

KEMENTERIAN PENDIDIKAN TINGGI
POLITEKNIK JELI KELANTAN

DOKUMEN SEBUTHARGA

PROJEK : **TAWARAN SEMULA BAGI KERJA-KERJA
MEMBINA DAN MENYIAPKAN LALUAN
PEJALAN KAKI BERBUMBUNG
MENGHUBUNGAN BANGUNAN
ASRAMA KE BANGUNAN INDUK
POLITEKNIK JELI, KELANTAN.**

**NO.
SEBUTHARGA** : **PJK(S)/SH/04/2016**

*PENGARAH,
POLITEKNIK JELI
JALAN RAYA TIMUR-BARAT*

KANDUNGAN

<u>NO.</u>	<u>ITEM</u>
1.	ARAHAN KEPADA PENYEBUTHARGA
2.	SYARAT-SYARAT SEBUTHARGA
3.	BORANG SEBUTHARGA
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**SENARAI SEMAKAN
(BEKALAN/PERKHIDMATAN/KERJA)**

Sila tandakan Bagi Dokumen-dokumen Yang Disertakan.

Bil.	Perkara/Dokumen	Untuk Ditanda Oleh Syarikat	Untuk Ditanda Oleh Jawatankuasa Pembuka Sebut Harga
1.	Salinan Sijil Akuan Pendaftaran Dari Kementerian Kewangan (Bekalan/Perkhidmatan)		<input type="checkbox"/>
2.	Salinan Sijil Akuan Bumiputera Dari Kementerian Kewangan (Bekalan/Perkhidmatan)		<input type="checkbox"/>
3.	Salinan Sijil Akuan Pembuat Dari Kementerian Kewangan (Bekalan/Perkhidmatan)		<input type="checkbox"/>
4.	Salinan Perakuan Pendaftaran Dari CIDB (Kerja)		<input type="checkbox"/>
5.	Salinan Sijil Perolehan Kerja Kerajaan Dari CIDB (Kerja)		<input type="checkbox"/>
6.	Salinan Sijil Taraf Bumiputera Dari Pusat Khidmat Kontraktor (Kerja)		<input type="checkbox"/>
7.	Borang Sebut Harga Telah Diisi Dengan Lengkap (termasuk nilai tawaran dan tempoh siap) dan Ditandatangani		<input type="checkbox"/>
8.	Borang Maklumat Penyebut Harga		<input type="checkbox"/>
9.	Pematuhan Kepada Spesifikasi		<input type="checkbox"/>
10.	Borang Penyerahan Contoh Dan Katalog (jika berkaitan)		<input type="checkbox"/>
11.	Cadangan Penyelenggaraan/Penyenggaraan (jika perlu)		<input type="checkbox"/>

Bil.	Perkara/Dokumen	Untuk Ditanda Oleh Syarikat	Untuk Ditanda Oleh Jawatankuasa Pembuka Sebut Harga
12.	Senarai Kakitangan Teknikal (jika berkaitan)		<input type="checkbox"/>
13.	Salinan Penyata Bulanan Akaun Bank bagi Tiga (3) Bulan Terakhir		<input type="checkbox"/>
14.	Lain-lain Sekiranya Ada		<input type="checkbox"/>

PENGESAHAN OLEH SYARIKAT	UNTUK KEGUNAAN JABATAN
<p>Dengan ini saya mengesahkan bahawa saya telah membaca dan memahami semua syarat-syarat dan terma yang dinyatakan di dalam dokumen sebut harga. Semua maklumat yang dikemukakan adalah benar.</p> <p>Tandatangan :</p> <p>Nama :</p> <p>Jawatan :</p> <p>Tarikh :</p>	<p>Jawatankuasa Pembuka Sebut Harga mengesahkan penerimaan dokumen bertanda kecuali bagi perkara bil. (jika ada).</p> <p>Tandatangan :</p> <p>Nama :</p> <p>Jawatan :</p> <p>Tarikh :</p> <p>Tandatangan :</p> <p>Nama :</p> <p>Jawatan :</p> <p>Tarikh :</p>

ARAHAN KEPADA PENYEBUTHARGA

1. HAK POLITEKNIK JELI KELANTAN (PJK) UNTUK MENERIMA / MENOLAK SEBUTHARGA

Politeknik Jeli Kelantan (PJK) adalah tidak terikat untuk menerima Sebutharga yang terendah atau mana-mana Sebutharga atau memberi apa-apa sebab di atas penolakan sesuatu Sebutharga. Keputusan Jawatankuasa Sebutharga adalah muktamad.

2. CARA-CARA MELENGKAPKAN DOKUMEN SEBUTHARGA

2.1. Penyediaan Sebutharga

Kontraktor adalah dikehendaki mengisi segala maklumat berikut dengan sepenuhnya:-

- a) Harga dan tandatangan Kontraktor di Ringkasan Sebutharga,
- b) Harga, tempoh dan tandatangan dalam Borang Sebutharga,
- c) Senarai Kerja Dalam Tangan,
- d) Jadual Kadar Harga (Jika ada),
- e) Butir-butir Spesifikasi. (Jika ada)
- f) Lampiran

Jika berlaku kesilapan dalam mengisi maklumat-maklumat di atas Kontraktor hendaklah menandatangani ringkas semua pembetulan.

2.2. Penyerahan Dokumen Sebutharga

- a) Dokumen Sebutharga yang telah diisi dengan lengkap hendaklah dimasukkan ke dalam sampul surat berlakri yang dicatatkan dengan Bilangan Sebutharga **PJK(S)/SH/04/2016** serta Tajuk Sebutharga dan hendaklah dimasukkan ke dalam Peti Sebutharga pada atau sebelum **4 September 2016, 12.30 tengahari**.
- b) Jika Dokumen Sebutharga tidak diserahkan dengan tangan, Penyebutharga hendaklah menghantar Dokumen tersebut dengan pos supaya tiba pada atau sebelum masa dan di tempat yang ditetapkan.
- c) Sebutharga yang diserahkan selepas masa yang ditetapkan, berbangkit dari sebarang sebab, tidak akan dipertimbangkan.

Kegagalan Kontraktor mengembalikan Dokumen Sebutharga pada tarikh tutup Sebutharga akan membolehkan sebutharga tersebut akan ditolak.

2.3. Penjelasan Lanjut

Sekiranya terdapat maklumat dalam Dokumen Sebutharga yang tidak jelas atau bercanggah, Kontraktor boleh menghubungi pejabat ini untuk penjelasan lanjut.

3. PERBELANJAAN PENYEDIAAN DOKUMEN SEBUTHARGA

Semua perbelanjaan bagi penyediaan Sebutharga ini hendaklah ditanggung oleh Penyebutharga sendiri.

4. TEMPOH SAH SEBUTHARGA

Sebutharga ini sah selama 60 hari dari tarikh tutup Sebutharga. Kontraktor tidak boleh menarik balik Sebutharganya sebelum tamat tempoh sah Sebutharga. Pengesyoran tindakan tatatertib akan diambil sekiranya Kontraktor menarik balik Sebutharganya sebelum tamat tempoh sah Sebutharga.

5. PERINGATAN MENGENAI KESALAHAN RASUAH

- 5.1 Sebarang perbuatan atau percubaan rasuah untuk menawar atau memberi, meminta atau menerima apa-apa suapan secara rasuah kepada dan daripada mana-mana orang berkaitan perolehan ini merupakan suatu kesalahan jenayah di bawah Akta Pencegahan Rasuah 1997.
- 5.2 Sekiranya mana-mana pihak ada menawar atau memberi apa-apa suapan kepada mana-mana anggota pentadbiran awam, maka pihak yang ditawarkan atau diberi suapan dikehendaki membuat aduan dengan segera ke pejabat Suruhanjaya Pencegah Rasuah Malaysia (SPRM) atau di balai polis yang berhampiran. Kegagalan berbuat demikian adalah merupakan satu kesalahan di bawah Akta Pencegahan Rasuah 1997.
- 5.3 Tanpa prejudis kepada tindakan-tindakan lain, tindakan tatatertib terhadap anggota perkhidmatan awam dan menyenaraihitamkan kontraktor atau pembekal boleh diambil sekiranya pihak-pihak terlibat dengan kesalahan rasuah di bawah Akta Pencegahan Rasuah.
- 5.4 Mana-mana kontraktor atau pembekal yang membuat tuntutan bayaran berkaitan perolehan ini walaupun tiada kerja dibuat atau tiada barangan dibekalkan mengikut spesifikasi yang ditetapkan atau tiada perkhidmatan diberi dan mana-mana anggota perkhidmatan awam yang mengesahkan tuntutan berkenaan adalah melakukan kesalahan di bawah Akta Pencegahan Rasuah 1997.

6. 'INTEGRITY PACT'

- 6.1 Penyebutharga wajib mengemukakan surat akuan pembida seperti di lampiran bersama-sama dengan Dokumen Sebutharga di mana ia berwaad untuk tidak akan menawarkan atau memberi rasuah kepada mana-mana individu lain sebagai sogokan untuk dipilih dalam tawaran tersebut. Wakil syarikat yang menandatangani Surat Akuan Pembida hendaklah juga melampirkan Surat Perwakilan Kuasa menandatangani bagi pihak Syarikat.
- 6.2 Surat Akuan Pembida tersebut adalah menjadi salah satu dokumen wajib dalam penilaian sebutharga peringkat pertama. Sekiranya pembida gagal mengemukakan Surat Akuan tersebut yang telah ditandatangani oleh pegawai syarikat bertauliah, pembida tersebut akan dinilai sebagai gagal dalam penilaian peringkat pertama (gagal mengemukakan dokumen wajib) dan penilaian seterusnya tidak akan dilaksanakan.
- 6.3 Kontraktor yang Berjaya wajib mengemukakan **Surat Akuan Pembida Berjaya** seperti di lampiran beserta dengan *Surat Setuju Terima/Borang Perjanjian Inden Kerja yang telah ditandatangani di mana ia berwaad tidak akan memberi rasuah sebagai ganjaran kerana mendapatkan kontrak. Wakil Syarikat yang menandatangani Surat Akuan Pembida Berjaya hendaklah juga melampirkan surat perwakilan kuasa menandatangani bagi pihak syarikat. Surat Akuan ini akan menjadi sebahagian daripada Perjanjian Sebutharga.

SYARAT-SYARAT SEBUTHARGA UNTUK KERJA

1. PEMERIKSAAN TAPAK BINA

Kontraktor adalah dinasihatkan untuk memeriksa dan meneliti Tapakbina dan sekitarnya, bentuk dan jenis Tapak bina, takat dan jenis kerja, bahan dan barang yang perlu bagi menyiapkan Kerja, cara-cara perhubungan dan laluan masuk ke Tapakbina dan hendaklah mendapatkan sendiri segala maklumat yang perlu tentang risiko, luar jangkaan dan segala hal-keadaan yang mempengaruhi dan menjejaskan Sebutharganya. Sebarang tuntutan yang timbul akibat daripada kegagalan Kontraktor mematuhi kehendak ini tidak akan dipertimbangkan.

2. INSURANS / BON PERLAKSANAAN

2.1 Kontraktor hendaklah atas nama bersama Kerajaan Malaysia dan Kontraktor mengambil perkara-perkara seperti berikut:-

- a) Bon Perlaksanaan sebanyak 5% daripada jumlah nilai Sebutharga, jika nilai yang tawarkan melebihi Rm 50,000.00. (Kontraktor dibenarkan membuat pilihan untuk mengemukakan Jaminan Bank atau Jaminan Insurans atau memilih dikenakan Wang Jaminan Perlaksanaan).
- b) Polisi Insuran Tanggungan Awam (iaitu insurans terhadap bencana kepada orang dan kerosakan kepada harta), dan
- c) Nombor-nombor pendaftaran di bawah Skim Keselamatan Sosial Pekerja (PERKESO). bagi tempoh pelaksanaan kerja Inden ini.

2.2 Kontraktor hendaklah mengemukakan kepada Pegawai Inden semua polisi insurans, Bon Perlaksanaan dan Nombor Kod Pendaftaran dengan PERKESO yang tersebut di atas sebelum memulakan Kerja. Bagaimanapun untuk tujuan memulakan Kerja sahaja Nota-nota Perlindungan dan resit-resit bayaran premium adalah mencukupi. Sekiranya Kontraktor gagal mengemukakan semua polisi Insurans selepas tempoh sah Nota-nota Perlindungan, tanpa sebarang sebab yang munasabah, Pegawai Inden berhak mengambil tindakan seperti di bawah Fasal 10 (d).

3. PERATURAN PERLAKSANAAN KERJA

Kerja-kerja yang dilaksanakan hendaklah mematuhi Spesifikasi, pelan-pelan, butir-butir kerja dalam Ringkasan Sebutharga dan Syarat-syarat yang dinyatakan dalam Dokumen Sebutharga ini dan arahan Pegawai Inden atau Wakilnya.

4. KEGAGALAN KONTRAKTOR MEMULAKAN KERJA

Sekiranya Kontraktor gagal memulakan kerja selepas 7 hari dari tarikh akhir tempoh mula kerja yang dinyatakan dalam Inden Kerja, tanpa sebab-sebab yang munasabah, Inden Kerja akan dibatalkan oleh Pegawai Inden dan tindakan tatatertib akan diambil terhadap Kontraktor.

5. SUB-SEWA DAN MENYERAHAK KERJA.

Kontraktor tidak dibenarkan mengsub-sewakan Kerja kepada kontraktor-kontraktor lain. Kontraktor tidak boleh menyerahkan apa-apa faedah di bawah Inden Kerja ini tanpa terlebih dahulu mendapatkan persetujuan bertulis dari Pegawai Inden.

6. PENOLAKAN BAHAN, BARANG DAN KERJA OLEH PEGAWAI INDEN.

Pegawai Inden atau Wakilnya berhak menolak bahan, barang dan kerja-kerja yang tidak menepati Spesifikasi. Bahan, barang dan kerja-kerja yang ditolak hendaklah diganti dan sebarang kos tambahan yang terlibat hendaklah ditanggung oleh Kontraktor sendiri.

7. RINGKASAN SEBUTHARGA

- 7.1 Ringkasan Sebutharga hendaklah menjadi sebahagian daripada Borang Sebutharga ini dan hendaklah menjadi asas Jumlah Harga Sebutharga.
- 7.2 Harga-harga dalam Ringkasan Sebutharga hendaklah mengambil kira semua kos termasuk kos pengangkutan, cukai, duti, bayaran dan caj-caj lain yang perlu dan berkaitan bagi penyiapan Kerja dengan sempurnanya.
- 7.3 Tiada sebarang tuntutan akan dilayan bagi pelarasan harga akibat daripada perubahan kos buruh, bahan-bahan dan semua duti dan cukai Kerajaan, samada dalam tempoh sah Sebutharga atau dalam tempoh Kerja.
- 7.4 Harga-harga dalam Ringkasan Sebutharga yang dikemukakan oleh Kontraktor hendaklah tertakluk kepada persetujuan sebelumnya daripada Pegawai Inden tentang kemunasabahnya. Persetujuan sebelumnya itu dan apa-apa pelarasan kemudiannya kepada harga-harga dalam Ringkasan Sebutharga hendaklah dibuat sebelum Inden Kerja dikeluarkan.
- 7.5 Apa-apa pelarasan harga dalam Ringkasan Sebutharga menurut perenggan (iv) tersebut di atas dan apa-apa kesilapan hisab dalam Ringkasan Sebutharga hendaklah dilaras dan diperbetulkan sebelum Inden Kerja dikeluarkan. Jumlah amaun yang dilaraskan hendaklah sama dengan amaun jumlah harga pukal dalam Borang Sebutharga. Amaun jumlah harga pukal dalam Borang Sebutharga hendaklah tetap tidak berubah.

8. PERCANGGAHAN DALAM DOKUMEN SEBUTHARGA

Jika Kontraktor mendapati apa-apa percanggahan dalam Dokumen Sebutharga, dia hendaklah merujuk kepada Pegawai Inden untuk mendapatkan keputusan.

9. BAYARAN BERPERINGKAT

Bagi Kerja yang bernilai melebihi RM25,000.00, satu kali bayaran berperingkat dibenarkan setelah nilai Kerja-kerja yang disiapkan melebihi 50% dari nilai Sebutharga tersebut.

10. KEGAGALAN KONTRAKTOR MENYIAPKAN KERJA DAN PENAMATAN PER-LANTIKAN KONTRAKTOR

Pegawai Inden berhak membatalkan Inden Kerja sekiranya Kontraktor berada dalam keadaan berikut dan setelah menerima surat amaran daripada Pegawai Inden.

- a) Sekiranya Kontraktor masih gagal menyiapkan Kerja dalam tempoh masa yang telah ditetapkan;
- b) Kemajuan Kerja terlalu lembab tanpa apa-apa sebab yang munasabah;
- c) Penggantungan pelaksanaan seluruh atau sebahagian Kerja, tanpa apa-apa sebab yang munasabah;
- d) Tidak mematuhi arahan Pegawai Inden tanpa apa-apa alasan yang munasabah; dan
- e) Apabila Kontraktor diisytiharkan bankrap oleh pihak yang sah.

11. KERJA PERUBAHAN

11.1 Pegawai Inden boleh menurut budi bicaranya mengeluarkan arahan-arahan yang berkehendakkan sesuatu perubahan kerja dengan secara bertulis. Tiada apa-apa perubahan yang dikeluarkan oleh Pegawai Inden atau yang disahkan kemudian oleh Pegawai Inden boleh membatalkan Sebutharga ini.

11.2 Semua kerja perubahan dan/atau tambahan yang diluluskan oleh Pegawai Inden akan diukur atau dinilai menggunakan kadar harga yang ada dalam Senarai Kuantiti/Ringkasan Sebutharga. Jika tidak terdapat sebarang kadar harga yang bersesuaian kadar harga yang dipersetujui oleh Pegawai Inden dan kontraktor hendaklah digunakan.

12. PEMATUHAN KEPADA UNDANG-UNDANG OLEH KONTRAKTOR

Kontraktor hendaklah mematuhi segala kehendak Undang-Undang Kecil dan Undang-undang Berkanun dalam Malaysia semasa pelaksanaan Kerja. Kontraktor tidak berhak menuntut sebarang kos dan bayaran tambahan kerana pematuhannya dengan Syarat-syarat ini.

13. PERATURAN MEMBAYAR SELEPAS SIAP

Bayaran sepenuhnya hanya akan dibayar setelah Kontraktor menyiapkan Kerja dengan sempurnanya dan mengembalikan Inden Kerja Asal.

14. TEMPOH TANGGUNGAN KECACATAN

Tempoh Tanggungan Kecacatan bagi Kerja yang bernilai di antara RM10,000.00 hingga RM200,000.00 adalah selama Enam (6) Bulan dari tarikh Kerja diperakukan siap.

15. TARIKH TUTUP TAWARAN

Tarikh Tutup Sebutharga seperti yang dinyatakan dalam surat pelawaan sebutharga pada atau sebelum **12.30 tengahari**. Dokumen Sebutharga yang telah lengkap diisi hendaklah dimasukkan ke dalam Peti Sebutharga di pejabat **4 hb September 2016**.

**BORANG SEBUTHARGA
SEBUTHARGA PJK(S)/SH/04/2016**

PENGARAH
POLITEKNIK JELI KELANTAN
JALAN RAYA TIMUR-BARAT
17600 JELI
KELANTAN.

