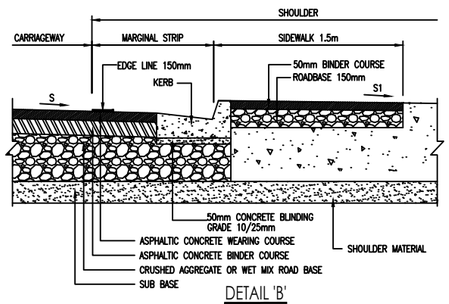
DETAIL `A'
TYPICAL PAVEMENT SECTION FOR MAIN ROAD

TABLE 2

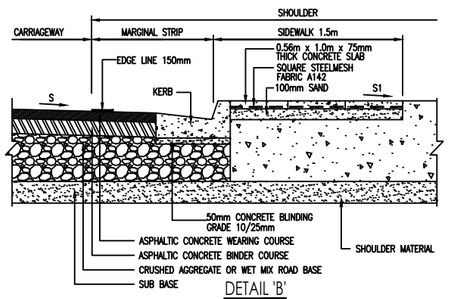
WEARING COURSE (mm)	
BINDER COURSE (mm)	
CRUSHED AGGREGATE ROAD BASE (mm)	
SUBBASE (mm)	
DESIGN PERIOD (year)	
CUMULATIVE TOTAL EQUIVALENT STANDARD AXLE (BASE YEAR_____)	
DESIGN SUBGRADE CBR (%)	
ROAD DESIGN STANDARD	



TYPICAL ROAD CROSS-SECTION FOR SINGLE CARRIAGEWAY



DETAIL 'B'
TYPICAL DETAILS OF PREMIX SIDEWALK



DETAIL 'B'
TYPICAL DETAILS OF CONCRETE SLAB SIDEWALK

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR
	LUKISAN INI TELAH DILUKIS SEMULA DARIPADA KPKR/J/R/STD/AM 116 STANDARD DRAWINGS FOR ROAD CONSTRUCTION 1989		N.T.S / UKURAN	
PINDAAN				

CAWANGAN JALAN

PENGARAH KANAN

PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN

JURUAUDIT	KETUA PENOLONG PENGARAH KANAN (HODT)		KETUA PENOLONG PENGARAH KANAN (HOPT)
JURUAUDIT KESELAMATAN JALAN	DIREKABENTUK:	DISEMAK:	
	DILUKIS:	DILULUSKAN:	

JABATAN KERJA RAYA MALAYSIA

PELANGGAN

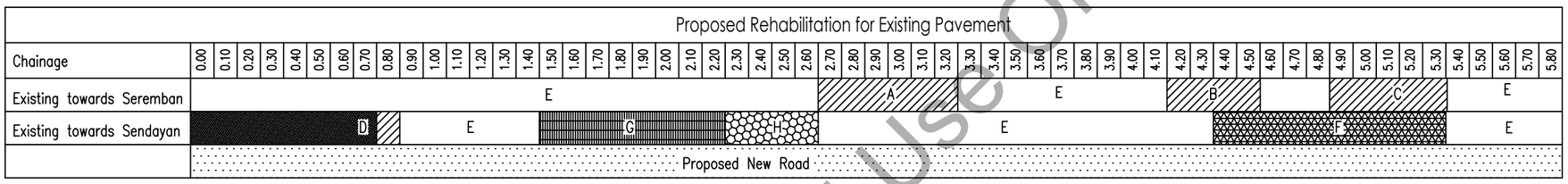
KEMENTERIAN KERJA RAYA

TYPICAL ROAD CROSS - SECTION

TARIKH:	BIL. LUKISAN:

Model Drawing No. 5B

NAMA PROJEK : ( )



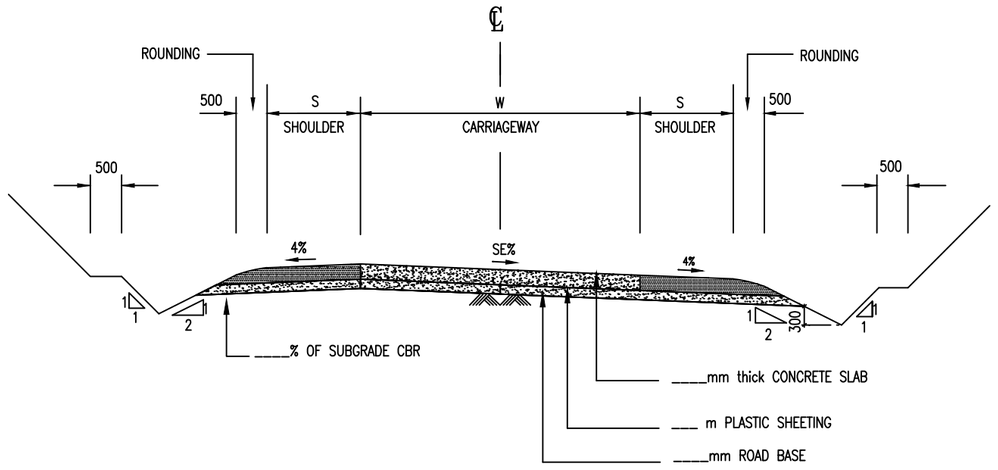
LEGEND:

A – Mill ___mm. Replace ___mm
B – Mill ___mm. Replace ___mm
C – Mill ___mm Replace ___mm
D – Reconstruction (Refer Drawing No _____)
E – Overlay ___mm
F – Crack Sealing
G – Cold in Place Recycling (CIPR)
H – Hot in Place Recycling (HIPR)

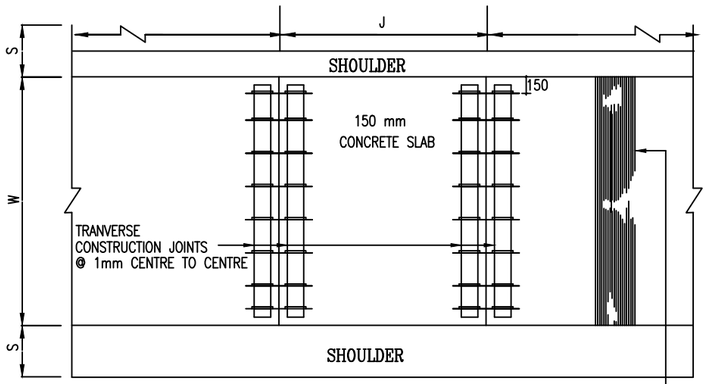
Mill and replace
Reconstruction
HIPR
CIPR
Crack sealing
Overlay

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN			JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			N.T.S		PENGARAH KANAN				KEMENTERIAN KERJA RAYA
			UKURAN		PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN		KETUA PENOLONG PENGARAH KANAN (HOPT)	PAVEMENT REHABILITATION DETAIL	
PINDAAN					JURUAUDIT / JURUAUDIT KESELAMATAN JALAN	KETUA PENOLONG PENGARAH KANAN (HODT) DIREKABENTUK: / DISEMAK: / DILUKIS: / DILULUSKAN:		TARIKH:	BIL. LUKISAN:

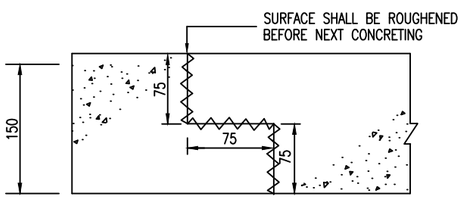
Model Drawing No. 5C
(Refer to Standard Drawing)



TYPICAL CROSS SECTION FOR CONCRETE ROAD



TYPICAL ROAD PLAN



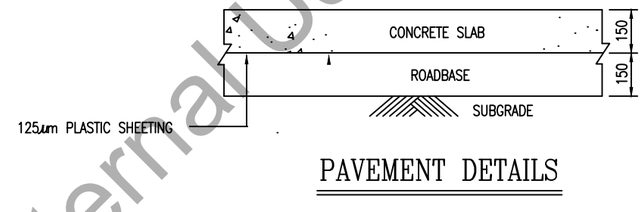
CONSTRUCTION JOINT

ROAD TYPE	mm		
	W	S	J
A	3000	1500	5000
B	4000	1500	5000
C	5000	2000	6000

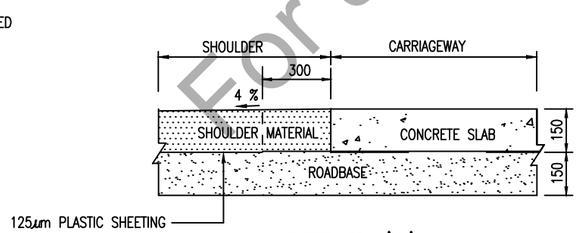
TABLE 1

W = CARRIAGEWAY WIDTH
S = SHOULDER WIDTH
J = CONTRACTION JOINT SPACING

FOR THIS PROJEK USE ROAD TYPE _ _ _ _ _ _



PAVEMENT DETAILS



DETAIL 'A'

SPECIFICATIONS

1. THE TYPE OF ROAD SHALL BE DETERMINED BY THE DESIGNER. (TABLE 1)
2. THE CONCRETE SHALL BE GRADE _ _ _ _WITH A WATER CEMENT RATIO NOT EXCEEDING 0.50 .
3. CEMENT SHALL BE ORDINARY PORTLAND CEMENT CONFORMING TO M.S 522.
4. COARSE AGGREGATES SHALL CONFORM TO M.S 29. MAXIMUN SIZE NOT EXCEED 40.00 mm .
5. SAND SHALL CONFORM WITH M .S 30 .
6. ADMIXTURE , IF USED , SHALL BE APPROVED BY THE S . O AND SHALL CONFORM TO M.S 922 .
7. WATER SHALL CONFORM TO M.S 28 .
8. STEEL SHALL CONFORM TO M.S 146 .
9. SEALANT FOR JOINT SHALL BE HOT – POURED TYPE CONFORMING TO B.S 2499 FOR TYPE A2 SEALANTS.
10. WATERPROOF MEMBRANE SHALL BE PLASTIC SHEETING 125 mm THICK .
11. DOWEL BARS SHALL BE DEBONDED WITH A COATING MC – 2 BITUMEN .
12. CURING SHALL BE BY APPLICATION OF AN APPROVED LIQUID MEMBRANE – FORMING COMPOUND COMPLYING WITH A AASHTO. M148 TYPE 2 (WHITE PIGMENTED) AT A RATE OF 0.22 – 0.27 LITRE / m2 BY MECHANICAL SPRAYER .
13. SHOULDER MATERIAL SHALL BE NATURALLY OCCURING EARTH AGGREGATE CONFORMING TO THE FOLLOWING GRADING .

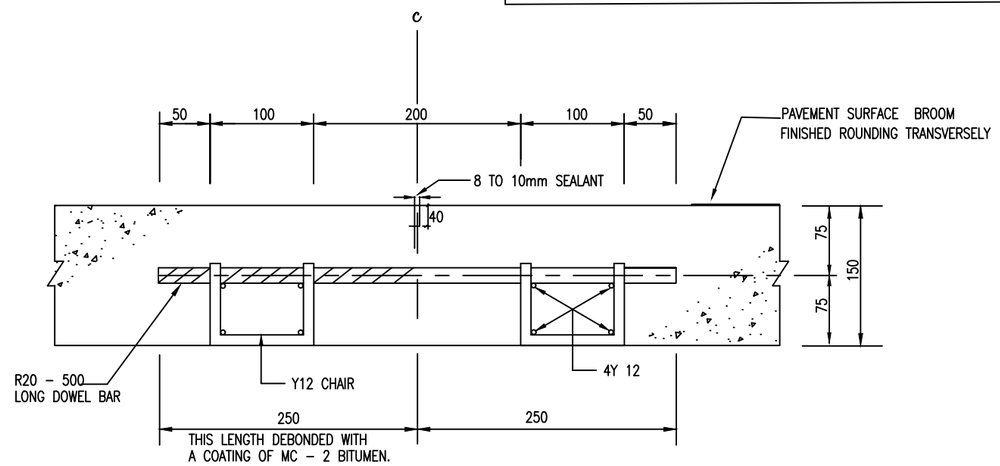
B.S SIEVE SIZE (mm)	% BY WEIGHT PASSING
20.00	100
10.00	75 – 100
5.00	50 – 75
2.00	30 – 60
0.425	15 – 35
0.075	5 – 15

THE PORTION PASSING THE 0.425 mm. IF IT IS PLASTIC SHALL HAVE :
a) LIQUID LIMIT 40%
b) WITHIN 5% – 15% PLASTIC INDEX PLASTICITY

14. SUBBASE SHALL BE RIVER OR TIN MINING SAND CONFORMING TO THE FOLLOWING GRADING.

B . S SIEVE SIZE (mm)	% BY WEIGHT PASSING
10.00	100
2.00	65 – 100
1.18	45 – 80
0.300	10 – 30
0.150	2 – 10

15. CONCRETE SURFACE SHALL BE BROOM FINISHED AS DIRECTED BY THE S.O.
16. MINIMUN OVERLAP OF PLASTIC SETTING SHALL BE 300 mm.

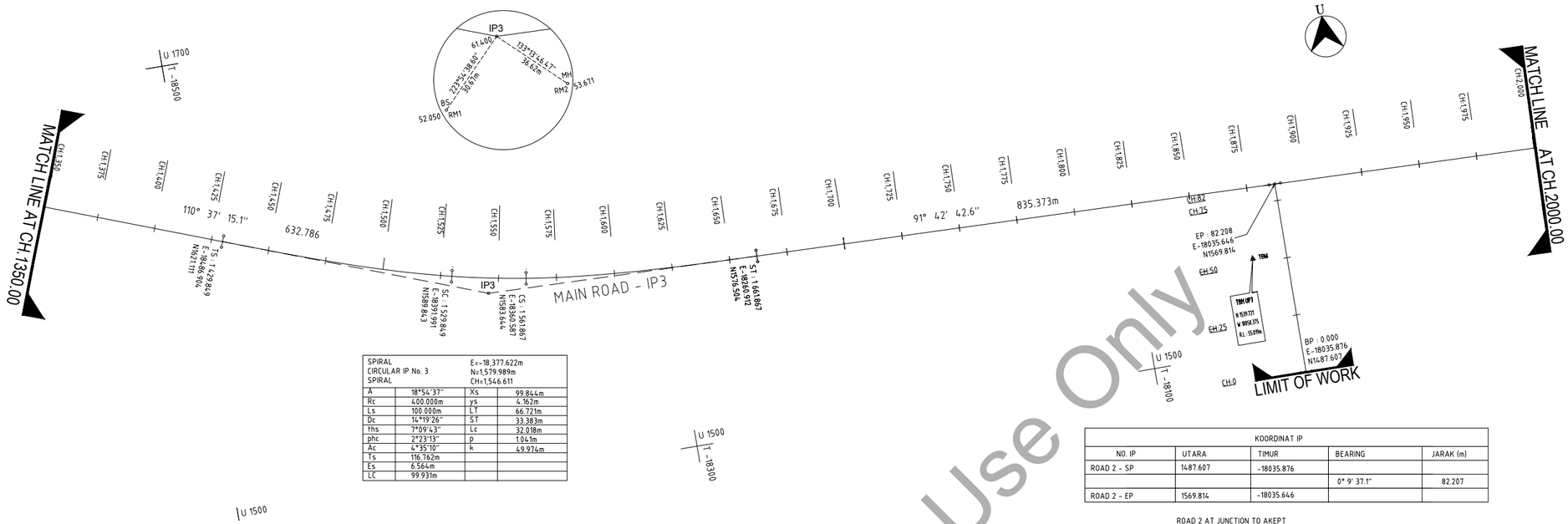


TRANSVERSE CONTRACTION JOINT DETAILS

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			N.T.S		PENGARAH KANAN		
			UKURAN		PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN		
					JURUAUDIT / JURUAUDIT KESELAMATAN JALAN; KETUA PENOLONG PENGARAH KANAN (HODT); DIREKABENTUK: DISEMAK: DILUKIS: DILULUSKAN:	KETUA PENOLONG PENGARAH KANAN (HOPT)	CONCRETE PAVEMENT FOR LOW COST ROADS
PINDAAN						TARIKH:	BIL. LUKISAN:

KEMENTERIAN KERJA RAYA

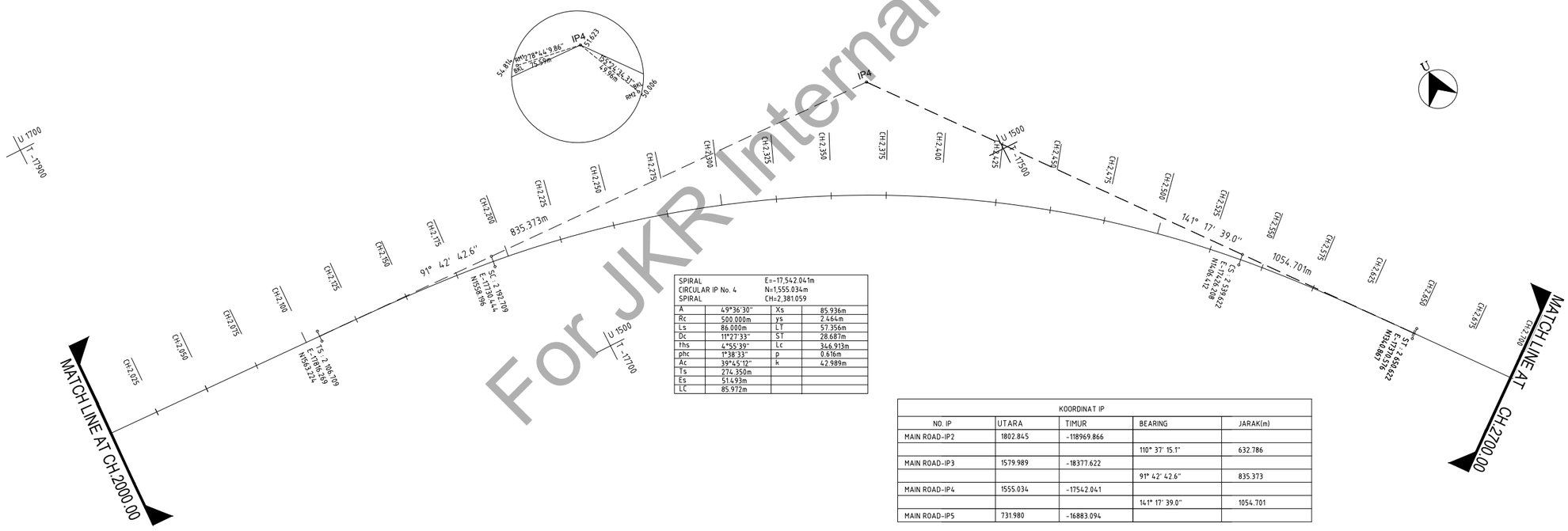
Model Drawing No. 6A



SPIRAL		E=-18,377.622m	
CIRCULAR IP No. 3		N=1,579.989m	
SPIRAL		CH=1,546.611	
A	18°54'37"	Xs	99.844m
Rc	400.000m	ys	4.162m
Ls	100.000m	LT	66.721m
Dc	14°19'26"	ST	33.383m
ths	7°09'43"	Lc	32.018m
phc	2°23'13"	p	1.041m
Ac	4°35'10"	k	49.974m
Ts	116.762m		
Es	6.564m		
LC	99.931m		

KOORDINAT IP				
NO. IP	UTARA	TIMUR	BEARING	JARAK (m)
ROAD 2 - SP	1487.607	-18035.876		
			0° 9' 37.1"	82.207
ROAD 2 - EP	1569.814	-18035.646		

ROAD 2 AT JUNCTION TO AKEPT

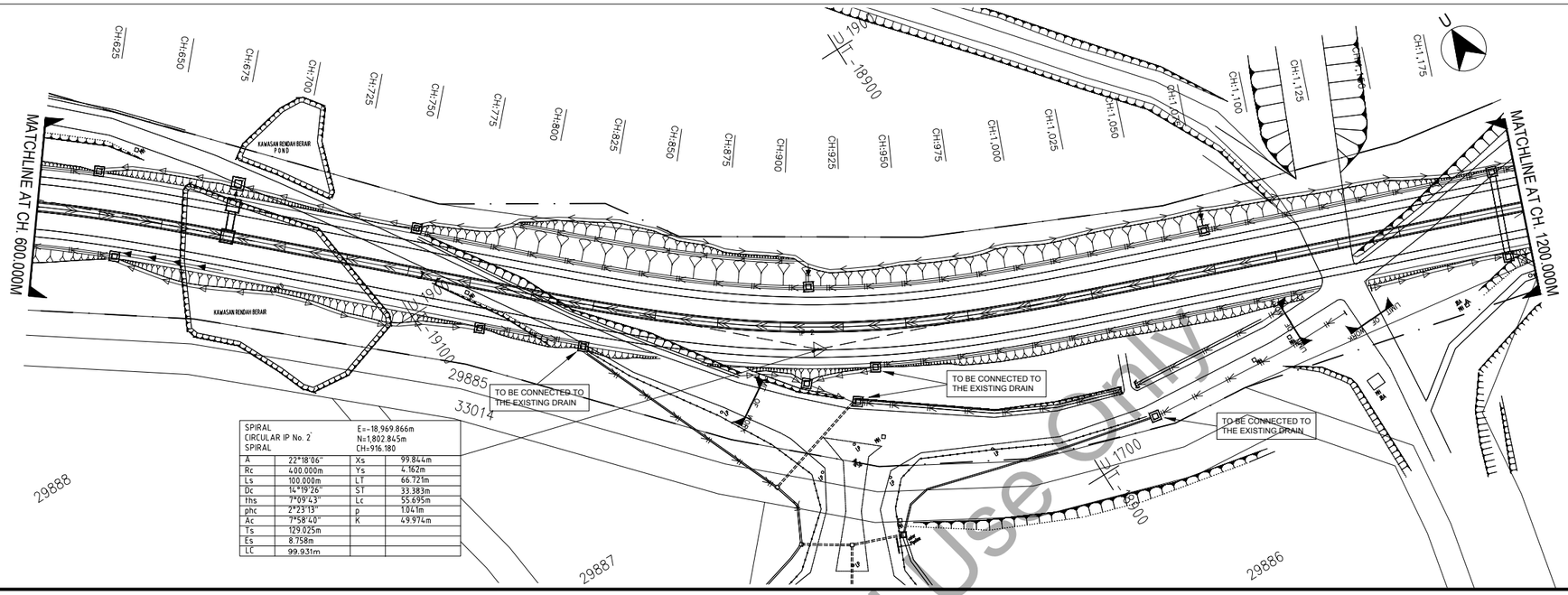


SPIRAL		E=-17,542.041m	
CIRCULAR IP No. 4		N=1,555.034m	
SPIRAL		CH=2,381.059	
A	49°36'30"	Xs	85.936m
Rc	500.000m	ys	2.464m
Ls	86.000m	LT	57.356m
Dc	11°27'33"	ST	28.687m
ths	4°55'39"	Lc	346.913m
phc	1°38'33"	p	0.616m
Ac	39°45'12"	k	42.989m
Ts	274.350m		
Es	51.493m		
LC	85.972m		

KOORDINAT IP				
NO. IP	UTARA	TIMUR	BEARING	JARAK(m)
MAIN ROAD-IP2	1802.845	-118969.866		
			110° 37' 15.1"	632.786
MAIN ROAD-IP3	1579.989	-18377.622		
			91° 42' 42.6"	835.373
MAIN ROAD-IP4	1555.034	-17542.041		
			141° 17' 39.0"	1054.701
MAIN ROAD-IP5	731.980	-16883.094		

