



**TECHNICAL CONDITIONS OF CONTRACT FOR
DESIGN AND BUILD OF
THE BUS INTERCHANGES
AND THE ASSOCIATED WORKS
AT YISHUN**

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**SALE OF SITE
FOR COMMERCIAL AND RESIDENTIAL DEVELOPMENT
INTEGRATED WITH BUS INTERCHANGE
LAND PARCEL
AT YISHUN CENTRAL/ YISHUN AVENUE 2**

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SCHEDULE 1 - TECHNICAL CONDITIONS OF CONTRACT FOR DESIGN AND BUILD OF THE BUS INTERCHANGES AND THE ASSOCIATED WORKS AT YISHUN

1 INTRODUCTION

1.1 This document forms part of the Agreement for the Design and Build of the Bus Interchanges and associated works at Yishun

1.2 It details out the following:

- a. Works for the Bus Interchanges and associated works
- b. Requirements on the design and construction for the Works
- c. Timeline and procedural requirements
- d. Design submission requirements
- e. Cost reimbursement and procurement requirements

1.3 In this document, the following expressions shall have the following meaning:

Integrated Bus Interchange	The proposed permanent bus interchange to be integrated with the development on the Land Parcel bounded between Yishun Central 1 and Yishun Ave 2
Temporary Bus Interchange	The proposed temporary bus interchange on the site bounded by Yishun Central and Yishun Central 1
Existing Bus Interchange	The existing Yishun Bus Interchange occupying part of the Land Parcel
Bus Interchanges	Collectively refers to the Temporary Bus Interchange and Integrated Bus Interchange
Development	The proposed development above, below or adjacent to the Integrated Bus Interchange
Bus Park Area	Refers to parking lots, circulation driveway, accesses and all berths.
ADC	Architectural Design Criteria
CSC	Certificate of Statutory Completion
LTA	Land Transport Authority
LTA OIC	Person authorised by LTA to act on its behalf as indicated in the Letter of Appointment
MRT Station	Yishun MRT Station
M&E	Mechanical and Electrical
Operator	Public Transport Operators
TOL	Temporary Occupation Licence
TOP	Temporary Occupation Permit
Works	The works to be performed in accordance with the LTA's Requirements and the Agreement

1.4 Where LTA's approval is required, the request for approval shall be sought in writing only. For avoidance of doubt any requests submitted via electronic mail (email) for LTA's approval shall not be considered as being made in writing.

2 SCOPE OF WORKS

2.1 General

2.1.1 The Works for the Bus Interchanges and associated works are broadly categorised as follow:

- a. Design and construct the Temporary Bus Interchange and its associated works
- b. Demolish the Existing Bus Interchange
- c. Design and construction of the Integrated Bus Interchange and its associated works
- d. Demolish the Temporary Bus Interchange and its associated works

2.1.2 The above works are to be carried out by the successful tenderer but reimbursed separately by LTA. Works that are not stated under this Section in this document **shall not be reimbursed** unless otherwise approved by LTA.

2.2 Design and Construction of the Temporary Bus Interchange and Associated Works

2.2.1 The notional layout of the Temporary Bus Interchange and associated works are shown in Appendix A. The Temporary Bus Interchange and associated works shall be completed in tandem.

2.2.2 The key design parameters of the Temporary Bus Interchange are summarised as below:

S/No	Description	Details/ Requirements
(a)	Approximate Bus Interchange Site Area	Minimum 2.5 ha and complying with ADC requirements
(b)	Type of Bus Facility	<input checked="" type="checkbox"/> Bus Interchange <input type="checkbox"/> Bus Terminal
(c)	Concourse Mode of Ventilation	<input checked="" type="checkbox"/> Naturally Ventilated <input type="checkbox"/> Air-Conditioned
(d)	Bus Park Area Mode of Ventilation	Open air, naturally ventilated
(e)	Bus Interchange Access(es)	<ul style="list-style-type: none"> ▪ One signalised, full-movement access at Yishun Central ▪ One signalised, full-movement access at Yishun Central 1
(f)	Floor Level of Bus Interchange	At ground/road level with Yishun Central and Yishun Central 1
(g)	Expected Number of Bus Services	23
(h)	Number and Type of Bus Parking Lots	<input checked="" type="checkbox"/> 27 X Lots for 12m Standard Bus <input checked="" type="checkbox"/> 21 X Lots for 18m Articulated Bus