Tuan,

Sebutharga untuk **TAWARAN SEMULA BAGI KERJA-KERJA MEMBINA DAN MENYIAPKAN LALUAN PEJALAN KAKI BERBUMBUNG MENGHUBUNGKAN BANGUNAN ASRAMA KE BANGUNAN INDUK POLITEKNIK JELI, KELANTAN.**

Dibawah dan tertakluk kepada Arahan Kepada Pentender, Syarat-syarat Am Sebut Harga, Spesifikasi Kerja dan Pelan-pelan, saya yang menandatangani di bawah ini adalah dengan ini menawarkan untuk melaksana dan menyiapkan kerja tersebut bagi jumlah wang pukal sebanyak :

Ringgit Malaysia :
..... (RM)

2. Saya bersetuju menyiapkan kerja-kerja ini dalam masa minggu dari tarikh tempoh mula kerja seperti yang ditetapkan di bawah Fasal 2 Borang Inden Kerja.

Bertarikh pada haribulan 2016

.....
(Tandatangan Kontraktor)

Nama Penuh :
No. K/P :
Alamat :
.....
.....

Atas sifat:

.....
(Tandatangan Saksi)

Nama Penuh :
No. K/P :
Alamat :
.....
.....

.....
(Meteri atau Cop Kontraktor)

Tarikh :

SURAT AKUAN PEMBIDA

Bagi

TAWARAN SEMULA BAGI KERJA-KERJA MEMBINA DAN MENYIAPKAN LALUAN PEJALAN KAKI BERBUMBUNG MENGHUBUNGKAN BANGUNAN ASRAMA KE BANGUNAN INDUK POLITEKNIK JELI, KELANTAN.

NO. SEBUT HARGA: PJK(S)/SH/04/2016

Saya, _____ nombor K.P. _____ yang mewakili _____ nombor Pendaftaran _____ (MOF/PKK/CIDB/ROS/ROC/ROB) dengan ini mengisytiharkan bahawa saya atau mana-mana individu yang mewakili syarikat ini tidak akan menawar atau memberi rasuah kepada mana-mana individu dalam **Politeknik Jeli Kelantan (PJK)** atau mana-mana individu lain, sebagai sogokan untuk dipilih dalam sebutharga seperti di atas. Bersama-sama ini dilampirkan Surat Perwakilan Kuasa bagi saya mewakili syarikat seperti tercatat di atas untuk membuat perisytiharan ini (jika berkaitan).


2. Sekiranya saya atau mana-mana individu yang mewakili syarikat ini didapati bersalah menawar atau memberi rasuah kepada mana-mana individu dalam PJK atau mana-mana individu lain sebagai sogokan untuk dipilih dalam sebutharga seperti di atas, maka saya sebagai wakil syarikat bersetuju tindakan-tindakan berikut diambil :

- 2.1 penarikan balik tawaran kontrak bagi sebutharga di atas; atau
- 2.2 penamatan kontrak bagi sebutharga di atas; dan
- 2.3 lain-lain tindakan tata tertib mengikut Peraturan Perolehan Kerajaan.

3. Sekiranya terdapat mana-mana individu cuba meminta rasuah daripada saya atau mana-mana individu yang berkaitan dengan syarikat ini sebagai sogokan untuk dipilih dalam sebutharga seperti di atas, maka saya berjanji akan dengan segera melaporkan perbuatan tersebut kepada pejabat Suruhanjaya Pencegahan Rasuah Malaysia (SPRM) atau balai polis yang berhampiran.

Yang Benar,

.....
(Nama dan No. KP)
Cop Syarikat :

 <p>JKR MALAYSIA</p>	<p>SECTION B : EXCAVATION AND EARTHWORKS</p>	<p>No. Dokumen : JKR 20800-0183-14 No. Keluaran : 01 No. Pindaan : 00 Tarikh : 29 Januari 2014 Muka Surat : B/1</p>
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1. General


- 1.1 This work shall consist of all the required excavation within the limits of the Works. It shall include the removal and proper utilization and hauling, or disposal of all excavated materials, and constructing, shaping and finishing of all earthworks over the entire extent of the Works, in conformity with the Drawings and these Specifications.
- 1.2 The excavation and earthworks shall be executed in such a manner and order as approved by the S.O. The Contractor shall be responsible for compliance with by-laws and regulations relating to earthworks.
- 1.3 Excavation in rock and/or hard material shall respectively be measured and paid for as extra over to excavation and earthworks in accordance with the Provisional B.Q. The Contractor shall give reasonable notice to the S.O. to examine, classify the excavation and to take measurement prior to breaking up.
- 1.4 For contract based on Specifications and Drawings, unless otherwise provided in the Contract, for the purpose of pricing the excavation and earthworks, the whole excavation shall be assumed to be without rock and/or hard material as defined hereunder.
- 1.5 For contract based on Quantities, the pricing shall be in accordance with the B.Q.
- 1.6 Computation of volume of rock excavation for payment shall be based on nett volume excavated as shown on the Drawings.
- 1.7 The Contractor shall comply with all statutory requirements and regulations such as payment of royalties and environmental protection for removal of unsuitable material and borrow materials.

2. Site Clearing, Grubbing And Stripping Topsoil

- 2.1 This work shall consist of clearing, grubbing and stripping topsoil in the areas within the limits of Works designated hereunder and/or shown on the Drawings and/or directed by the S.O., and of clearing only in other areas designated hereunder and/or shown on the Drawings and/or directed by the S.O., all as specified herein and as required by the S.O. The work shall also include the demolition and disposal of structures in the said areas, except where otherwise provided for in the Contract, as specified herein and as required by the S.O.

2.1.1 Site clearing

Clearing shall consist of cutting and/or taking down, removal and disposal of everything above ground level, including objects such as walls, fences, drains and other obstructions, except such trees, vegetation, structures or parts of structures and other things which are designated in the Contract to remain, to be protect as satisfied under SECTION R : LANDSCAPING AND TURFING WORKS. The material to be cleared shall include but not necessarily be limited to trees, stumps (parts above ground), logs, brushwood, undergrowth, long grasses, crops, loose vegetable matter and structures (except those structures whose removal or clearance is otherwise provided for in the Contract). Clearing shall also include levelling of obsolete dikes, terraces, ditches, et cetera, unless otherwise directed by the S.O.

 <p>JKR MALAYSIA</p>	<p>SECTION B : EXCAVATION AND EARTHWORKS</p>	<p>No. Dokumen : JKR 20800-0183-14 No. Keluaran : 01 No. Pindaan : 00 Tarikh : 29 Januari 2014 Muka Surat : B/2</p>
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2.1.2 Grubbing

Grubbing shall consist of removal and disposal of surface vegetation, bases of stumps, roots, underground parts of structures, and other obstructions to a depth of at least 0.50 m below ground level, with the agreement of the S.O.

2.1.3 Stripping topsoil

Stripping topsoil shall consist of the removal of topsoil to an average depth of at least 100 mm below ground level, and its stockpiling for use in the Works, and/or its disposal, as directed by the S.O.

2.1.4 Disposal

All materials resulting from site clearing, grubbing and stripping topsoil shall be removed and disposed of as approved by the S.O. in accordance with Environmental Quality Act 1974(Act 127) and Solid Waste and Public Cleansing Management Act 2007 (Act 672).

3. Demolition Of Existing Structures

- 3.1 Major structures are those which cannot practicably be cleared by bulldozer and/or hydraulic excavator, whose demolition requires pneumatic tools, explosives and/or other specialized equipment. A brief description of each major structure (if any) and depth to which extent it shall be demolished is given in the B.Q.
- 3.2 All fences, buildings, structures, and encumbrances of any character within the limits of the limits of the Works, except those to be removed by others or designated to remain, shall be demolished and removed by the Contractor.
- 3.3 Materials designated in the Contract or directed by the S.O. to be salvaged, shall be carefully removed and stored, and shall be the property of the Government.


4. Relocation Of Existing Utilities And Services

- 4.1 The Contractor's attention is specially drawn to his responsibilities under the Clause headed 'Damage to Property' of the Condition of Contract.
- 4.2 Before commencing on any excavation, the Contractor or his representative shall accompany the S.O. on a site inspection to identify the presence of underground cables, water or other service pipes at or in the vicinity of such excavation. Thereafter, the Contractor shall carry out the excavation work in a manner and sequence as approved by the S.O.
- 4.3 If during excavation, the Contractor's workmen uncover any cables, water or other service pipes, work shall be stopped immediately and shall not be again started until the matter has been reported to the S.O. who will notify the appropriate local authority, and subsequently issue whatever directions he deemed appropriate.

5. Excavation Works

5.1 General Requirements

- 5.1.1 The work shall include the excavation of all types of material, backfilling, compaction, forming embankments and slopes, et cetera, as is necessary

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for the completion of the works up to the formation levels, in accordance with the lines, grades, dimensions, shapes and typical cross-sections shown on the Drawings and to the approval of the S.O.

- 5.1.2 The Contractor shall provide where necessary temporary water courses, ditches, drains, pumping or other means of maintaining the earthworks free from water. Such provision shall include carrying out the work of forming the cuttings and embankments in such a manner that their surfaces have at all times a sufficient gradient to enable them to shed water and prevent water ponding.
- 5.1.3 In pumping water out from excavation and in the lowering of water table the Contractor shall pay due regard to the stability and settlement of all structures.
- 5.1.4 Adequate means for trapping silt shall be provided on all temporary drainage systems. Similar arrangements shall be made for all earthworks including excavation whether for pile trenches, foundations or cuttings.
- 5.1.5 Should the surface of completed areas be damaged by erosion or by any other causes, the Contractor shall at his own cost make good such areas to the approval of the S.O.
- 5.1.6 The Contractor shall exercise care in preventing wastage of suitable material needed for embankment or fill construction.

5.2 Definitions

5.2.1 Formation level

Formation level means the final earthwork level after cutting or filling.

5.2.2 Common excavation


Common excavation shall mean excavation in any materials which are not rock or hard materials as defined in sub-sections 5.2.5 and 5.2.6.

5.2.3 Unsuitable materials

5.2.3.1 Unsuitable materials shall include:

- (i) Running silt, peat, logs, stumps, roots, grass and other vegetable matter, perishable or toxic material, slurry or mud; or
- (ii) Organic clay and organic silt; or
- (iii) Any material
 - a) which is susceptible to spontaneous combustion; or
 - b) which is clay having a liquid limit exceeding 80% and/or a plasticity index exceeding 55%; or
 - c) which has a loss of weight greater than 2.5% on ignition.

5.2.3.2 Materials that are soft or unstable merely because they are too wet or too dry for effective compaction shall not to be classified as unsuitable, unless otherwise classified by the S.O.

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5.2.4 Suitable materials

5.2.4.1 Suitable materials shall mean those materials other than the unsuitable materials defined in sub-section 5.2.3.

5.2.4.2 General fill shall generally comprise of suitable materials made up of either cohesive soil or cohesion less soil or mixture of both. The classification of cohesive and cohesion less soil shall be based on Soil Classification System set out in the latest MS 1056: Site Investigation.

5.2.4.3 Special fill shall comprise of material, which would otherwise be classified as general fill but which contains durable well-graded natural sand and gravel or crushed rock, other than argillaceous rock, or durable clean crushed demolition rubble of similar particle size and free from any contaminants.

5.2.5 Hard material

5.2.5.1 This shall mean any hard material which can be excavated using an excavator with minimum weight of 44 tonnes and nett horsepower rating of 321 brake horsepower with production rate not exceeding 50 m³ / hour. The excavator unit is to be in good condition and operated by experienced personnel.

5.2.5.2 Hard material shall exclude individual masses less than 0.5 m³.

5.2.5.3 Trial excavation shall be carried out using the above equipment to determine hard material. The trial excavation shall be carried out on a flat platform in order to develop the rated horsepower at maximum efficiency.

5.2.6 Rock

5.2.6.1 Rock shall mean material found in ledges or masses which can be excavated using the following equipment with production rate not exceeding 20 m³ / hour:

(i) Track-type tractor (dozer)


Equipment with minimum weight of 37 tonnes and nett horsepower rating of 305 brake horsepower or more (D8R or equivalent). The tractor unit is to be in good condition and operated by experienced personnel skilled in the use of ripping equipment; and

(ii) Ripping unit

The ripper to be attached to the above mentioned tractor shall have a minimum penetration force of 120 kN. The ripper shall have a single shank in good working condition with sharpened cutting point.

5.2.6.2 Trial excavation shall be carried out using the above equipment to determine rock.

5.2.6.3 Boulders or detached pieces shall only be regarded as rock if they individually exceed 0.5 m³. For determination of the volume of individual boulder, diameters of the boulder in three (3) orthogonal directions shall be taken. The average of the three (3)

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diameters shall be used to calculate the volume of boulder. Records of measurements and photographs shall be taken and kept to support the calculation of the volume of boulder.

5.3 Dimensional Tolerances

Slopes in cutting shall be trimmed mechanically to neat and even surfaces which shall have gradients not steeper than that shown on the Drawings. Widths of excavations shall not exceed the dimensions shown on the Drawings by more than 300 mm with encumbrance free to complete the Work, unless otherwise approved by the S.O.

5.4 Separation And Stockpiling Of Suitable Material

Where excavation reveals a combination of suitable and unsuitable materials, the Contractor shall, wherever the S.O. considers it practicable, carry out the excavation in such a manner that the suitable materials are excavated separately for use in the Works without contamination by the unsuitable materials.

5.5 Removal Of Excavated Material From Site

5.5.1 Trial pit shall be carried out prior to removal of material to be excavated to confirm water table and depth of excavation.

5.5.2 No excavated material shall be removed from the Site except on the direction or with the approval of the S.O. Should the Contractor be permitted to remove suitable materials from the Site to suit his operational procedure, then he shall make good any consequent deficit of fill material arising there from, at his own expense. Unless designated dump sites have been shown on the Drawings, the Contractor shall dispose of surplus suitable material at his own dump areas outside the Site as approved by the S.O.

5.6 Removal Of Unsuitable Material

5.6.1 Trial pit shall be carried out prior to removal of material to be excavated to confirm water table and depth of excavation.

5.6.2 Unsuitable material shall be excavated to such depth and over such area as shown on the Drawings and/or directed by the S.O. and be transported and disposed off in an approved manner. Unless approval of the S.O. to dump and spread the unsuitable material within the Site is obtained, the Contractor shall be responsible for providing his own dump site for such unsuitable material.

5.7 Replacement Of Excavated Material Under Standing Water

Where it is decided by the S.O. that replacement of excavated material shall be done under standing water, voids created due to removal of excavated material shall be backfilled with hard clean crushed rock, natural gravel or sand having grading within the respective limits specified in TABLE B1.

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1. General

This section shall apply to the construction of all structures or parts of structures to be composed of concrete with or without steel reinforcement. The work shall be carried out all in accordance with this specification and the lines, levels, grades, dimensions and cross-sections shown on the Drawings and as required by the S.O.

2. Material

2.1 Cement

2.1.1 The cement to be used throughout the Work shall be cement obtained from SIRIM-certified manufacturer. The cement shall be described and complied with MS EN 197-1 as shown in TABLE D1.

2.1.2 Certificates of test

2.1.2.1 Manufacturers' certificates of test shall in general be accepted as proof of soundness. Additional tests shall be carried out on any cement which appears to have deteriorated through age, damage to containers, improper storage, or any other reason. The test shall be carried out at any approved laboratory in accordance with MS EN 196 at the expense of the Contractor. Any batch of cement that has been sampled and tested and found not to have complied with the requirements shall be rejected and removed from the Site.

2.1.2.2 The S.O. may, without tests being made, order that any bag of cement, a portion of the contents of which has hardened, or which appears to be defective in any other way, be removed from the Site.

2.1.3 Transportation and storage

The cement shall be transported to the Site in covered vehicles adequately protected against water. It shall be stored in a weatherproof cement store to the approval of the S.O. Cement stored in bags shall not be laid directly on the ground. It shall be taken for use in the Work in the order of its delivery into the store. Cement delivered in bulk shall be stored in purposely built silos of an approved design.

2.2 Aggregates

2.2.1 Aggregates shall be naturally occurring sand, granite or limestone, crushed or uncrushed, except as otherwise specified, and shall comply with MS EN 12620. They shall be obtained from a source approved by the S.O. Marine aggregates shall not be used.

2.2.2 Coarse aggregates

Coarse aggregates shall comply with MS EN 12620. For work below ground level, only crushed granite shall be used. Unless otherwise specified in the Drawings, tests shall be carried out according to MS 30. The property limits shall be as specified in TABLE D2. The maximum nominal size of aggregate shall be as specified in the Drawings.

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2.2.3 Fine aggregates

Fine aggregates shall comply with MS EN 12620. In the context of MS EN 12620, the term 'sand' is used to mean 'fine aggregate'. Unless otherwise specified in the Drawings, tests shall be carried out in accordance with MS 30. The property limits shall be as specified in TABLE D2.

2.2.4 Grading

2.2.4.1 Coarse aggregates

The grading of coarse aggregates shall be analysed as described in MS 30 and shall be within the limits specified in TABLE D3.

2.2.4.2 Fine aggregates

The grading of fine aggregates shall be analysed as described in MS 30 and shall be within the limits specified in TABLE D3A. However, for prescribed mixes Grading Limit M shall only be used.

2.2.5 Sampling and testing of aggregates

Where site mixing is used, samples of fine and coarse aggregates approved by the S.O. shall be kept on Site. These samples shall give a fair indication of the general quality of the aggregates for comparison with the aggregates delivered during the course of executing the work. Tests shall be carried out on samples of the latter, taken at intervals as required by the S.O., or whenever there is a change of source. The appropriate method of sampling and testing shall be in accordance with the standards as specified in TABLE D2. Any batch of aggregate rejected by the S.O. shall be removed from the Site.

2.2.6 Storage of aggregates

2.2.6.1 Separate storage facilities with adequate provision for drainage shall be provided for each different size of aggregate used.

2.2.6.2 Aggregate shall be handled and stored so as to minimize segregation and contamination.

2.3 Water

Water shall comply with the requirements of MS EN 1008. It shall be clean and free from materials deleterious to concrete in the plastic and hardened state and shall be from a source approved by the S.O. The S.O. may instruct the Contractor to carry out chemical tests at any approved laboratory at the expense of the Contractor. The Contractor shall make adequate arrangement to supply and store sufficient water at the Site for use in mixing and curing of concrete.

2.4 Admixtures

2.4.1 Suitable admixtures may be used in concrete mixes with the prior approval of or as directed by the S.O.

2.4.2 The admixtures, the sampling and testing of the admixtures and the information to be provided with the admixture supplied shall comply with MS EN 934/ BS EN 934-2

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- 2.4.3 All admixtures shall be used strictly in accordance with manufacturer's recommendation.
- 2.4.4 Before allowing the admixture to be used in the Work, relevant tests based on trial mixes shall be carried out. A control mix shall be made using a conventional trial mix that is without using the admixture, to determine the free water: cement ratio and mix proportion required to give the specified strength with the required slump. Using the same mix proportion as in the control mix but with a modified water: cement ratio whenever necessary, a test shall be carried out using the recommended dosage of the admixture. The results of the relevant test obtained from the control mix and test mix shall be compared. The S.O. may allow the use of the admixture only when the results are found to be satisfactory and comparable to the effects as claimed by the manufacturer. The admixture acceptance test shall comply with the requirements specified in TABLE D4.
- 2.4.5 The uses of admixtures that are chloride based are not permitted for structural concrete containing reinforcement, prestressing tendons or other embedded metal. The Contractor shall submit documentary evidence on the contents of the admixture to be used.
- 2.4.6 When the Contractor proposes the use of super-plasticiser, special control tests shall be carried out with prior approval of the S.O. The tests shall be carried out in accordance with the latest standard and the manufacturer's recommendations.
- 2.4.7 If two or more admixtures are proposed to be used simultaneously in the same concrete mix, the Contractor shall furnish the S.O. with supporting data on their suitability and compatibility.