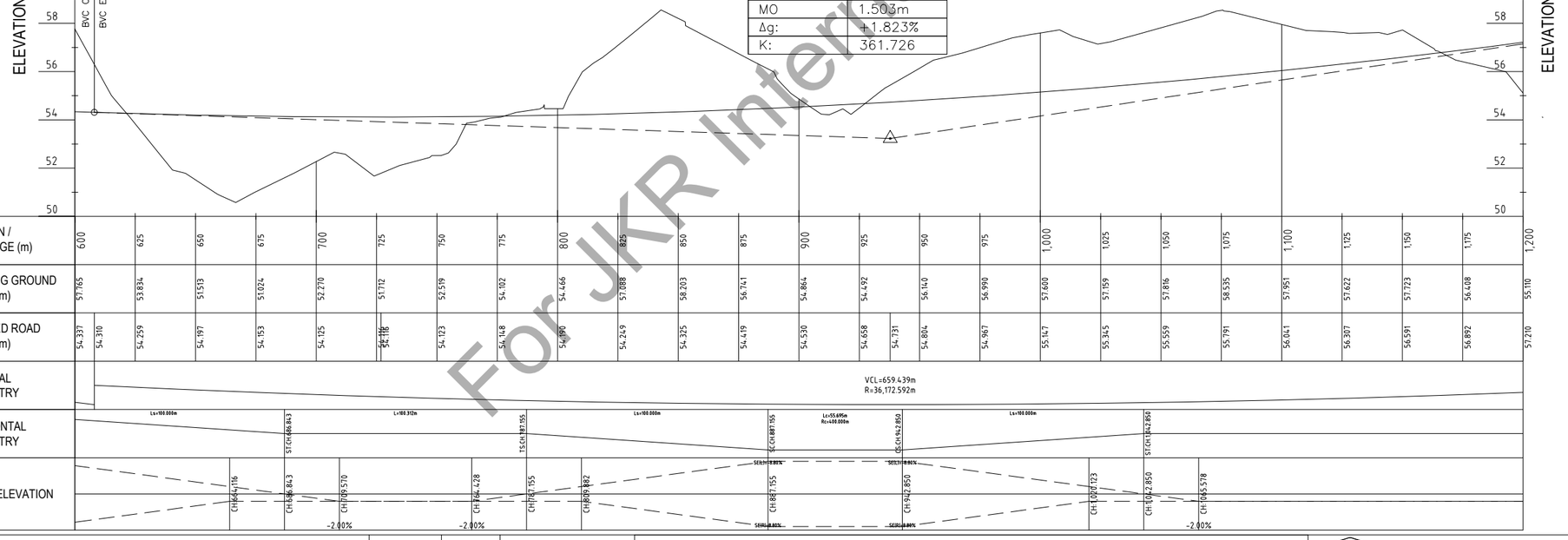
TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			1:1000		PENGARAH KANAN		KEMENTERIAN KERJA RAYA
					PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN		
				JURUAUDIT	KETUA PENOLONG PENGARAH KANAN (HODT)	KETUA PENOLONG PENGARAH KANAN (HOPT)	ALIGNMENT CONTROL PLAN
				JURUAUDIT KESELAMATAN JALAN	DIREKABENTUK: / DISEMAK:		
PINDAAN			UKURAN		DILUKIS: / DILULUSKAN:		TARIKH: / BIL. LUKISAN:

Model Drawing No. 7A



SPIRAL		E=-18,969.866m	
CIRCULAR IP No. 2`		N=1,802.845m	
SPIRAL		CH=916.180	
A	22°18'06"	Xs	99.844m
Rc	400.000m	Ys	4.162m
Ls	100.000m	LT	66.721m
Dc	14°19'26"	ST	33.383m
ths	7°09'43"	Lc	55.695m
phc	2°23'13"	p	1.041m
Ac	7°58'40"	K	49.974m
Ts	129.025m		
Es	8.758m		
LC	99.931m		

VIP CH.	937.816
VIP ELEV.	53.228m
VCL	659.439m
MO	1.503m
Δg:	+1.823%
K:	361.726

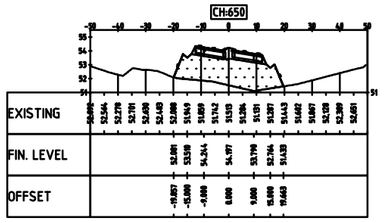


STATION / CHAINAGE (m)	600	625	650	675	700	725	750	775	800	825	850	875	900	925	950	975	1,000	1,025	1,050	1,075	1,100	1,125	1,150	1,175	1,200
EXISTING GROUND LEVEL (m)	57.765	53.834	51.513	51.024	52.270	51.712	52.519	54.102	54.466	57.088	58.203	56.741	54.864	54.492	56.140	56.990	57.600	57.159	57.816	58.535	57.951	57.622	57.723	56.408	55.110
FINISHED ROAD LEVEL (m)	54.337	54.310	54.259	54.197	54.153	54.125	54.116	54.118	54.123	54.148	54.190	54.249	54.325	54.419	54.530	54.658	54.731	54.804	54.967	55.147	55.345	55.559	55.791	56.041	56.307	56.591	56.892	57.210
VERTICAL GEOMETRY	VCL=659.439m R=36,172.592m																								
HORIZONTAL GEOMETRY	Ls=100.000m			ST CH:606.843	L=100.312m			SC CH:707.155		Ls=100.000m			SC CH:807.155	Lc=55.695m Rc=400.000m	CS CH:942.850	Ls=100.000m			ST CH:1042.850							
SUPERELEVATION	CH:644.116		CH:686.843	CH:709.570		CH:764.428		CH:787.155	CH:809.882				CH:887.155		CH:942.850		CH:1,020.123		CH:1042.850	CH:1065.718					
				-2.00%		-2.00%							SE=+4.00%		SE=+4.00%					-2.00%					
													SE=+4.00%		SE=+4.00%										

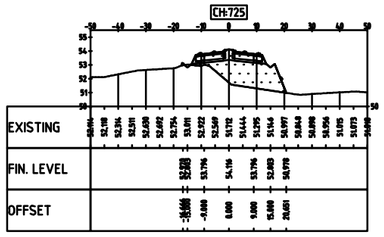
TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
					PENGARAH KANAN		KEMENTERIAN KERJA RAYA
					PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN	PLAN AND LONGITUDINAL PROFILE	
	PINDAAN		1:1000 UKURAN		JURUAUDIT / JURUAUDIT KESELAMATAN JALAN; KETUA PENOLONG PENGARAH KANAN (HODT); DIREKABENTUK: DISEMAK: DILUKIS: DILULUSKAN:	TARIKH : BIL. LUKISAN :	KETUA PENOLONG PENGARAH KANAN (HOPT)

Model Drawing No. 8A

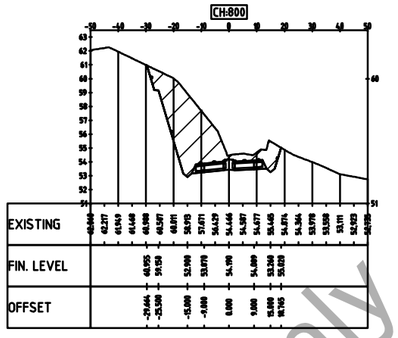
CH:650



CH:725



CH:800



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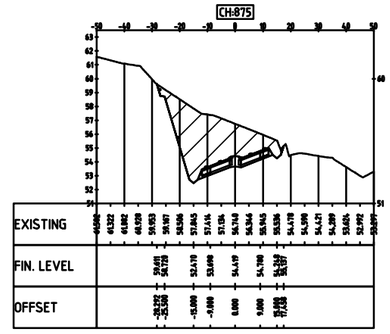

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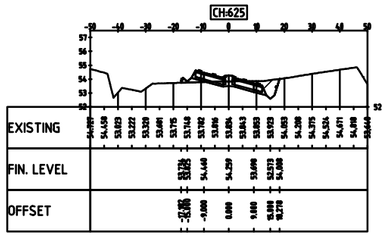

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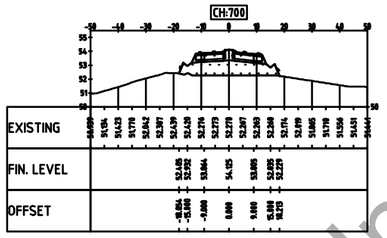

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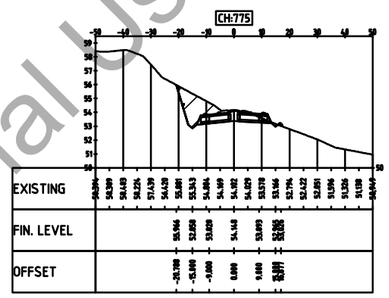
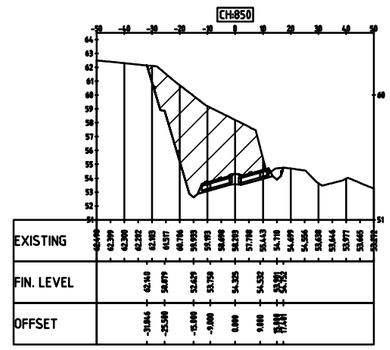


CH:850



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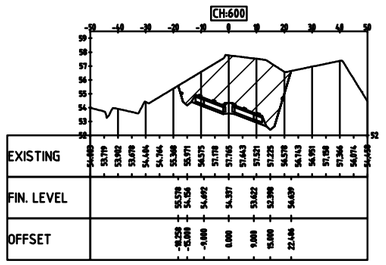
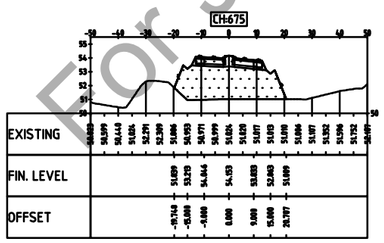


CH:675



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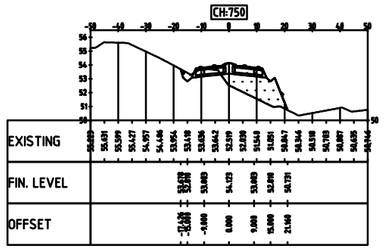

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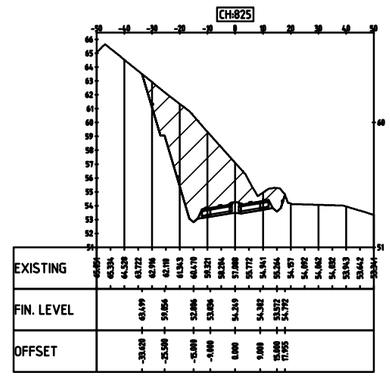
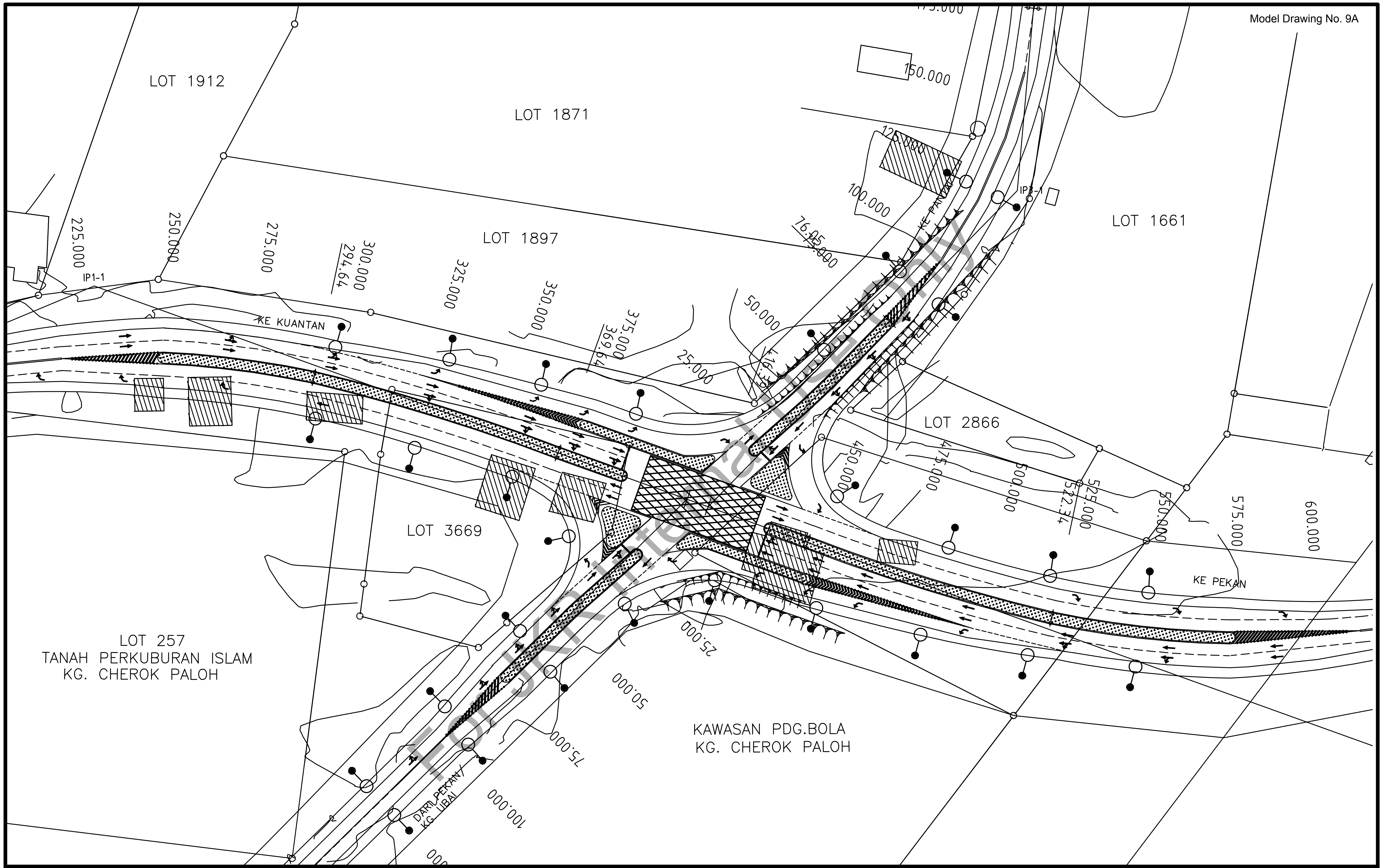


TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN			JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			N.T.S		PENGARAH KANAN				
			UKURAN		PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN				
					JURUAUDIT	KETUA PENOLONG PENGARAH KANAN (HODT)			KEMENTERIAN KERJA RAYA
PINDAAN					JURUAUDIT KESELAMATAN JALAN	DIREKABENTUK:	DISEMAK:	CROSS SECTION	
						DILUKIS:	DILULUSKAN:	TARIKH:	BIL. LUKISAN:

Model Drawing No. 9A



TARIKH	BUTIRAN	RUJUKAN

PINDAAN

1 : 50
UKURAN

JURUUKUR

CAWANGAN JALAN

PENGARAH KANAN

PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN

JURUAUDIT

JURUAUDIT KESELAMATAN JALAN

KETUA PENOLONG PENGARAH KANAN

DIREKABENTUK: DISEMAK:

DILUKIS: DILULUSKAN:

KETUA PENOLONG PENGARAH KANAN (HOPT)

JABATAN KERJA RAYA MALAYSIA

JUNCTION DETAILS - GENERAL LAYOUT

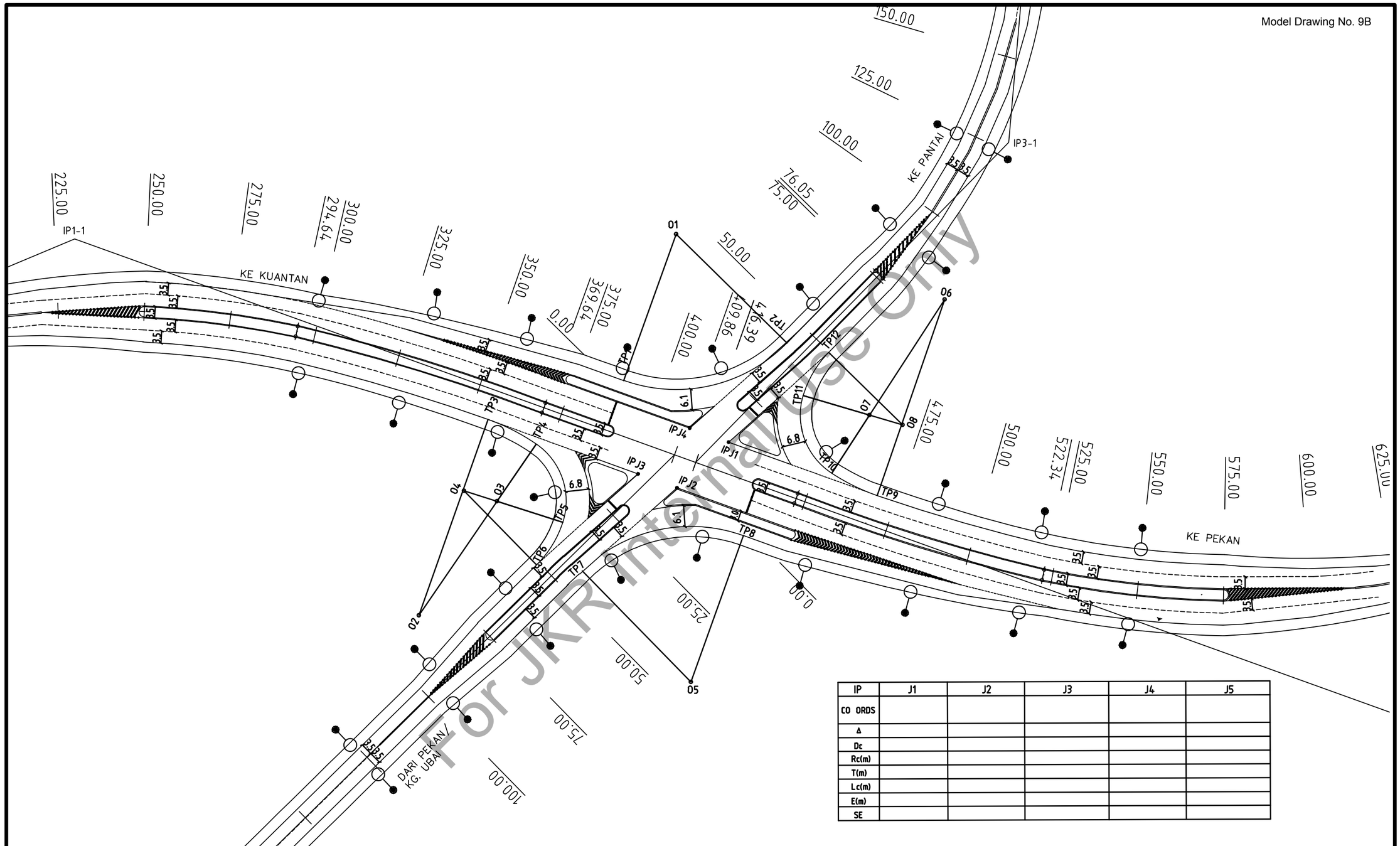
TARIKH :

BIL. LUKISAN :

PELANGGAN

KEMENTERIAN KERJA RAYA

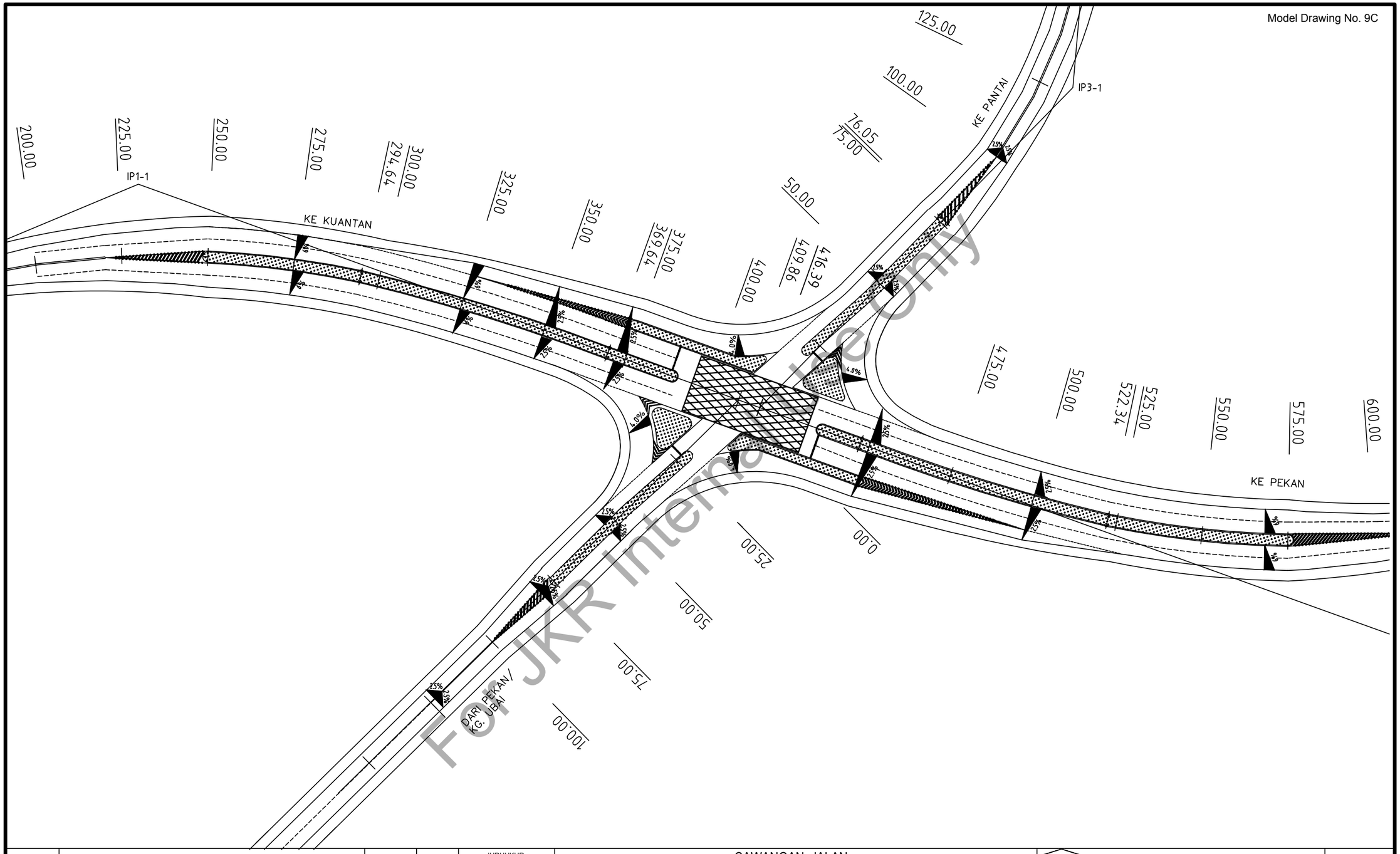
Model Drawing No. 9B



IP	J1	J2	J3	J4	J5
CO ORDS					
Δ					
Dc					
Rc(m)					
T(m)					
Lc(m)					
E(m)					
SE					

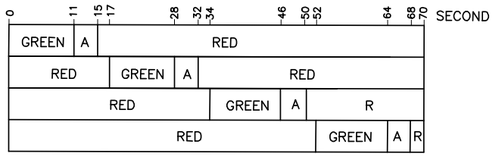
TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			1 : 50 UKURAN		PENGARAH KANAN PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN		KEMENTERIAN KERJA RAYA
PINDAAN					JURUAUDIT: JURUAUDIT KESELAMATAN JALAN KETUA PENOLONG PENGARAH KANAN — DIREKABENTUK: / DISEMAK: / DILUKIS: / DILULUSKAN: KETUA PENOLONG PENGARAH KANAN (HOPT)	JUNCTION DETAILS - SETTING OUT	
						TARIKH : / BIL. LUKISAN :	

Model Drawing No. 9C



TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN			JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			1 : 50		PENGARAH KANAN				KEMENTERIAN KERJA RAYA
			UKURAN		PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN			JUNCTION DETAILS - PAVEMENT SUPERELEVATION	
PINDAAN					JURUAUDIT	KETUA PENOLONG PENGARAH KANAN			
					JURUAUDIT KESELAMATAN JALAN	DIREKABENTUK:	DISEMAK:	KETUA PENOLONG PENGARAH KANAN (HOPT)	
						DILUKIS:	DILULUSKAN:	TARIKH :	BIL. LUKISAN :