S/No	Description	Details/ Requirements
(i)	Number and Type of Berths	<input checked="" type="checkbox"/> Saw-Tooth Berths Boarding (with queue rails): <u>4</u> X 12m Standard Bus <u>4</u> X 18m Articulated Bus Alighting (without queue rail): <u>3</u> X 12m Standard Bus <u>1</u> X 18m Articulated Bus <hr/> <input type="checkbox"/> End-On Berths <u> </u> X Boarding/ Alighting (with queue rails) <hr/> <input type="checkbox"/> Others Please specify: _____
(j)	Concourse Clear Width (Minimum distance free from encumbrances e.g. queue railings, etc)	<input type="checkbox"/> 6m <input checked="" type="checkbox"/> 8m <input type="checkbox"/> 10m <input type="checkbox"/> Others, please specify: ____ m
(k)	Type of Pavement for Bus Park Area and Bus Interchange Accesses	<input checked="" type="checkbox"/> Rigid Pavement <input type="checkbox"/> Semi-Rigid Pavement (see Appendix C)
(l)	Offices and Other Facilities (Refer to the ADC for details and sizing)	<input checked="" type="checkbox"/> Passenger Service Office 1 <input checked="" type="checkbox"/> Passenger Service Office 2 <input checked="" type="checkbox"/> Administrative Office <input checked="" type="checkbox"/> Manager Room <input checked="" type="checkbox"/> Server Room <hr/> <input checked="" type="checkbox"/> Ticket Office <input checked="" type="checkbox"/> Add Value Machine room <input checked="" type="checkbox"/> Commercial Space <input checked="" type="checkbox"/> ATM Equipment/ Public Telephone/ Vending Machine Spaces <hr/> <input checked="" type="checkbox"/> Staff Lounge cum Briefing Room <input checked="" type="checkbox"/> Staff Toilets <hr/> <input checked="" type="checkbox"/> Public Toilets <input checked="" type="checkbox"/> Canteen <input checked="" type="checkbox"/> Kitchen <input checked="" type="checkbox"/> Rodent-Free Storeroom

S/No	Description	Details/ Requirements
		<input checked="" type="checkbox"/> Technician's Room <input checked="" type="checkbox"/> Store Room <input checked="" type="checkbox"/> Cleaner's Room <input checked="" type="checkbox"/> First Aid cum Nursing Room <input type="checkbox"/> Special Purpose Room
		<input checked="" type="checkbox"/> Bin Centre/ Point <input type="checkbox"/> Fire Control Centre <input checked="" type="checkbox"/> Switch Room <input type="checkbox"/> AHU, Chiller Plant Rooms, Cooling Towers <input checked="" type="checkbox"/> Main Distribution Frame <input type="checkbox"/> Generator Room
(m)	Others	<input checked="" type="checkbox"/> CCTV in Concourse <input type="checkbox"/> CCTV at Perimeter <input checked="" type="checkbox"/> Security Bollards <input checked="" type="checkbox"/> Safety Bollards(see Appendix C) <input checked="" type="checkbox"/> Perimeter Fence <input checked="" type="checkbox"/> Vehicular Swing Gates <input type="checkbox"/> Noise Mitigation Measures (in addition to acoustic building materials) <input type="checkbox"/> Landscaping (in addition to NParks' requirement) <input checked="" type="checkbox"/> Bicycle Parking : <u>300</u> Racks

2.2.3 The associated works for the Temporary Bus Interchange are as follows:

- a. One high covered linkway with signalised pedestrian crossing (minimum 6m wide) across Yishun Central 1 (see Appendix C)
- b. One covered linkway from Temporary Bus Interchange to existing bus stop along Yishun Central (across Blk 201)
- c. Two temporary bus stops with bay (along Yishun Central and along Yishun Avenue 2) and their necessary traffic enhancement measures
- d. Modification of existing bus stop at Yishun Avenue 5 and its necessary traffic enhancement measures
- e. Modification of existing signalised junction at Yishun Central (Temporary Bus Interchange access)
- f. New signalised junction at Yishun Central 1 (Temporary Bus Interchange access) with Advanced Warning Lights
- g. Junction enhancement at the signalised junction of Yishun Avenue 2/Yishun Central/Yishun Avenue 5

2.3 Demolition of Existing Bus Interchange

2.3.1 Upon the operation of the Temporary Bus Interchange, the Existing Bus Interchange shall be demolished at a date agreed by LTA OIC.