2.5 Classification Of Concrete Mixes

- 2.5.1 The concrete mix shall be designed concrete to MS523-1 and MS523-2 unless otherwise stated in the Drawings. However, prescribed concrete may be used subject to the following:
 - (i) The work is of minor nature or involving a small quantity of concrete,
 - (ii) Prior approval is given by the S.O.,
 - (iii) The Contractor shall be responsible for the strength of the concrete
 - (iv) Only CEM I cement is specified to be used
- 2.5.2 When other than CEM I cement is specified to be used, the concrete mix shall be of designed concrete only.

2.6 Prescribed Concrete

- 2.6.1 Prescribed concrete shall conform to MS 523-1 and MS 523-2. Prescribed concrete shall be as detailed in TABLE D5. The mix prescribed in the table does not require the use of admixture.
- 2.6.2 For small volume concreting work, volume batching is permitted provided prior approval of the S.O. is obtained. The proportion shall be as specified in TABLE D5A.

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3.4.2 Identity testing for compressive strength

3.4.2.1 Sampling and testing plan

- (i) The sampling rate for identity testing shall be as follows:
 - a) One sample per 10.0 m³ or every group of 10 batches for critical structures e.g. prestressed concrete, masts, cantilevers, columns, footing, pile caps, shear wall, retaining wall.
 - b) One sample per 20.0m³ or every group of 20 batches e.g. slabs, beams.
 - c) One sample per 50.0 m³ or every group of 50 batches e.g. raft foundation and mass concrete.
- (ii) Samples shall be taken from different batches or loads in accordance with EN 12350-1 Test specimens shall be prepared and cured in accordance with EN 12390-2. The compressive strength of the specimens shall be determined in accordance with EN 12390-3 The test result shall be that obtained from the average of the results of two or more specimens made from one sample for testing at the same age. Where the range of test values is more than 15% of the mean, the results shall be disregarded unless an investigation reveals an acceptable to justify disregarding an individual test value.

3.4.2.2 Cube strength at 7 days

One cube from each sample batch shall be tested for the seven (7) days compressive strength. The cube compressive strength shall not fall below the corresponding values given in TABLE D12 for prescribed concrete, and two-third (2/3) of the twenty eight (28) days compressive strength for designed concrete.

3.4.3 Identity criteria for compressive strength

3.4.3.1 Concrete under production control certification

- (i) Identity of concrete is assessed for each individual strength test result and the average non-overlapping discrete results as identified in TABLE D13.
- (ii) Concrete is deemed to come from a conforming population if both the criteria in TABLE D13 are satisfied for n results derived from strength tests on samples taken from the defined volume of concrete.

3.4.3.2 Concrete not under production control certification

From the defined volume of concrete, at least three (3) samples shall be taken for testing. The concrete is deemed to come from a conforming population if the conformity in sub-section 4.2.1.3 and TABLE D11 for initial production is satisfied.

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3.4.4 Identity testing for slump and flow

3.4.4.1 Sampling and testing plan

- (i) The sampling shall be either:
 - a) In accordance with MS26-1-1; or
 - b) Measured using a spot sample obtained from the initial discharge, if concrete is delivered in a truck mixer or agitating equipment. The spot sample shall be taken after a discharge of approximately 0.3 m³ by taking six increments from the moving stream of the concrete in accordance with MS 26-1-1.
- (ii) The sample shall be remixed on a non-absorbent surface and tested for slump or flow. Slump shall be measured in accordance with MS 26-1-2. Flow shall be measured in accordance with MS 26-1-5.

3.4.5 Identity criteria for the slump of an individual batch

If the measured slump meets the requirements specified in TABLE D14 or is within the tolerance specified in TABLE D15, the identity test confirms that the batch conforms to MS 523: Part 1 with respect to consistence. For identity criteria for flow reference shall be made to Annex B of MS523-2.

4. Production Of Concrete

4.1 General

4.1.1 All concrete shall be subjected to production control under the responsibility of the contractor.

4.1.1.1 Production control comprises all measures necessary to maintain the properties of concrete in conformity to specified requirements. It includes:

- (i) selection of materials.
- (ii) concrete design.
- (iii) concrete production.
- (iv) inspection and tests.
- (v) the use of the results of test on constituent materials, fresh and hardened concrete and equipment.
- (vi) For ready-mixed concrete, inspection of equipment used in transporting fresh concrete.

4.2 Production Control System

The production control system shall contain adequately documented procedures and instructions. These procedures and instructions shall, where relevant, be established in respect of the control requirement as given in the TABLES D10, D11 and D16.

4.3 Supervision

The Contractor shall ensure the required standard of control over materials and workmanship. The S.O. shall be afforded all reasonable opportunities and facilities to

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inspect the constituent materials and the production of concrete and to take samples for testing.

4.4 Site Mixed Concrete

- 4.4.1 The quantities of cement, fine aggregate and various sizes of coarse aggregate shall be measured by weight unless otherwise approved by the S.O. A separate weighing machine shall be provided for weighing the cement. Alternatively, the cement may be measured by using a whole number of bags in each batch. The quantity of water shall be measured by volume or by weight. Any solid admixtures to be added shall be measured by weight; liquid or paste admixtures shall be measured by volume or weight.
- 4.4.2 The batch weight of aggregate shall be adjusted to allow for the moisture content of the aggregate being used. All measuring equipment shall be calibrated on site or their calibration status established by certificates from accredited laboratories.
- 4.4.3 The mixing time shall be not less than two minutes and not more than five minutes or any other time recommended by the mixer manufacturer after all the ingredients have been placed in the mixer.
- 4.4.4 Mixers that have been out of use for more than 30 minutes shall be thoroughly cleaned before any fresh concrete is mixed. Unless otherwise agreed by the S.O., the first batch of concrete through the mixer shall contain only two thirds of the normal quantity of coarse aggregate. The mixer shall be thoroughly cleaned before changing from one type of cement to another.
- 4.4.5 The water content of each batch of concrete may be adjusted so as to produce concrete of the workability required. However care shall be taken to ensure the free water: cement ratio is maintained. The total amount of water added to the mix shall be recorded.

4.5 Ready Mixed Concrete

- 4.5.1 Ready mixed concrete are batched, either dry or wet, at a control plant and transported in purpose-made agitators operating continuously or truck mixers to the Site.
- 4.5.2 Ready mixed concrete shall comply with the requirements of designed concrete as in sub-section 3.2 and MS 523-1. All concrete materials, including water and admixtures shall be mixed in the plant and delivered to Site in purpose made truck mixers. No extra water or admixtures are allowed to be added after the concrete has left the plant.
- 4.5.3 Ready mixed concrete delivered to the Site shall be accompanied by delivery ticket and manufacturer's batching record stating the details of mix proportions by weight, the grade of concrete, type and size of aggregate, date and time of loading at plant, type and dosage of chemical admixtures and other relevant production details in suitable format, failing which the S.O, or his representative, shall immediately reject the total load of the concrete. The S.O, or his representative, and the contractor shall ensure the information provided in the delivery tickets and the manufacturer's batching record complies with the details of the approved 'designed concrete' and its corresponding consistence as in sub-section 3.2.1 before discharging the concrete.

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4.5.4 Rejected concrete shall be removed from the Site. The delivery ticket shall be marked 'REJECTED'.

4.6 Transporting

Concrete shall be transported from the mixer to the formwork as rapidly as practicable by methods, which will prevent segregation or loss of any constituents or ingress of foreign matter or water and maintain the required workability. It shall be deposited as near as practicable in its final position to avoid rehandling or moving the concrete horizontally by vibration. The concrete shall be conveyed by chutes or concrete pumps only with permission from the S.O.

4.7 Placing

4.7.1 Placing of concrete in dry condition

4.7.1.1 For all concrete whether mixed on or off the site of the Work, each batch shall be placed and compacted within two (2) hours of adding the cement to the dry aggregates and within 45 minutes (or any other period of time based on the trial mix as per sub-sections 2.4 and 3.2.3 and approved by the S.O. if an admixture is used) of adding water to the cement and aggregate. Concrete shall not be placed in any part of the structure until the approval of the S.O. has been obtained. If concreting is not started within 24 hours of approval given, approval shall again be obtained from the S.O.

4.7.1.2 All formwork and reinforcement contained in it shall be clean and free from standing water immediately before the placing of concrete. Concreting shall be carried out continuously between and up to predetermined construction joints in one sequence of operation. It shall be thoroughly compacted by either hand tamping or mechanical vibration or both and shall be thoroughly worked into the corners. After tamping into place the concrete shall not be subjected to disturbance other than such as incidental to compaction by vibration. In the event of unavoidable stoppage in positions not predetermined, the concreting shall be terminated on a horizontal plane and against vertical surfaces by the use of stop boards. The location for termination shall be subjected to the approval of the S.O.

4.7.1.3 Fresh concrete shall not be placed against in-situ concrete which has been in position for more than 45 minutes unless a construction joint is formed in accordance with sub-section 6.1. When in-situ concrete has been in place for four hours, no further concrete shall be placed against it for a further 20 hours. Where retarding admixture has been used, the S.O. may approve variation to this limit.

4.7.1.4 Except where otherwise approved by the S.O., concrete shall be deposited in horizontal layers to a compacted depth not exceeding 450 mm when internal vibrators are used or 300 mm in all other cases. The surface of the concrete shall be maintained reasonably level during placing.

4.7.1.5 Concrete shall not be dropped into place from a height exceeding 1.5 m. However, higher drops may be allowed provided the mix has been well designed and proportioned. When trunking or chutes are used, they shall be kept clean and used in such a manner as to avoid segregation.

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4.7.1.6 The Contractor shall maintain an experienced steel fixer at the site of reinforced concrete works during the placing of concrete to reposition any reinforcement which may be displaced.

4.7.2 Placing of concrete under water

4.7.2.1 No concrete shall be placed in flowing water. Underwater concrete if deemed unavoidable, shall be placed in position by Tremie pipes from the mixer. During and after concreting under water, pumping or dewatering operations in the immediate vicinity shall be suspended until the S.O. permits them to continue. Where the concrete is placed by a Tremie pipe, the following requirements shall be applicable: -

- (i) The hopper and tremie pipe shall be a closed system. The bottom of the Tremie pipe shall be kept as far as practicable beneath the surface of the placed concrete.
- (ii) The tremie pipe shall be large enough with due regard to the size of aggregate. For 20 mm aggregates, the Tremie pipe shall be of a diameter not less than 150 mm and for larger aggregates, a bigger diameter Tremie pipe approved by the S.O. shall be used.
- (iii) Unless otherwise agreed by the S.O., the first charge of concrete shall be placed with a sliding plug pushed down the Tremie pipe ahead of it to prevent mixing of concrete and water.
- (iv) The Tremie pipe shall always penetrate well into the concrete with an adequate margin of safety against accidental withdrawal if the pipe is surged to discharge the concrete.
- (v) The concrete shall be deposited wholly by Tremie pipe and the method of deposition shall not be changed part way up to prevent the laitance from being entrapped within the structure.
- (vi) All Tremie pipes shall be properly cleaned after use.

4.8 Placement Temperature

4.8.1 Placement temperature shall comply with MS 523-3 to prevent premature setting and loss of water during placing of concrete in the formwork and the following precautions shall be taken:

- (i) At the time of placing, no part of the concrete shall have a temperature exceeding 36°C. This may be achieved by cooling the water and aggregate prior to mixing.
- (ii) Concrete shall not be placed in forms or around reinforcement whose temperature exceeds 36°C. This can be achieved by providing shading or other means to protect from direct sunlight.
- (iii) Freshly placed concrete shall be protected from direct sunlight and from loss of moisture by covering, shading or other means.
- (iv) No concrete shall be placed when the air temperature at the point of deposition exceeds 36°C

4.8.2 However, higher temperatures may be allowed if specified in the Drawings.

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4.9 Compaction

- 4.9.1 Unless otherwise approved by the S.O., concrete shall be thoroughly compacted by vibration and thoroughly worked around the reinforcement, tendons or duct formers, around embedded fixtures and into corners of the formwork to form a dense, homogenous mass, free from voids and which will have the required surface finish when the formwork is removed. Vibration shall be applied continuously during the placing of each batch of concrete until the expulsion of air has practically ceased and in a manner which does not promote segregation of the ingredients.
- 4.9.2 The concrete maintained between the two walls of formwork shall be compacted by internal or external vibrators. Concrete in slabs with no formwork on its upper surface shall be compacted either by vibrators of the pan type or by a vibrating screen.
- 4.9.3 The internal vibrators shall be inserted and withdrawn slowly and at a uniform pace of approximately 100 mm per second. Compaction shall be deemed to be completed when cement mortar appears in an annulus around the vibrator. Over vibration leading to segregation of the mix must be avoided. The internal vibrators shall be inserted at points judged by the area of mortar showing after compaction, with a certain allowance made for overlapping and they shall not be allowed to come into contact with the formwork or the reinforcement and shall be inserted at a distance of not less than 75 mm from the formwork.
- 4.9.4 The pan vibrator shall be placed on the surface of the concrete, which shall have previously been tamped and leveled leaving an allowance in height for compaction until the cement mortar appears under the pan. The vibrator shall then be lifted and placed on the adjoining surface and this operation shall be repeated until the whole surface has been compacted. Alternatively, a vibrating screen spanning the full width of the surface may also be used.
- 4.9.5 Whenever vibration has to be applied externally, the design of formwork and disposition of vibration shall receive special consideration to ensure efficient compaction and to avoid surface blemishes. The vibration shall be such that there will be no excess water on the top surface on completion of compaction.
- 4.9.6 External vibrators shall be firmly secured to the formwork which must be sufficiently rigid to transmit the vibration and strong enough not to be damaged by it. Internal vibrators shall be capable of operating at not less than 10,000 cycles per minute and external vibrators at not less than 3,000 cycles per minute. Sufficient vibrators in serviceable condition shall be on Site so that spare equipment is always available in the event of breakdowns. Vibrators shall be operated by workmen skilled in their use.
- 4.9.7 Concrete shall not be subjected to any disturbance within 24 hours after compaction. No standing or flowing water shall be allowed to come into contact with exposed concrete surfaces during the first two (2) hours after placing and compaction of the concrete.
- 4.9.8 In the event where inadequate or improper compaction is suspected, the S.O. has the right to inspect and to carry out further tests. The tests may include non-destructive and destructive methods. All expenses incurred in carrying out such sampling, testing and remedial works shall be borne by the Contractor irrespective of whether the tests prove the structure to be sound or otherwise.

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4.10 Curing And Protection

- 4.10.1 All concrete work shall be cured for the full period of curing which shall not be less than five (5) days for F1, F2, F3 and F4 surfaces, but not less than three (3) days for F11, F12, F13, F14 and F15 surfaces.
- 4.10.2 Curing and protection shall start immediately after compaction of the concrete to protect it from:
- (i) Impact damage such as shock, overloading or falling earth which may disrupt the concrete and interface with its bond to reinforcements.
 - (ii) Premature drying out from direct sunlight and wind.
 - (iii) Leaching out by rain and flowing water.
 - (iv) High internal thermal gradients.
- 4.10.3 Normal curing and protection
- 4.10.3.1 Concrete, after it is placed and until the expiration of the curing duration, shall not be allowed to dry out. Provision shall be made for adequate protection against direct sunlight and wind to allow the process of curing to complete within the specified period.
- 4.10.3.2 Curing and protection shall be accomplished by covering the exposed concrete surface with an impermeable material such as polyethylene sheet, which should be well sealed and fastened and if required, this treatment can be continued efficiently throughout the whole period of curing.
- 4.10.3.3 When the concrete has attained its final set, one of the following curing methods shall be adopted:
- (i) Water curing shall be accomplished by keeping the surface of the concrete continuously wet by ponding with water.
 - (ii) Curing may be accomplished by sealing in the water as specified above by covering with an approved waterproofed curing paper or plastic sheeting laid with airtight joints. It must be securely positioned to prevent displacement by wind and protected from tearing or other injury.
- 4.10.3.4 The use of other methods of curing may be deemed necessary when the concrete is subjected to high internal thermal gradient, or with large exposed surface area. The Contractor shall submit a method statement to the approval of the S.O.
- 4.10.3.5 In the event where the Contractor does not do proper curing, the S.O. has the right to inspect and to carry out further tests which may include destructive methods. All expenses incurred in carrying out such sampling, testing and remedial works shall be borne by the Contractor irrespective of whether the tests proved the structure to be sound or otherwise.
- 4.10.4 Accelerated curing
- 4.10.4.1 Elevated temperature curing may be used only with Ordinary Portland Cement.
- 4.10.4.2 After the completion of the placing of concrete, four (4) hours shall elapse before its temperature is raised, unless the Contractor is able

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5.4.7 Hot-poured rubber/bitumen sealing compound

Hot-poured rubber/bitumen sealing compound shall comply with BS 2499.

5.4.8 Bituminous sheeting

5.4.8.1 Bituminous sheeting with non-asbestos fibre shall comply with the following requirements:

- (i) Resistant to lime water (no visual effect after two (2) weeks immersion)
- (ii) Maximum water absorption of 10% of dry weight
- (iii) Minimum tensile strength of 50 kg/cm²
- (iv) Ozone and ultraviolet resistant

5.4.9 Neoprene bearing pads

5.4.9.1 Neoprene bearing pads shall comply with the following requirements:

- (i) Shore 'A' Hardness of 60 ± 5 at 27.5°C
- (ii) Minimum rupture strength of 105 kg/cm²
- (iii) Minimum rupture elongation of 300%.

5.4.10 Polyurethane foam backing rods

5.4.10.1 Polyurethane foam backing rods used as sealant stops in panel joints shall have the following properties: -

- (i) Minimum compressibility of 75% of original volume at 27.5°C
- (ii) Excellent resilient properties;
- (iii) Density between 35 kg/cm³ and 45 kg/cm³
- (iv) Total resistance to common acids, lubricants and detergents
- (v) Total resistance to water infiltration by capillary action
- (vi) Suitability for up to 70°C.

6. Steel Reinforcement

6.1 General

The Work shall consist of furnishing and placing reinforcing steel in accordance with this specification and in conformity with the Drawings or as directed by the S.O.

6.2 Materials

6.2.1 Hot rolled mild steel and high yield bars shall comply with the requirements of MS 146. Cold worked steel bars shall comply with the requirements of BS 4461. Hard drawn mild steel wire shall comply with the requirements of MS 144.

6.2.2 Steel fabric reinforcement shall comply with the requirements of MS 145 and shall be delivered to the Site in flat sheets, unless otherwise specified.

6.2.3 Dowel bars shall be plain, round bars conforming to the requirements of MS 146. They shall be free from burring or other deformations restricting slippage in the concrete. Dowel bar sleeves used for debonding shall be of approved synthetic material. The closed end of the sleeve shall be filled with 25 mm thick compressible foam fillers and the sleeve shall fit tightly over the length of the bar to be debonded.