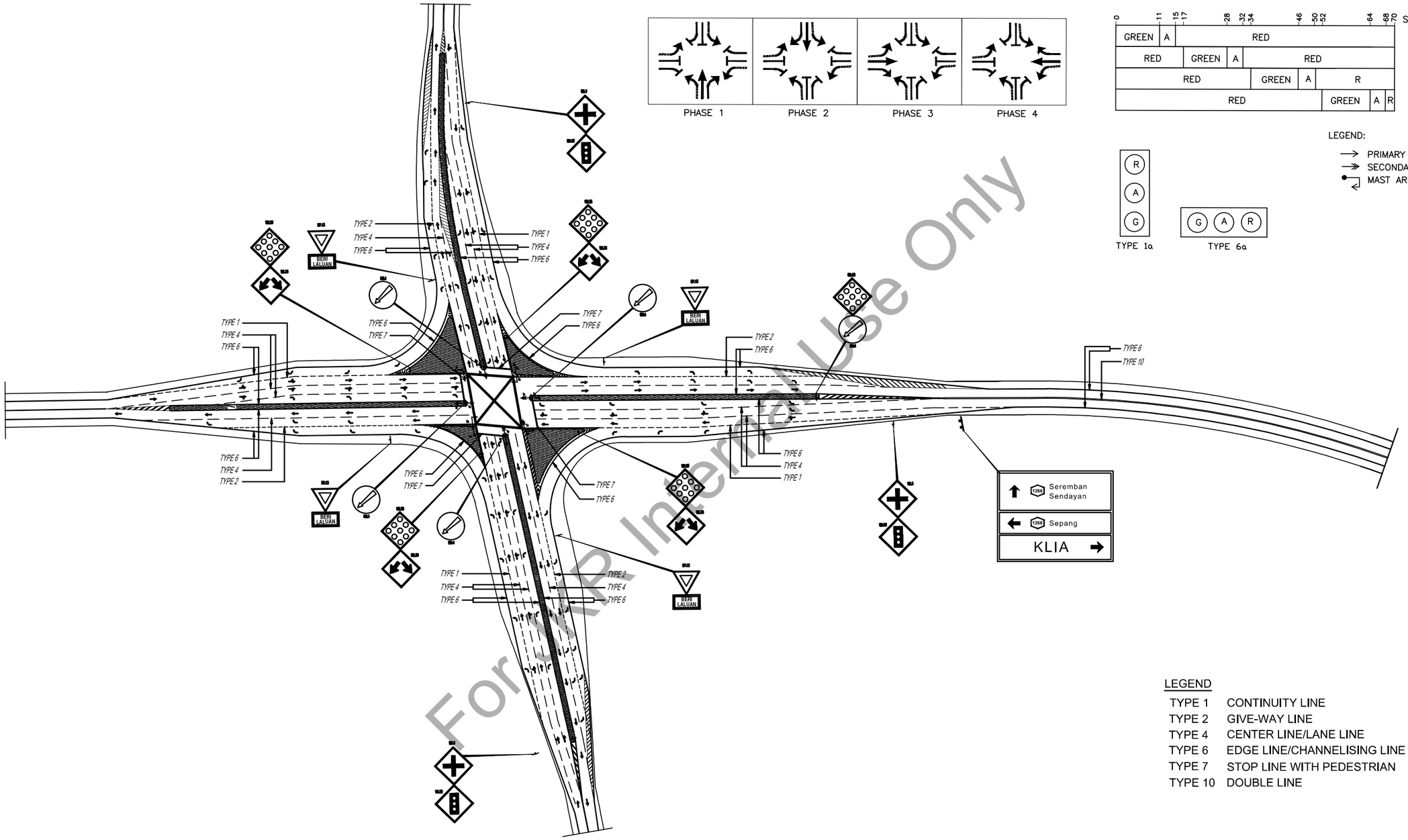
Model Drawing No.10A



LEGEND:
- PRIMARY
- SECONDARY
- MAST ARM

TYPE 1a

TYPE 6a

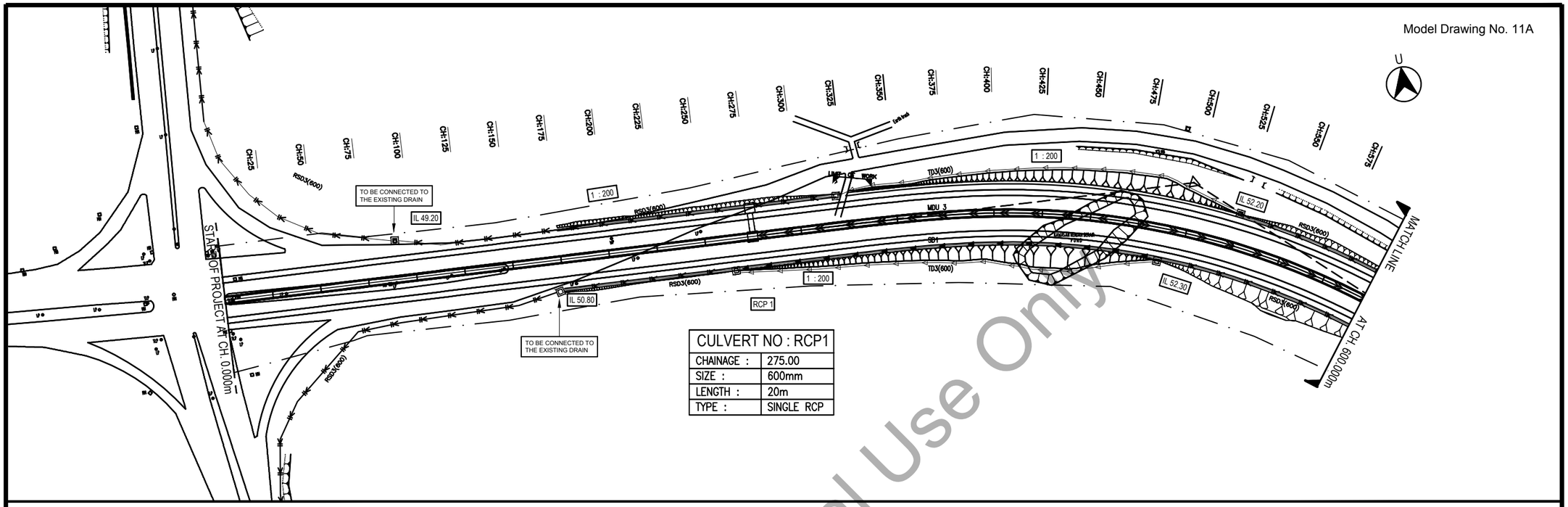


LEGEND

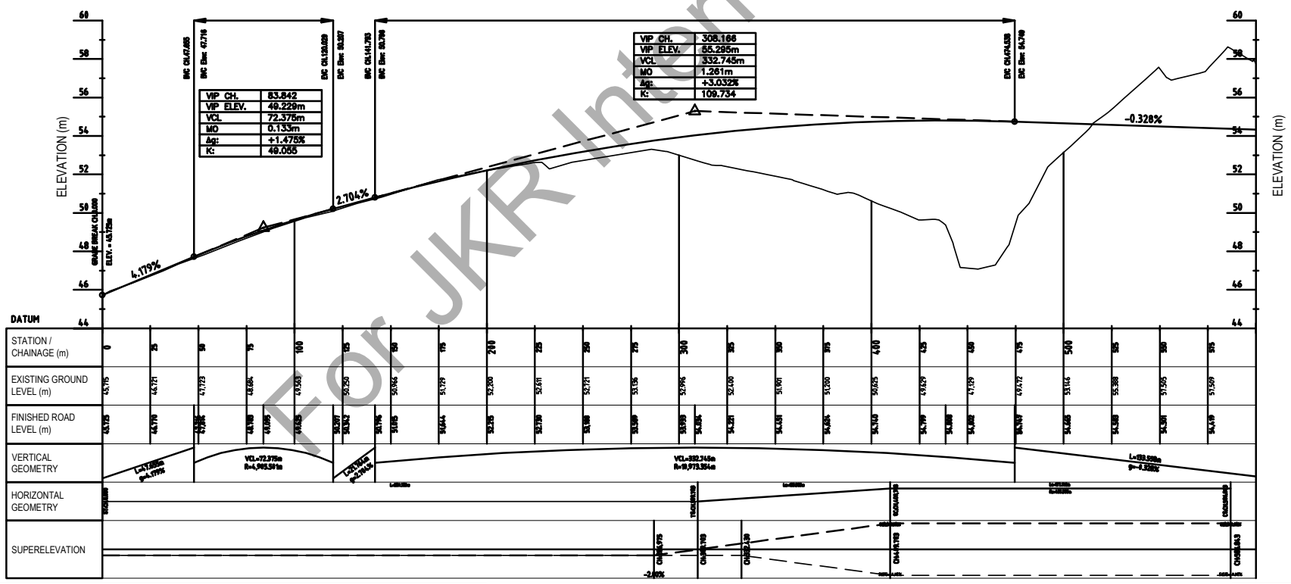
TYPE 1	CONTINUITY LINE
TYPE 2	GIVE-WAY LINE
TYPE 4	CENTER LINE/LANE LINE
TYPE 6	EDGE LINE/CHANNELISING LINE
TYPE 7	STOP LINE WITH PEDESTRIAN
TYPE 10	DOUBLE LINE

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN			JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			N.T.S		PENGARAH KANAN				
			UKURAN		PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN				
PINDAAN					JURUAUDIT	KETUA PENOLONG PENGARAH KANAN (HODT)		KETUA PENOLONG PENGARAH KANAN (HOPT)	ROAD MARKING, TRAFFIC SIGNS & TRAFFIC SIGNAL	KEMENTERIAN KERJA RAYA
					JURUAUDIT KESELAMATAN JALAN	DIREKABENTUK:	DISEMAK:		TARIKH:	BIL. LUKISAN:
						DILUKIS:	DILULUSKAN:			

Model Drawing No. 11A



CULVERT NO : RCP1	
CHAINAGE :	275.00
SIZE :	600mm
LENGTH :	20m
TYPE :	SINGLE RCP

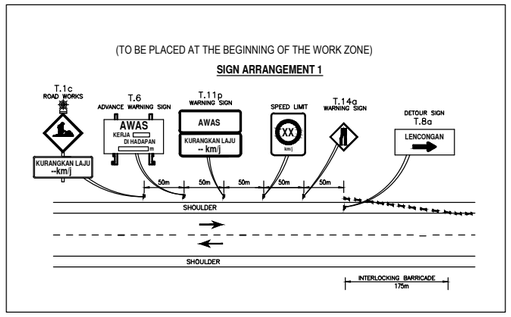


LEGEND :

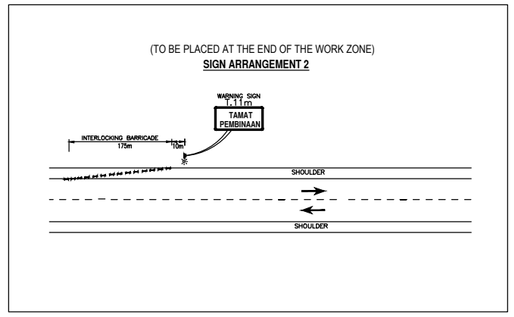
- TOE DRAIN (TD2)
- TOE DRAIN (TD3)
- TOE DRAIN (TD5)
- ROADSIDE DRAIN (RSDU 1)
- ROADSIDE DRAIN (RSD 2)
- ROADSIDE DRAIN (RSD 3)
- ROADSIDE DRAIN (RSD 5)
- SHOULDER DRAIN (SD 1)
- BENCH DRAIN (BC 1)
- BERM DRAIN (BF 1)
- INTERCEPTOR DRAIN (ID 2)
- OUTFALL DRAIN (OD 2)
- MEDIAN DRAIN (MDU 3)
- MEDIAN DRAIN (MDU 5)
- SUBSOIL DRAIN
- CULVERT WITH SUMP
- PIPE CULVERT
- SUMP
- IL — INVERT LEVEL

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN		JABATAN KERJA RAYA MALAYSIA	
			1 : 1 1 : 2 UKURAN		PENGARAH KANAN			PELANGGAN
					PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN			
PINDAAN				JURUAUDIT JURUAUDIT KESELAMATAN JALAN	KETUA PENOLONG PENGARAH KANAN DIREKABENTUK: / DISEMAK: DILUKIS: / DILULUSKAN:	KETUA PENOLONG PENGARAH KANAN (HOPT)	DRAINAGE PLAN	
							TARIKH :	BIL. LUKISAN :

Model Drawing No. 12A



SIGN 1



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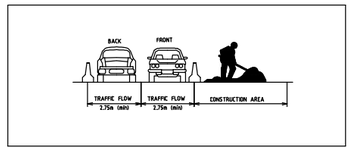
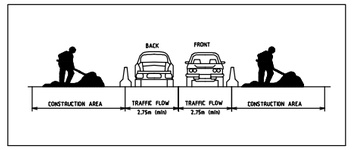
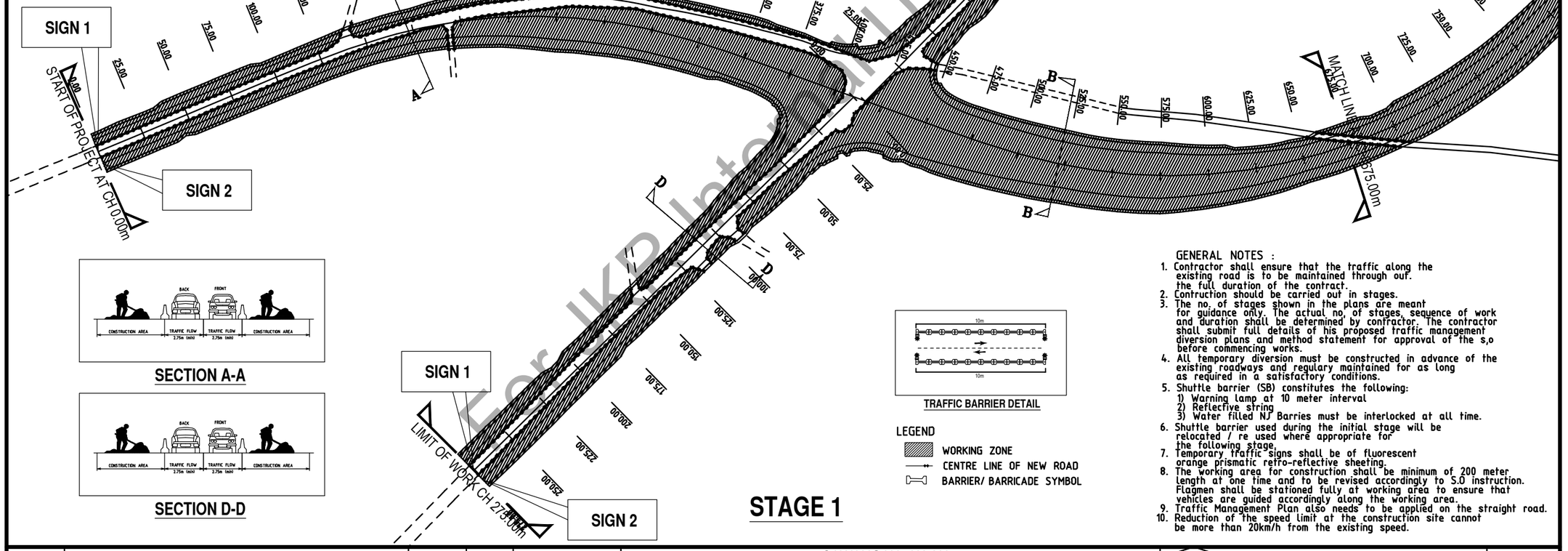


SECTION B-B



SECTION C-C



SECTION A-A

SECTION D-D

TRAFFIC BARRIER DETAIL

LEGEND

- WORKING ZONE
- CENTRE LINE OF NEW ROAD
- BARRIER/ BARRICADE SYMBOL

GENERAL NOTES :

1. Contractor shall ensure that the traffic along the existing road is to be maintained through out. the full duration of the contract.
2. Contruction should be carried out in stages.
3. The no. of stages shown in the plans are meant for guidance only. The actual no. of stages, sequence of work and duration shall be determined by contractor. The contractor shall submit full details of his proposed traffic management diversion plans and method statement for approval of the s,o before commencing works.
4. All temporary diversion must be constructed in advance of the existing roadways and regulary maintained for as long as required in a satisfactory conditions.
5. Shuttle barrier (SB) constitutes the following:
   1) Warning lamp at 10 meter interval
   2) Reflective string
   3) Water filled NJ Barries must be interlocked at all time.
6. Shuttle barrier used during the initial stage will be relocated / re used where appropriate for the following stage.
7. Temporary traffic signs shall be of fluorescent orange prismatic retro-reflective sheeting.
8. The working area for construction shall be minimum of 200 meter length at one time and to be revised accordingly to S.O instruction. Flagmen shall be stationed fully at working area to ensure that vehicles are guided accordingly along the working area.
9. Traffic Management Plan also needs to be applied on the straight road.
10. Reduction of the speed limit at the construction site cannot be more than 20km/h from the existing speed.

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			1:1000 UKURAN		PENGARAH KANAN PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN JURUAUDIT: JURUAUDIT KESELAMATAN JALAN KETUA PENOLONG PENGARAH KANAN (HODT): DIREKABENTUK: / DISEMAK: / DILUKIS: / DILULUSKAN: KETUA PENOLONG PENGARAH KANAN (HOPT)	TRAFFIC MANAGEMENT PLAN - STAGE 1	KEMENTERIAN KERJA RAYA
PINDAAN						TARIKH: / BIL. LUKISAN:	

Model Drawing No. 12B

SIGN 1

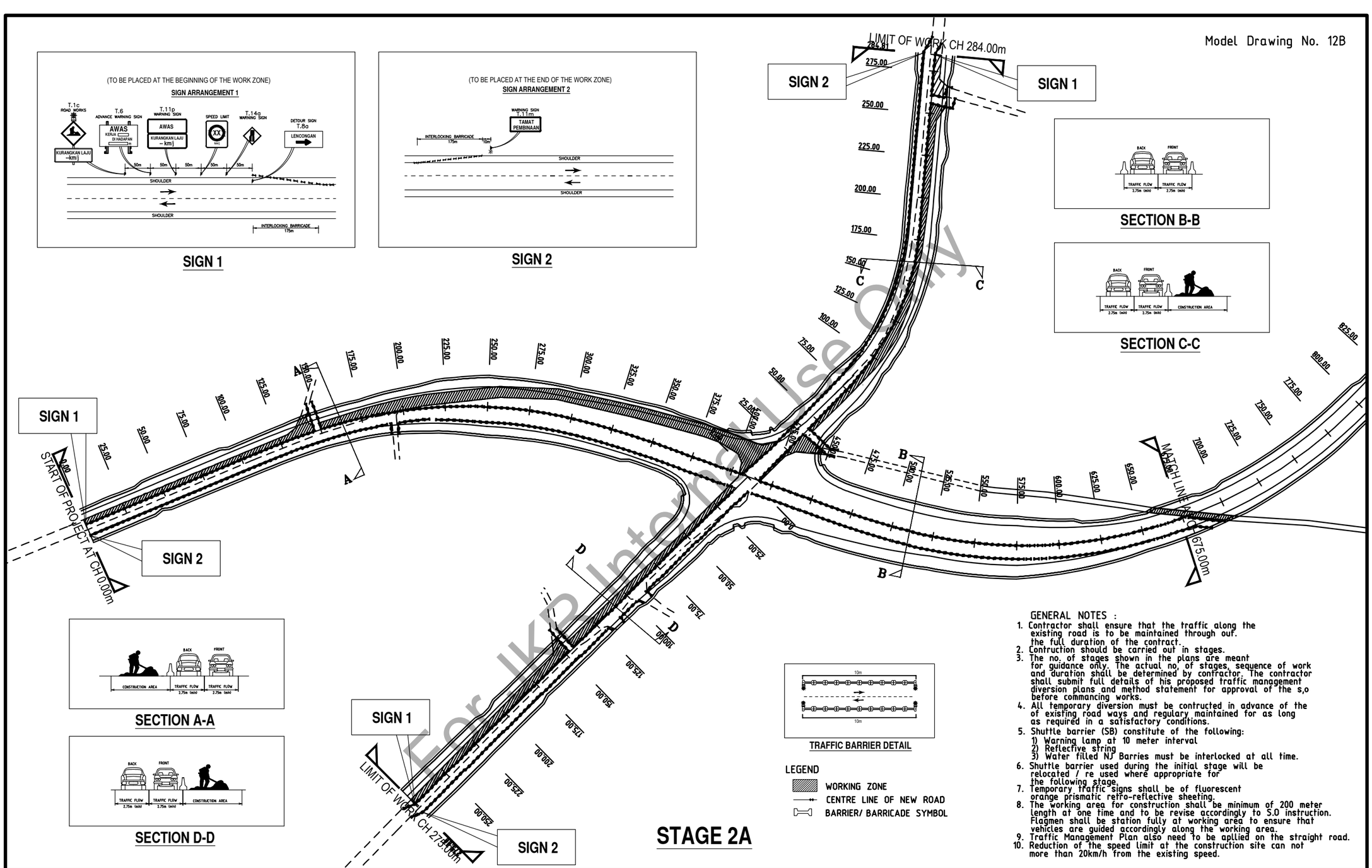
SIGN 2

SECTION A-A

SECTION D-D

SECTION B-B

SECTION C-C



TRAFFIC BARRIER DETAIL

LEGEND

- WORKING ZONE
- CENTRE LINE OF NEW ROAD
- BARRIER/ BARRICADE SYMBOL

GENERAL NOTES :

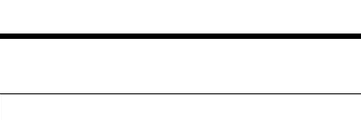
1. Contractor shall ensure that the traffic along the existing road is to be maintained through out. the full duration of the contract.
2. Contruction should be carried out in stages.
3. The no. of stages shown in the plans are meant for guidance only. The actual no. of stages, sequence of work and duration shall be determined by contractor. The contractor shall submit full details of his proposed traffic management diversion plans and method statement for approval of the s,o before commancing works.
4. All temporary diversion must be contructed in advance of the of existing road ways and regulary maintained for as long as required in a satisfactory conditions.
5. Shuttle barrier (SB) constitute of the following:
   1) Warning lamp at 10 meter interval
   2) Reflective string
   3) Water filled NJ Barries must be interlocked at all time.
6. Shuttle barrier used during the initial stage will be relocated / re used where appropriate for the following stage.
7. Temporary traffic signs shall be of fluorescent orange prismatic retro-reflective sheeting.
8. The working area for construction shall be minimum of 200 meter length at one time and to be revise accordingly to S.O instruction. Flagmen shall be station fully at working area to ensure that vehicles are guided accordingly along the working area.
9. Traffic Management Plan also need to be apllied on the straight road.
10. Reduction of the speed limit at the construction site can not more than 20km/h from the existing speed.