2.4 Design and Construction of the Integrated Bus Interchange and Associated Works

2.4.1 The notional layout of the Integrated Bus Interchange and associated works are shown in Appendix B. The Integrated Bus Interchange and associated works shall be completed in tandem.

2.4.2 The key design parameters of the Integrated Bus Interchange are summarised as below:

S/No	Description	Details/ Requirements
(a)	Approximate Bus Interchange Site Area	Minimum 2.5 ha and complying with ADC requirements
(b)	Type of Bus Facility	<input checked="" type="checkbox"/> Bus Interchange <input type="checkbox"/> Bus Terminal
(c)	Concourse Mode of Ventilation	<input type="checkbox"/> Naturally Ventilated <input checked="" type="checkbox"/> Air-Conditioned
(d)	Bus Park Area Mode of Ventilation	As naturally ventilated as possible, with minimum of two openings on different sides of the bus interchange for cross ventilation, subject to Computational Fluid Dynamics Study
(e)	Bus Interchange Access(es)	<ul style="list-style-type: none"> ▪ One signalised, full-movement access at Yishun Ave 2 ▪ One Left-In-Left-Out (LILO) access at Yishun Ave 2
(f)	Floor Level of Bus Interchange	At ground/road level with Yishun Ave 2 and Yishun Central 1
(g)	Expected Number of Bus Services	23
(h)	Number and Type of Bus Parking Lots	<input checked="" type="checkbox"/> 33 X Lots for 12m Standard Bus <input checked="" type="checkbox"/> 13 X Lots for 18m Articulated Bus
(i)	Number and Type of Berths	<input checked="" type="checkbox"/> Saw-Tooth Berths Boarding (with queue rails): <u>4</u> X 12m Standard Bus <u>4</u> X 18m Articulated Bus Alighting (without queue rail): <u>3</u> X 12m Standard Bus <u>1</u> X 18m Articulated Bus <hr/> <input type="checkbox"/> End-On Berths <u> </u> X Boarding/ Alighting (with queue rails) <hr/> <input type="checkbox"/> Others Please specify: _____
(j)	Concourse Clear Width	<input type="checkbox"/> 6m

S/No	Description	Details/ Requirements
	(Minimum distance free from encumbrances e.g. queue railings, etc)	<input checked="" type="checkbox"/> 8m <input type="checkbox"/> 10m <input type="checkbox"/> Others, please specify: ____ m
(k)	Type of Pavement for Bus Park Area and Bus Interchange Accesses	<input type="checkbox"/> Rigid Pavement <input checked="" type="checkbox"/> Semi-Rigid Pavement (see Appendix C)
(l)	Offices and Other Facilities (Refer to the ADC for details and sizing)	<input checked="" type="checkbox"/> Passenger Service Office 1 <input checked="" type="checkbox"/> Passenger Service Office 2 <input checked="" type="checkbox"/> Administrative Office <input checked="" type="checkbox"/> Manager Room <input checked="" type="checkbox"/> Server Room <hr/> <input checked="" type="checkbox"/> Ticket Office <input checked="" type="checkbox"/> Add Value Machine room <input checked="" type="checkbox"/> Commercial Space <input checked="" type="checkbox"/> ATM Equipment/ Public Telephone/ Vending Machine Spaces <hr/> <input checked="" type="checkbox"/> Staff Lounge cum Briefing Room <input checked="" type="checkbox"/> Staff Toilets <hr/> <input checked="" type="checkbox"/> Public Toilets <input checked="" type="checkbox"/> Canteen <input checked="" type="checkbox"/> Kitchen <input checked="" type="checkbox"/> Rodent-Free Storeroom <hr/> <input checked="" type="checkbox"/> Technician's Room <input checked="" type="checkbox"/> Store Room <input checked="" type="checkbox"/> Cleaner's Room <input checked="" type="checkbox"/> First Aid cum Nursing Room <input type="checkbox"/> Special Purpose Room <hr/> <input checked="" type="checkbox"/> Bin Centre/ Point <input checked="" type="checkbox"/> Fire Control Centre <input checked="" type="checkbox"/> Switch Room <input checked="" type="checkbox"/> AHU, Chiller Plant Rooms, Cooling Towers <input checked="" type="checkbox"/> Main Distribution Frame <input checked="" type="checkbox"/> Generator Room
(m)	Others	<input checked="" type="checkbox"/> CCTV in Concourse <input checked="" type="checkbox"/> CCTV at Perimeter <input checked="" type="checkbox"/> Security Bollards