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- 6.2.4 Before any reinforcement steel is brought to Site, the Contractor shall furnish the mill certificates of tests and these shall be submitted for acceptance by the S.O. In addition Contractor shall on request, furnish the S.O. with a test sheet from approved laboratories for any batch of bars, giving the results of each of the mechanical tests and/or chemical composition analysis required under the MS or any equivalent international standards approved by the S.O. The specified characteristic strength of steel reinforcement shall be as given in TABLE D17.
- 6.2.5 During the course of the work, any reinforcement found to be not in accordance with the MS or BS may be rejected by the S.O. notwithstanding any previous acceptance on the strength of the test certificates. The S.O. may call for additional tests to be made at the Contractor's expense on samples taken from the batch of the defective reinforcement. If the samples do not comply with the MS or BS, then the S.O. may reject the whole batch and instruct its removal from the Site.
- 6.2.6 Steel reinforcement shall be stored in clean and dry conditions. When placed in the work it shall be clean and free from loose rust, mill scale, oil, grease, paint, dirt or anything which may reduce its bond with concrete. If directed by the S.O., the steel bars shall be brushed or otherwise cleaned before use, at the Contractor's expense.
- 6.2.7 Binding wire shall be 1.6 mm diameter soft annealed steel wire complying with the requirements of BS 1052.

6.3 Construction Methods

6.3.1 Cutting and bending of reinforcement

- 6.3.1.1 Bars shall be of their correct lengths and bent to the exact shapes required before being fixed in the work.
- 6.3.1.2 Bars shall be cut and bent cold by the application of slow, steady pressure or in an approved bar-bending machine. Bending at temperatures in excess of 100°C may only be carried out with the S.O.'s approval and under his supervision. Except where otherwise indicated in the Drawings, bars shall be bent and measured in accordance with BS 4449.
- 6.3.1.3 Cold worked and hot rolled bars shall not be straightened or bent again once having been bent. Where it is necessary to bend the free end of mild steel reinforcement already cast in the concrete, the internal radius of the bend shall not be less than twice the diameter of the bar.
- 6.3.1.4 Special care shall be taken that the overall length of bars with multiple bends is accurate and that after bending and fixing in position the bars remain in place without wrap or twist.

6.3.2 Fixing of reinforcement

- 6.3.2.1 The number, size, length, shape, type and position of all reinforcing bars, links, spacer bars and other parts of the steel reinforcement, shall be in accordance with the Drawings.
- 6.3.2.2 Reinforcements shall be secured against displacement. Unless specified otherwise, the actual concrete cover shall be taken as the

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distance between face of concrete and the nearest steel surface. All intersecting bars shall be tied together with binding wire and the ends of the wire shall be turned into the main body of the concrete.

- 6.3.2.3 Reinforcement temporarily left projecting from the concrete at construction or other joints shall not be bent out of position during the periods in which concreting is suspended except with the approval of the S.O.
- 6.3.2.4 The Contractor shall take particular care that the reinforcement is laid out correctly in every aspect and temporarily suspended by annealed wire or supported on concrete blocks or other approved spacers in the forms to prevent displacement during the placing and compacting of concrete. Links shall tightly embrace the longitudinal reinforcement to which they shall be securely wired or spot welded. The top reinforcement in slabs shall be rigidly supported on mild steel 'chairs' or equivalent spaced in each direction to prevent sagging during concreting.
- 6.3.2.5 No concrete shall be placed until the reinforcement has been inspected and approved by the S.O.
- 6.3.3 Splicing
 - 6.3.3.1 Joints to reinforcement bars shall be effected by lapping of bars at positions shown on the Drawings. Where other types of joints are to be used, prior approval of the S.O shall be obtained and their use shall be strictly in accordance with manufacturer's recommendation, at the positions approved by the S.O.
- 6.3.4 Supporting and spacer blocks
 - 6.3.4.1 The size of supporting and spacer blocks required for ensuring that the reinforcement is correctly positioned shall be not more than 50mm x50mm consistent with their purpose, of a shape approved by the S.O., and designed so that they will not overturn when the concrete is placed.
 - 6.3.4.2 The nominal size of aggregates used shall be 10 mm. The concrete spacers shall be of at least the same strength and material's source as the concrete to be poured. Wires cast in these blocks for the purpose of tying them to the reinforcement shall be as described in sub-section 7.2.
 - 6.3.4.3 Spacers left in situ shall not impair the desired appearance or durability of the structure by causing spalling, rust staining or allowing the passage of moisture.
 - 6.3.4.4 Other types of spacers may be used only with the approval of the S.O.
- 6.3.5 Welding of reinforcement
 - 6.3.5.1 Welding workmanship, including welder qualification shall comply with sub-section 5 of JKR Standard Specification for structural Steel Work JKR No. 200600-0019-99.

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- 6.3.5.2 Reinforcement in structures shall not be welded except where detailed in the Drawings or permitted in this specification.
- 6.3.5.3 Welding shall be carried out in accordance with BS EN 1011 and BS EN 60974. Butt welds shall be of the double V type and two butt weld bond tests shall be carried out on a specimen prepared to represent each form of the butt welded joint used in welding the reinforcement and for each position of welding. The method of making butt weld tests shall be as laid down in BS EN 17637. The specimen shall pass the test to the approval of the S.O. before using the joint, which the specimen represents. Welded joints shall not be made at bends in reinforcement. Unless otherwise approved by the S.O., joints in parallel bars of the principal tensile reinforcement shall be staggered in the longitudinal direction at a distance not less than the end anchorage length for the bar.
- 6.3.5.4 The S.O. shall be informed in advance of when welding is to be carried out so that he may supervise and inspect the work. Welding shall not be performed in the field during rain or other adverse conditions.

7. Formwork And Surface Finish For Structure

7.1 Design And Construction

7.1.1 Description

- 7.1.1.1 Formwork shall include all temporary or permanent forms required for forming the concrete, together with all temporary construction required for their support.
- 7.1.1.2 The Contractor is deemed to have made a study of the Drawings at tender stage and is aware of all areas of construction, requiring heavy and specially designed propping to provide the support and the necessary bracing for the stability of such propping.
- 7.1.1.3 The design and construction of formwork shall be carried out by a competent person. The Contractor shall identify all critical formwork design and submit the strength and deflection calculations and Drawings or the proposed design, certified by a Professional Engineer to the S.O. for prior approval. Notwithstanding any approval by the S.O. with respect to the design submitted by the Contractor, the responsibility or the adequacy and safety of the design shall remain with the Contractor. The Contractor shall also appoint a competent formwork coordinator whose duties would be similar to those outlined in BS 5975.
- 7.1.1.4 When the use of proprietary type of formwork is proposed by the Contractor, the design shall be certified by a Professional Engineer.
- 7.1.1.5 The formwork shall be sufficiently rigid and tight to prevent loss of grout or mortar from the concrete at all stages of construction and shall be appropriate for the methods of placing and compacting.
- 7.1.1.6 Formwork (including supports) shall be sufficiently rigid to maintain the forms in their correct position, shape, profile and dimensions. The supports shall be designed to withstand the worst combination of forces due to self-weight, formwork weight, formwork forces,

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reinforcement weight, wet concrete weight, construction and wind loads, together with all incidental dynamic effects caused by placing, vibrating and compacting the concrete. Guidance on these loadings is given in The Concrete Society Manual Formwork - Guide to good practice, and in CIRIA Report 108, Concrete Pressure in Formwork, and in BS 5975. Vertical propping to formwork shall be carried down sufficiently far to provide the necessary support without overstressing the completed concrete structure.

7.1.1.7 Metal ties may only be used with the prior approval of the S.O. Where metal ties are permitted, the use of storey height steel soldiers shall be used to reduce the number of tie bolts required. Tie bolts with rubber or plastic cone against the form face are to be used to prevent unsightly grout loss. No metal part of any device for maintaining formwork in the correct location shall remain permanently within the specified concrete cover to the reinforcement. Except for ties used for anchoring void formers, all ties shall be at least 1.2 m apart and through bolts will not be permitted on exposed form finished faces. All holes left by ties shall be made good within one day of the removal of the formwork using a mortar of the same strength as the cast concrete. Metal ties which allow for holes through the concrete being cast shall not be permitted to be used in concrete for water-retaining structure, roof slabs and walls.

7.1.1.8 The formwork shall be so arranged as to be readily dismantled and removed from the cast concrete without shock, disturbance or damage. Where necessary, the formwork shall be so arranged that the soffit form, properly supported, can be retained in position for such period as may be required by the condition of the maturing concrete or the specification. If a component is to be prestressed whilst still resting on the soffit form, provision shall be made to allow for elastic deformation and any variation in weight distribution. As far as practicable, formwork joints shall coincide with construction joints.

7.1.2 Form lining

7.1.2.1 The type and treatment of any lining (plywood, metal, plastic, Controlled Permeability Formwork liner, et cetera) of the forms shall be appropriate to the concrete finish required.

7.1.2.2 The Controlled Permeability Formwork (CPF) liner shall have the following requirements:

- (i) The requirement for a special finish shall be as for traditional formwork finishes except that the formwork shall be covered by a CPF liner.
- (ii) CPF liner shall be used on all surfaces as detailed on the Drawings
- (iii) The CPF liner shall be a Water Bylaws Scheme - Approved Product for use with potable water in accordance with BS 6920.
- (iv) The CPF liner shall have the following properties:
 - a) Compression of less than 10% under a pressure 200 kPa.
 - b) Maximum pore size of less than 0.030 mm.
 - c) Minimum water retention capacity of 0.35 l/m².
 - d) Result in bleed water from the liner which is free from cement and fine aggregate particles.

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m wide. They shall be of similar thickness and similarly reinforced as the elements they represent and shall incorporate all features which contribute to the final appearance of the Works.

7.3 Preparation Of Forms Before Concreting

7.3.1 Before concreting, all forms shall be thoroughly cleaned out, free from sawdust shavings, dust, mud or other debris. The inside surfaces of forms shall, unless otherwise approved by the S.O., be coated with an approved non-staining form oil or other approved material to prevent adhesion of the concrete. Such release agents shall be applied strictly in accordance with the manufacturer's recommendation and shall not come into contact with the reinforcement or prestressing tendons and anchorages. For any exposed surface only one release agent shall be used throughout the entire area.

7.3.2 All formwork shall be inspected by the S.O. after preparation and immediately prior to depositing concrete and no concrete shall be deposited until approval of the formwork has been obtained.

7.4 Removal Of Forms

7.4.1 The Contractor shall inform the S.O. and obtain his approval before striking any formwork, but such approval shall not relieve the Contractor of his responsibilities for the safety of the work.

7.4.2 Formwork shall be removed without such shock or vibration as would damage the concrete. A period of time shall elapse between the placing of the concrete and the removal of the formwork for various parts of the structure so as to suit the requirements for its curing.

7.4.3 The minimum periods between concreting and the removal of forms are given in TABLE D18. The periods stated in this table are based on the use of Ordinary Portland Cement. They may be changed with the approval of the S.O., if other types of cement as described in sub-section 2.1, admixtures as described in sub-section 2.4 are used. The result of the compressive strength obtained from cube strength at 7 days as described in sub-section 4.4.2.2 may also be used for early removal of forms provided always the Contractor provide proof of calculation to the S.O for approval.

7.4.4 For prestressed in-situ components, temporary supports shall not be removed until the components is stressed to the approval of the S.O.

7.4.5 Where it is intended that forms are to be reused, they shall be cleaned and made good to the approval of the S.O.

7.4.6 Following the removal of forms, no further loads shall be imposed upon the concrete until at least after the completion of the curing period or until such later time as in the opinion of the S.O. the concrete shall have attained sufficient strength to safely withstand such loads. Full design loads shall not be applied to any structure until all load bearing concrete is at least 28 days old.

7.5 Inspection And Making Good

7.5.1 The surface of the concrete shall be inspected for defects and for conformity to the surface finish specified and where appropriate, with approved sample finishes.

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7.5.2 Subject to the strength and durability of the concrete being unimpaired, the making good of surface defects may be permitted but the level of acceptance shall be appropriate to the type and quality of the finish specified and ensure satisfactory permanence and durability.

7.5.3 Any remedial treatment of surfaces shall be approved by the S.O. following inspection immediately after removing the formwork and shall be carried out without delay.

8. Mass And Lean Concrete

Mass and lean concrete shall consist of cement, fine aggregate and coarse aggregate in the nominal ratio by volume of 1:3:6 and 1:4:8 respectively. However where a denser and more workable concrete can be produced by a variation in the ratio of the fine aggregate to that of coarse aggregate, this ratio may be varied within the limits (1:1½) and (1:3), provided that the volumes of fine and coarse aggregate, each measured separately, shall nevertheless equal the sum of the volumes of fine and coarse aggregate appropriate to the nominal mix. The concrete shall be mixed as described for reinforced concrete.

9. Building Accuracy

After removal of formwork, the Contractor shall take measurements as directed by the S.O. to check the deviation of the reinforced concrete works from specified dimensions shown on the Drawings. All measurements shall be recorded and submitted to the S.O. Any deviation in building accuracy shall comply with BS EN 13670.

10. Apparatus

10.1 The Contractor shall provide the following apparatus for use on the Site at all times:

- (i) Concrete slump test apparatus or flow test apparatus complying with MS 26. One set of the apparatus shall be provided for each concreting location.
- (ii) At least twelve (12) numbers of steel or cast iron moulds for casting 150 mm concrete test cubes and six (6) numbers of 100 mm mortar or grout test cube moulds complete with tamping bars and base plates in accordance with MS 26. A minimum number shall be provided such that no stripping of cubes is required prior to 24 hours setting and hardening period.
- (iii) Three (3) measuring cylinders of 250 ml capacity, graduated to measure to the nearest 2.0 ml., for determination of silt content (field setting method).
- (iv) An approved apparatus for measuring moisture content in fine aggregate.
- (v) One (1) electronic calculator with statistical functions.
- (vi) One (1) 300 mm steel rule.
- (vii) One (1) set of sieves in compliance with BS 410.
- (viii) Scale or balance 25 kg maximum capacity and weights.
- (ix) Trowel, shovel, spanner and other tools

11. Precast Concrete Construction

11.1 Manufacture Off Site

11.1.1 After the method of manufacture has been approved, no changes shall be made without the approval of the S.O.

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1. General

- 1.1 Unless otherwise stated, the pitch and laps for each type of roof covering shall be strictly in accordance with the manufacturer's recommendation.
- 1.2 Unless otherwise approved, all roof covering pieces or accessories such as eaves, hips, ridges, valley et cetera, shall be of the same material as the general covering.

2. Interlocking Concrete Tiles

- 2.1 Interlocking concrete roof tiles shall be laid on timber or steel battens approved for roofing at spacing and tightly nailed or screwed as recommended by the manufacturer.
- 2.2 Unless otherwise specified, the concrete roof tiles shall be laid to slope in accordance to the manufacturer's recommended pitch and to the S.O's approval. The roof tiles shall conform to MS 797 and unless otherwise specified on the Drawings, it shall be laid on metal trusses system to engineer's detail and S.O's approval.
- 2.3 Tiling fillers consisting of 1:3 cement mortar as specified under SECTION E: NON-STRUCTURAL WALL SYSTEM, shall be provided at the feet of the rafters.
- 2.4 Verges, ridges, hips, valley tiles and complete with all roofing accessories shall be provided and laid to bond with the general roof tiling works in accordance with the manufacturer's recommendation.

3. Clay Tiles

- 3.1 Unless otherwise stated in the Drawings, clay tiles shall be of 470 mm (length) x 284 mm (horizontal width) pattern confirming to BS 402 and shall be free from cracks, chips and warps.
- 3.2 Clay tiles shall be laid with a minimum head lap of 95mm on timber or steel battens approved for roofing at spacing as recommended by the tile manufacturer. The tiles shall be firmly screwed or nailed at intervals as recommended by the roofing tile manufacturer and as approved by the S.O.
- 3.3 Ridge capping, hip and valley tiles complete with all roofing accessories shall be provided to match the general tiling works in accordance with the manufacturer's recommendation. All these shall be bedded in matching 1:3 coloured cement mortar.

4. Pre-painted Aluminium Roofing Sheet

Unless otherwise stated, where aluminium roofing sheets are to be used, they shall be of the type, gauge and finish as shown in the Drawings and to be fixed strictly in accordance with the manufacturer's recommendation.

5. Concrete Flat Roofs

Concrete flat roofs shall be as specified under SECTION D: CONCRETE WORKS.

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6. Pre-painted Steel Roofing Sheet

6.1 Unless otherwise stated, the metal roof decks shall comply with the following:

6.1.1 Materials

6.1.1.1 The roofing sheets shall be produced from aluminium/zinc alloy coated steel conforming to MS 1196: "Continuous Hot-Dip Aluminium/Zinc Coated Steel Sheet of Commercial, Drawing and Structural Qualities" and AS 1397 "Steel Sheet and Strip: Hot-Dip Zinc Coated or Aluminium/Zinc Coated".

6.1.1.2 The pre-painted finish over the aluminium/zinc alloy coated base steel shall conform to MS 2383: "Prefinished/Pre-painted Sheet Metal Products for Interior/Exterior Building Applications - Performance Requirements" and AS/NZS 2728: "Prefinished/Pre-painted Sheet Metal Products for Interior/Exterior Building Applications - Performance Requirements".

6.1.1.3 The exterior finish coat shall have a nominal film thickness of 20 µm over 5 µm thick corrosion inhibitive primer on top side or weather side. The backing coat shall be with nominal film thickness of 5 µm over 5 µm corrosion inhibitive primer.

6.1.1.4 Minimum steel yield strength shall be 550 MPa.

6.1.1.5 Minimum aluminium/zinc alloy coating mass shall be 150 g/m² (Coating Class AZ 150) on both surfaces conforming to ISO 9223 Category 3 (C3) environment.

6.1.1.6 The Contractor shall submit material warranty from the manufacturer in accordance with ISO 9223: "Corrosion of Metals and Alloys – Corrosivity of Atmosphere - Classification" of the project site and the format approved by the S.O. Material warranty shall be up to 25 years against perforation by corrosion, 15 years against flake and peel, 10 years against colour fading and 5 years against dirt staining.

6.1.1.7 The Contractor shall submit shop drawings for the S.O's approval prior to commencement of installation works.

6.1.2 Metal sheet profiles

6.1.2.1 Unless otherwise specified or shown in the Drawings, the metal sheet profile shall be of a concealed fixing system as approved by the S.O. The roofing sheets shall have the following minimum requirements:

- (i) Base Metal Thickness (BMT) = 0.42 mm.
- (ii) Cover width = 680 mm.
- (iii) Rib height = 40 mm.
- (iv) Coating = Pre-painted aluminium and zinc coated steel with AZ150 (150 g/m²) on both surfaces.

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6.1.2.2 Where pierced fixing system is specified or shown in the Drawings, the roofing sheet shall have the following minimum requirements:

- (i) Base Metal Thickness (BMT) = 0.42 mm.
- (ii) Cover width = 750 mm
- (iii) Rib height = 38 mm
- (iv) Coating = Pre-painted aluminium/zinc coated steel with AZ150 (150 g/m²) on both surfaces.

6.1.3 Fixing

6.1.3.1 Installation procedures shall conform to the recommendation of the manufacturer.

6.1.3.2 The roofing sheets shall be installed and fixed according to the following method:

- (i) Concealed fixing using approved clips compatible with the roofing sheet.
- (ii) Pierced fixing using approved fasteners compatible with the roofing sheet.