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN		JABATAN KERJA RAYA MALAYSIA	PELANGGAN
					PENGARAH KANAN			
					PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN			
			1:1000		JURUAUDIT	KETUA PENOLONG PENGARAH KANAN (HODT)		KEMENTERIAN KERJA RAYA
			UKURAN		JURUAUDIT KESELAMATAN JALAN	DIREKABENTUK: DISEMAK:	TRAFFIC MANAGEMENT PLAN - STAGE 2A	
PINDAAN					KETUA PENOLONG PENGARAH KANAN (HOPT)	DILUKIS: DILULUSKAN:	TARIKH: BIL. LUKISAN:	

Model Drawing No. 12C

SIGN 1

SIGN 2

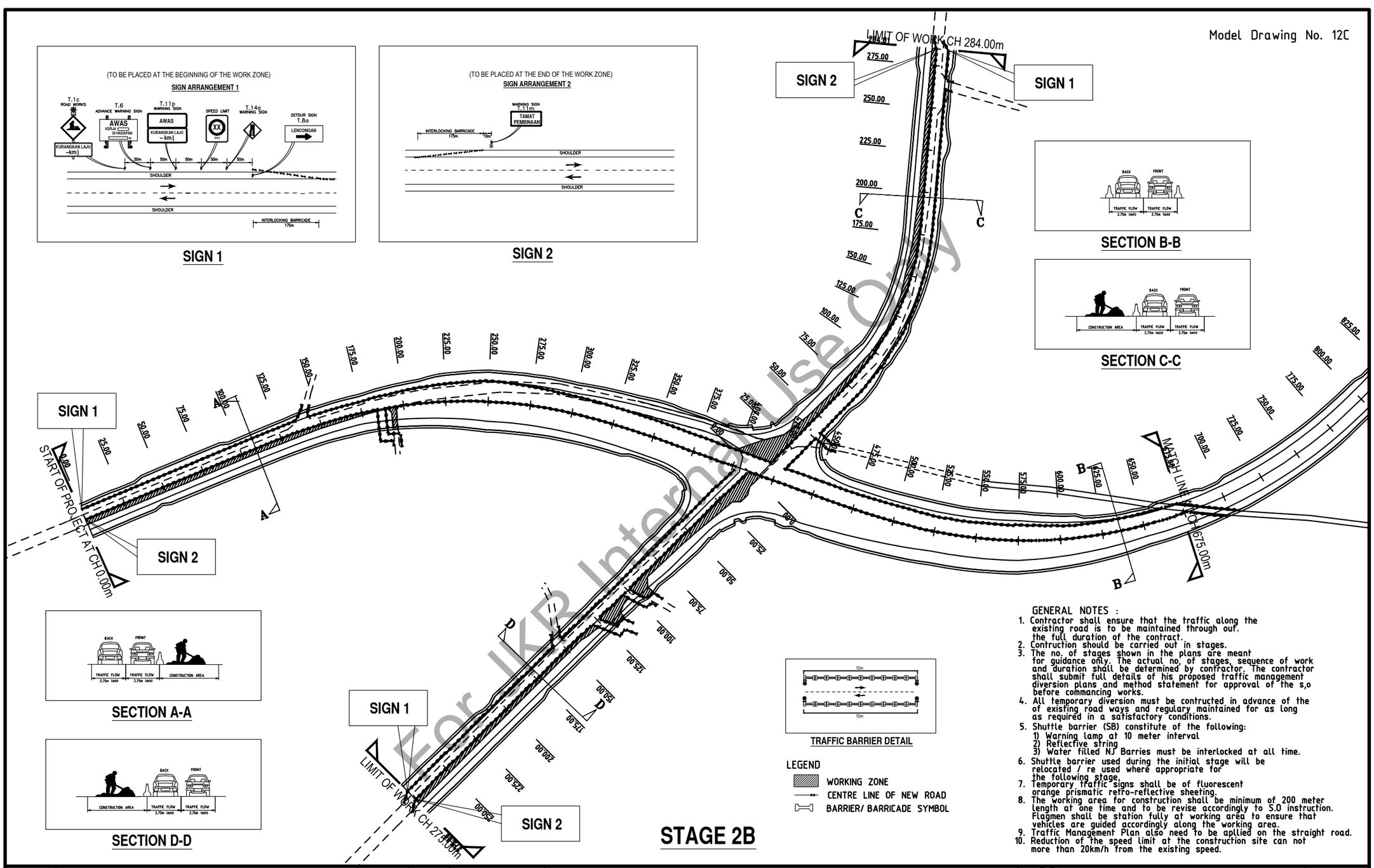


SECTION A-A

SECTION D-D

SECTION B-B

SECTION C-C



TRAFFIC BARRIER DETAIL

LEGEND

- WORKING ZONE
- CENTRE LINE OF NEW ROAD
- BARRIER/ BARRICADE SYMBOL

GENERAL NOTES :

1. Contractor shall ensure that the traffic along the existing road is to be maintained through ouf. the full duration of the contract.
2. Contruction should be carried out in stages.
3. The no. of stages shown in the plans are meant for guidance only. The actual no. of stages, sequence of work and duration shall be determined by contractor. The contractor shall submit full details of his proposed traffic management diversion plans and method statement for approval of the s,o before commancing works.
4. All temporary diversion must be contructed in advance of the of existing road ways and regulary maintained for as long as required in a satisfactory conditions.
5. Shuttle barrier (SB) constitute of the following:
   1) Warning lamp at 10 meter interval
   2) Reflective string
   3) Water filled NJ Barries must be interlocked at all time.
6. Shuttle barrier used during the initial stage will be relocated / re used where appropriate for the following stage.
7. Temporary traffic signs shall be of fluorescent orange prismatic retro-reflective sheeting.
8. The working area for construction shall be minimum of 200 meter length at one time and to be revise accordingly to S.O instruction. Flagmen shall be station fully at working area to ensure that vehicles are guided accordingly along the working area.
9. Traffic Management Plan also need to be apllied on the straight road.
10. Reduction of the speed limit at the construction site can not more than 20km/h from the existing speed.

TARIKH	BUTIRAN	RUJUKAN
PINDAAN		

1:1000
UKURAN

JURUUKUR

CAWANGAN JALAN

PENGARAH KANAN

PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN

JURUAUDIT

JURUAUDIT KESELAMATAN JALAN

KETUA PENOLONG PENGARAH KANAN (HODT)

DIREKABENTUK: DISEMAK:

DILUKIS: DILULUSKAN:

KETUA PENOLONG PENGARAH KANAN (HOPT)

JABATAN KERJA RAYA MALAYSIA

PELANGGAN

KEMENTERIAN KERJA RAYA

TRAFFIC MANAGEMENT PLAN - STAGE 2B

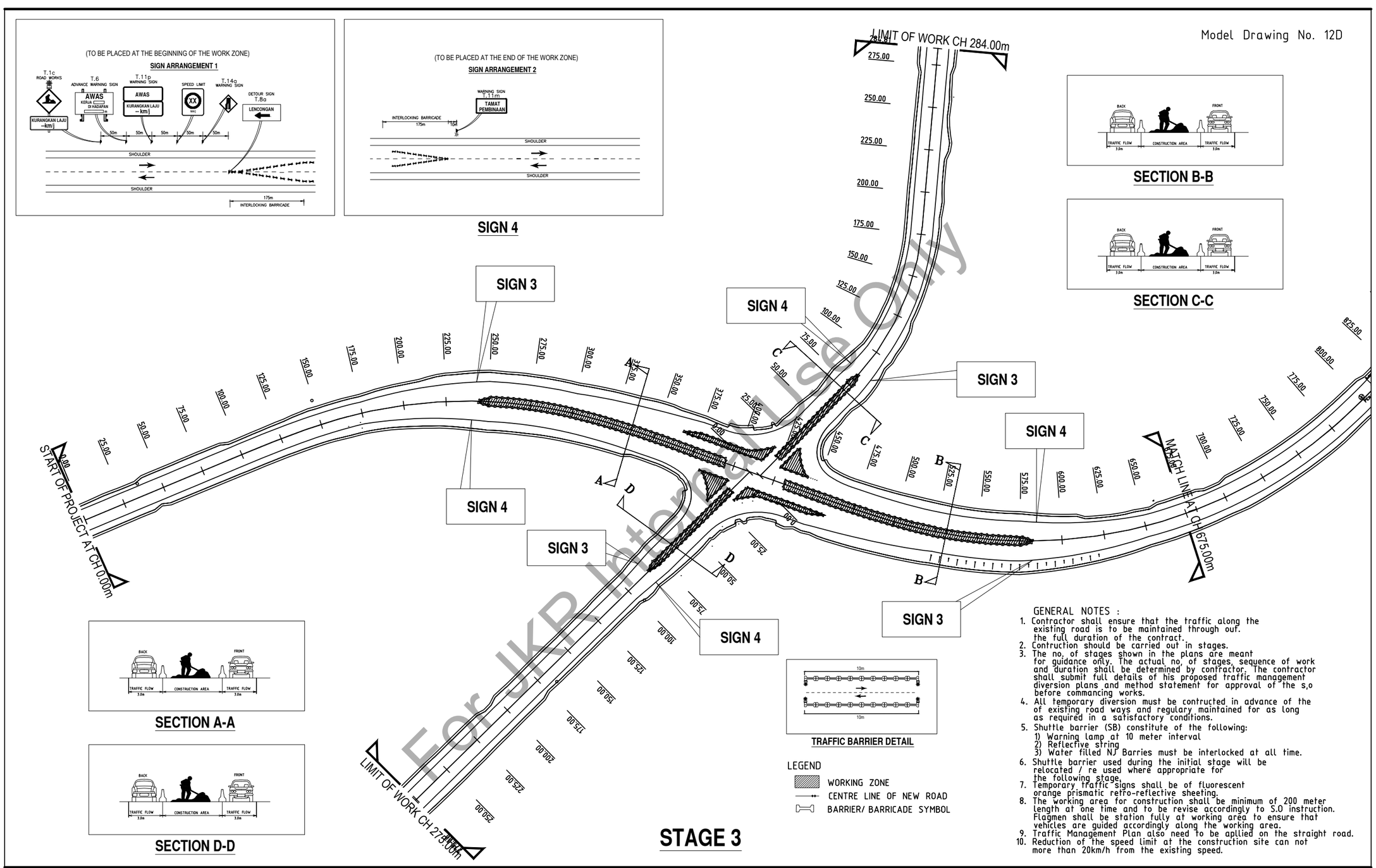
TARIKH: BIL. LUKISAN:

Model Drawing No. 12D

SIGN 4

SECTION B-B

SECTION C-C



SECTION A-A

SECTION D-D

TRAFFIC BARRIER DETAIL

LEGEND

- WORKING ZONE
- CENTRE LINE OF NEW ROAD
- BARRIER/ BARRICADE SYMBOL

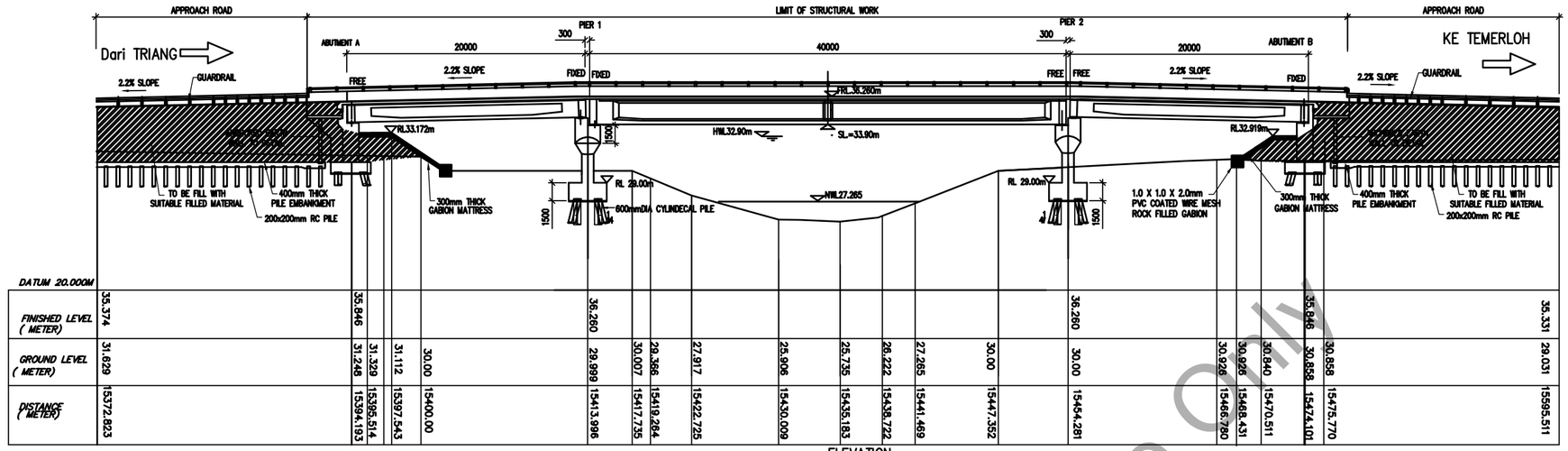
STAGE 3

GENERAL NOTES :

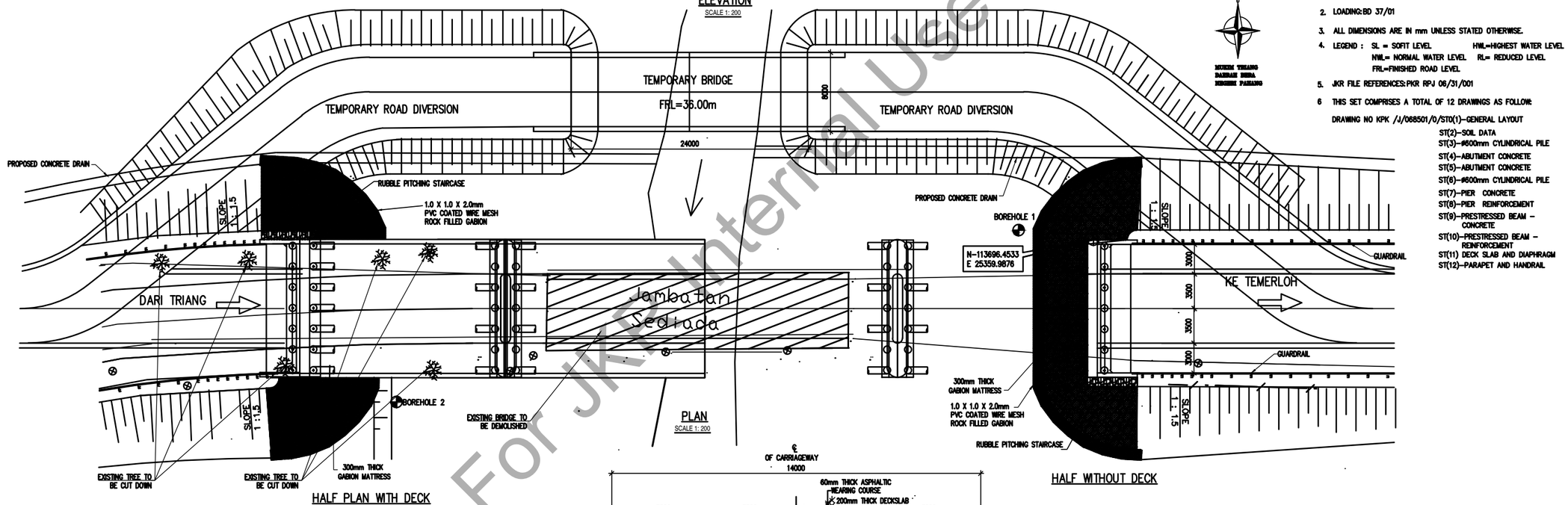
1. Contractor shall ensure that the traffic along the existing road is to be maintained through out. the full duration of the contract.
2. Contruction should be carried out in stages.
3. The no. of stages shown in the plans are meant for guidance only. The actual no. of stages, sequence of work and duration shall be determined by contractor. The contractor shall submit full details of his proposed traffic management diversion plans and method statement for approval of the s,o before commancing works.
4. All temporary diversion must be contructed in advance of the of existing road ways and regulary maintained for as long as required in a satisfactory conditions.
5. Shuttle barrier (SB) constitute of the following:
   1) Warning lamp at 10 meter interval
   2) Reflective string
   3) Water filled NJ Barries must be interlocked at all time.
6. Shuttle barrier used during the initial stage will be relocated / re used where appropriate for the following stage.
7. Temporary traffic signs shall be of fluorescent orange prismatic retro-reflective sheeting.
8. The working area for construction shall be minimum of 200 meter length at one time and to be revise accordingly to S.O instruction. Flagmen shall be station fully at working area to ensure that vehicles are guided accordingly along the working area.
9. Traffic Management Plan also need to be apllied on the straight road.
10. Reduction of the speed limit at the construction site can not more than 20km/h from the existing speed.

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			1:1000 UKURAN		PENGARAH KANAN PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN JURUAUDIT JURUAUDIT KESELAMATAN JALAN KETUA PENOLONG PENGARAH KANAN (HODT) DIREKABENTUK: DISEMAK: DILUKIS: DILULUSKAN: KETUA PENOLONG PENGARAH KANAN (HOPT)	TRAFFIC MANAGEMENT PLAN - STAGE 3 TARIKH: BIL. LUKISAN:	KEMENTERIAN KERJA RAYA
PINDAAN							

Model Drawing No. 13A



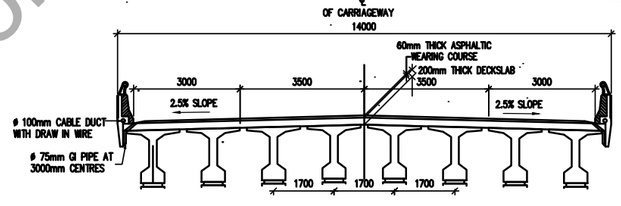
ELEVATION
SCALE 1: 200

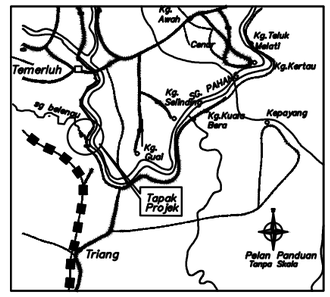


HALF PLAN WITH DECK

PLAN
SCALE 1: 200

HALF WITHOUT DECK





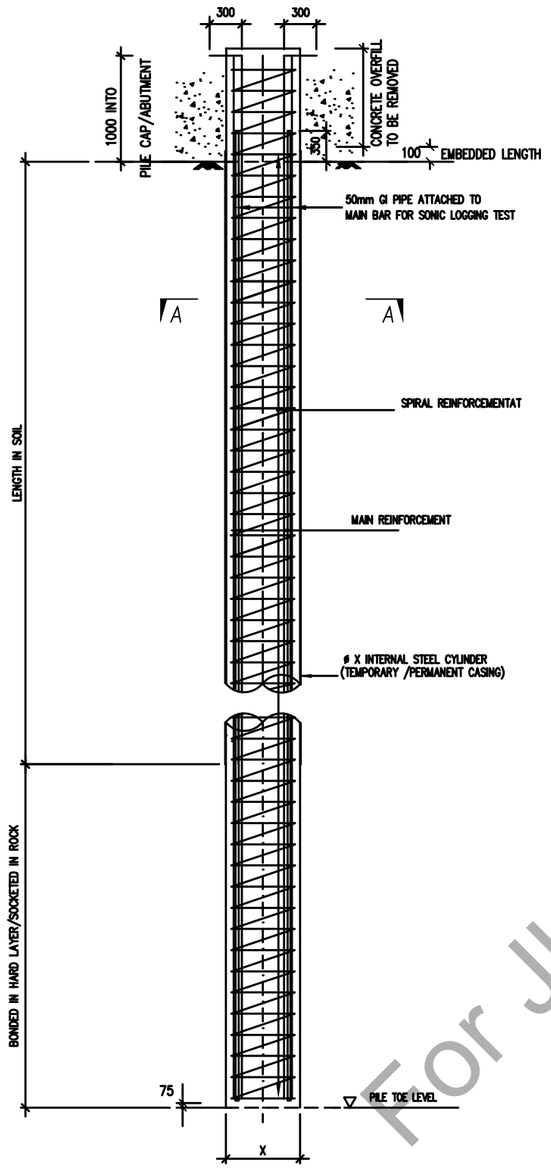
LOCATION PLAN

NOTES

1. LENGTH OF BRIDGE = 20.0+40.0+20.0m=80.0m
2. LOADING:BD 37/01
3. ALL DIMENSIONS ARE IN mm UNLESS STATED OTHERWISE.
4. LEGEND : SL = SOFIT LEVEL HWL=HIGHEST WATER LEVEL
   NWL= NORMAL WATER LEVEL RL= REDUCED LEVEL
   FRL=FINISHED ROAD LEVEL
5. JKR FILE REFERENCES:PKR RPJ 06/31/001
6. THIS SET COMPRISES A TOTAL OF 12 DRAWINGS AS FOLLOW:

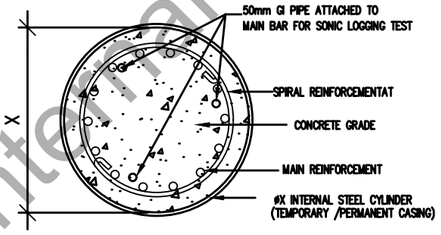
   DRAWING NO KPK /J/068501/0/ST0(1)–GENERAL LAYOUT
   ST(2)–SOIL DATA
   ST(3)–ϕ600mm CYLINDRICAL PILE
   ST(4)–ABUTMENT CONCRETE
   ST(5)–ABUTMENT CONCRETE
   ST(6)–ϕ600mm CYLINDRICAL PILE
   ST(7)–PIER CONCRETE
   ST(8)–PIER REINFORCEMENT
   ST(9)–PRESTRESSED BEAM – CONCRETE
   ST(10)–PRESTRESSED BEAM – REINFORCEMENT
   ST(11) DECK SLAB AND DIAPHRAGM
   ST(12)–PARAPET AND HANDRAIL

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			1 : 50 UKURAN		PENGARAH KANAN		
					PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN		
PINDAAN				JURUAUDIT JURUAUDIT KESELAMATAN JALAN	KETUA PENOLONG PENGARAH KANAN DIREKABENTUK: / DISEMAK: / DILUKIS: / DILULUSKAN:	KETUA PENOLONG PENGARAH KANAN (HOPT)	GENERAL ARRANGEMENT - BRIDGE	KEMENTERIAN KERJA RAYA
						TARIKH :	BIL. LUKISAN :	



SECTIONAL ELEVATION

SCALE 1 : 25



SECTION A–A

SCALE 1: 10

TABLE 1

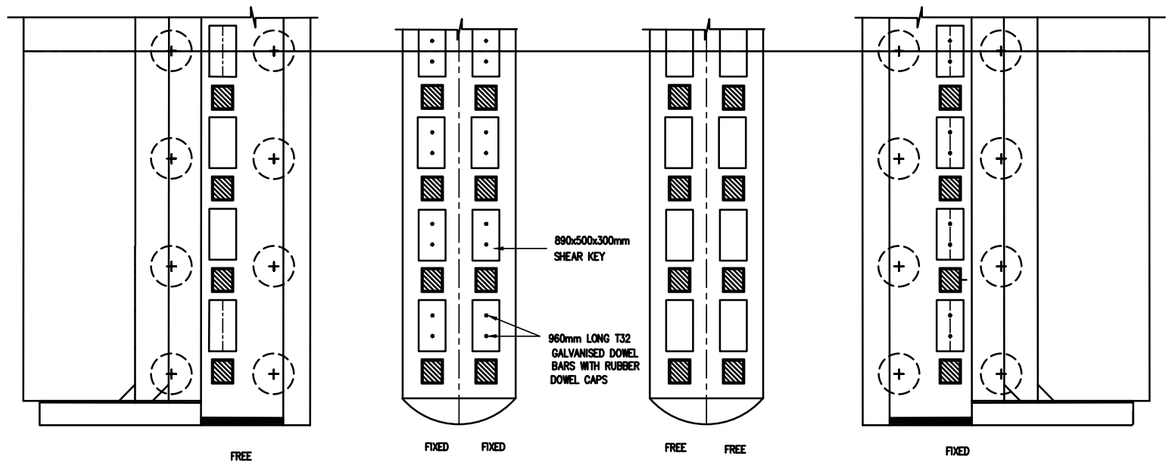
STRUCTURE	NO OF PILES VERTICAL	ESTIMATED LENGTH OF PILE (m)	DIAMETER OF PILE (X) (m)	BONDED IN HARD LAYERS SPT > 50 (m)	SOCKETED IN ROCK (m)	DESIGN LOAD OF PILES (kN)
ABUTMENT A						
ABUTMENT B						
PIER 1						
PIER 2						