S/No	Description	Details/ Requirements
		<input checked="" type="checkbox"/> Safety Bollards (see Appendix C) <input checked="" type="checkbox"/> Perimeter Fence <input checked="" type="checkbox"/> Vehicular Swing Gates <input type="checkbox"/> Noise Mitigation Measures (in addition to acoustic building materials) <input type="checkbox"/> Landscaping (in addition to NParks' requirement)

2.4.3 The associated works for the Integrated Bus Interchange are as follows:

- a. Replacement of two existing bus stops along Yishun Ave 2. Adjoining new bus stop shall be designed as an integral part of the Development.
- b. One covered linkway connecting two new bus stops, new underpass and the Development
- c. Omission of existing signalised junction at existing bus interchange access
- d. Two new signalised junctions at Yishun Avenue 2 (Integrated Bus Interchange accesses)

2.5 Demolition of Temporary Bus Interchange and its Associated Works

2.5.1 Upon the completion of Integrated Bus Interchange and associated works, the Temporary Bus Interchange and its associated works (except item 2.2.3 g) shall be demolished at a date agreed by LTA OIC.

3 DESIGN AND CONSTRUCTION REQUIREMENTS

3.1 General Requirements

3.1.1 The design and construction of the Bus Interchanges and associated works shall observe and comply with all relevant requirements, codes of practices, regulations, guidelines, etc from all relevant LTA technical divisions, authorities and agencies.

3.1.2 In addition, the design and construction of the Bus Interchanges and associated works shall comply with the following requirements (refer to: <http://www.lta.gov.sg>, unless otherwise stated):

- a. Architectural Design Criteria (Revision A3, December 2012)
- b. Standard Details of Road Elements (April 2000 Edition) (<http://www.corenet.gov.sg/einfo>)
- c. Materials & Workmanship Specification for Civil and Structural Works (Revision A1, June 2010)
- d. Architectural Materials and Workmanship Specifications (Revisions A1, June 2009)
- e. Civil Design Criteria (Revision A1, Feb 2010)
- f. LTA Signage Reference Manual (will be provided by LTA separately)
- g. Code of Practice for Traffic Control at Work Zone (Revision R2, July 2010)
- h. Code of Practice for Works on Public Streets (Revision R4, March 2008)
- i. The Code of Practice for Railway Protection (October 2004 Edition)
- j. Guide to Carrying out Restricted Activities within Railway Protection and Safety Zone (May 2009 Edition)
- k. The Rapid Transit Systems (Development and Building Works in Railway Corridor and Railway Protection Zone) Regulations (January 2002 Edition) (<http://statutes.agc.gov.sg/aol/home.w3p>)
- l. Rapid Transit Systems (Railway Protection, Restricted Activities) Regulations (June 1997 Edition) (<http://statutes.agc.gov.sg/aol/home.w3p>)
- m. Code on Accessibility in the Built Environment (2007 Edition) (<http://www.bca.gov.sg>)

3.1.3 Where there is any ambiguity or difference, the latest revision shall prevail. All instances of discrepancies are to be drawn to the attention of LTA for clarification.

3.1.4 All design and construction concepts, drawings, studies, reviews, methodology, costs and tender procurement procedures for the Bus Interchanges and associated works shall be submitted to LTA for review and approval.

3.2 Studies and Reviews

3.2.1 All studies and reviews shall be done in a timely manner such that any recommendations can be incorporated into the construction tender of the Bus Interchanges and associated works.

3.2.2 The following studies and reviews shall be carried out by the successful tenderer and submitted **prior to the finalisation of the design** of the Bus Interchanges and associated works:

Temporary Bus Interchange

- a. Traffic Impact Assessment;
- b. Traffic Plans (e.g. road markings, signages);
- c. Bus Simulation Study (e.g. swept path, auto-turn analysis);

- d. Bus Trials (with boarding berths and critical turning points pegged out by a surveyor) jointly with LTA and Operator;
- e. Safety Review (Safe to Use);
- f. Lighting Study (simulated with parked buses); and
- g. Pedestrian Simulation Study.