6.1.3.3 The roofing installer shall be registered with CIDB.

6.1.3.4 Metallic swarf and all other debris including nail, screws, mortar, construction materials et cetera shall be swept away from the roof area and gutters regularly, particularly at the end of each day's work and at completion of the installation works.

6.1.4 Clips and fasteners

6.1.4.1 Fasteners type shall comply with AS 3566 Class 3 and be certified as such by the supplier of fasteners.

6.1.4.2 The recommended type of fasteners shall conform to the following test:

- (i) Salt spray test - 1000 hours
- (ii) Kesternich test - 15 cycles.
- (iii) Humidity test - 1000 hours.
- (iv) UV test - 2000 hours.

6.1.4.3 All fasteners and screws shall be of the self-drilling type either concealed or screwed fixing, complete with preassembled ethylene propylene diene monomer (EPDM) rubber washers.

6.1.5 Flashing and capping

Approved 0.42 mm BMT ridge capping, flashing, capping and trimming shall be manufactured to the required shape and sizes. The flashing and capping materials used shall be from the same material as the roofing sheets.

6.1.6 Sealants

Only neutral cure silicone rubber sealant type Dow Corning 780 or equivalent shall be used conforming to AS 3902.

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6.1.7 Lightning conductors

Aluminium lightning conductor is recommended for use on steel roof system.

- 6.2 All fixing accessories shall be rust-resistant and of suitable design and construction as recommended by the manufacturer for the roofing system and as approved by the S.O. All fasteners and screws shall be of the self-drilling type either concealed or screwed fixing, complete with preassembled EPDM rubber washers.
- 6.3 Identification, storage and packaging of alum/zinc steel roof decking shall be strictly in accordance with the manufacturer's recommendation and comply with the S.O.'s requirements.
- 6.4 All roof decking sheets, capping, flashing et cetera or wall cladding shall be new, clean, regular, straight and true to shape with sharp defined profiles, free from cracks, chips, bends and defects detrimental to practical use or from other surface imperfections.
- 6.5 At Site, the sheets shall be lifted from the transport carrier by a crane and properly stacked clear of the ground, ready to be lifted up to the roof structure for laying. Where sheets are to be manually lifted, care should be taken not drag the sheets to avoid scraping away the surface coating.
- 6.6 Where storage is necessary, stack heights shall be kept to a minimum and the sheets shall be stacked in a sloping position. Sheets shall be stacked off a dry firm ground, under cover by tarpaulin or polythene sheets but ventilated and away from building operations. Should the stack sheets become wet, they shall be immediately dried to prevent staining and degradation of the surface coatings.
- 6.7 The Contractor shall be responsible for the absolute water-tightness of the roof and must ensure that the method of installation, fixing and fastening decking sheets, caps, flashings et cetera including acoustical, insulation and expansion joints, whenever required shall conform strictly to the manufacturer's recommendation.
- 6.8 The completed portions of the roof shall be clear of all metallic particles such as blind rivet shanks, screws, nuts, nails et cetera and dirty foot prints should be wiped off to avoid early deterioration/corrosion and discolouration. Damages to the coating shall be repaired with touch-up paint as recommended by the manufacturer and approved by the S.O.

7. Roofing Sheet For Marine Environment (Coastal Areas)

- 7.1 The Contractor shall select the correct type of metal sheet profile to be installed for coastal areas as recommended by the roof manufacturer and approved by the S.O.
- 7.2 Unless otherwise specified or shown in the Drawings, the roofing sheet for marine environment shall be metallic coated steel with minimum aluminium/zinc alloy coating mass of 200 g/m² (Coating Class AZ 200) on both surfaces conforming to ISO 9223 Category 4 (C4) and Category 5 (C5) environment.
- 7.3 Metallic coated steel shall be manufactured and certified by SIRIM according to MS 1196 'Continuous Hot-Dip Aluminium/Zinc Coated Steel Sheet of Commercial, Drawing and Structural Qualities' or AS 1397 'Steel Sheet and Strip: Hot-Dip Zinc Coated or Aluminium/Zinc Coated'.
- 7.4 The pre-painted finish (super polyester paint) type shall be used over the aluminium/zinc alloy coated base steel shall conform to MS 2383: "Prefinished/Pre-

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1. General

This section provides the generally applicable requirements for steel and metal for the construction of structures, building components and related works. All materials shall conform to the relevant Malaysian or British or European Standards.

2. Hot Rolled Structural Steelworks

2.1 All hot rolled structural steelwork design, materials, drawings, workmanship, protective treatment, fire protection and quality assurance shall be in accordance with the Specification for Structural Steelworks No. JKR 20601-0191-12 or the latest edition published by JKR.

2.2 Quality Assurance

The Contractor shall submit a Quality Assurance programme as specified in the Specification for Structural Steelworks as in sub-section 2.1.

2.3 Drawings

2.3.1 The Contractor shall prepare Drawings with details in accordance with MS EN 1993 or other relevant standards. The Drawings shall be certified by a Professional Engineer. He shall also prepare Drawings and arrangements of temporary steelworks for the different stages of construction in compliance with the requirements specified in the Specification for Structural Steelworks as in sub-section 2.1.

2.3.2 The Drawings to be submitted are as follows:

- (i) Fabrication drawings;
- (ii) Erection drawings;
- (iii) As-built drawings.


2.4 Records

2.4.1 The Contractor shall submit to the S.O., document and records which shall include but not limited to:

- (i) Document register;
- (ii) Drawings and design calculations and documentation registers;
- (iii) Certificates for materials and consumables;
- (iv) Calibration of equipment;
- (v) Weld procedures, concessions et cetera;
- (vi) Inspection and test reports;
- (vii) Delivery schedules and method statements;
- (viii) Surveys and final inspection results;
- (ix) Completion of erection and hand over certification.

3. Prefabricated Cold Formed Steel Roof Trusses

3.1 All prefabricated components shall be manufactured only by reputable licensed truss suppliers and approved by the S.O. This supplier duly termed as 'System Provider' is responsible for the analysis, design, detailing, drawing, manufacture, material, handling and erection of the roof members, and their ancillary fixing components. The full requirement is outlined in the Specification for Prefabricated Cold Formed Steel Roof Trusses (JKR 20601-0186-11) or the latest edition published by JKR.

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3.2 System Provider

The System Provider (S.P) is a supplier of a proprietary roof truss system appointed by the Contractor and approved by the S.O, which employs Quality Assurance procedures in the design, detailing, connection, bracing, erection criteria and manufacture of truss components for the structural roof truss system.

3.3 Duties Of Professional Engineer

3.3.1 The S.P. shall appoint a Professional Engineer (P.E.) whose duties shall include the following:

- (i) Preparation of roof truss analysis and design;
- (ii) Preparation of drawings;
- (iii) Design changes in every stage of work;
- (iv) Certification for completion of roof truss installation;
- (v) Final certification for roof truss installation prior to issuance of Certificate of Practical Completion for the whole Works to the Contractor.

3.4 Fabricator

All trusses shall only be assembled by licensed fabricators approved by the S.P. and registered with CIDB. A copy of CIDB registration certificate shall be submitted to the S.O. for verification.

3.5 Installer

All installation works shall be executed and supervised by qualified personnel with valid certificate issued by CIDB. The S.O. shall verify the identification and qualification of the installer prior to the installation.


3.6 General Truss Limitation

3.6.1 Prior to any pre fabricated cold formed roof trusses works, the following general limitation shall be applied:

- (i) Maximum unsupported truss span 13 m with permitted deviation of ± 0.05 m.
- (ii) Maximum truss spacing of 1.2 m with permitted deviation of ± 0.025 m.
- (iii) The minimum basic wind speed shall be 35 m/s. However, the minimum basic wind speed shall be increased to 41 m/s for lightweight roof covering.
- (iv) Minimum base steel thickness for main truss member shall be:
 - a) 1 mm for unsymmetrical section or open cross section;
 - b) 0.6 mm for symmetrical machine-manufactured box or closed cross section.
- (v) Minimum base steel thickness for other truss element shall be:
 - a) 0.5 mm for batten or purlin;
 - b) 1.2 mm for wall plate;
 - c) 1 mm for all bracings.

3.7 Analysis, Design Report And Drawings Submission

3.7.1 The S.P. through the Contractor shall propose to the S.O. for his approval a roof truss system which is safe, functional and conforming to design

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standard. Submission of proposal shall include truss analysis, design report, and construction drawings. The truss analysis shall indicate all loads, load combinations, connections criteria, bracings and tie-down of the truss. Design output of the truss members, battens, connections, tie-down and wall plates, anchors, bracings, truss accessories, splicing and stiffeners where related to the analysis shall be included in the design report. (Refer to Appendix 3 of JKR 20601-0186-11)

3.7.2 All details in the construction drawings shall be sufficient to enable checking against the analysis and design report, including specifying and providing the truss layout and configuration, steel grades, section properties of members, length of members in each truss configuration, properties of truss accessories, specification of corrosion protection, specification of fastener and anchor, tie-down and anchoring details and all types of connection details including the connection of all attachments to the trusses.

3.7.3 Technical specifications or mill certificates for base steel, fastener and anchor shall also be included in the submission. Verification test certificate from an approved accredited laboratory on the technical parameter specified in the technical specifications or mill certificates shall be submitted upon request by the S.O.

3.8 Warranty

3.8.1 When a prefabricated cold formed steel roof truss system is used, the Contractor shall submit to the S.O. a warranty from the S.P. with the following provisions:

- (i) The products used are genuine and free from manufacturing defects;
- (ii) The prefabricated cold formed steel roof truss system is installed in accordance with the S.P.'s instructions, guidance and specifications that will deliver the specified level of performance;
- (iii) The warranty certificate shall cover a period of ten (10) years from the date of Certificate of Practical Completion against any defect or failure due to the installation and workmanship by the S.P.'s registered panel installer.

4. Metal Frames For Doors And Windows

4.1 Steel Frames

4.1.1 The Contractor shall supply, assemble and fix steel frames for doors and windows as shown on the Drawings. The steel frames shall comply with BS 6510, and shall be from an approved source and shop-primed with two coats of red lead oxide or other approved rust resisting primer.

4.1.2 The steel frames shall be manufactured from sections rolled from good commercial grade galvanized mild steel in single sections, mechanically straightened with all corners pre-cut with a 45 degrees mitre joint giving a snug and accurate fit, fully electrically welded, and carefully ground and cleaned, or shall be mechanically jointed by an approved method.

4.1.3 All screws, nuts, bolts and washers shall be of stainless steel.

4.1.4 Steel frames shall be painted as specified in SECTION O: PAINTING WORKS.

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1. General

1.1 Cement

1.1.1 The cement, unless otherwise described shall be Ordinary Portland Cement, complying with MS 522 as specified in SECTION D: CONCRETE WORKS or Masonry Cement complying with MS 794.

1.1.2 White and coloured cement shall be of approved manufacture.

1.2 Plasticiser

The plasticizer shall be of approved manufacture and used strictly in accordance with the manufacturer's recommendation.

1.3 Plasterlime

The plasterlime shall be of approved manufacture and shall comply with BS 890 and shall be applied strictly in accordance with the manufacturer's recommendation.

1.4 Sand

The sand for external rendering, internal plastering and floor screeding shall comply with MS 29 for fine aggregates. Sand for plastering using gypsum shall comply with MS 701.

1.5 Water

Water for mixing shall be clear and free from harmful matter as specified in SECTION D: CONCRETE WORKS.

1.6 Mixing

1.6.1 All mixing of mortar for plaster and screed shall be done by machine. Hand mixing shall only be allowed for small quantities and with the approval of the S.O. Hand mixing shall be done on a clean platform. The water content of the mix shall be only the minimum required to give a workable mix.

1.6.2 Mortar for plaster and screed shall be used up within forty five (45) minutes after mixing.

1.6.3 For gypsum plaster, mixes shall be used up within one (1) hour after mixing.

1.6.4 No remaking of the mix shall be permitted thereafter.

1.7 Surface Preparation

1.7.1 Where possible cement paving, screeding and rendering on concrete surface shall be laid while the concrete is still green that is after the final set but not later than twenty four (24) hours of laying concrete. The concrete surfaces shall be brushed with a stiff broom before it has hardened to remove laitance and give a roughened surface. Hardened concrete surfaces shall be thoroughly hacked to form a key to the approval of the S.O.

1.7.2 Before any paving, screeding or rendering is applied, all surfaces shall be thoroughly cleaned and wetted and be in damp state at the time the paving, screeding or rendering is applied.

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2.6.2 Water is added to produce slaked lime (calcium hydroxide), which is sold as a wet putty or white powder. Water is added to the white powder mix as per the manufacturer's recommendation.

2.6.3 Water is added to the proprietary lime plaster mix as per the manufacturer's recommendation to form a workable paste prior to use. Lime plaster is used as an alternative to or in combination with ordinary Portland cement. It is commonly used for decorative works such as mural paintings on walls, ceilings or any type of flat surface.

2.6.4 Once the water is mixed it shall be stored in an air-tight container. Once exposed to the atmosphere, the calcium hydroxide turns back into calcium carbonate, causing the plaster to set.

2.7 Barium Plaster

The plastering of internal surfaces of X-Ray room walls shall be of barium plaster consisting of one (1) part cement, one (1) part barytes (barium sulphate) fines and three (3) parts barytes sand by volume.

2.8 Plaster to Sides of Manholes, Inspection Chambers and Septic Tanks

Plastering to sides of manholes, inspection chambers and septic tanks shall be as specified under SECTION F: SEWERAGE WORKS.

3. Paving Work

3.1 Cement Paving

3.1.1 Unless otherwise shown on the Drawings or described in the B.Q., cement paving shall be 20 mm thick consisting of one part cement to three parts sand by volume. The paving shall be thoroughly rammed within 30 minutes of laying and trowelled smooth after it has stiffened sufficiently to prevent laitance being brought to the surface. Paving to apron shall finish to a slight fall towards surface drains.

3.1.2 Unless otherwise shown on the Drawings or described in the B.Q., skirtings shall be formed to a height of 150 mm and thickness of 20 mm, coved at bottom and rounded at top.

3.2 Granolithic Paving

3.2.1 Granolithic paving shall be 20 mm thick, consisting of two (2) parts cement and five (5) parts granite chipping passing 6 mm mesh and retained upon 3 mm mesh by volume.

3.2.2 The chipping shall be washed and free from dust. The paving shall be trowelled smooth to proper level or fall where appropriate. After initial set the surface shall be brushed lightly to achieve the required textured finish.

3.2.3 Unless otherwise shown on the Drawings, granolithic skirting shall be 100mm high and 20 mm thick, coved at bottom and slightly rounded at top.

3.2.4 Unless otherwise shown on the Drawings or described in the B.Q., the edge of threshold and treads of concrete stairs shall be finished with 150 mm x 75 mm x 12 mm thick vitreous non-slip nosing tiles laid lengthwise bedded and pointed in 1:3 cement and sand mortar. The sides of open

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stringers shall be finished with granolithic plaster worked to profile of treads and risers to the approval of the S.O.

3.3 In-situ Terrazzo

- 3.3.1 In-situ terrazzo shall consist of one (1) part approved coloured cement and three (3) parts selected limestone chipping passing through 12 mm mesh and retained upon 3 mm mesh by volume.
- 3.3.2 The terrazzo topping shall be 20 mm thick laid on 20 mm thick cement and sand (1:3) screed. The concrete base to receive the screed shall be thoroughly cleaned and wetted.
- 3.3.3 While laying the screed, aluminium or brass strips of size 32 mm wide x 3 mm thick shall be set in vertically on edge into the screed to form panels. Each panel shall not exceed 4 m² with top edges of the strips standing sufficiently high to finish flush with the finished terrazzo floor level. The terrazzo shall be trowelled to a dense even finish.
- 3.3.4 When sufficiently hard but not less than two (2) days after being laid it shall be rubbed down to a smooth surface by means of carborundum stone.
- 3.3.5 Tile impregnator then shall be applied strictly in accordance to the manufacturer's recommendation onto the terrazzo surface to prevent future staining.
- 3.3.6 Unless otherwise shown on the Drawings or described in the B.Q., the edge of the threshold and treads of concrete stairs shall be finished with 150 mm x 76 mm x 12 mm vitreous non-slip nosing tiles of approved colour laid lengthwise bedded and pointed. The sides of open stringers shall be finished with in-situ terrazzo working to profile of treads and risers to the approval of the S.O.

3.4 Waterproof Paving to Roof Slabs

Waterproof paving to roof slabs shall be as specified under SECTION D: CONCRETE WORKS.

3.5 Precast Concrete Paving

- 3.5.1 Unless otherwise shown on the Drawings or described in the B.Q., precast concrete paving slabs shall be of size 600 mm x 600 mm x 50 mm thick each and made of 1:2:4-20 mm concrete reinforced with 'A6' fabric reinforcement to MS 145. The top surfaces of slab shall be brushed with stiff broom or wire brush after the initial set to give a rough finish.
- 3.5.2 Paving slabs shall be laid to the pattern as shown on the Drawings or approved by the S.O. The slabs shall be bedded on 25 mm thick semi-dry cement and sand (1:3) screed laid on 100 mm thick properly compacted and blinded hardcore.
- 3.5.3 The joints between the paving slabs shall be 20 mm wide filled with cement mortar (1:3) and raked to a depth of 6 mm.

3.6 Interlocking Concrete Paving

- 3.6.1 Taking the existing sub-grade/soil conditions and the anticipated traffic loading into consideration, an adequate thickness of well compacted base course must be provided to ensure good pavement performance. Unless

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otherwise specified, existing bitumen or concrete surfaces need not be removed and can act as good sub-grade.

- 3.6.2 Interlocking concrete paving blocks shall comprise of segmental interlocking concrete paving units laid on minimum 30 mm thick sand bedding course.
- 3.6.3 A layer of sand should be loosely spread and screed to a uniform thickness such that its compacted thickness would be approximately 30 mm thick. It is important that the sand layer remains undisturbed prior to the laying of blocks.
- 3.6.4 The grade of the concrete and thickness of the paving blocks shall be as detailed in the Drawings.
- 3.6.5 Concrete edge restraints shall be provided at the perimeter of the pavement to ensure the paving blocks are tightly abutted and to separate areas of different laying pattern.
- 3.6.6 The paving blocks are placed side by side on the sand bed with gaps of approximately 2 mm between adjoining blocks. The gap between the paving blocks shall be filled with fine sand of different grading to that required for the bedding sand.
- 3.6.7 The paving blocks can be cut to fit edges and awkward corners. The pavement which has been laid shall be compacted with a hand-guided plate vibrator until it is firmly embedded in the sand layer.
- 3.6.8 The general specification of the precast concrete paving blocks shall comply with MS 1380.
- 3.7 In-situ Concrete Paving Footpath
 - 3.7.1 In-situ concrete paving shall consist of 75 mm thick concrete of 1:3:6-20 mm mix by volume as specified in Section D: CONCRETE WORKS, laid on 100 mm thick properly compacted and blinded hardcore to panels as shown on the Drawings or as approved by the S.O.
 - 3.7.2 The concrete shall be well compacted and floated with a wooden float to smooth and even finish. After the concrete has achieved the initial set, the surface shall be brushed with stiff broom or wire brush to give a rough finish.
 - 3.7.3 The joints between the panels shall be filled with approved cold-poured polyurethane joint filler.
- 3.8 Brick Paving
 - 3.8.1 Bricks for paving shall be of semi-vitreous bricks 225 mm x 75 mm x 50 mm thick of approved quality and colour.
 - 3.8.2 The bricks shall be soaked as specified in SECTION E: NON-STRUCTURAL WALL SYSTEM before laying and shall be laid flat on 25 mm semi-dry cement and sand (1:3) screed with 6 mm spacing to the pattern as shown on the Drawings or as approved by the S.O.
 - 3.8.3 The screed shall be laid on 75 mm thick concrete (1:3:6-19mm) base founded on properly compacted and blinded 100 mm thick hardcore. The joints shall be filled with cement mortar (1:2) and finish flush.