NOTES:

1. a) CONCRETE SHALL BE OF GRADE 35/20, WITH THE MAXIMUM WATER/CEMENT RATIO OF 0.5
   b) THE SLUMP SHALL BE BETWEEN 125mm TO 175mm WITH APPROVED SUPER PLASTICIZER.
2. NOMINAL CONCRETE COVER SHALL BE 75mm.
3. THE CONTRACTOR SHALL PROVIDE A SUPERVISOR WITH PREVIOUS EXPERIENCES ON BORED PILING.
4. DRILLING OPERATION OF BORE SHAFT SHALL BE COMPLETED IN A SINGLE OPERATION AND CONCRETING SHALL BE CARRIED OUT IMMEDIATELY AFTER CLEANING THE HOLE AND CARRIED OUT CONTINUOUSLY UNTIL COMPLETION
5. ALL REINFORCEMENT TO CONFORM TO MS 146 fy =460 N/mm2.
6. TEMPORARY STEEL CASING SHALL BE ADOPTED FOR THE INSTALLATION OF BOREPILES IF THE FOLLOWING CONDITIONS ARE MET:–
   a) TEST ON THE INITIAL BOREPILE INSTALL WITH TEMPORARY STEEL CASING SHOWS THAT THE PILE INTEGRITY IS NOT COMPROMISED. ie. PILE NECKING, ETC.
   b) THE OPERATION OF PULLING THE TEMPORARY STEEL CASING DOES NOT CAUSE ANY ADVERSE EFFECTS TO THE ENVIRONMENT IN TERM OF NOISE, VIBRATION, DAMAGE TO EXISTING STRUCTURES, EXCESSIVE SETTLEMENT OF GROUND ETC.
   c) THE OPERATION OF PULLING THE TEMPORARY STEEL CASING SHALL BE COMPLETED BY 10.00 PM. WHICH IS THE LIMIT OF WORKING HOURS.
7. IN THE EVENT THAT NONE OF THE ABOVE CONDITION IN NOTE 6 CAN BE MET ALL TEMPORARY STEEL CASING SHALL BE LEFT IN PLACE AS A PERMANENT STEEL CASING.
8. TEST LOAD TO TWICE WORKING LOAD.
9. ALL DIMENSIONS ARE IN mm UNLESS STATED OTHERWISE.
10. MAXIMUM PERMISSABLE DEVIATION OF THE PILE CENTER SHALL NOT EXCEED 75mm

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			UKURAN		PENGARAH KANAN		
					PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN		
PINDAAN					JURUAUDIT / JURUAUDIT KESELAMATAN JALAN; KETUA PENOLONG PENGARAH KANAN (DIREKABENTUK: / DISEMAK: / DILUKIS: / DILULUSKAN:); KETUA PENOLONG PENGARAH KANAN (HOPT)	BORED PILE DETAIL FOR BRIDGE	KEMENTERIAN KERJA RAYA
						TARIKH : / BIL. LUKISAN :	

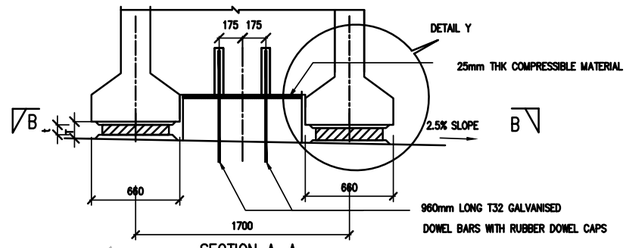
Model Drawing No. 13C



ABUTMENT A | PIER 1 | PIER 2 | ABUTMENT B

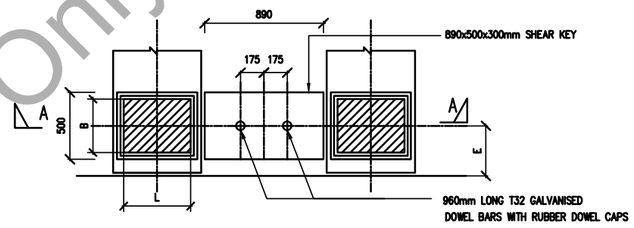
PLAN VIEW

NOT TO SCALE



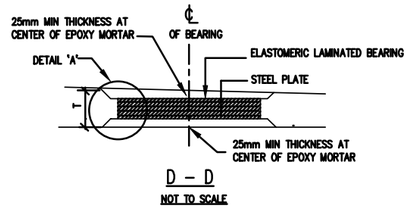
SECTION A–A

SCALE=1:20



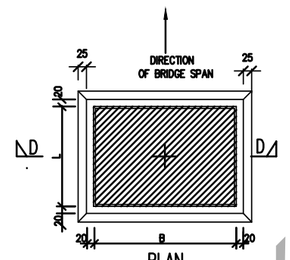
SECTION B–B

SCALE=1:20



D – D

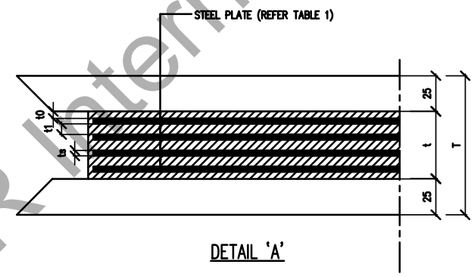
NOT TO SCALE



PLAN

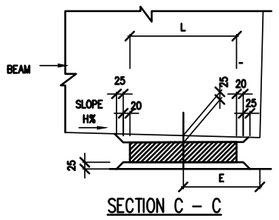
DETAILS OF ELASTOMERIC LAMINATED BEARING

NOT TO SCALE



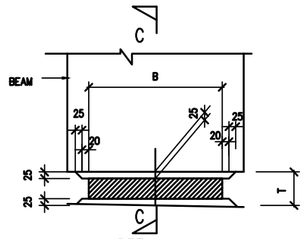
DETAIL 'A'

NOT TO SCALE



SECTION C – C

SCALE=1:10



DETAIL Y

SCALE=1:10

TABLE 1 : ELASTOMERIC LAMINATED BEARINGS

TYPE	DIMENSION L X B X t (mm)	COMPRESSIVE STIFFNESS (kN/mm)	SHEAR STIFFNESS (kN/mm)	MAXIMUM LOAD CAPACITY		MAX. SHEAR DEFLECTION (mm)	NATURAL RUBBER THICKNESS FOR		STEEL PLATE		TOTAL THICKNESS OF EPOXY MORTAR AND BEARING T (mm)	DISTANCE FROM CENTERLINE OF BEARING TO END OF BEAM (E)	REMARKS
				FIXED END (kN)	FREE END (kN)		INNER SLAB t1 (mm)	OUTER SLAB t2 (mm)	NOS.	THICKNESS t3 (mm)			TO BE USED IN CONJUNCTION WITH JKR BEAM

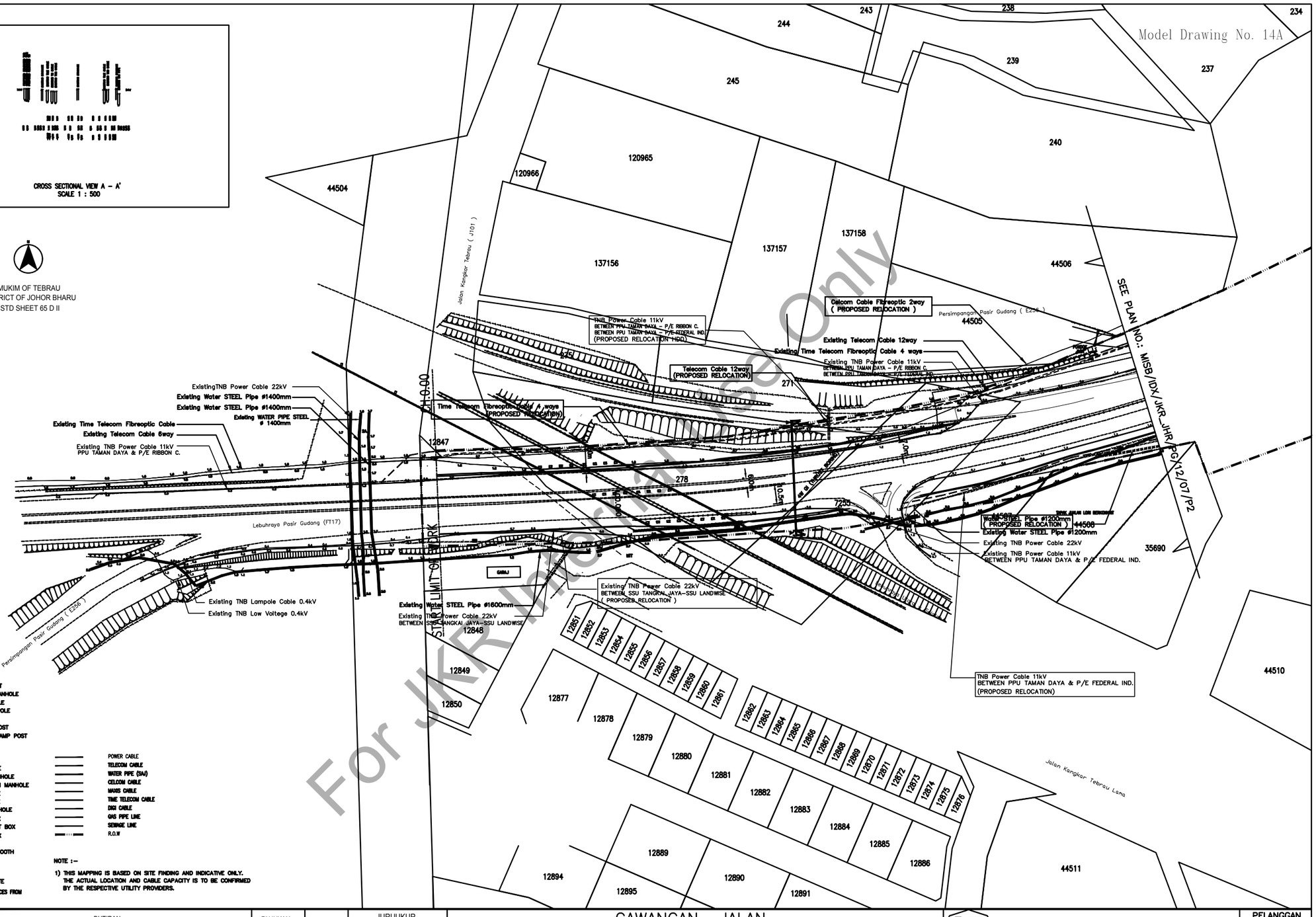
TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
			1 : 50 UKURAN		PENGARAH KANAN PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN JURUAUDIT / JURUAUDIT KESELAMATAN JALAN KETUA PENOLONG PENGARAH KANAN DIREKABENTUK: DISEMAK: DILUKIS: DILULUSKAN: KETUA PENOLONG PENGARAH KANAN (HOPT)	BEARING AND DOWEL BAR DETAILS	KEMENTERIAN KERJA RAYA
PINDAAN						TARIKH : BIL. LUKISAN :	

Model Drawing No. 14A

[redacted]

CROSS SECTIONAL VIEW A – A'
SCALE 1 : 500

MUKIM OF TEBRAU
DISTRICT OF JOHOR BHARU
STD SHEET 65 D II



LEGEND :

TL	TRAFFIC LIGHT		POWER CABLE
MK	SEWERAGE MANHOLE		TELECOM CABLE
EP	ELECTRIC POLE		WATER PIPE (SAJ)
TP	TELEPHONE POLE		CELCOM CABLE
SAJ	SAJ MARKER		MAXIS CABLE
KM	KILOMETRE POST		TIME TELECOM CABLE
	ELECTRICAL LAMP POST		DIGI CABLE
GAS	GAS MARKER		GAS PIPE LINE
	SIGNBOARD		SEWAGE LINE
MH	MANHOLE		R.O.W
MHG	GAS MANHOLE		
MHT	TELEKOM MANHOLE		
MHTT	TIME TELECOM MANHOLE		
MHD	DIGI MANHOLE		
SAJ	SAJ MANHOLE		
MHC	CELCOM MANHOLE		
TB	TELECOM BOX		
TLB	TRAFFIC LIGHT BOX		
EB	ELECTRIC BOX		
	HYDRANT		
TEL	TELEPHONE BOOTH		
	TREE		
	GUARDRAIL		
	FENCE & GATE		
0.8 1.2	DEPTH OF SERVICES FROM		

NOTE :–

1) THIS MAPPING IS BASED ON SITE FINDING AND INDICATIVE ONLY. THE ACTUAL LOCATION AND CABLE CAPACITY IS TO BE CONFIRMED BY THE RESPECTIVE UTILITY PROVIDERS.

TARIKH	BUTIRAN	RUJUKAN

PINDAAN

1 : 1
1 : 2
UKURAN

JURUUKUR

CAWANGAN JALAN

PENGARAH KANAN

PENGARAH PAKAR KEJURUTERAAN JALAN & JAMBATAN

JURUAUDIT

JURUAUDIT KESELAMATAN JALAN

KETUA PENOLONG PENGARAH KANAN

DIREKABENTUK: DISEMAK:

DILUKIS: DILULUSKAN:

KETUA PENOLONG PENGARAH KANAN (HOPT)

JABATAN KERJA RAYA MALAYSIA

PELANGGAN

KEMENTERIAN KERJA RAYA

UTILITIES RELOCATION

TARIKH :

BIL.
LUKISAN :

Model Drawing No. 15A

KERAJAAN MALAYSIA

JABATAN KERJA RAYA MALAYSIA

PEMASANGAN SISTEM ELEKTRIK UNTUK
[TAJUK PROJEK]

[TARIKH]

PEJABAT PENGARAH KANAN
CAWANGAN KEJURUTERAAN ELEKTRIK
IBU PEJABAT JKR MALAYSIA
TINGKAT 11, BLOK G,
NO. 6, JLN SULTAN SALAHUDDIN,
50480 KUALA LUMPUR
MALAYSIA

BAHAGIAN PERUNDING REKABENTUK (KUMPULAN E)
CAWANGAN KEJURUTERAAN ELEKTRIK
IBU PEJABAT JKR MALAYSIA

Model Drawing No. 15B

[TAJUK PROJEK]

LIST OF DRAWINGS :

BIL	DRAWING NO. (Refer Drawing Index)	DESCRIPTION
1	KPKR/J/R/_	LIST OF DRAWINGS
2	KPKR/J/R/_	STRIP MAP AND DESIGN CRITERIA
3	KPKR/J/R/_	BLOCK DIAGRAM FOR ELECTRICAL SUPPLY SYSTEM
4	KPKR/J/R/_	ROAD LIGHTING LAYOUT AT JUNCTION (NO. __)
5	KPKR/J/R/_	ROAD LIGHTING LAYOUT AT BRIDGE
6	KPKR/J/R/_	SCHEMATIC DIAGRAM FOR FEEDER PILLAR 1A AT JUNCTION (NO. __)
7	KPKR/J/R/_	ROAD CROSS SECTION OF ROAD LIGHTING
8	KPKR/J/R/_	ROAD LIGHTING COLUMN & TECHNICAL INFORMATION
9	KPKR/J/R/_	ROAD LIGHTING COLUMN DETAIL 1
10	KPKR/J/R/_	ROAD LIGHTING COLUMN DETAIL 2
11	KPKR/J/R/_	CORBEL AND PIT DETAIL @ PARAPET (BRIDGE)

LIST OF DRAWINGS :

BIL	DRAWING NO. (Refer Drawing Index)	DESCRIPTION
12	KPKR/J/R/_	TRAFFIC SIGNAL LIGHT LAYOUT AT JUNCTION (NO. __)
13	KPKR/J/R/_	SCHEMATIC DIAGRAM FOR TRAFFIC SIGNAL LIGHT CONTROLLER AT JUNCTION (NO. __)

TARIKH	BUTIRAN	RUJUKAN
PINDAAN		

JURUAUDIT

NO. LAPORAN AUDIT :

CAWANGAN KEJURUTERAAN ELEKTRIK

PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK
KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA
JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK

CAWANGAN JALAN

PENGARAH KANAN

KETUA PENOLONG PENGARAH KANAN (HOPT)

JABATAN KERJA RAYA MALAYSIA

PROJEK:

BUTIRAN: LIST OF DRAWING OF ELECTRICAL PLAN

TARIKH:	SKALA: N.T.S	BIL. LUKISAN:

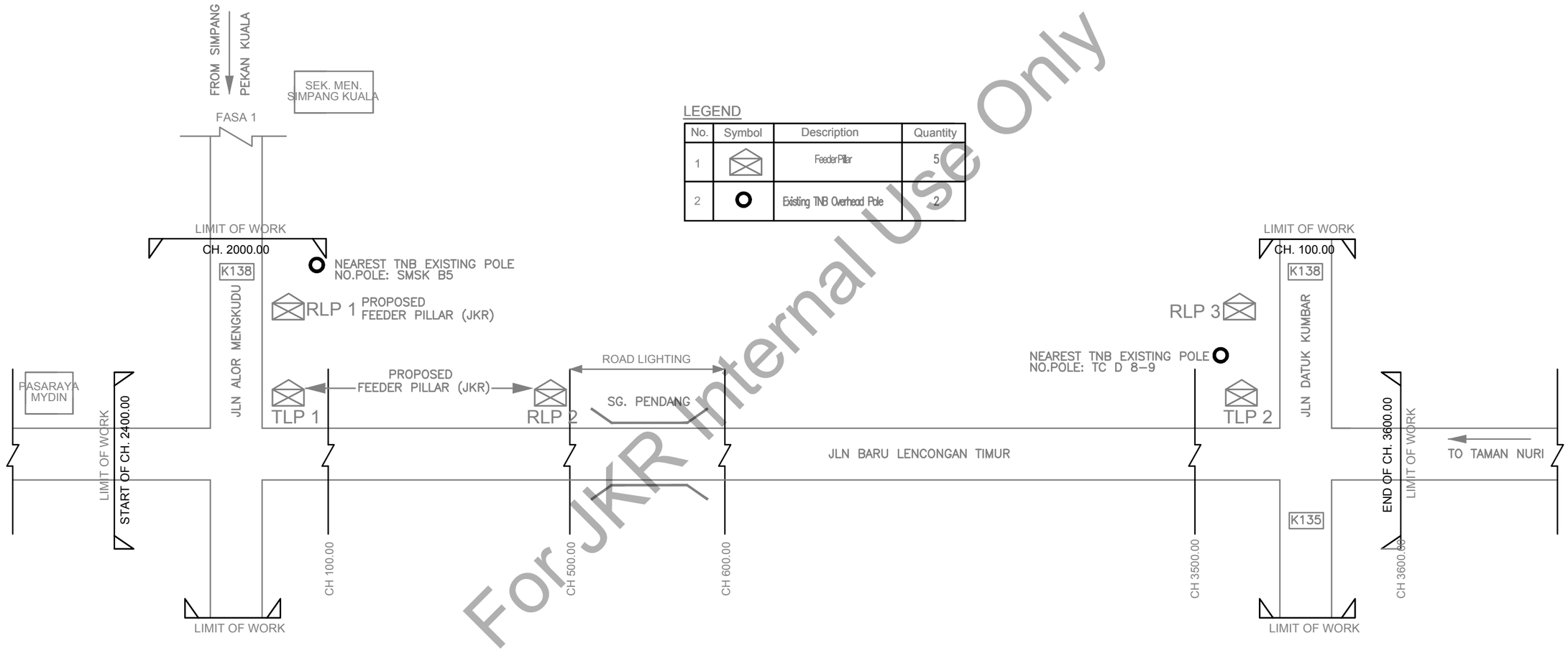
NAMA PELANGGAN

KEMENTERIAN KERJA RAYA

BIL. HELAIAN:

Model Drawing No. 15C

STRIP MAP FOR ELECTRICAL WORK SCOPE



LEGEND

No.	Symbol	Description	Quantity
1		Feeder Pillar	5
2		Existing TNB Overhead Pole	2

TARIKH	BUTIRAN	RUJUKAN

PINDAAN

JURUAUDIT

NO. LAPORAN AUDIT :

CAWANGAN KEJURUTERAAN ELEKTRIK	
PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK
KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA
JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK

CAWANGAN JALAN

PENGARAH KANAN

KETUA PENOLONG PENGARAH KANAN (HOPT)

JABATAN KERJA RAYA MALAYSIA

PROJEK:

BUTIRAN: STRIP MAP FOR ELECTRICAL WORK SCOPE

TARIKH: | SKALA: N.T.S | BIL. LUKISAN:

NAMA PELANGGAN

KEMENTERIAN KERJA RAYA

BIL. HELAIAN: .....

Model Drawing No. 15D

DESIGN CRITERIA OF ROAD LIGHTING

DESIGN STANDARDS

THE FOLLOWING DESIGN STANDARDS ARE USED IN DESIGNING ROAD LIGHTING.

- MS 825 : PART 1, 2007 - CODE OF PRACTICE FOR THE DESIGN OF ROAD LIGHTING LIGHTING OF ROADS AND PUBLIC AMENITY AREAS
- CIE 115-1995 : RECOMMENDATIONS FOR THE LIGHTING OF ROADS FOR MOTOR AND PEDESTRIAN TRAFFIC
- IEC 60598-2-3 : LUMINAIRES
- L-S20 : SPECIFICATION FOR ROAD LIGHTING INSTALLATION

DESIGN CRITERIA

ITEM	TYPICAL CONFLICT AREA (JUNCTION)
LIGHTING CLASS	CE2
MINIMUM MAINTAINED AVERAGE ILLUMINANCE (LUX)	20 LUX
ILLUMINANCE (INITIAL) / REQUIRED	24 LUX
OVERALL UNIFORMITY (E Min/ E Ave)	≥0.4
LONGITUDINAL UNIFORMITY (Emin / Emax)	-
DISABILITY GLARE (TI)	-
MAINTENANCE FACTOR	0.83 (ASSUMPTION : CLEANING INTERVAL = 36 MONTH, MEDIUM POLUTION, IP 6X MIN)
LIGHTING ARRANGEMENT	STAGGERED & OPPOSITE
AVERAGE DISTANCE	AT GRADE 40m AT BRIDGE (PARAPET) 35m
ROAD SURFACE TYPE	ASPHALT, Q_o = 0.07
CLASS OF ROAD = R3	

TYPE OF LUMINAIRES AND COLUMNS

TYPE OF COLUMNS :-

> ALL COLUMNS USED ARE OCTAGONAL HOT-DIPPED GALVANISED IRON (2 SECTIONS)

> LIGHTING COLUMNS ARE DESIGNED TO WITHSTAND A WIND SPEED OF 35m/s²

TYPE OF LUMINAIRES :-

> TYPE OF LUMINAIRES USED WILL BE AS FOLLOWS :

AREA	TYPE OF FITTING	LAMP LUMEN	ARM LENGTH	TILTING ANGLE
JUNCTION	1 X 250W HPSV LUMINAIRE MOUNTED ON 10m POLE	28000 Lm	2.5 m (WITH ARM)	5°
BRIDGE	1 X 250W HPSV LUMINAIRE MOUNTED ON 9m POLE AT BRIDGE PARAPET	28000 Lm	2.5 m (WITH ARM)	5°

> ALL LIGHT LUMINAIRES WILL MEET THE MINIMUM REQUIREMENT OF IP66 FOR OPTICAL COMPARTMENT AND MINIMUM IP43 FOR CONTROL GEAR COMPARTMENT.

> ACCESS TO THE INTERIOR OF THE LUMINAIRE SHALL BE FROM THE TOP. BOTTOM ACCESS IS NOT ACCEPTABLE.

> MAIN SUPPORTING STRUCTURE OF LUMINAIRE MADE OF DIE-CAST ALUMINIUM ALLOY MATERIALS..
GRP / FRP MATERIAL IS NOT ACCEPTABLE.