Integrated Bus Interchange

- a. Traffic Impact Assessment;
- b. Traffic Plans (e.g. road markings, signages);
- c. Bus Simulation Study (e.g. swept path, auto-turn analysis);
- d. Bus Trials (with boarding berths and critical turning points pegged out by a surveyor) jointly with LTA and Operator;
- e. Safety Review (Safe to Use);
- f. Lighting Study (simulated with parked buses);
- g. Pedestrian Simulation and Modelling Study;
- h. Acoustic Study;
- i. Computational Fluid Dynamics Study; and
- j. Environmental Impact Assessment.

3.2.3 The cost of the above studies and reviews for the Integrated Bus Interchange shall be borne by the successful tenderer.

3.3 Transport Integration Requirements

3.3.1 The Bus Interchanges shall be planned and designed such that the commuter transfer between the Bus Interchanges, MRT Station, bus stops and taxi stands shall be direct, seamless and of a short distance. The connectivity between these nodes shall be sheltered. The Bus Interchanges shall be designed to be at-grade only.

3.3.2 *Temporary Bus Interchange*

3.3.2.1 The Temporary Bus Interchange concourse configuration shall allow commuter accessibility to the MRT Station, bus stops, taxi stands and nearby developments.

3.3.3 *Integrated Bus Interchange*

3.3.3.1 There shall be two at-grade commuter accesses to the Integrated Bus Interchange concourse via Yishun Ave 2 (see Appendix B). These entrances shall be 6m wide and clearly identifiable from Yishun Ave 2.

3.3.3.2 There shall be a minimum of three commuter accesses between the Integrated Bus Interchange and the Development. The access (north of the Integrated Bus Interchange nearer to North Point) shall be 8m wide, while the other two accesses shall be 6m wide.

3.3.3.3 The commuter passageways, within the Development leading to the Integrated Bus Interchange commuter accesses, shall maintain the same width as these accesses and free from any encumbrances.

3.3.3.4 Where the commuter accesses to the Integrated Bus Interchange are via the Development, the right of access to the Integrated Bus Interchange shall be maintained during Bus Interchange operational hours.

3.4 Architectural Design Requirements

- 3.4.1 The successful tenderer shall develop a cost-effective & optimal design. The design approach shall aim towards integrating high-quality spatial design with structural, operational, and M&E systems. Strategies shall be developed from the earliest design stages towards this objective.
- 3.4.2 There shall not be any shared facilities within the Integrated Bus Interchange which are used by the Operator and the Development. The facilities in the Bus Interchange shall be for the sole purpose to serve the functions of the Bus Interchange only.
- 3.4.3 For the Integrated Bus Interchange, the successful tenderer shall design the layout such that all Integrated Bus Interchange facilities, including M&E rooms and facilities (excluding cooling towers), are contiguous within the Integrated Bus Interchange airspace.
- 3.4.4 The successful tenderer shall provide a positive contemporary design solution with an identity for the Integrated Bus Interchange.
- 3.4.5 The physical wall between the Integrated Bus Interchange concourse and the Development shall be opaque.
- 3.4.6 Only Bus Interchange commercial spaces are allowed to front the Bus Interchange concourse. There shall not be any Development commercial space/ shops fronting the Bus Interchange concourse, regardless of setback distance.
- 3.4.7 In the design of the Development, the successful tenderer shall take into consideration the Integrated Bus Interchange concourse and commuter passageways areas as part of the Development GFA computation.

3.5 Public Transit Signage Requirements

- 3.5.1 The successful tenderer shall propose, plan, design, supply and install the public transit signage according to the LTA's Signage Reference Manual.
- 3.5.2 There shall be clear signs within the Development pointing to Bus Interchanges, MRT Station, bus stops and taxi stands. The costs of the signs shall be borne by successful tenderer.

3.6 Civil & Structural Requirements

- 3.6.1 Structural elements adjacent to and in the Bus Park Area shall be designed for bus impact with a load to stop a double-decked bus travelling up to 15km/h.
- 3.6.2 The unfactored uniformly distributed live load for the Bus Park Area shall be at least 20kN/m². The Bus Park Area shall be checked for local heavy axle load of a double-decked bus.