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1. General

- 1.1 All paints to be used shall be those supplied by approved manufacturers. The quality of paints shall comply with MS 125 in respect of oil/enamel paints and MS 134 in respect of emulsion paints/acrylic paint.
- 1.2 Prior to commencing painting work, the Contractor shall submit the following to the S.O.:
 - (i) Name of the paint manufacturer and the manufacturer's certification that the paint conform to the relevant standard as specified in sub-section 1.1 hereof together with the proof that such certification have been verified by tests carried out by SIRIM or ISO in the last three (3) years.
 - (ii) The performance warranty by the manufacturer to the Government on the performance of the paint against any peeling, cracking, fungus/ algae growth and discoloration which may arise during a period of five (5) years or more from the date of practical completion due to insufficiency in material or workmanship. The terms of the performance warranty shall be as stipulated in APPENDIX O/1 and as approved by the S.O.
 - (iii) Name of the painting applicator as approved by the paint manufacturer including written evidence of the current approval.
 - (iv) A copy of the method statement including procedure for the painting works in accordance with these specification and manufacturer's instructions.
- 1.3 All paints shall be delivered to the Site in the manufacturer's original sealed containers unopened and shall be used strictly in accordance with the manufacturer's instructions.
- 1.4 Paints shall not be adulterated and any paint that has deteriorated shall not be used and shall be removed from the Site forthwith.
- 1.5 Unless otherwise specified in the Drawings, the types of paints to be used for the work on exposed surfaces shall be as stated in the 'Schedule of Paint Finish' attached hereinafter.
- 1.6 The colours and tints of paints shall be selected by the S.O. and the priming, undercoats and finishing coats shall be of approved differing tints and shall be obtained from the same manufacturer.
- 1.7 No painting shall be done under conditions which may jeopardize the quality of finish paintwork.
- 1.8 During painting, care shall be taken to prevent stain or damage to other works.
- 1.9 Surfaces to be painted shall be dry, free from dirt, oil, grease, old loose paint and other deleterious matter. All cracks shall be raked out and stopped and all holes and dents shall be filled.
- 1.10 Unless otherwise specified in the manufacturer's instructions, each coat of paint applied on timber or metal surfaces shall be allowed to dry and subsequently rubbed down lightly with sandpaper before the next coat is applied. Any dirt or dust shall be removed from preceding coats immediately before proceeding with application of the next coat.
- 1.11 All priming to shop fabricated components shall be done at shop.
- 1.12 All prime surfaces shall be inspected and approved by the S.O. before commencement of painting works.

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- 1.13 Finish surfaces shall be uniform in finish and colour and be free from brush marks or other defects.
- 1.14 Sample areas showing all tints of paints to be used shall be prepared by the Contractor as and when required by the S.O.

2. Painting To Timberwork

2.1 Painting To New Timberwork

- 2.1.1 Unless otherwise as shown on the Drawings, all exposed wrot surfaces of timber shall be painted as specified hereinafter.
- 2.1.2 Before painting to new timberwork, all knots shall be covered with knotting and all nail holes, cracks, et cetera shall be stopped with white lead and putty (1:3) and shall be primed with aluminium wood primer well brushed in.
- 2.1.3 Unless otherwise specified, the prepared surface shall be painted with one undercoat (alkyd undercoat) and shall be finished with two coats of premium semi-gloss fungus resisting alkyd paint or three (3) coats UV protection, low odour alkyd wood finish.
- 2.1.4 Timber decks shall be applied with three coats of scratch resistant, UV protection, fast drying low odour urethane alkyd wood finish. Each preceding coat shall be allowed to dry thoroughly and rubbed down lightly with fine sand paper and thoroughly cleaned before applying the next coat.
- 2.1.5 All timber surfaces abutting concrete or brickwork shall be primed before fixing or assembling.
- 2.1.6 All ironmongeries except hinges shall be removed before painting begins and shall be carefully re-fixed.

2.2 Repainting Existing Timberwork

Where repainting to existing timber work is specified, the following procedure shall be adhered to. If the surface is intact, it shall be rubbed down with fine sand paper to the approval of the S.O. Then one coat of undercoat shall be applied followed by two (2) coats of gloss enamel paint unless otherwise specified. Where cracking and flaking have occurred, the entire existing paint shall be removed by burning off or by use of paint remover as approved by the S.O. The surfaces shall then be thoroughly cleaned and shall be applied with one coat minimum wood primer followed by one (1) undercoat and unless otherwise specified in the Drawings, shall be finished with two (2) coats of gloss enamel paint.

3. Painting To Metalwork

3.1 Painting New Steel And Ironwork

The areas to be painted shall be cleaned down and be free from rust, scale, oil, grease, dirt and dust. One (1) coat of approved metallic primer shall be applied followed by one (1) coat of premium alkyd undercoat unless specified, and shall be finished with two (2) finishing coats of gloss/semi-gloss fungus resisting alkyd paint. Soil and vent pipes shall be primed as above and given two (2) coats of approved bituminous paint.

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3.2 Repainting Existing Steel And Ironwork

- 3.2.1 Where repainting to existing steel or ironwork is stated in the Drawings, the following procedure shall be adhered to. Where a firm surface exists, it shall be scuffed with fine sand paper to the approval of the S.O. and spot primed if necessary before the application of by one (1) coat of premium alkyd undercoat unless specified, and shall be finished with two (2) finishing coats of gloss/semi-gloss fungus resisting alkyd or gloss enamel paint.
- 3.2.2 If the old paint is in a bad, deteriorated condition the whole paint shall be removed by the use of approved paint remover or by scraping as approved by the S.O. The surface shall be thoroughly cleaned and shall be applied with one coat approved metallic primer, by one (1) coat of premium alkyd undercoat unless specified, and shall be finished with two (2) finishing coats of gloss/semi-gloss fungus resisting alkyd or gloss enamel paint.

3.3 Painting New Galvanized Ironwork

Where painting to new galvanized ironwork is specified, the surfaces shall be applied with one coat of approved self-etching quick drying metallic primer unless otherwise specified, and shall be finished with two finishing coats of gloss/semi-gloss fungus resisting alkyd paint or gloss enamel paint.

3.4 Repainting Existing Galvanized Ironwork

- 3.4.1 Where repainting to existing galvanized ironwork is specified, the following procedure shall be adhered to. If the surface is not corroded, it shall be slightly sanded and all dirt, oil, and grease removed by washing with an approved solvent and applied with one (1) coat of approved metallic primer unless otherwise specified, shall be finished with two (2) finishing coats of gloss/semi-gloss fungus resisting alkyd paint or gloss enamel paint. If the surface has corroded, the whole paint shall be removed by the use of approved paint remover or by scraping as approved by S.O.
- 3.4.2 When the surface is completely clean, it shall be applied with one coat approved metallic primer, unless otherwise specified, shall be finished with two finishing coats of gloss/semi-gloss fungus resisting alkyd paint or gloss enamel paint.

4. Painting To Masonry Work

4.1 Painting New Plastered/Masonry Surfaces

- 4.1.1 The new plastered or masonry surfaces shall be allowed to dry completely and shall be cleaned down to remove dust, dirt, plaster splashes, and the like. In case of old unpainted walls, all fungus, mosses, lichens and vegetative growth shall also be removed.
- 4.1.2 The cleaned surfaces of the external walls shall be applied with one coat of approved alkaline resisting primer and unless otherwise specified in the Drawings, followed with two (2) coats of ultra-violet (UV) weather resistant emulsion paint.
- 4.1.3 The external wall surfaces shall be applied with one (1) coat of approved alkaline resisting primer, unless otherwise stated in the Drawings, followed with two (2) coats of 100% acrylic with heat reflective and UV protected, and temperature reduction weather resistant emulsion paint for Green Ratings Certification as approved by the S.O.

 <p>JKR MALAYSIA</p>	<p>SECTION O : PAINTING WORKS</p>	<p>No. Dokumen : JKR 20800-0183-14 No. Keluaran : 01 No. Pindaan : 00 Tarikh : 29 Januari 2014 Muka Surat : O/7</p>
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- 13.3 Mild steel shall be applied with one (1) coat of zinc rich epoxy, one (1) coat of surface tolerance epoxy mastic and followed with two (2) coats of polyurethane topcoat.
- 13.4 Galvanized steel shall be applied with one (1) coat of surface tolerance epoxy mastic and followed with two (2) coats of polyurethane topcoat.
- 13.5 Roofing sheet coatings for marine environment shall refer to SECTION G: ROOFING WORKS.
- 13.6 Coatings of fasteners used shall comply with AS 3566 Class 4 and be certified as such by the supplier of fasteners and as approved by the S.O.

14. Painting Works To Clinical Areas (Hygienic Areas)

- 14.1 All external walls shall be applied with one (1) coat of approved siloxane primer sealer, unless otherwise stated in the Drawings, followed with two (2) coats of silicone emulsion water repellent paint applied strictly in accordance to manufacturer's instruction.
- 14.2 Internal walls shall be applied with one (1) coat of approved ultra-low VOCs alkaline resisting primer sealer, followed with two (2) coats of anti-bacteria, anti-fungus, low VOCs, 100% APEO free, formaldehyde free acrylic premium emulsion paint.

15. Completion Of Painting Works

- 15.1 On completion of paintwork, all paint marks inadvertently left on glass, floors, tiles and other surfaces shall be removed. Any stain or marking on finished paintwork shall be removed and touched up to the approval of the S.O.

Tajuk Projek : **TAWARAN SEMULA BAGI KERJA-KERJA MEMBINA DAN MENYIAPKAN LALUAN PEJALAN KAKI BERBUMBUNG MENGHUBUNGKAN BANGUNAN ASRAMA KE BANGUNAN INDUK POLITEKNIK JELI KELANTAN.**

No. Sebutharga : **PJK(S)/SH/04/2016**

Nota : Sebarang butiran yang tidak diperhargakan adalah dianggap dimasukkan dalam harga butiran-butiran lain. Penyebutharga adalah dianggap telah melawat tapak bina dan membaca syarat-syarat kontrak bersama-sama dengan pelan-pelan dan spesifikasi untuk memastikan sendiri liputan kerja yang terlibat sebelum menghargakan sebutharga kerana sebarang tuntutan bayaran tambahan berhubung dengan perkara di atas tidak akan dipertimbangkan.

Bil.	Keterangan Kerja	Unit	Kuantiti	Kadar Harga	Jumlah (RM)
1.0	<u>Kerja-Kerja Permulaan Dan Syarat Am</u>				
1.1	Menyediakan keperluan-keperluan sebagaimana syarat-syarat Sebutharga.				
	(a) Akta Keselamatan Sosial Pekerja 1969 (PERKESO)	pukal	pukal	pukal	
	(b) Insurans Tanggungan Awam	pukal	pukal	pukal	
	(c) Insurans Kerja	pukal	pukal	pukal	
1.2	Mengemas, membersihkan dan membaiki kerosakan jalan akibat kerja-kerja pembinaan apabila siap kerja.	pukal	pukal	pukal	
	JUMLAH				

Bil.	Keterangan Kerja	Unit	Kuantiti	Kadar Harga	Jumlah (RM)
	<u>(ALL PROVISIONAL)</u>				
2.0	Laluan Pejalan Kaki (2400mm lebar)				
2.1	Menyediakan tapak ke paras yang dikehendaki termasuk mengimpot tanah yang sesuai atau mengeluarkannya daripada tapakbina, meratakan serta memampatkan permukaan tanah tersebut dengan menggunakan mesin pemampat yang sesuai.	pukal	pukal	pukal	
2.2	100mm tebal batu-baur hancur atau bahan dasar jalan (road base) lain yang setara dan diluluskan, dimampatkan seperti yang ditentukan.	pukal	pukal	pukal	
2.3	Membina dan menyiapkan pelantaian laluan pejalan kaki serta kerja-kerja berkaitan sebagaimana berikut:				
2.3.1	<u>Konkrit</u> Kerja-kerja pelantaian konkrit 100mm tebal, konkrit Gred 25 dengan tetulang jenis A6 dipasang pada kedudukan yang betul, diratakan di lapisan atas dengan simen berwarna termasuk lapisan pasir setebal 150mm di lapisan bawah.	m ³	55.68		
2.3.2	<u>Concrete Interlocking Paving</u> (a) Kerja-kerja konkrit di bahagian tepi bagi pelantaian 'concrete interlocking paving'. (b) 60mm tebal unit turapan konkrit memanca (interlocking concrete paving units) diturap di atas lapisan permukaan lapis pasir setebal 150mm serta dipadatkan dan ruang di antara unit turapan diisi dengan pasir halus.	pukal m ²	pukal 271.20	pukal	
	JUMLAH				

Bil.	Keterangan Kerja	Unit	Kuantiti	Kadar Harga	Jumlah (RM)
3.0	Laluan Berbumbung				
3.1	Membina dan menyiapkan laluan berbumbung dengan tapak konkrit, tiang besi CHS, kekuda keluli RHS dengan bumbung Metal Deck berombak termasuk kemasan dan juga kerja-kerja mengecat serta kerja-kerja berkaitan dengan ketinggian sebagaimana berikut : a) Tinggi 2100mm b) Tinggi 5000mm	m ² m ²	950.4 105.6		
4.0	Kerja Infra				
4.1	Bina dan pasang dua (2) unit tangga konkrit bertetulang berukuran 4 meter (ukuran sebenar akan ditentukan ditapak).	pukal	pukal	pukal	
4.2	Kerja-kerja menggali, menanggal serta mengalih dan memasang semula paip jenis Polietilena (PE) termasuk kelengkapan.	pukal	pukal	pukal	
4.3	Kerja-kerja mengubahsuai pintu pagar utama sediaada serta membina dan memasang pintu pagar jaring berangkai jenis sliding termasuk tiang keluli (ukuran akan ditentukan ditapak) termasuk kelengkapan.	pukal	pukal	pukal	
4.4	Kerja-kerja mengorek kerb yang sediaada serta dipasang dengan lapisan premix serta dipadatkan sebagaimana arahan Pegawai Penguasa.	pukal	pukal	pukal	
	JUMLAH				

Tajuk Projek : **TAWARAN SEMULA BAGI KERJA-KERJA MEMBINA DAN MENYIAPKAN LALUAN PEJALAN KAKI BERBUMBUNG MENGHUBUNGKAN BANGUNAN ASRAMA KE BANGUNAN INDUK**
 No. Sebutharga : **PJK(S)/SH/04/2016**

RINGKASAN SEBUTHARGA

BIL	BUTIRAN-BUTIRAN KERJA	JUMLAH HARGA (RM)
1.0	Kerja-kerja Permulaan	
2.0	Laluan Pejalan Kaki	
3.0	Laluan Berbumbung	
4.0	Kerja Infra	
	JUMLAH DIBAWA KE BORANG SEBUTHARGA	

Catatan:

Jika ada butiran yang dikehendaki dalam Spesifikasi dan Skop Kerja tidak termasuk di dalam Ringkasan Sebut Harga ini, harga butiran tersebut hendaklah disifatkan telah dimasukkan ke dalam salah satu butiran dalam Ringkasan Sebut Harga.

Tarikh :

Tandatangan Pemborong :

Nama & Alamat :

.....

Tarikh :

Tandatangan Saksi :

Nama & Alamat :

.....

MAKLUMAT LATAR BELAKANG, KEWANGAN DAN PRESTASI KONTRAKTOR

- Lampiran - Arahan-arahan yang perlu dimasukkan ke dalam Arahan Kepada Pentender
- Lampiran A - Surat Pengakuan Kebenaran Maklumat dan Keesahan Dokumen Yang Dikemukakan oleh Pentender
- Lampiran B - Maklumat Am Latar Belakang Pentender
- Lampiran C - Data-data Kewangan
- Lampiran D - Rekod Pengalaman Kerja
- Lampiran E - Kakitangan Teknikal
- Lampiran F - Senarai Kerja Kontrak Semasa
- Lampiran G - Senarai loji dan Peralatan Utama
- Lampiran H - Borang CA – Laporan Bank/ Institusi Kewangan Mengenai Kedudukan Kewangan Pentender
- Lampiran I - Borang FA – Laporan Penyelia Projek Atas Prestasi Kerja (Bukan Projek JKR) Semasa Pentender
- Lampiran J - Borang FA1 – Laporan Jurutera Projek Atas Prestasi Kerja Semasa Pentender

ARAHAN-ARAHAN YANG PERLU DIMASUKKAN KE DALAM ARAHAN KEPADA PENTENDER

A. Maklumat Latar Belakang, Kewangan Dan Prestasi Pentender.

1. Pentender-pentender hendaklah mengambil maklum bahawa penilaian Tender ini akan mengambil kira dan mementingkan keupayaan pentender untuk melaksanakan projek yang ditender, di samping kemunasabahan harga tender., Jesteru itu keupayaan pentender - pentender akan dinilai semasa penilaian Tender. Penilaian ini akan dibuat berasaskan kedudukan kewangan, pengalaman kerja, kakitangan teknikal, dan prestasi kerja semasa pentender serta keempunyaan peralatan dan loji.
2. Untuk membolehkan Penilaian ini dibuat, Pentender - pentender adalah dikehendaki mengemukakan dokumen dokumen seperti tersenarai di bawah ini bersama sama tendernya.
 - (a) Salinan Akaun Syarikat yang telah disahkan dan diaudit oleh Juru Audit yang bertauliah, bagi dua (2) tahun kewangan terakhir : (Bagi Syarikat Sdn. Bhd. sahaja).
 - (b) Salinan Penyata Bulanan Akaun Bank mengenai Wang Dalam Tangan Pentender bagi tiga (3) bulan terakhir sebelum tarikh tutup tender.
 - (c) Laporan bank / institusi kewangan mengenai kedudukan kewangan pentender, atas format seperti Borang CA, dalam satu sampul berlakri.
 - (d) Salinan Perakuan / Pengesahan siap kerja bagi setiap kerja yang telah disiapkan dan disenaraikan di Borang D.
 - (e) Salinan Borang KWSP ' A ' bagi bulan caruman terakhir bagi setiap kakitangan teknikal atau salinan perjanjian perkhidmatan professional yang diambil secara kontrak yang disenaraikan di Borang E.
 - (f) Salinan sijil kelulusan / kelayakan setiap kakitangan teknikal kategori A dan b yang disenaraikan di Borang E.
 - (g) Laporan Penyeliaan Projek mengenai prestasi semasa pretender, bagi setiap kerja semasa yang bukan projek JKR yang disenaraikandi Borang F, atas format seperti Borang FA, dalam satu sampul berlakri.

Dokumen-dokumen ini sangatlah penting untuk membolehkan penilaian keupayaan yang sewajarnya dibuat ke atas pentender. Sekiranya pretender tidak atau gagal untuk mengemukakan dokumen-dokumen ini, terutamanya dokumen-dokumen (a), (b) dan (g), tender pretender akan ditolak dan tidak akan dipertimbangkan.