TARIKH	BUTIRAN	RUJUKAN
PINDAAN		

JURUAUDIT

NO. LAPORAN AUDIT :

CAWANGAN KEJURUTERAAN ELEKTRIK

PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK
KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA
JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK

CAWANGAN JALAN

PENGARAH KANAN

KETUA PENOLONG PENGARAH KANAN (HOPT)

JABATAN KERJA RAYA MALAYSIA

PROJEK:

BUTIRAN: DESIGN CRITERIA

TARIKH:	SKALA:	BIL. LUKISAN:
	N.T.S	

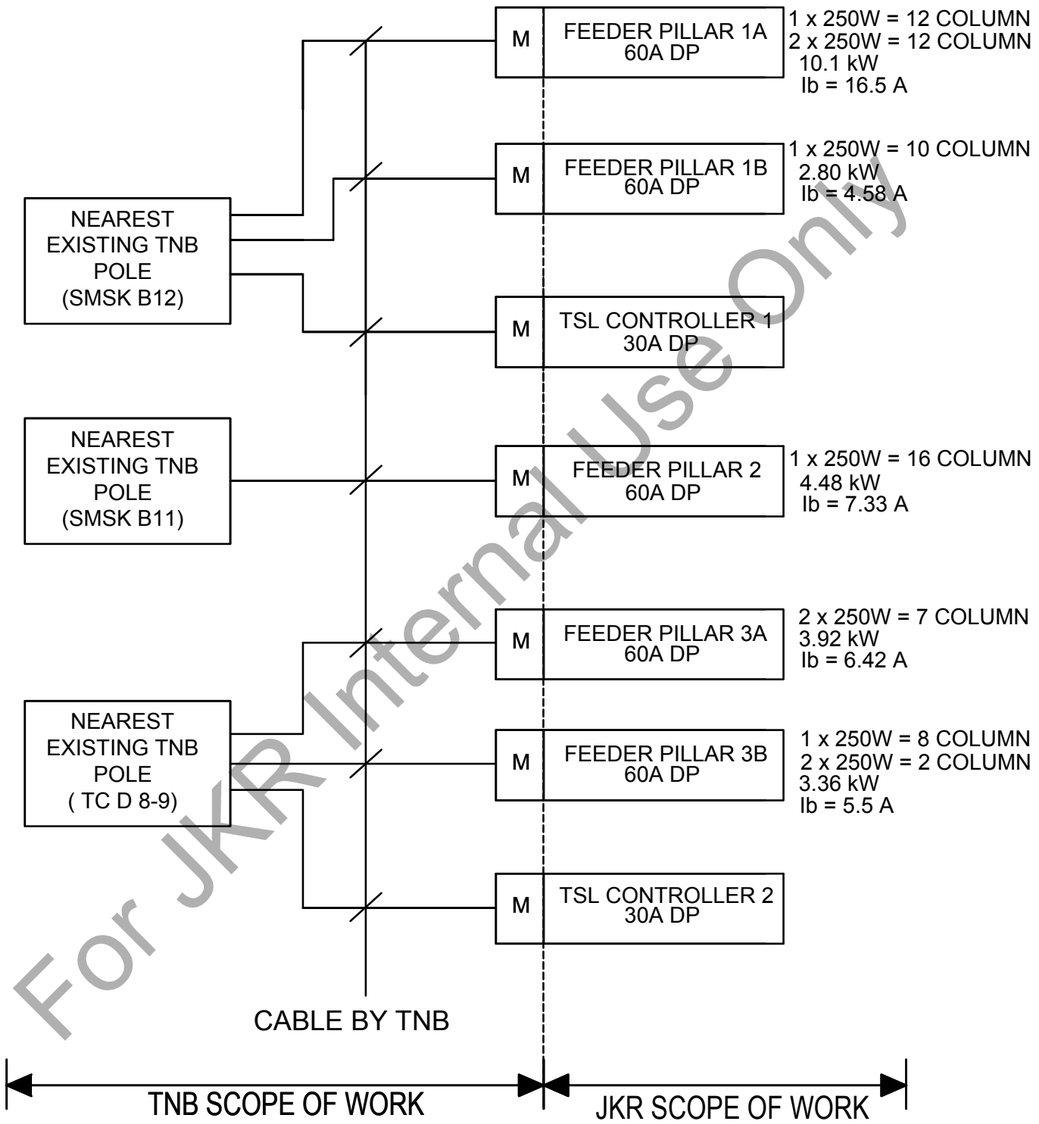
NAMA PELANGGAN

KEMENTERIAN KERJA RAYA

BIL. HELAIAN: .....

Model Drawing No. 15E

BLOCK DIAGRAM FOR ELECTRICAL SUPPLY SYSTEM



SURAT KELULUSAN
TNB/SESCO/SESB
RUJUKAN : XXXXXXX
TARIKH : YY-YY-YYYY

TARIKH	BUTIRAN	RUJUKAN	JURUAUDIT	CAWANGAN KEJURUTERAAN ELEKTRIK		CAWANGAN JALAN
				PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK	PENGARAH KANAN
				KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA	
			NO. LAPORAN AUDIT :	JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK	KETUA PENOLONG PENGARAH KANAN (HOPT)
PINDAAN						

JABATAN KERJA RAYA MALAYSIA

PROJEK:

BUTIRAN: BLOCK DIAGRAM FOR ELECTRICAL DISTRIBUTION SYSTEM

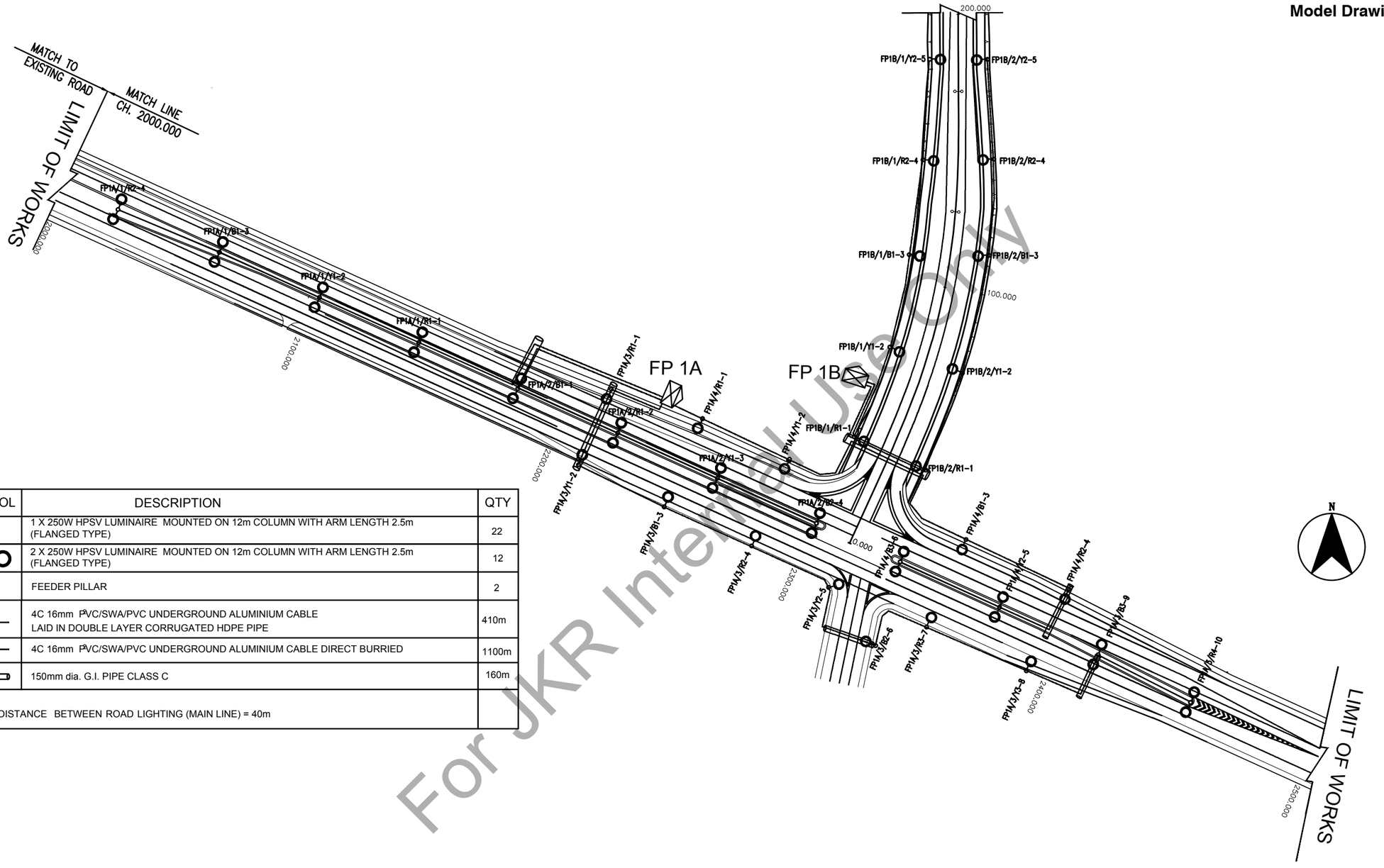
TARIKH:	SKALA: N.T.S	BIL. LUKISAN:

NAMA PELANGGAN

KEMENTERIAN KERJA RAYA

BIL. HELAIAN:

Model Drawing No. 15F



LEGEND

SYMBOL	DESCRIPTION	QTY
	1 X 250W HPSV LUMINAIRE MOUNTED ON 12m COLUMN WITH ARM LENGTH 2.5m (FLANGED TYPE)	22
	2 X 250W HPSV LUMINAIRE MOUNTED ON 12m COLUMN WITH ARM LENGTH 2.5m (FLANGED TYPE)	12
	FEEDER PILLAR	2
	4C 16mm ^{2}PVC/SWA/PVC UNDERGROUND ALUMINIUM CABLE LAID IN DOUBLE LAYER CORRUGATED HDPE PIPE	410m
	4C 16mm ^{2}PVC/SWA/PVC UNDERGROUND ALUMINIUM CABLE DIRECT BURRIED	1100m
	150mm dia. G.I. PIPE CLASS C	160m
Notes: AVERAGE DISTANCE BETWEEN ROAD LIGHTING (MAIN LINE) = 40m		

TARIKH	BUTIRAN	RUJUKAN	JURUAUDIT	CAWANGAN KEJURUTERAAN ELEKTRIK		CAWANGAN JALAN
			UNIT KESELAMATAN JALAN	PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK	PENGARAH KANAN
				KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA	KETUA PENOLONG PENGARAH KANAN (HOPT)
			NO. LAPORAN AUDIT :	JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK	
PINDAAN						

JABATAN KERJA RAYA MALAYSIA

PROJEK:

BUTIRAN: ROAD LIGHTING LAYOUT AT JUNCTION (No.)

TARIKH:	SKALA: 1: 1500	BIL. LUKISAN:

NAMA PELANGGAN

KEMENTERIAN KERJA RAYA

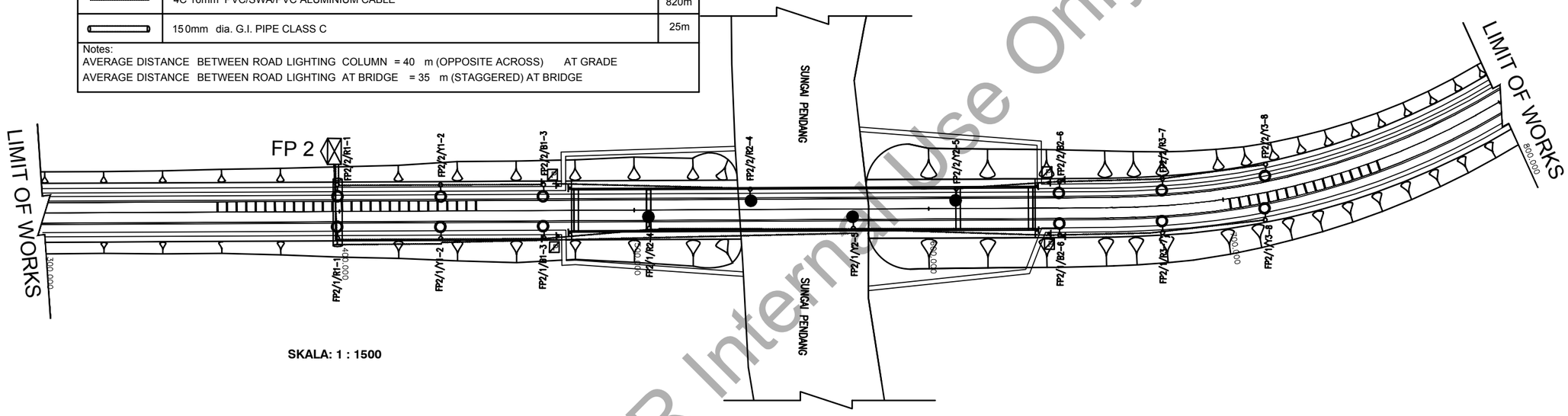
BIL. HELAIAN:

Model Drawing No. 15G

LEGEND

SYMBOL	DESCRIPTION	QTY
	1 X 250W HPSV LUMINAIRE MOUNTED ON 12m COLUMN WITH ARM LENGTH 2.5m - AT GRADE (FLANGED TYPE)	12
	1 X 250W HPSV LUMINAIRE MOUNTED ON 11m COLUMN WITH ARM LENGTH 2.5m - AT BRIDGE (FLANGED TYPE)	4
	FEEDER PILLAR	1
	400mm X 400mm X 500mm CABLE PIT C/W COVER	4
	4C 16mm PVC/SWA/PVC ALUMINIUM CABLE	820m
	150mm dia. G.I. PIPE CLASS C	25m

Notes:
AVERAGE DISTANCE BETWEEN ROAD LIGHTING COLUMN = 40 m (OPPOSITE ACROSS) AT GRADE
AVERAGE DISTANCE BETWEEN ROAD LIGHTING AT BRIDGE = 35 m (STAGGERED) AT BRIDGE



SKALA: 1 : 1500

TARIKH	BUTIRAN	RUJUKAN	JURUAUDIT	CAWANGAN KEJURUTERAAN ELEKTRIK		CAWANGAN JALAN
			UNIT KESELAMATAN JALAN	PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK	PENGARAH KANAN
				KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA	KETUA PENOLONG PENGARAH KANAN (HOPT)
			NO. LAPORAN AUDIT :	JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK	
PINDAAN						

JABATAN KERJA RAYA MALAYSIA

PROJEK:

BUTIRAN: ROAD LIGHTING LAYOUT AT BRIDGE

TARIKH:	SKALA: 1: 1500	BIL. LUKISAN:

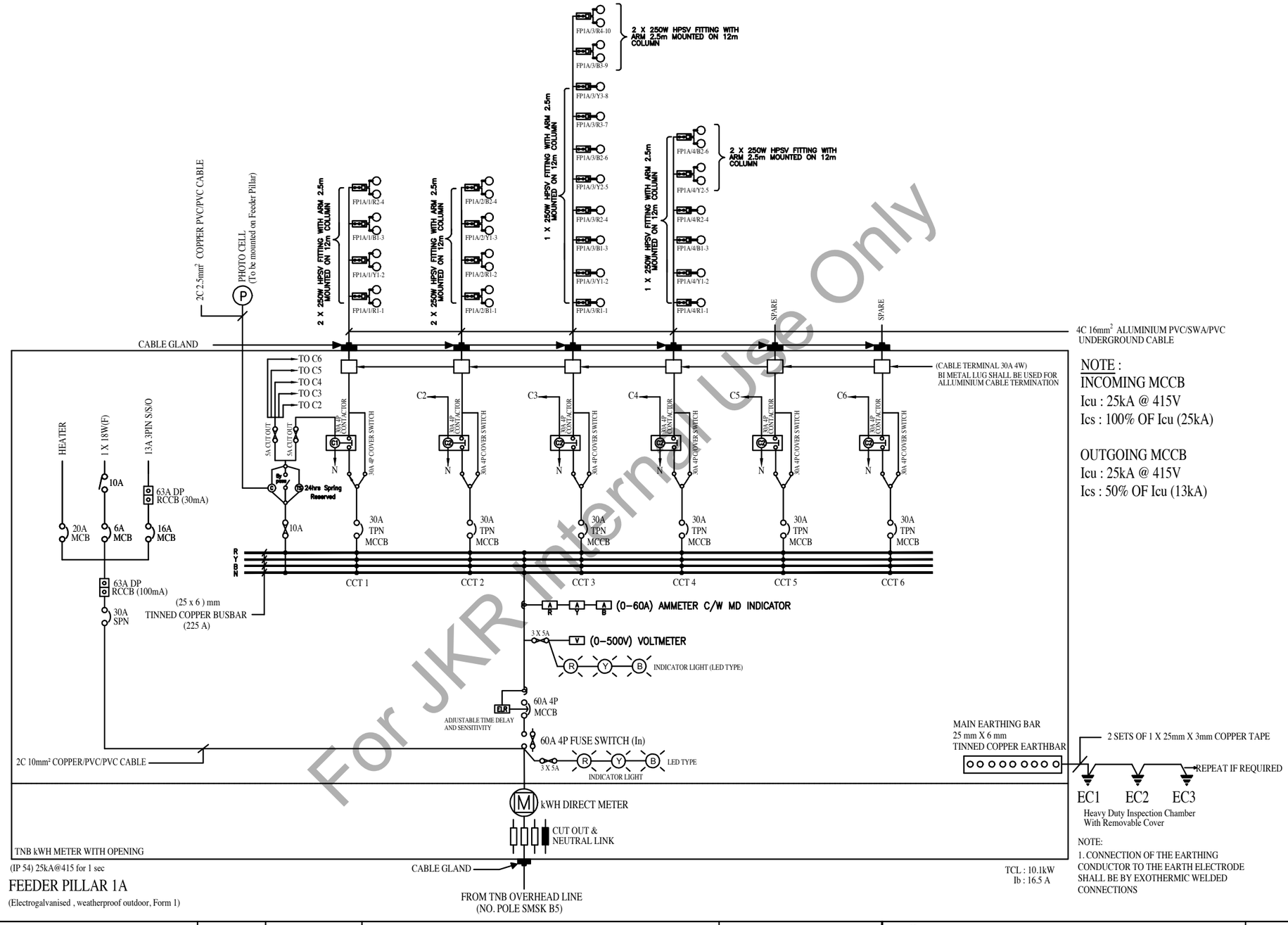
NAMA PELANGGAN

KEMENTERIAN KERJA RAYA

BIL. HELAIAN:

Model Drawing No. 15H

SCHEMATIC DRAWING FOR ROAD LIGHTING FEEDER PILLAR 1A



FEEDER PILLAR 1A

(Electrogalvanised , weatherproof outdoor, Form 1)

NOTE :

INCOMING MCCB
Icu : 25kA @ 415V
Ics : 100% OF Icu (25kA)

OUTGOING MCCB
Icu : 25kA @ 415V
Ics : 50% OF Icu (13kA)

NOTE:
1. CONNECTION OF THE EARTHING CONDUCTOR TO THE EARTH ELECTRODE SHALL BE BY EXOTHERMIC WELDED CONNECTIONS

TARIKH	BUTIRAN	RUJUKAN
PINDAAN		

JURUAUDIT	CAWANGAN KEJURUTERAAN ELEKTRIK		CAWANGAN JALAN
UNIT KESELAMATAN JALAN	PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK	PENGARAH KANAN
	KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA	KETUA PENOLONG PENGARAH KANAN (HOPT)
NO. LAPORAN AUDIT :	JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK	

JABATAN KERJA RAYA MALAYSIA

PROJEK:

BUTIRAN: SCHEMATIC DIAGRAM FOR FEEDER PILLAR (No.)

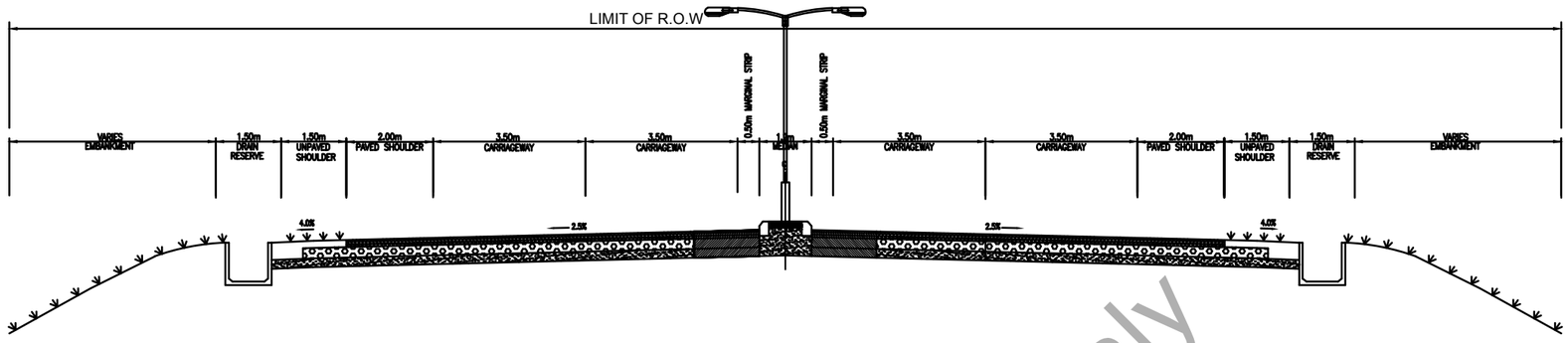
TARIKH:	SKALA: N.T.S	BIL. LUKISAN:

NAMA PELANGGAN

KEMENTERIAN KERJA RAYA

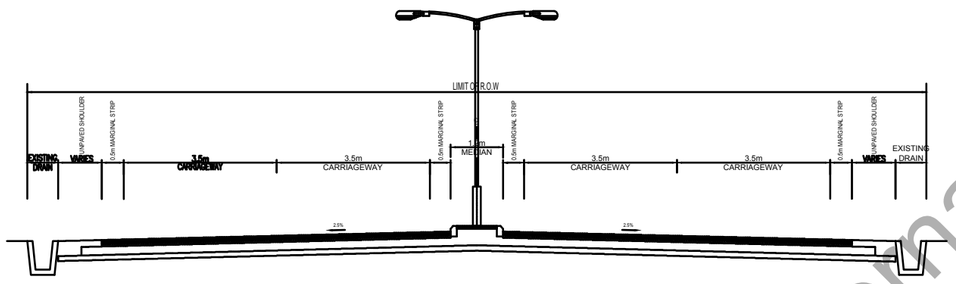
BIL. HELAIAN:

Model Drawing No. 15l

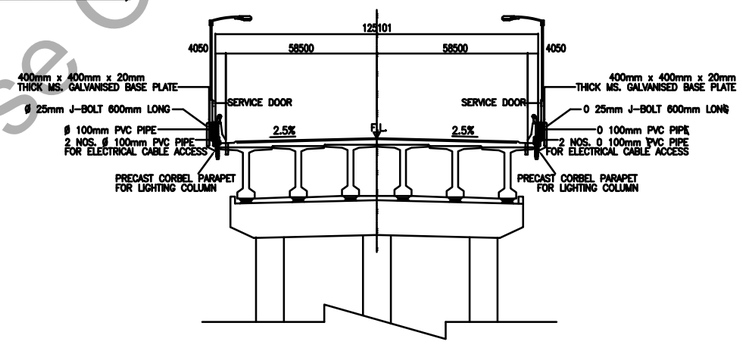


TYPICAL CROSS-SECTION OF U5 AT EXISTING ROAD. (CH. 2000.00 TO CH. 2500.00)

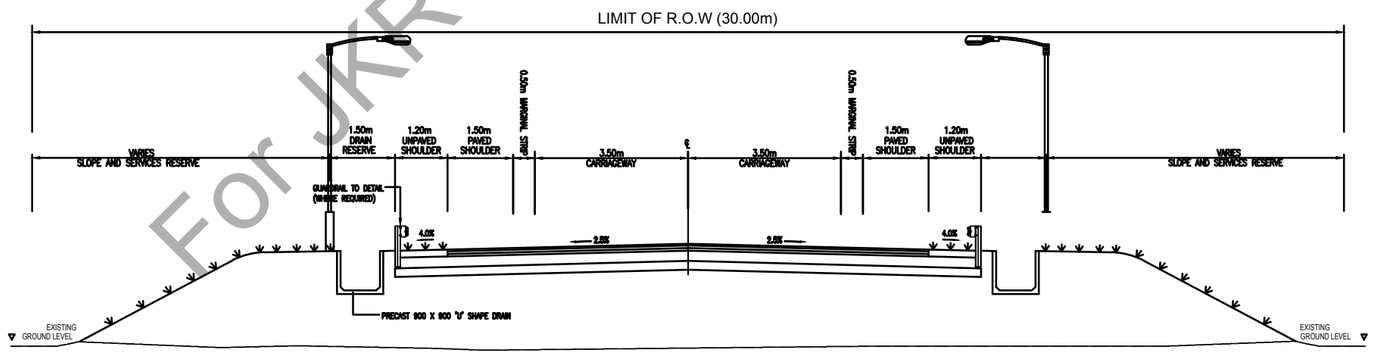
SCALE : 1 : 40



TYPICAL CROSS SECTION OF JALAN DATUK KUMBAR



TYPICAL CROSS SECTION OF BRIDGE



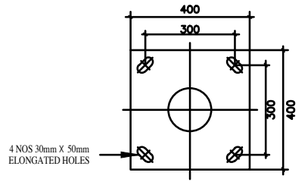
TYPICAL CROSS-SECTION OF U5 AT NEW ROAD.