3.7 Road Traffic Requirements

- 3.7.1 The new Bus Interchanges accesses and junctions shall be improved with necessary junction flaring and turning lanes.
- 3.7.2 For changes to the junction configuration or signal phasing, the successful tenderer shall submit the temporary and final traffic plans (which include the existing and proposed traffic signal aspect layout and phasing diagram) to LTA Traffic Management Division for approval. The approved/endorsed traffic plans shall be submitted to LTA Intelligent Transport Systems Control 4–6 months prior to the actual implementation of the traffic diversion/reinstatement.
- 3.7.3 For any road traffic works, the successful tenderer shall comply with the requirements stated in Appendix D.

3.8 Mechanical & Electrical Requirements

- 3.8.1 Dedicated M&E equipment, sewerage, drainage services and incoming utility services, not limited to electrical, mechanical and ventilation, fire-services, water, sewer and telecom, shall be provided with the sole purpose to serve the functions of the Bus Interchanges.
- 3.8.2 All M&E services within the Bus Interchanges' boundary are for the sole purpose to serve the functions of the Bus Interchanges only. There shall be no penetration, transverse, crossing, etc of services of any kind from the Development within the entire boundary envelope of the Bus Interchanges. Where this is not possible, services serving the Development shall be separated by reinforced concrete slab from the Bus Interchange envelope. The limit of the envelope is the soffit / surface of the structural finishes and / or the boundaries and this shall include the ceiling and floor space.
- 3.8.3 All utilities and services provided to serve the Bus Interchanges shall be connected at source and with separate metering provided by the successful tenderer or the approved developer.
- 3.8.4 For air-conditioned Integrated Bus Interchange, its air-conditioning system shall be entirely separate from that of the Development.
- 3.8.5 All M&E rooms serving the functions of Bus Interchange shall be of reinforced concrete slabs.
- 3.8.6 The design of the Integrated Bus Interchange shall meet the Green Mark standards as required by BCA.

3.9 Warranties and Defects Liability Period

3.9.1 *Temporary Bus Interchange*

- 3.9.1.1 The warranties for the civil & structural, architectural and M&E items for the Temporary Bus Interchange shall be in accordance to the duration of its operation.

3.9.2 *Integrated Bus Interchange*

- 3.9.2.1 The successful tenderer shall provide warranties for civil & structural, architectural and M&E items for the Integrated Bus Interchange in accordance with the Schedule of Warranties in Material and Workmanship Specification.

3.10 Operational Requirements and Access Rights

- 3.10.1 The successful tenderer shall allow the Operator and its tenants in the Integrated Bus Interchange to utilise the service/ goods lifts and service bays and loading and unloading facilities within the Development.
- 3.10.2 The successful tenderer shall grant access to LTA and the Operator, upon request, to enter the Development, for maintenance and repair purposes to all parts of the Integrated Bus Interchange structure and facilities at any time.

3.11 Maintenance Requirements

- 3.11.1 Should there be any development above the Integrated Bus Interchange; the structural maintenance of the structural elements supporting it shall be done by the successful tenderer.
- 3.11.2 The successful tenderer shall be fully responsible for the maintenance of the commuter passageways, which includes all sliding grilles, fire door/shutter, electrical and mechanical equipment therein. The structure, finishes and all services of the commuter passageways shall be maintained to a standard comparable to that carried out within the Integrated Bus Interchange.

- 3.11.3 The successful tenderer shall grant access to LTA and the Operator, upon request, to enter and carry out periodic checks on the maintenance of the commuter passageways to ensure that a standard comparable with Integrated Bus Interchange is achieved.
- 3.11.4 Upon request by LTA, the successful tenderer shall execute any cleaning, repair and replacement if so required to ensure the safety and operational of the Integrated Bus Interchange.
- 3.11.5 The successful tenderer shall grant access to LTA and the Operator, upon request, to enter and carry out minor works and repairs as a result of the Development and to claim from the successful tenderer the cost of such works and repairs if the successful tenderer failed to do so.

4 TIMELINE AND PROCEDURAL REQUIREMENTS

4.1 Inaugural and Regular Progress Meeting

- 4.1.1 Upon the signing of the Agreement and before the design commencement, the successful tenderer shall arrange an inaugural meeting with LTA and the successful tenderer. LTA will explain the roles and responsibilities of various LTA divisions, the point of contact, reporting structures, Works, LTA's requirements and cost reimbursement processes.
- 4.1.2 To guide the design and construction of the Bus Interchanges and associated works, the successful tenderer shall arrange regular progress meeting between LTA and the successful tenderer.