3. Sekiranya pentender gagal untuk mengemukakan salah satu atau sebahagian daripada dokumen-dokumen (c), (d), (e) dan (f), maklumat dan data-data yang tidak dapat disemak kerana ketiadaan atau ketidak-cukupan dokumen-dokumen tersebut adalah tidak sah dan tidak boleh diambilkira dalam penilaian keupayaan pentender yang berkenaan melainkan maklumat atau data-data tersebut membawa kesan negative terhadap nilai keupayaannya. Ini bermakna kriteria-kriteria yang mana penilaiannya memerlukan maklumat atau data-data ini, akan diambil sebagai kosong.

4. Disamping mengemukakan dokumen-dokumen yang tersebut diatas pentender pentender dikehendaki melengkapkan borang-borang berikut yang disertakan bersama Dokumen Tender ini, dengan sempurna dan mengembalikannya bersama-sama dengan tender masing-masing.
- (a) Lampiran A - SURAT PENGAKUAN KEBENARAN MAKLUMAT DAN KEESAHAN DOKUMEN YANG DIKEMUKAKAN OLEH PENTENDER
 - (b) Lampiran B - MAKLUMAT AM LATAR BELAKANG PENTENDER
 - (c) Lampiran C - DATA-DATA KEWANGAN PENTENDER
 - (d) Lampiran D - REKOD PENGALAMAN KERJA
 - (e) Lampiran E - KAKITANGAN TEKNIKAL
 - (f) Lampiran F - SENARAI KERJA KONTRAK SEMASA
 - (g) Lampiran G - KEEMPUNYAAN LOJI DAN PERALATAN PENTENDER

Borang-borang ini hendaklah diisi dengan maklumat yang benar dan data yang tepat. Semua butiran perlu diisi dan jawapan yang jelas hendaklah diberikan terhadap semua pertanyaan didalam borang-borang di atas. Jika perlu helaian tambahan boleh dilampirkan setiap helaian tambahan yang dilampirkan kepada borang-borang lain hendaklah ditandatangani oleh pentender.

- 5. Bagi pentender usahasama atau gabungan (seperti yang dibenarkan oleh PKK) antara dua atau lebih Kontraktor setiap ahli gabungan hendaklah masing-masing menyertakan dokumen-dokumen yang tersebut diatas secara berasingan.
- 6. Semua maklumat dan dokumen-dokumen yang tersebut di atas hendaklah dikemukakan oleh pentender bersama-sama tendemnya sebelum tarikh mengemukakannya selepas itu. Sebarang maklumat atau mana-mana dokumen tersebut yang diterima selepas Tender ditutup tidak akan diambil kira dalam penilaian keupayaan pentender.
- 7. Sekiranya pentender didapati memberi maklumat palsu atau sengaja menyorok (withhold) atau tidak memberikan mana-mana maklumat yang memberikan kesan negatif terhadap keupayaannya, tendemnya akan ditolak dan tindakan tatatertib akan diperakukan terhadapnya.

B. Tempoh Siap Inginan*

- 1. Julat Tempoh Siap Inginan bagi projek ini antara hingga Minggu.
- 2. Pentender adalah dinasihatkan untuk menawarkan julat tempoh penyiapan kerja yang dianggap sesuai dan munasabah baginya.

** Batalkan jika Tender berasaskan satu tempoh penyiapan yang ditetapkan oleh Jabatan.

C. Kriteria Penilaian

1. Penilaian akan dibuat dalam dua (2) peringkat berdasarkan pra-syarat dan kriteria -kriteria penilaian yang ditetapkan.

2. Penilaian Peringkat Pertama

2.1 Tender - tender yang diterima mestilah mematuhi beberapa pra-syarat sebelum boleh dinilai diperingkat kedua. Pra syarat yang telah ditetapkan ialah:-

- (i) Tender mestilah sempurna dimana pentender telah mematuhi syarat syarat tender.
- (ii) Tender telah disertai dengan dokumen-dokumen wajib yang telah ditetapkan di perenggan A2 di atas.
- (iii) Pentender mempunyai asset mudah cair tidak kurang daripada 3% dari anggaran jabatan (kerja Pembina).
- (iv) Pentender mestilah tidak mempunyai projek - projek yang mana prestasi semasanya tidak memuaskan iaitu peratus (%) kemajuan sebenar melebihi 30% terkebelakang dari jadual atau sedang menghadapi tindakan penamatan pengambilan kerjanya.

2.2 Hanya tender-tender yang memenuhi pra-syarat diatas sahaja yang akan dinilai di peringkat kedua.

3. Penilaian Peringkat Kedua - Penentuan Tender Yang Paling Menguntungkan Untuk Diperakukan

3.1 Penilaian akan dibuat berdasarkan kriteria - kriteria berikut:-

- (i) Harga tender berbanding dengan anggaran Jabatan (kerja pembina).
- (ii) Pengalaman Pentender menyiapkan projek dalam lima (5) tahun terbelakang.
- (iii) Prestasi Kerja Semasa samada cemerlang atau memuaskan berdasarkan laporan Pegawai Penguasa atau Pegawai Penyelia.
- (iv) Kakitangan teknikal yang mencukupi untuk melaksanakan projek projek yang ditender.
- (v) Faktor faktor lain yang menyokong harga tendemnya seperti pentender mempunyai loji, kuari, kilang dan sebagainya.

3.2 Disamping itu kriteria-kriteria lain dalam menentukan tender yang akan diperakukan adalah seperti berikut:

3.2.1 Tempoh Siap Kerja

Sekiranya tempoh siap tender terendah yang layak dipertimbangkan lebih panjang dari had tertinggi julat Tempoh Siap Inginan (TSI) atau penengah Tempoh-tempoh siap kerja yang ditawarkan (sekiranya TSI tidak ditetapkan)

maka pelarasan ke atas harga tender akan dibuat untuk mengambilkira kesan kelambatan penyiapan projek kepada kerajaan.

3.2.2 Beban Kerja Semasa

Pentender akan dipastikan tidak mempunyai beban kerja semasa yang terlalu banyak yang dijangka akan dapat menjejaskan prestasinya.

**SURAT PENGAKUAN KEBENARAN MAKLUMAT DAN KEESAHAN DOKUMEN YANG
DIKEMUKAKAN OLEH PENTENDER.**

Nama Kontraktor :
Alamat :
.....

Kepada,

.....
.....
.....

(Pihak yang akan menilai tender)

Tuan,

Maklumat Latar Belakang, Kewangan dan Teknikal Pentender.

1. Kami telah membaca dengan teliti semua arahan arahan yang terkandung dalam Arahan Kepada Pentender termasuk arahan arahan yang menghendakkan kami mengemukakan maklumat maaklumat dan dokumen dokumen mengenai perkara diatas bersama sama dokumen tender kami semasa mengemukakan Tender ini untuk membolehkan JKR menilai keupayaan kami untuk melaksanakan kerja yang ditender, semasa penilaian Tender.
2. Kami faham dan mengambil maklum bahawa penilaian Tender ini akan mengambil kira dan mementingkan keupayaan kami melaksanakan kerja yang ditender. Justeru itu tender kami akan hanya dipertimbangkan untuk diperakukan kepada Lembaga Tender untuk disetujui terima sekiranya kami didapati berupaya untuk melaksanakan projek yang ditender, mengikut penilaian JKR berasaskan maklumat maklumat dan dokumen dokumen yang kami kemukakan.
3. Kami juga mengambil maklum bahawa kami dikehendaki mengemukakan semua maklumat dan dokumen dokumen yang diminta bersama sama tender kami sebelum Tender ditutup dan maklumat maklumat atau dokumen dokumen yang dikemukakan kemudian daripada itu tidak akan diterima untuk diambil kira dalam penilaian keupayaan kami.
4. Kami mengaku bahawa maklumat maklumat dan data data yang kami berikan bersama sama ini di Borang B,C,CA,D,E,F,FA dan dokumen dokumen yang kami sertakan bersamanya setahu kami adalah semuanya benar dan sari pada semua segi dan telah mengambil maklum dan sedar akan tindakan yang boleh diambil oleh Kerajaan terhadap kami dan / atau tender kami, sekiranya mana mana maklumat, data data dan dokumen yang kami berikan itu didapati tidak benar atau palsu.
5. Kami juga mengambil maklum dan sedar bahawa Tender kami akan ditolak (disqualified) dan tidak akan dipertimbangkan sekiranya maklumat maklumat yang kami berikan tidak mencukupi atau sekiranya kami gagal untuk memberkan bersama sama ini mana mana maklumat dan / atau menyertakan mana mana dokumen dokumen penting yang sangat diperlukan untuk membolehkan JKR menilai keupayaan kami, terutamanya dokumen dokumen berhubung dengan kedudukan kewangan dan prestasi kerja semasa kami seperti berikut:
 - (i) Salinan Akaun Syarikat yang telah disahkan dan diaudit oleh Juru Audit yang bertauliah, bagi (2) tahun kewangan terakhir,

- (ii) Salinan Penyata Bulanan Akuan Bank mengenai Wang Dalam Tangan pentender bagi tiga (3) bulan terakhir sebelum tarikh tutup Tender;
- (ii) Laporan Penyelia Projek atas prestasi kerja semasa yang bukan projek JKR diatas Borang FA dalam satu sampul berlakri bagi setiap kerja semasa yang sedang dilaksanakan.

6. Kami dengan ini memberi kuasa kepada mana mana pegawai Kerajaan, jurutera jurutera projek, bank dan kewangan lain, dan lain lain atau mana mana orang yang atau firma yang berkenaan untuk memberikan maklumat maklumat yang dianggap perlu dan diminta oleh JKR untuk menyemak maklumat maklumat yang kami berikan atau untuk mendapatkan maklumat maklumat tambahan. Kami mengambil maklum bahawa pihak JKR juga boleh merujuk apa apa maklumat yang kami kemukakan dengan mana mana pihak termasuk Jabatan Hasil Dalam Negeri. Walaubagaimanapun, kami tetap bertanggungjawab diatas maklumat maklumat dan dokumen dokumen yang kami berikan bersama sama ini.

Yang Benar,

.....
(Tandatangan Pentender)

Nama Penuh :

Tarikh :

Kad Pengenalan :

Atas Sifat :

yang diberi kuasa dengan sempumanya untuk menandatangani Tender ini untuk dan bagi pihak

.....
Meteri atau Cap Pentender

.....
(Tandatangan Saksi)

Nama Penuh :

Tarikh :

Kad Pengenalan :

Pekerjaan :

Alamat :

.....
.....

MAKLUMAT AM LATAR BELAKANG PENTENDER

Semua butir dilampirkan ini hendaklah diisi oleh Pentender dengan betul dan lengkap dan dikembalikan bersama-sama dengan tendernya. Kegagalan berbuat demikian boleh mengakibatkan tender ini ditolak atau/dan mengakibatkan tindakan tatatertib diambil keatas pentender berkenaan.

LATARBELAKANG PENTENDER

Bahagian A

1. Nama :
2. Alamat :
3. Kelas : Tajuk/Tajuk Kecil:
4. Tarikh didaftarkan :
5. Jika bertaraf Bumiputera, nyatakan :
Tarikh berkuatkuasa :
Tarikh tamat :
6. Bagi Syarikat Sdn. Bhd., nyatakan :
Modal dibenarkan :
Modal dibayar :
7. Ahli-ahli Lembaga Pengarah

Nama	Jawatan	Saham Modal Dipegang

8. Ahli-ahli Pengurusan

Nama	Jawatan	Kelulusan Akademik/Iktisas

BORANG DATA-DATA KEWANGAN

- A. Ringkasan harta dan liabiliti seperti yang ditunjukkan dalam Lembaran Imbangan (Balance Sheet) yang diaudit bagi tahun kewangan terakhir.

Asset (A)	Liabiliti (B)	Nilai Kewangan (Worth) (A - B)
Semasa:	Semasa:	Modal Pusingan :
Tetap :	Tetap :	Modal Tetap :
Jumlah :	Jumlah :	Net Worth:

- B. Akaun Wang Di Tangan (Cash in Hand)

1. Nama dan Alamat Bank dimana akaun dibuka :
2. Nombor Akaun :

- C. Kemudahan Kredit

1. Nama dan Alamat Bank dimana akaun dibuka :
 2. Bentuk dan baki amaun yang boleh digunakan untuk projek pembinaan

(i)	Overdraf atau Talian Kredit	:	RM
(ii)	Overdraf bercagar	:	RM
(iii)	Pinjaman Tetap yang akan/layak diperolehi untuk projek	:	RM
(iv)	:	RM
	JUMLAH	:	RM
-

Peringatan Penting

- * Sila sertakan salinan Akaun Syarikat bagi (2) tahun kewangan terakhir, yang disahkan dan diaudit oleh Juru Audit bertauliah (Certified Accountant) atau sekiranya tiada, bagi tahun kewangan setahun sebelumnya bagi menyokong data-data yang diberi Tender yang tidak disertakan dengan Akaun ini akan ditolak.
- ** Sila Sertakan salinan penyata Bulanan Bank bagi tiga (3) bulan terakhir sebeelum tarikh tutu Tender. Tender yang tidak disertakan dengan penyata akan ditolak.
- *** Sila dapatkan dan sertakan Laporan sulit daripada pihak Bank/Institusi Kewangan atas format seperti Borang CA, dalam satu sampul berlakri.

SULIT

REKOD PENGALAMAN KERJA

Senarai semua kerja yang disiapkan dalam 5 tahun lepas.

Bil.	Nama Kontrak / Projek Dan Skop Kerja+	Nilai Kontrak (RM)	Nilai Pentender Bertanggungja wab*	Tempoh Kontrak**	Tarikh Milik Tapak	Tarikh Siap		Nama Dan Alamat Pegawai Penguasa / Jurutera Perunding	Nama Dan Alamat Majikan
						Kontrak	Sebenar		

+ Salinan Perakuan / Pengesahan Siap Kerja bagi setiap kerja yang disenaraikan hendaklah disertakan.

* Hanya perlu diisi sekiranya pentender melaksanakan kerja sebagai ahli syarikat gabungan.

** Tempoh Kontrak hendaklah termasuk lanjutan masa yang diluluskan.

KAKITANGAN TEKNIKAL

Butir-butir kakitangan teknikal yang ada dalam penggajian pentender masa kini.

Bil.	Nama dan No. K/Pengenalan *	Kelulusan Profesional / Pendidikan**	Tahun Kelulusan	Tarikh Diambil Bekerja	Jawatan Yang Disandang / Tugas- tugas Semasa	Pengalaman Lepas (Jawatan disandang, nama projek dan majikan dan tempoh bekerja dan sebagainya)

* Salinan Borang KWSP 'A' setiap pekerja bagi bulan caruman terakhir dan salinan perjanjian perkhidmatan ahli professional yang diambil khidmat secara kontrak hendaklah disertakan.

** Sila sertakan salinan sijil kelulusan atau sijil keahlian Badan-badan professional.

SENARAI KERJA KONTRAK SEMASA

Senarai semua kerja di dalam tangan / sedang berjalan dan belum siap termasuk kontrak yang baru diaward.

Bil.	Nama Kontrak / Projek Dan Skop Kerja+	Nilai Kontrak (RM)	Nilai Pentender Bertanggungjawab*	Tempoh Kontrak**	Tarikh Milik Tapak	Tarikh Siap Kontrak	Kemajuan Kerja		Nama Dan Alamat Jurutera Projek	Nama Dan Alamat Majikan
							Ikut Jadual (%)	Sebenar Dicapai (%)		

* Hanya perlu diisi sekiranya pentender melaksanakan kerja sebagai ahli syarikat gabungan.

** Tempoh Kontrak hendaklah termasuk lanjutan masa yang diluluskan.

+ Peringatan Penting:

Bagi setiap kerja semasa bukan projek JKR, sertakan (wajib) Laporan Penyelia Projek atau format seperti Borang FA, dalam satu sampul berlakri. Tender yang tidak disertakan dengan laporan ini bagi setiap kerja semasa yang disenaraikan akan ditolak.

LAPORAN KEEMPUYAAN LOJI DAN PERALATAN PENTENDER

- Pentender hendaklah mengemukakan bukti dan dilengkapi dengan gambar-gambar berkaitan dengan peralatan atau loji kepunyaannya bagi kerja-kerja membaikpulih peralatan Mekanikal dalam format yang dinyatakan dibawah ini.

Bil.	Jenis Modal, Buatan Dan Keupayaan / Saiz	Tahun Buatan	Bil. Setiap Satu	Nilai Semasa (RM)	Baki Umur Bekerja (Tahun)	Tempat Simpanan / Digunakan Sekarang	Jenis Keupayaan (Nyatakan Hak Milik Atau Dalam Sewa/Beli)
A.	Loji Pembinaan						
B.	Lori / Trak (Pengangkutan Bahan Korekan & Timbunan Sahaja)						

* Salinan kad pengenalan dan/atau dokumen-dokumen lain bukti keempunyaan hakmilik pentender atau perjanjian sewabeli/sewapajak atas setiap Loji dan Peralatan yang disenaraikan hendaklah disertakan.

**BORANG CA - LAPORAN BANK/INSTITUSI KEWANGAN
MENGENAI KEDUDUKAN KEWANGAN PETENDER**

(Borang ini hendaklah dilengkapkan oleh pihak bank atau institusi kewangan lain dan diserahkan kepada petender dalam satu sampul berlakri untuk disertakan bersama-sama tendernya sekiranya terdapat petender mempunyai kemudahan kredit dengan Bank/Institusi Kewangan yang berkenaan)

Kepada,

.....
.....
.....

(Pihak yang akan menilai tender)

Nama Pentender :

Projek : Tender Untuk

.....
.....
.....
.....

(A) Kemudahan Kredit yang boleh digunakan untuk pelaksanaan Projek :
Kemudahan Kredit yang diluluskan dan kemudian kredit tambahan minimum yang layak diperolehi oleh pentender adalah seperti berikut :-

Bentuk Kemudahan Kredit	Baki drp. Yang Telah diluluskan	Tambahan Minima Yang Akan diluluskan	Jumlah
i Overdraf	RM	RM	RM
ii Overdraf bercagar	RM	RM	RM
iii Talian Kredit	RM	RM	RM
iv Pinjaman Tetap yang akan/layak diperolehi untuk projek*	RM	RM	RM
v	RM	RM	RM
JUMLAH :	RM	RM	RM

(*Jika Projek diawardkan kepada Pentender)

(B) ULASAN

Tandatangan untuk dan bagi pihak Bank :

Nama Bank : Nama Pegawai :

Materi Bank : Jawatan :

Tarikh :

BORANG FA - LAPORAN PENYELIA PROJEK ATAS PRESTASI KERJA (BUKAN PROJEK JKR) SEMASA PENTENDER

(Borang ini hendaklah dilengkapkan oleh Penyelia Projek atau Pembantu Kanannya yang mengawasi projek dan diserahkan kepada Kontraktor dalam satu sampul berlakri untuk disertakan bersama sama tendernya).

Kepada,

.....
.....
.....