TARIKH	BUTIRAN	RUJUKAN	JURUAUDIT	CAWANGAN KEJURUTERAAN ELEKTRIK		CAWANGAN JALAN
				PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK	PENGARAH KANAN
				KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA	
			NO. LAPORAN AUDIT :	JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK	KETUA PENOLONG PENGARAH KANAN (HOPT)
PINDAAN						

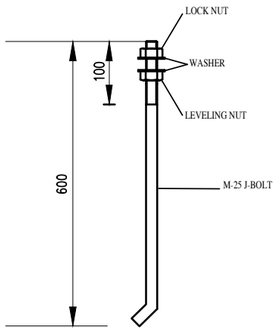
JKR	JABATAN KERJA RAYA MALAYSIA		NAMA PELANGGAN
PROJEK:			KEMENTERIAN KERJA RAYA
BUTIRAN:	TYPICAL CROSS SECTION OF ROAD LIGHTING		
TARIKH:	SKALA: N.T.S	BIL. LUKISAN:	BIL. HELAIAN:

CORBEL DETAIL & PIT DETAIL

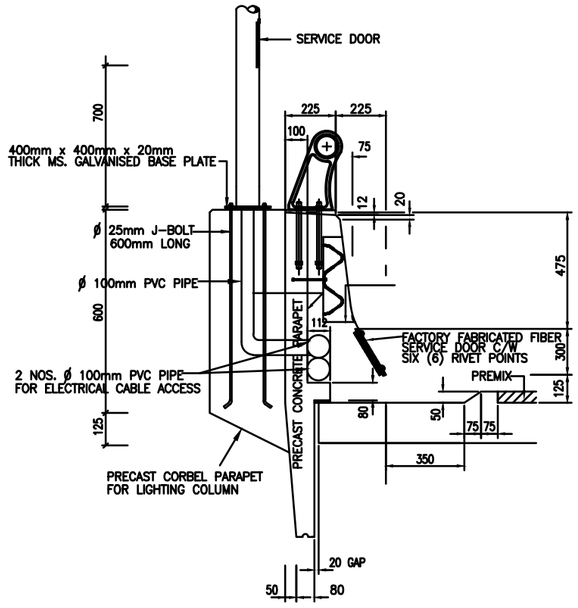
Model Drawing No. 15J



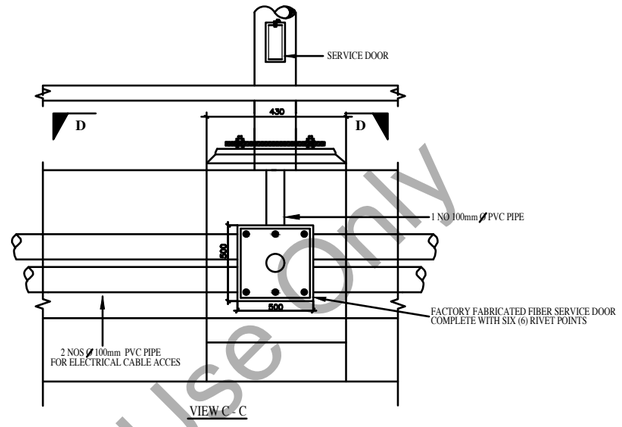
DETAIL OF MS.GALVANISED PLATE



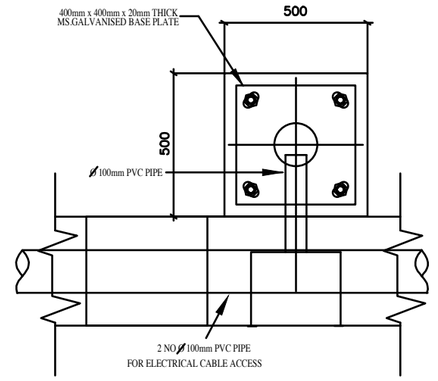
DETAIL OF J-BOLT (BY OTHERS)

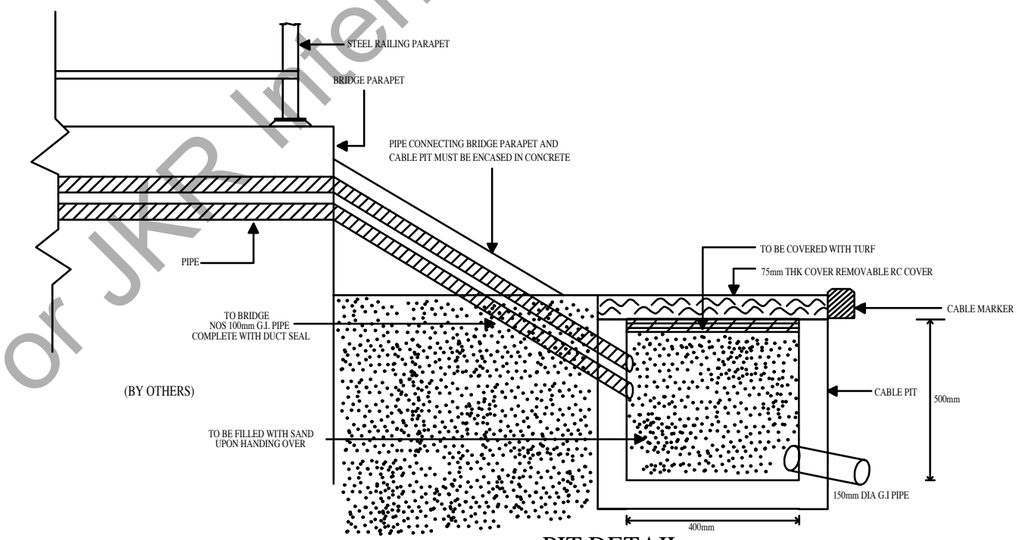


PARAPET TYPE 1 DETAILS WITH CORBEL



CORBEL DETAIL





PIT DETAIL

LUKISAN TENDER

TARIKH	BUTIRAN	RUJUKAN
PINDAAN		

JURUAUDIT	CAWANGAN KEJURUTERAAN ELEKTRIK		CAWANGAN JALAN
UNIT KESELAMATAN JALAN	PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK	PENGARAH KANAN
	KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA	KETUA PENOLONG PENGARAH KANAN (HOPT)
NO. LAPORAN AUDIT :	JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK	

JABATAN KERJA RAYA MALAYSIA

PROJEK :

BUTIRAN : DETAIL CORBEL AND PIT AT BRIDGE

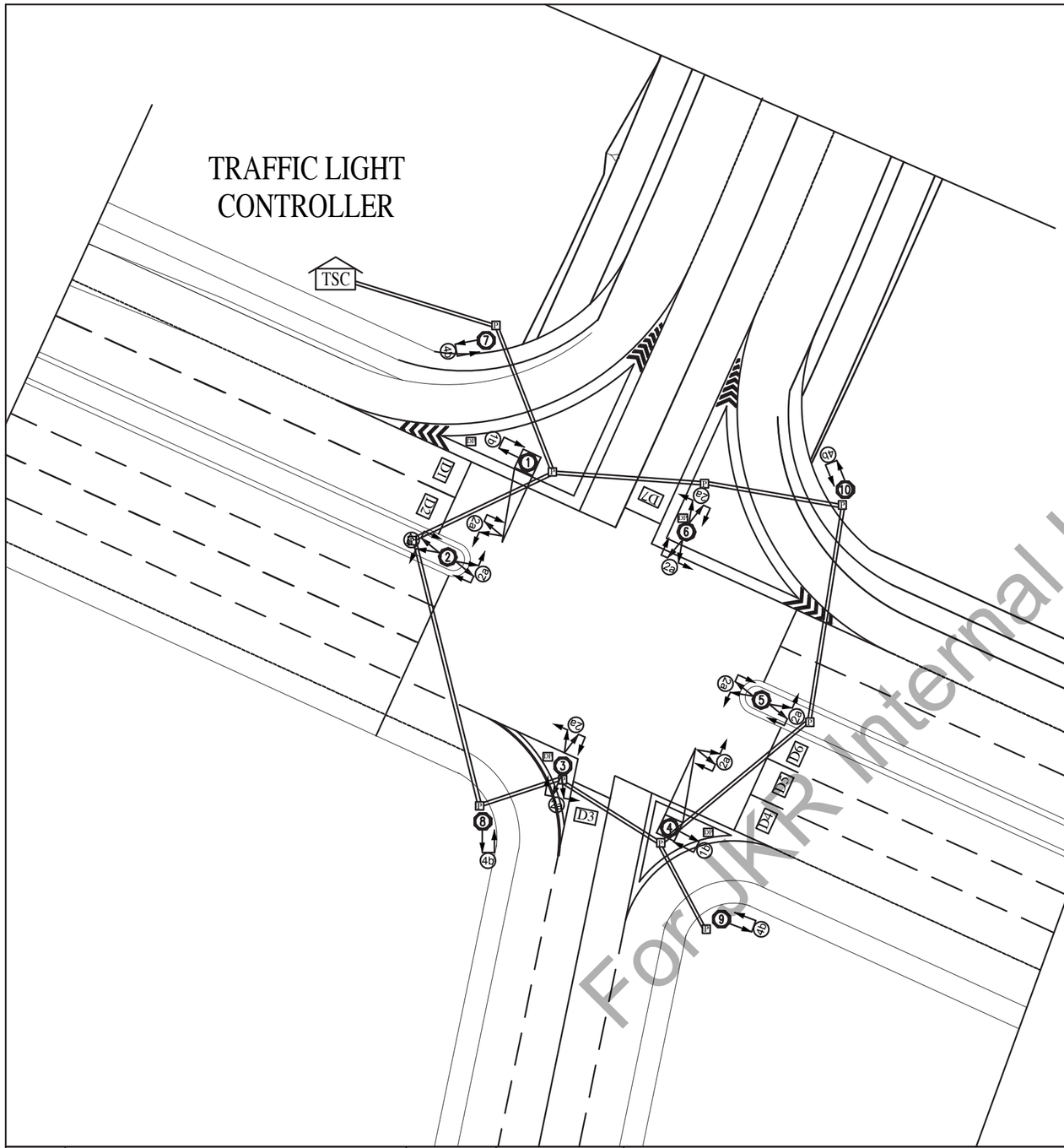
TARIKH:	SKALA:	BIL. LUKISAN:
	NTS	

NAMA PELANGGAN

KEMENTERIAN LUAR BANDAR DAN WILAYAH

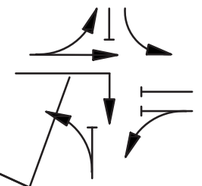
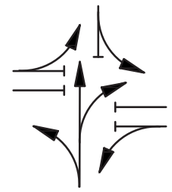
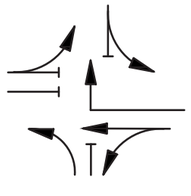
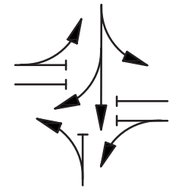
BIL. HELAIAN:

Model Drawing No. 15K



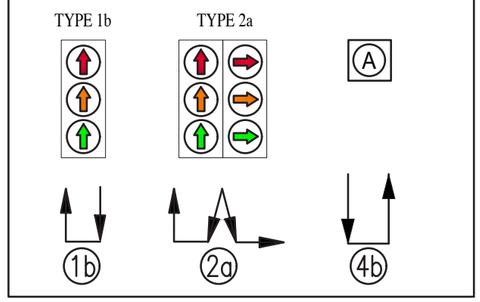
LEGEND:

SYMBOL	DESCRIPTION	QUANTITY
	OVERHEAD POLE	2 NOS.
	VERTICAL POLE	6 NOS.
1a	TYPE OF TRAFFIC SIGNAL HEAD	-
TSC	TRAFFIC SIGNAL CONTROLLER (TSC)	1 NO.
	100 mm GI PIPE CLASS 'C'	300 METER
D3	LOOP DETECTOR	7 NOS.
	DETECTOR PIT (300 mm X 300 mm X 300mm)	4 NOS.
	CABLE PIT (450 mm X 450 mm X 450mm)	8 NOS.

PHASE A	PHASE B	PHASE C	PHASE D
			

THE ACTUAL PHASING / PHASE TIME DESIGN SHALL BE OBTAINED FROM TRAFFIC DESIGNER (JURUTERA PERUNDING FAJAR SDN. BHD.)

SIGNAL HEAD LIGHT



* 1st ROAD LIGHTING POLE SHALL BE LOCATED WITHIN 3m FROM TRAFFIC SIGNAL POLE

TARIKH	BUTIRAN	RUJUKAN
PINDAAN		

JURUAUDIT	CAWANGAN KEJURUTERAAN ELEKTRIK	
UNIT KESELAMATAN JALAN	PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK
	KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA
NO. LAPORAN AUDIT :	JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK

CAWANGAN JALAN

PENGARAH KANAN

KETUA PENOLONG PENGARAH KANAN (HOPT)

JABATAN KERJA RAYA MALAYSIA

PROJEK:

BUTIRAN: TRAFFIC SIGNAL LIGHT LAYOUT AT JUNCTION (No.)

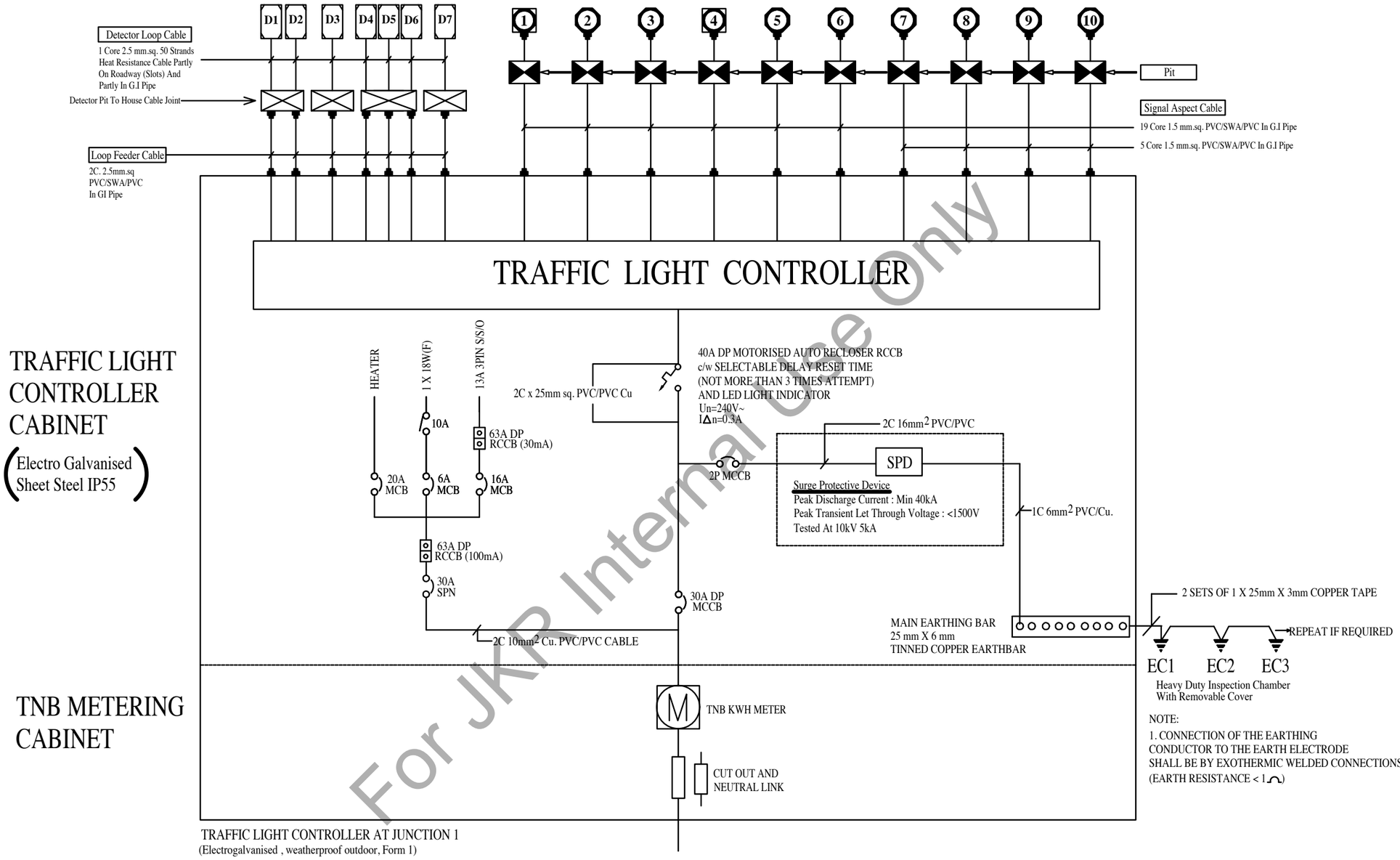
TARIKH:	SKALA: 1: 1500	BIL. LUKISAN:

NAMA PELANGGAN

KEMENTERIAN KERJA RAYA

BIL. HELAIAN:

Model Drawing No. 15L



TRAFFIC LIGHT CONTROLLER CABINET

(Electro Galvanised Sheet Steel IP55)

TNB METERING CABINET

TARIKH	BUTIRAN	RUJUKAN
PINDAAN		

JURUAUDIT	CAWANGAN KEJURUTERAAN ELEKTRIK		CAWANGAN JALAN
UNIT KESELAMATAN JALAN	PENGARAH KANAN	PENGARAH PERUNDING REKABENTUK	PENGARAH KANAN
	KETUA JURUTERA ELEKTRIK	JURUTERA ELEKTRIK PENGUASA	KETUA PENOLONG PENGARAH KANAN (HOPT)
NO. LAPORAN AUDIT :	JURUTERA ELEKTRIK	PENOLONG JURUTERA ELEKTRIK	

JABATAN KERJA RAYA MALAYSIA

PROJEK:

BUTIRAN: SCHEMATIC DIAGRAM FOR TRAFFIC LIGHT CONTROLLER AT JUNCTION (No.)

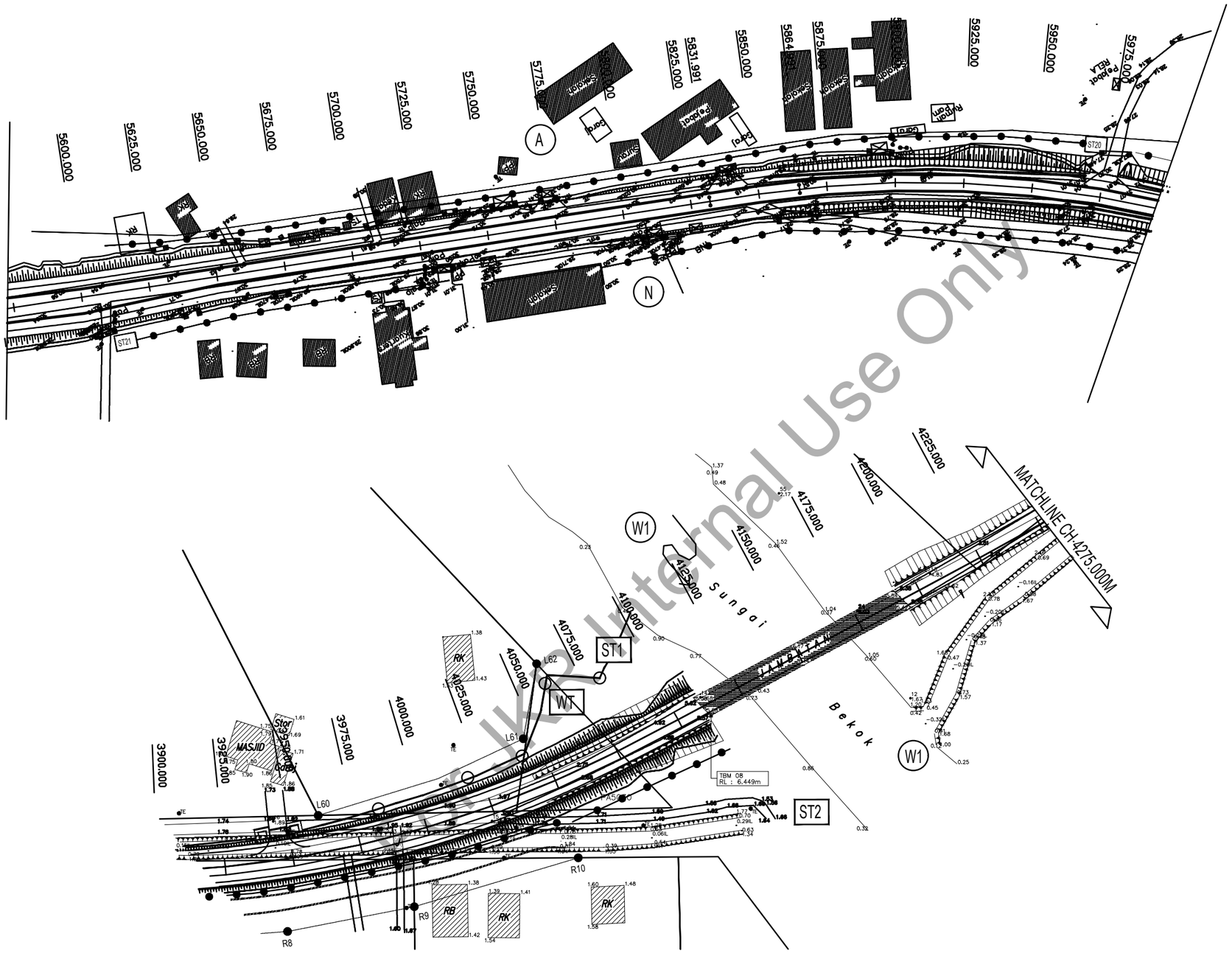
TARIKH:	SKALA: NTS	BIL. LUKISAN:

NAMA PELANGGAN

KEMENTERIAN KERJA RAYA

BIL. HELAIAN:

Model Drawing No. 16A



LEGEND

- ST — SILT TRAP
- WT — WASH THROUGH
- N — NOISE MONITORING
- A — AIR QUALITY
- W1 — WATER QUALITY
- CHECK DAM
- SILT FENCE
- EARTH DRAIN