4.2 Timelines

- 4.2.1 Within 1 month of signing of the Agreement, the successful tenderer shall prepare and submit to LTA for approval a programme for the design and construction of the Bus Interchanges. The programme shall stipulate the major milestones and completion dates.

4.2.2 *Temporary Bus Interchange*

- 4.2.2.1 The Temporary Bus Interchange is to be completed within 25 months from the date of tender acceptance.
- 4.2.2.2 The base construction period of the Temporary Bus Interchange, excluding design submissions, shall be 12 months. If the successful tenderer wish to propose a contract period that differs from 12 months, LTA shall pay the cost which is lower.

4.2.3 *Integrated Bus Interchange*

- 4.2.3.1 The Integrated Bus Interchange is to be completed within 84 months from the date of tender acceptance.

4.3 Handing/ Taking Over Requirements

- 4.3.1 The successful tenderer can only take over the Existing Bus Interchange site when the Temporary Bus Interchange is in operation.
- 4.3.2 The Bus Interchanges can only open for operation during school holiday periods, in March, June, September and November/ December.
- 4.3.3 After the full handover, LTA and the Operator will require a lead time of at least three months to open the Bus Interchanges for operation.
- 4.3.4 The successful tenderer can only demolish the Existing Bus interchange and Temporary Bus Interchange at a date agreed by LTA OIC during the handover of the Temporary Bus Interchange and Integrated Bus Interchange respectively.
- 4.3.5 The successful tenderer is required to complete fully and hand over the Bus Interchanges to LTA OIC upon obtaining the TOP for the Bus Interchanges. LTA OIC reserves the rights not to take over the Bus Interchanges until all Works satisfy LTA requirements and inspections.
- 4.3.6 **Before the handing/ taking over of the Bus Interchanges**, the successful tenderer shall submit documents showing evidence of completion of the following endorsed studies:
 - a. Traffic Impact Assessment - by LTA Planning Division, Traffic Management Division and Development & Building Control Division

- b. Traffic Plans - by LTA Traffic Management Division, Development & Building Control Division and Public Transport Promotion Division
 - c. Bus Simulation Study – by LTA Architectural Division
 - d. On-site Bus Trials – by LTA Public Transport Promotion Division
 - e. Safety Review – by LTA Architectural Division
 - f. Lighting Study – by LTA Mechanical & Electrical System Division
 - g. Actual Lighting Test – by LTA Mechanical & Electrical System Division
 - h. Pedestrian Simulation and Modelling Study - by LTA Architectural Division
 - i. Acoustic Study – by LTA Mechanical & Electrical System Division
 - j. Actual Acoustic Test – by LTA Mechanical & Electrical System Division
 - k. Computational Fluid Dynamics Study – by LTA Mechanical & Electrical System Division
 - l. Actual Air-Conditioning and Mechanical Ventilation Measurement Test – by LTA Mechanical & Electrical System Division
 - m. Environmental Impact Assessment – by LTA Mechanical & Electrical System Division
- 4.3.7 Before the handing/ taking over of the Bus Interchanges, the successful tenderer shall also submit the following:
- a. All architectural, civil & structural and M&E as-built drawings
 - b. All relevant submissions and approvals from authorities
- 4.3.8 If the above submissions are not submitted before the handing/taking over of the Bus Interchanges, **LTA reserves the right to hold back the reimbursement of costs** related to the design and construction of the works.