(Pihak yang akan menilai tender)

Nama Kontraktor :

Nama Projek Yang Dilaksanakan :

No. Kontrak :

Harga Kontrak (termasuk anggaran nilai kerja perubahan) : RM

Wang Kos Prima dan Peruntukan Sementara : RM

Nilai Kerja Pembina : RM

Tarikh Milik Tapak : Tempoh Kontrak : Minggu

Tarikh Penyiapan Asal :

Lanjutan Masa Yang Telah Diluluskan : Hari

Lanjutan Masa Seterusnya :

Yang difikirkan/dijangka layak diperakukan : Hari

Atas sebab-sebab : (i)

(ii)

Kemajuan Kerja (berdasarkan penilaian kerja yang telah dilaksanakan) :

Pencapaian sebenar : % Mengikut jadual : %

Tarikh Kerja dijangka akan dapat disiapkan :

Nilai Bahagian Kerja Yang Telah Siap : RM

Nilai Baki Kerja Yang Belum Siap : RM

Ulasan ulasan mengenai Prestasi Kontraktor :

(Nyatakan apa apa kepujian dan / atau kelemahan kontraktor dan juga apa apa tindakan / perakuan yang diambil / dipertimbang berhubung dengan prestasi Kontraktor melaksanakan Kontrak).

.....
(Tandatangan Pegawai Penguasa / Jurutera Projek / Wakilnya)

Nama :

Jawatan :

Tarikh :

**BORANG FA1 - LAPORAN JURUTERA PROJEK ATAS PRESTASI KERJA SEMASA
PENTENDER**

(Borang ini hendaklah dilengkapkan oleh Jurutera Projek atau Pembantu Kanannya yang mengawasi projek apabila diminta berbuat demikian oleh Pegawai Penilaian dan hendaklah dihantar segera dengan menggunakan mesin fax).

Kepada,

.....
.....
.....

(Pihak yang akan menilai tender)

Nama Kontraktor :

Nama Projek Yang Dilaksanakan :

No. Kontrak :

Harga Kontrak (termasuk anggaran nilai kerja perubahan) : RM

Wang Kos Prima dan Peruntukan Sementara : RM

Nilai Kerja Pembina : RM

Tarikh Milik Tapak : Tempoh Kontrak : Minggu

Tarikh Penyiapan Asal :

Lanjutan Masa Yang Telah Diluluskan : Hari

Lanjutan Masa Seterusnya : Hari

Atas sebab-sebab : (i)
(ii)

Kemajuan Kerja (berdasarkan penilaian kerja yang telah dilaksanakan) :

Pencapaian sebenar : % Mengikut jadual : %

Tarikh Kerja dijangka akan dapat disiapkan :

Nilai Bahagian Kerja Yang Telah Siap : RM

Nilai Baki Kerja Yang Belum Siap : RM

Ulasan ulasan mengenai Prestasi Kontraktor :

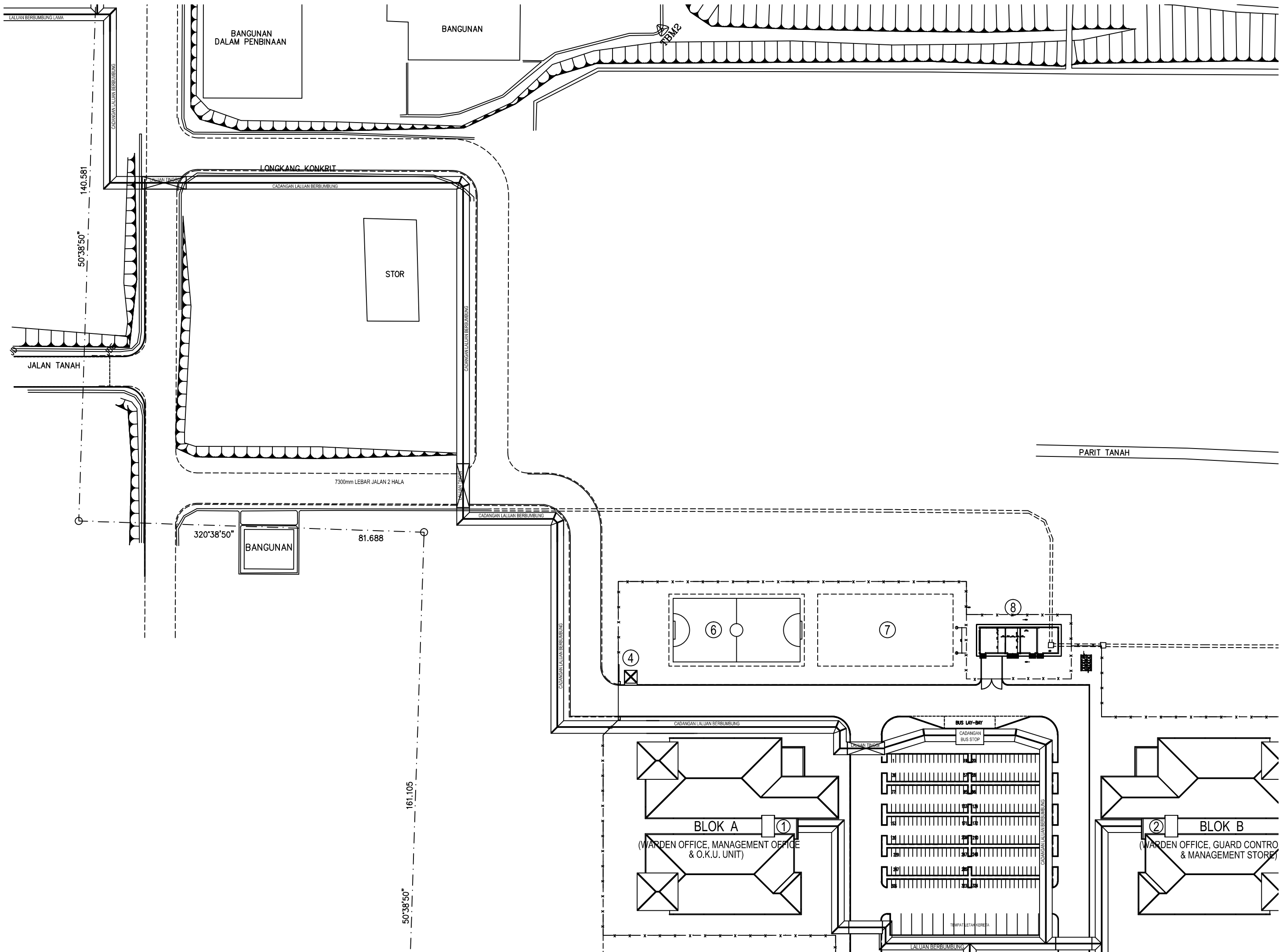
(Nyatakan apa apa kepujian dan / atau kelemahan kontraktor dan juga apa apa tindakan / perakuan yang diambil / dipertimbang berhubung dengan prestasi Kontraktor melaksanakan Kontrak).

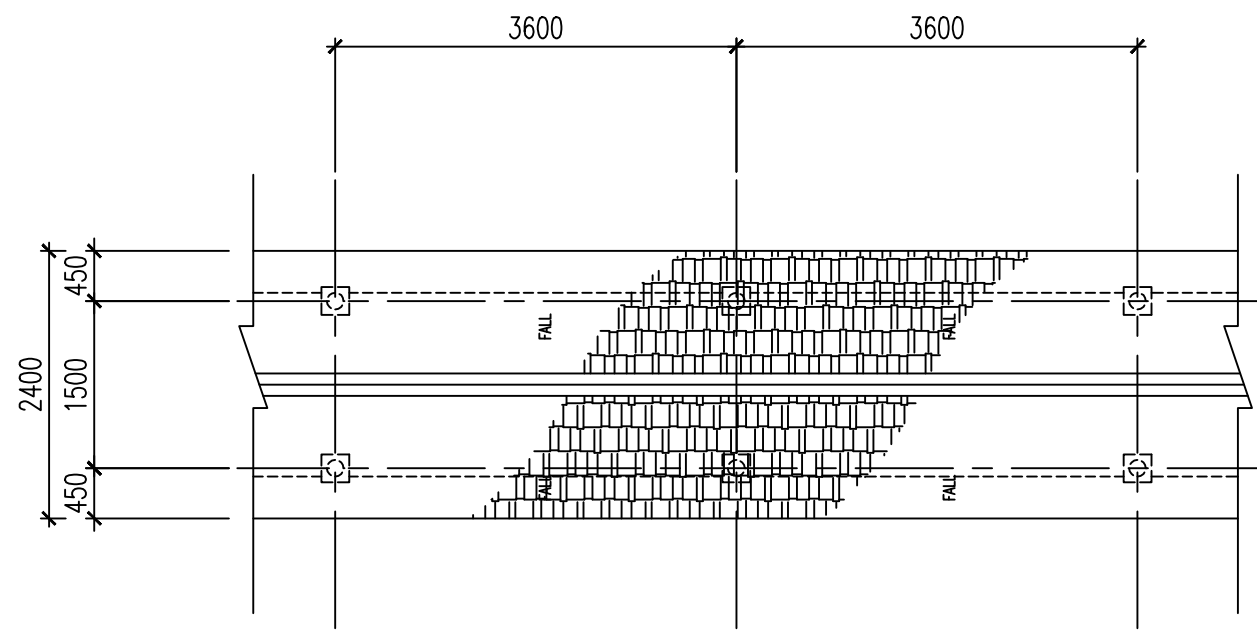
.....
(Tandatangan Pegawai Penguasa / Jurutera Projek / Wakilnya)

Nama :

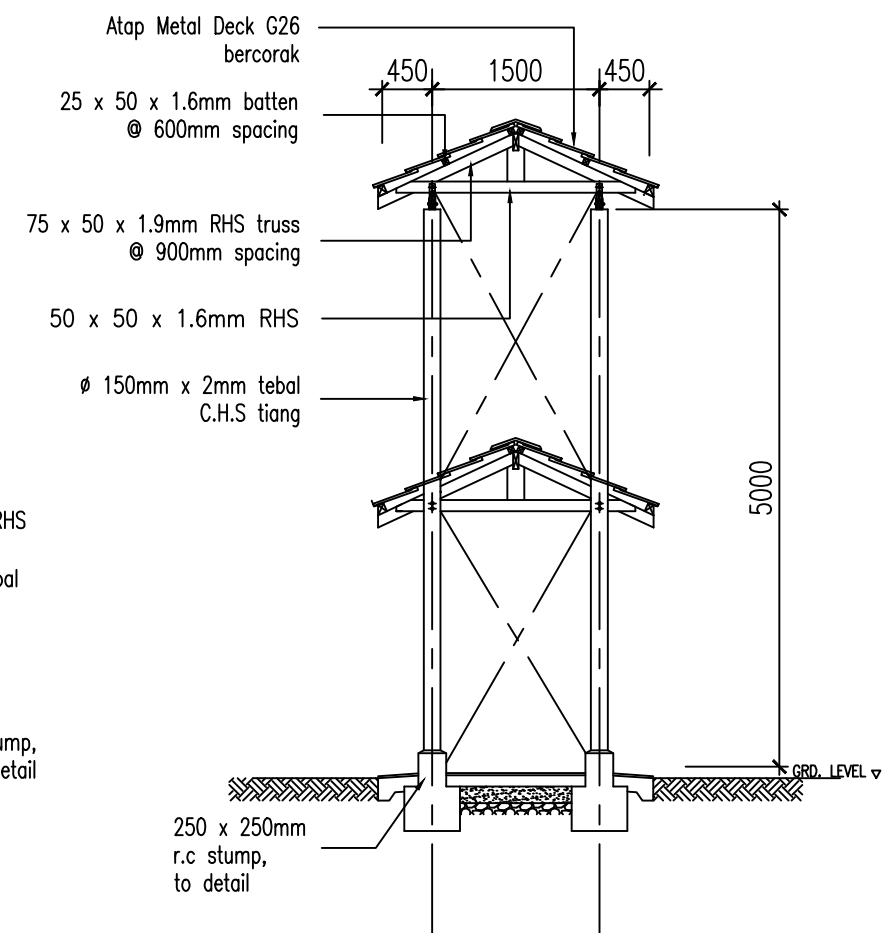
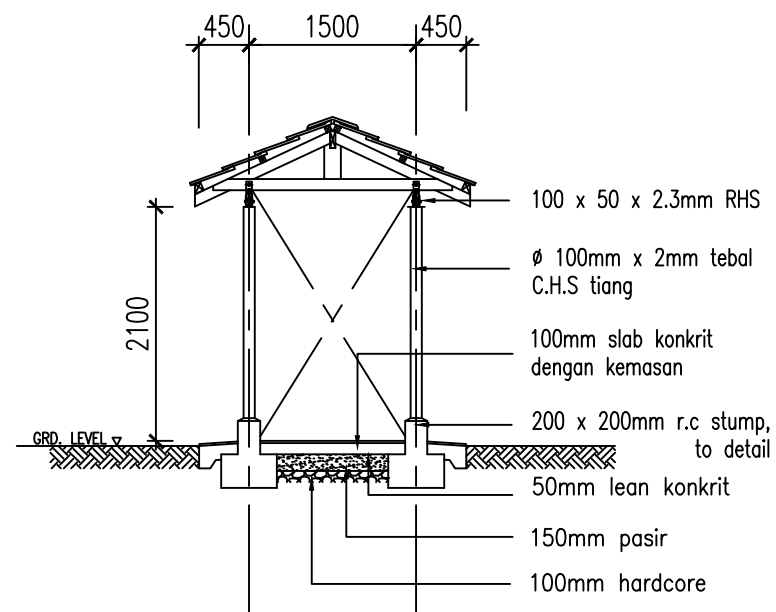
Jawatan :

Tarikh :

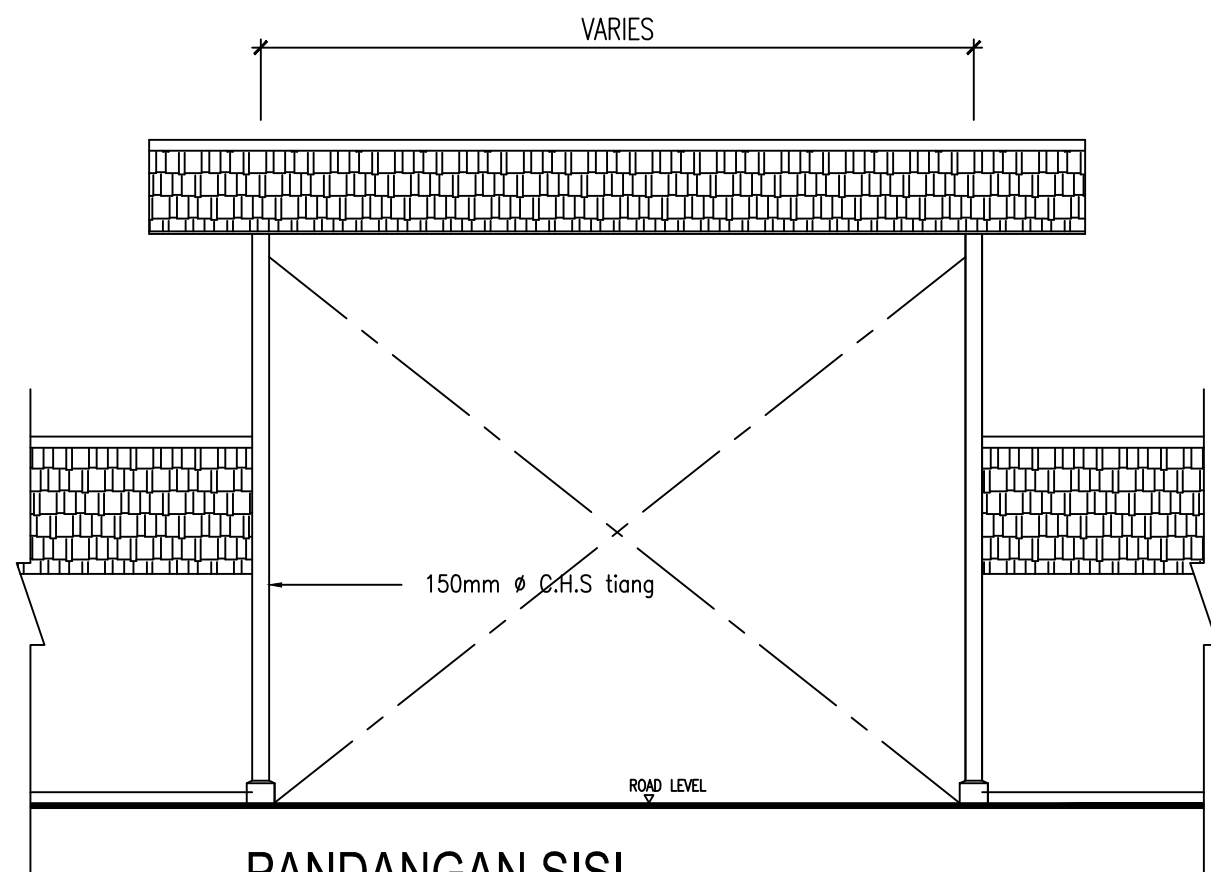




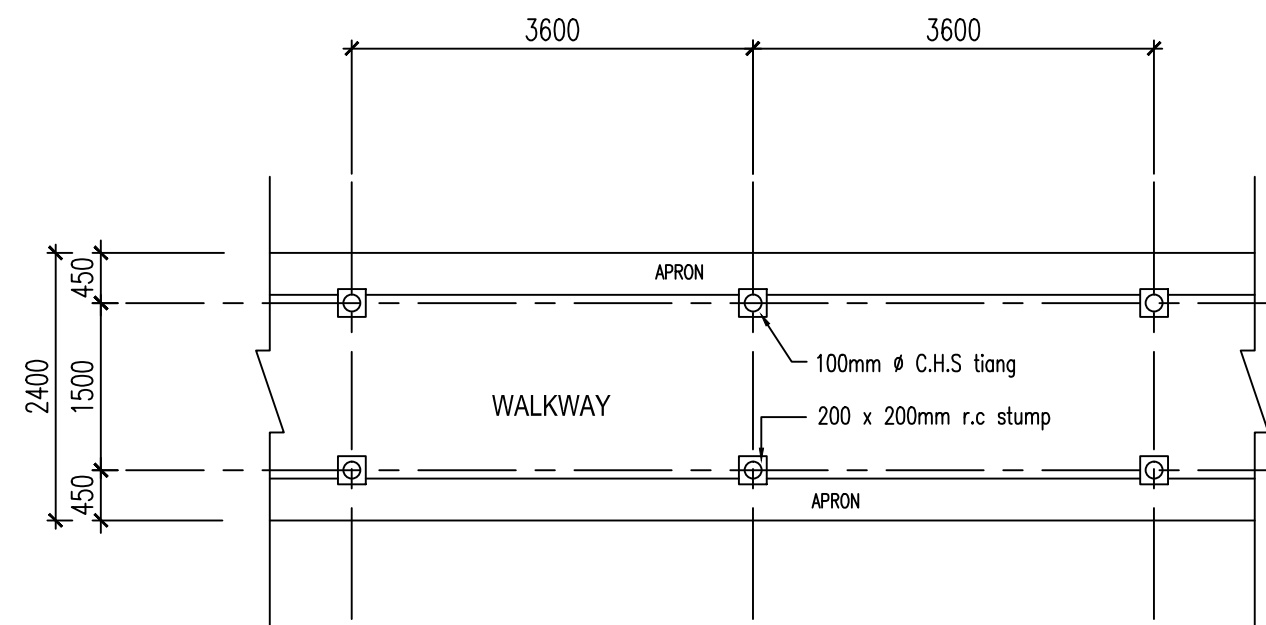
PANDANGAN BUMBUNG



KERATAN RENTAS



PANDANGAN SISI



PELAN