TARIKH	BUTIRAN	RUJUKAN
PINDAAN		

1:1000
UKURAN

JURUUKUR
UNIT UKUR TANAH
CAW. PENGKALAN UDARA DAN MARITIM
JABATAN KERJA RAYA MALAYSIA

CAWANGAN ALAM SEKITAR & TENAGA

PENGARAH

JURUAUDIT
JURUAUDIT KESELAMATAN JALAN

KETUA PENOLONG PENGARAH
DIREKABENTUK:
DISEMAK:
DILUKIS:
DILULUSKAN:

CAWANGAN JALAN

PENGARAH

KETUA PENOLONG PENGARAH KANAN (HOPT)

JABATAN KERJA RAYA MALAYSIA

ENVIROMENTAL PROTECTION WORK

TARIKH :
BIL.
LUKISAN :

PELANGGAN
KEMENTERIAN KERJARAYA MALAYSIA

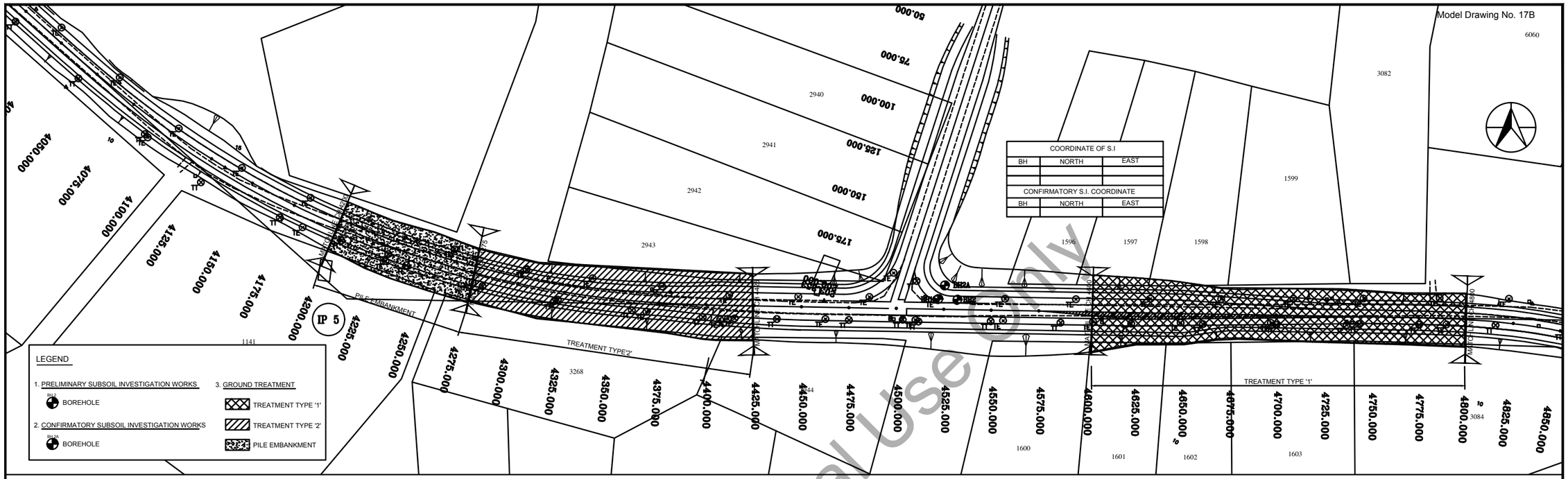
Model Drawing No. 17A

GROUND TREATMENT SCHEDULE

LOCATION CHAINAGE (m)	FULL / PARTIAL WIDTH	REMARKS	TYPE OF GROUND TREATMENT	DETAIL OF GROUND TREATMENT															
				1				2						3					
				REMOVAL & REPLACEMENT(R&R)				TEMPORARY SURCHARGE		PVD		GEOTEXTILE		PILE EMBANKMENT					
				R&R MATERIAL		GEOTEXTILE SEPARATOR	REINFORCING GEOTEXTILE					SEPARATOR	REINFORCING	PILE					SLAB
				SOIL/ SAND	DEPTH, D (m)	TYPE	TYPE	HEIGHT, H (m)	REST PERIOD, R (month)	LENGTH, L (m)	SPACING, S (m c/c)	TYPE	TYPE	TYPE	SIZE, D (mmxmm)	SPACING, S (m c/c)	PENETRATION LENGTH, L (m)	WORKING LOAD (kN)	THICKNESS, T (mm)
MAINLINE 1																			

TARIKH	BUTIRAN	RUJUKAN							
			NOT TO SCALE / UKURAN	JURUUKUR	CAWANGAN KEJURUTERAAN GEOTEKNIK		CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
PINDAAN					PENGARAH		PENGARAH		KEMENTERIAN KERJA RAYA
					JURUAUDIT	KETUA PENOLONG PENGARAH KANAN		GROUND TREATMENT SCHEDULE	
						DIREKABENTUK: / DISEMAK:			
						DILUKIS: / DILULUSKAN:	KETUA PENOLONG PENGARAH KANAN (HOPT)	TARIKH: / BIL. LUKISAN:	

Model Drawing No. 17B

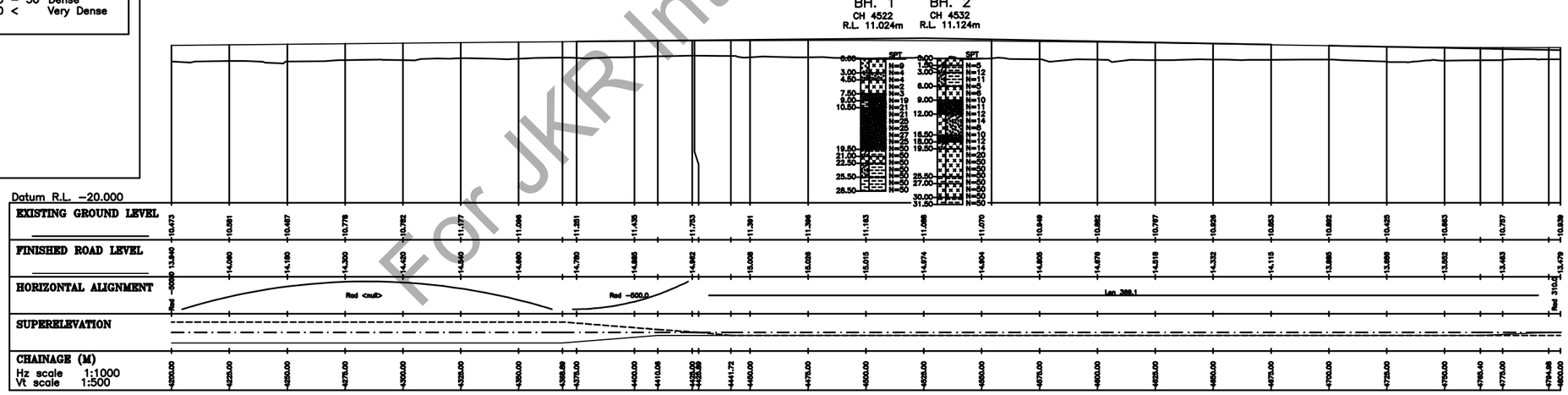


NOTES:

CONSISTENCY/RELATIVE DENSITY	
Cohesive Soil (N)	Non Cohesive Soil (N)
0 – 2 Very Soft	0 – 4 Very Loose
2 – 4 Soft	4 – 10 Loose
4 – 8 Medium Stiff	10 – 30 Medium Dense
8 – 15 Stiff	30 – 50 Dense
15 – 30 Very Stiff	50 < Very Dense
30 < Hard	

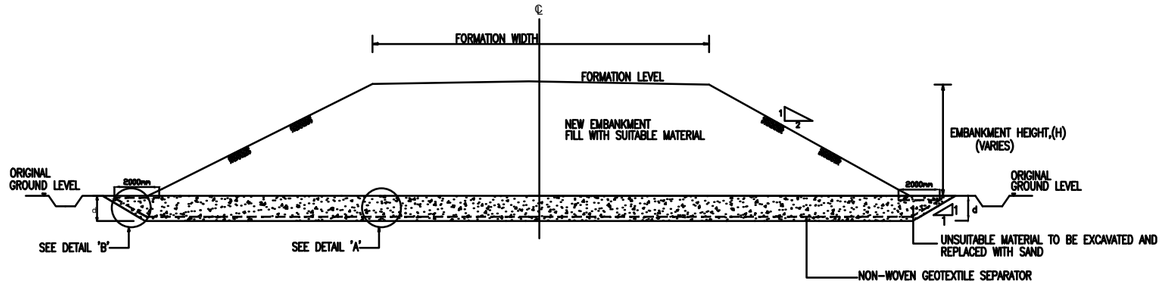
BOREHOLE PROFILE

- CLAY
- SILT
- SAND
- GRAVEL
- GRANITE

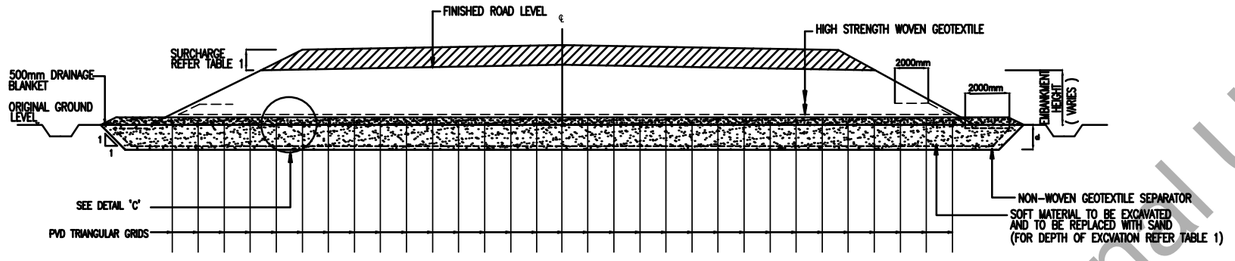


TARIKH	BUTIRAN	RUJUKAN						
			H-1 :1000 V-1 :200	JURUUKUR	CAWANGAN KEJURUTERAAN GEOTEKNIK		CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA
PINDAAN			UKURAN		PENGARAH		PENGARAH	PELANGGAN: KEMENTERIAN KERJA RAYA
					JURUAUDIT	KETUA PENOLONG PENGARAH KANAN		LOCATION OF SOIL PROFILE ON PLAN AND LONGITUDINAL PROFILE
						DIREKABENTUK: / DISEMAK:		
						DILUKIS: / DILULUSKAN:	KETUA PENOLONG PENGARAH KANAN (HOPT)	TARIKH: / BIL. LUKISAN:

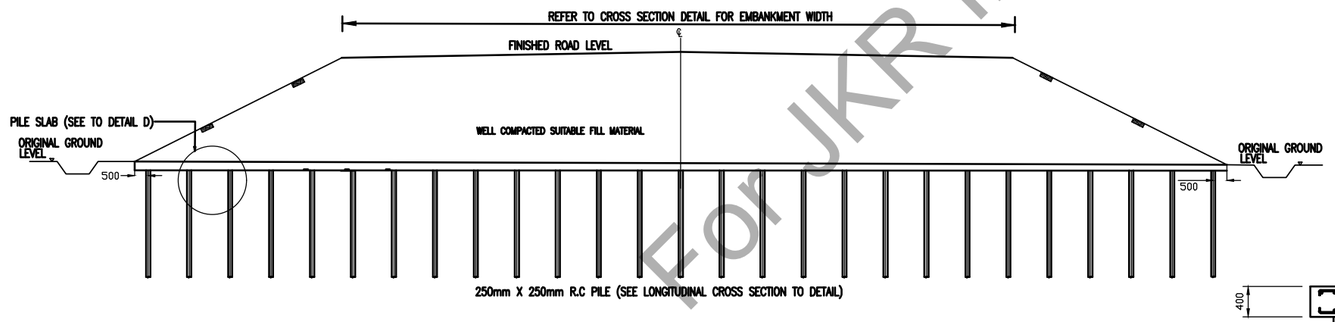
Model Drawing No. 17C



TREATMENT TYPE '1'
NEW EMBANKMENT
SCALE : N.T.S



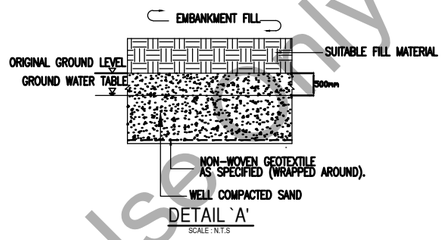
TREATMENT TYPE '2'
NEW EMBANKMENT WITH SAND REPLACEMENT & PVD
SCALE : N.T.S



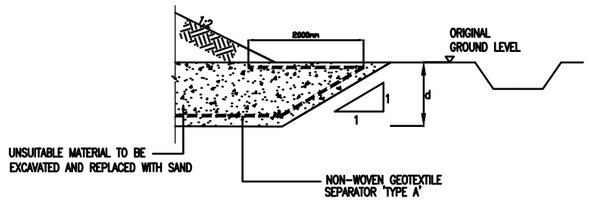
TYPICAL NEW PILED EMBANKMENT
SCALE : N.T.S

TABLE 1 : DETAIL OF GROUND TREATMENT

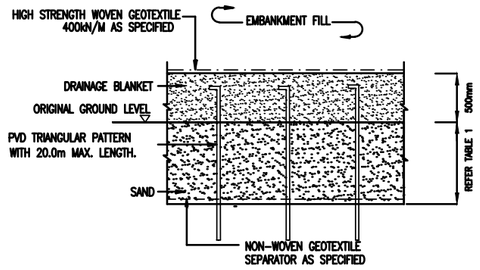
CHAINAGE	EMBANKMENT HEIGHT	MAX DEPTH OF EXCAVATION, (d)	TYPE OF TREATMENT	PROPOSED TREATMENT



DETAIL `A'
SCALE : N.T.S



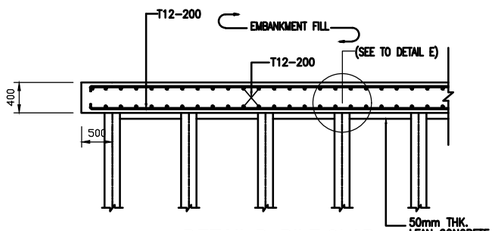
DETAIL `B'
SCALE : N.T.S



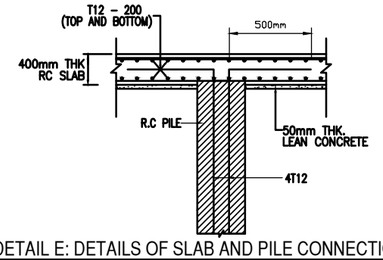
DETAIL 'C' : PVD
SCALE : N.T.S

TABLE 2 LOCATION AND DETAIL OF PILED EMBANKMENT

LOCATION	PILE SPACING	WORKING LOAD	NO. OF ROW (VERTICAL PILE)	PILE LENGTH (m)

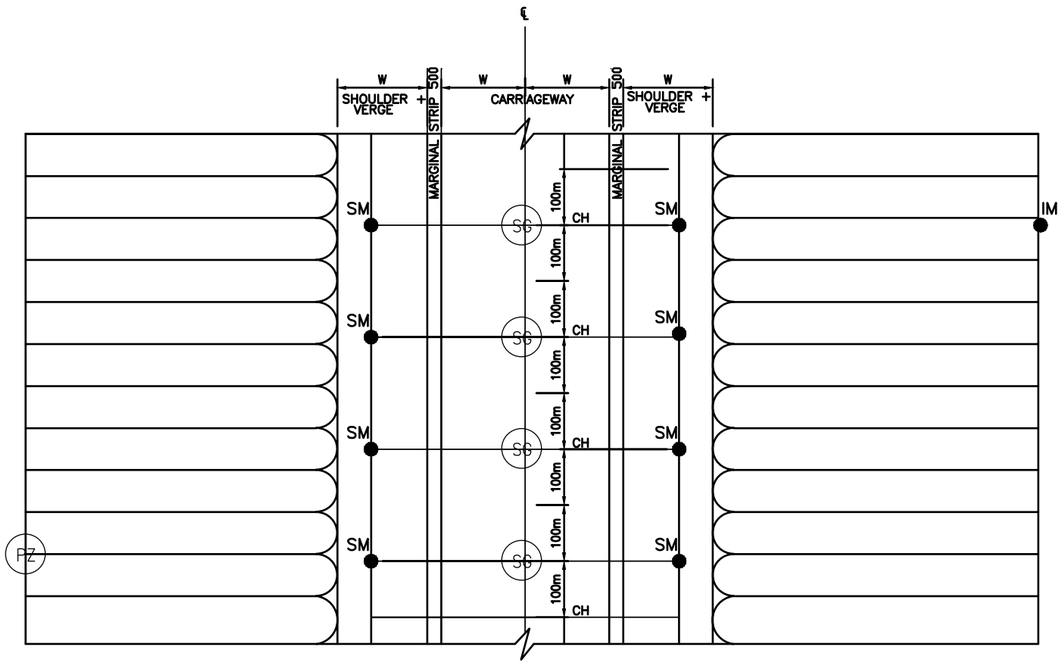


DETAIL D: PILE SLAB
SCALE: N.T.S



DETAIL E: DETAILS OF SLAB AND PILE CONNECTION
SCALE: N.T.S

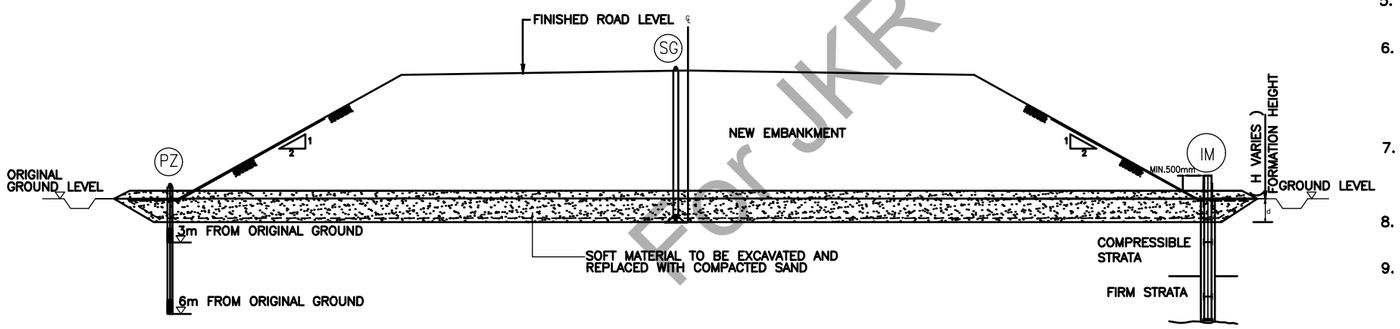
TARIKH	BUTIRAN	RUJUKAN						
					CAWANGAN KEJURUTERAAN GEOTEKNIK		CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
					PENGARAH		PENGARAH		KEMENTERIAN KERJA RAYA
PINDAAN			NOT TO SCALE / UKURAN	JURUUKUR	JURUAUDIT	KETUA PENOLONG PENGARAH KANAN		TYPICAL DETAILS OF GROUND TREATMENT	
						DIREKABENTUK: / DISEMAK:	KETUA PENOLONG PENGARAH KANAN (HOPT)	TARIKH:	BIL. LUKISAN:
						DILUKIS: / DILULUSKAN:			



ROAD SECTION
PLAN VIEW
SCALE N.T.S

LEGEND :-

- SG — DEEP SETTLEMENT GAUGES
- IM — INCLINOMETER
- SM — SETTLEMENT MARKER
- PZ — PIEZOMETER



TYPICAL CROSS SECTION FOR INSTRUMENTATION
SCALE N.T.S

TABLE 3 : INSTRUMENTATION SCHEDULES

CHAINAGE	FILL EMBANKMENT (m)	DEEP SETTLEMENT GAUGE (DSG)			SETTLEMENT MARKER (SM)		INCLINOMETER (IM)	
		LHS	C	RHS	LHS	RHS	LHS	RHS

TABLE 4: PROPOSED DATA COLLECTION SCHEDULE OF INSTRUMENTATION

DURATION	FREQUENCY
DURING FILLING WORKS UP TO SUBGRADE LEVEL	THE READING SHOULD BE RECORDED AFTER EACH CHANGE IN LOADING (EACH LAYER OF EMBANKMENT)
NEXT 2 WEEKS AFTER COMPLETION OF FILLING WORK	EVERY 3 DAYS
NEXT 4 WEEKS	1 TRIP / WEEK
NEXT 13 WEEKS	1 TRIP / 2 WEEKS

NOTES :

1. ALL INSTRUMENTS SHALL BE IN ACCORDANCE TO THE SPECIFICATION AT LOCATIONS SPECIFIED IN TABLE 3. THE INSTRUMENTS SHALL BE ARRANGED AT LOCATIONS SUBJECT TO MINIMUM CONSTRUCTION ACTIVITIES AND OBSTRUCTION.
2. PROCEDURE OF MONITORING AND FREQUENCIES OF THE INSTRUMENTS SHALL BE IN ACCORDANCE TO THE SPECIFICATION AND TABLE 4.
3. PROPER PROTECTIONS APPROVED BY THE ENGINEER SHALL BE PROVIDED FOR ALL INSTRUMENTS.
4. SHOULD ANY INSTRUMENT BE DAMAGED, ALL CONSTRUCTION ACTIVITIES IN THE VICINITY OF THE INSTRUMENT SHALL BE STOPPED UNTIL THE NECESSARY REMEDIAL WORKS HAVE BEEN SATIFACTORILY CARRIED OUT.
5. THE METHOD STATEMENT FOR INSTALLATION OF INSTRUMENTS NEED TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO STARTING OF WORKS.
6. SETTLEMENT PLATES ARE USED TO MEASURE SETTLEMENT TAKING PLACE BENEATH THE EMBANKMENT DURING AND AFTER CONSTRUCTION . THE BASE PLATE AND THE FIRST LENGTH OF ROD SHALL BE PLACED AS EARLY AS POSSIBLE DURING EARTHWORKS, PREFERABLY BEFORE ANY SIGNIFICANT FILLING (INCLUDING ANY DRAINAGE BLANKET).
7. SETTLEMENT PLATE AND MARKERS SHALL BE MONITORED BY STANDARD LEVELLING TECHNIQUES. THE DATUM USED SHALL BE PREFERABLY REQUIRE ONLY ONE SET UP TO THE LEVEL AND LEVELLING SHALL BE CLOSED BACK TO THE APPROVED DATUM LOCATED ON FIRM GROUND.
8. TEMPORARY BENCH MARK (TBM) SHALL SET ON STABLE GROUND OR AT EXISTING PILED STRUCTURE APPROVED BY ENGINEER.
9. THE CONTRACTOR SHALL CEASE FILLING AND INFORM THE S.O SHOULD THE INSTRUMENT SHOW THE FOLLOWING OVER A ONE WEEK MONITORING PERIOD.

(i) $\frac{\text{CHANGE OF PORE WATER PRESSURE}}{\text{INCREASE IN EMBANKMENT PRESSURE}} > 0.7$ (ii) $\frac{\text{MAXIMUM SURFACE HEAVE}}{\text{MAXIMUM VERTICAL SETTLEMENT}} > 0.2$

TARIKH	BUTIRAN	RUJUKAN		JURUUKUR	CAWANGAN KEJURUTERAAN JALAN & GEOTEKNIK	CAWANGAN JALAN	JABATAN KERJA RAYA MALAYSIA	PELANGGAN
					PENGARAH	PENGARAH		KEMENTERIAN KERJA RAYA
PINDAAN			NOT TO SCALE UKURAN		JURUAUDIT / KETUA PENOLONG PENGARAH KANAN	KETUA PENOLONG PENGARAH KANAN (HOPT)	DETAIL OF INSTRUMENTATION	
					DIREKABENTUK: / DISEMAK: / DILUKIS: / DILULUSKAN:		TARIKH: / BIL. LUKISAN:	