5 DESIGN SUBMISSION REQUIREMENTS

5.1 General

- 5.1.1 The successful tenderer shall coordinate and reconcile the various requirements from the all relevant LTA technical divisions, authorities, agencies, Operator and external parties. These include, but not limited to, seeking approval for relevant authorities, TOL, land allocation, etc.
- 5.1.2 Comparisons shall be made of various design options that shall be evaluated for, and not limited to, costs (including whole life costs), constructability, construction safety, work sequencing, availability of materials and maintainability of the structures and finishes.
- 5.1.3 There are four stages to the design of the Bus Interchanges and associated works, namely Concept, Preliminary, Pre-Final and Final stages. The successful tenderer shall make various presentations to LTA and panels as appointed by LTA during each stage of the design.
- 5.1.4 The presentations of the design, not limited to the four stages, as determined by LTA shall be made as and when required in order to satisfy LTA that the designs under preparation are satisfactory and that alternatives have been properly considered. LTA will reserve the right to request further substantiation if the submission(s) is deemed inadequate to provide a comprehensive view of the design. It is a requisite that acceptance is obtained on the way the design is progressing.
- 5.1.5 The materials for the Architectural presentations shall include, but not limited to:
- a. Site analysis and photographs, presentation of design proposal, analysis of spatial sequence, integration and quality, passenger movement and flow, structural concept, computer generated perspectives of preliminary designs for key internal public areas, entrances and surface structures;
 - b. Design of surface structures, landscape and urban design, Interiors: Ceilings, walls and floors, Sample boards and perspectives shall indicate how construction, maintenance and aesthetic design concepts are addressed;
 - c. 3D computer-generated animated walk-throughs and perspective drawings rendered to achieve an appropriate level of realism, including material, colour & texture, lighting, components, etc;
 - d. The final presentation videos shall be with real and virtual environmental activities (e.g. surrounding context, pedestrians to provide human scale, bus arriving/departing, boarding/alighting berths screen doors, etc); and
 - e. Material samples as appropriate.
- 5.1.6 Unless otherwise stated, all materials prepared and used by the successful tenderer for the Architectural presentations under this contract shall become the property of LTA. LTA shall retain complete ownership rights to the completed video and all raw footage. The final video as well as the raw footage shall be the property of LTA and the successful tenderer shall have no rights to use or display such footage without the written permission of LTA.
- 5.1.7 Tender for all Works for the Bus Interchanges **shall not begin** before the clearance of the Final Stage submissions. For each stage submissions shall be endorsed by the respective LTA technical divisions and approved by LTA OIC.

5.2 Submissions

- 5.2.1 The following drawings shall be submitted to LTA at appropriate stages for acceptance:

- a. Architectural Plans
 - b. M&E Plans
 - c. Civil & Structural Plans
 - d. Traffic Plans
 - e. Schedule of Finishes/ Materials
 - f. Public Transit Signage Plans
- 5.2.2 Submission shall include but not limited to layout plans, sections, elevations, details and estimated construction costs of the Bus Interchanges, etc that best demonstrate the concepts of the design.
- 5.3 Concept Stage
- 5.3.1 The design shall have the configurations of the Bus Interchanges, human traffic circulation, vehicular circulation and the traffic layout, layouts of public areas, levels, civil & structural strategies, M&E strategies & design.
- 5.3.2 The design configurations of the Bus Interchanges and Development shall illustrate the strategies of transport nodes integration, taking into consideration the following principles:
- 5.3.2.1 Ease of use by commuters, i.e. minimise transfer walking distance between various transport nodes, ensure comfortable, safe and secure environment, ease of way finding, etc; and
- 5.3.2.2 Cost and operational efficiency of the Bus Interchanges, i.e. ensure ease of operation and maintenance, reduce recurrent costs, provide safe and efficient layout, promote staff welfare, etc.
- 5.3.3 The design shall include critical examination of the geographical terrain, information/ data, drawings and to illustrate the analysis, generating ideas, concept information, design approach/ method, options, etc. Design shall also demonstrate that all pertinent information/ data have been fully analysed and considered. These data set the basis of evaluation and the direction of the design development in terms of detail design, material selection, etc.
- 5.4 Preliminary Stage
- 5.4.1 The design shall illustrate the development for the design from Concept Stage. A general impression of the spatial experiences within the Bus Interchanges and the transitional areas are to be illustrated.
- 5.4.2 A complete set of plan drawings showing the proposed setting out of all structural walls, columns, shafts, partitions, doorways, stairs, escalators, lifts and other features, together with sections and elevations, all at appropriate scale, as necessary to fully describe the intended arrangements.
- 5.4.3 The routing of services especially the major duct works required by M&E systems and operational requirements are to be illustrated. The strategy for integration of all M&E systems and the routing of services associated with them shall be shown including, as appropriate, three-dimensional zoning diagrams.
- 5.4.4 A list of all drawings, specifications, reports and all other documents are to be included in the submission.
- 5.4.5 At this stage, all relevant authorities' consultation and Development Control submission and relevant land allocation/ TOL applications shall be done. This includes consulting LTA's Development & Building Control Division on the externalities, traffic access, roads, interfacing, etc.

- 5.4.6 A Preliminary Design Status report shall be submitted, describing the extent of the design development and the construction methodology being considered.
- 5.4.7 To achieve the desired design intent and performance, a design assessment of the Materials and Workmanship Specification shall be done.
- 5.4.8 All constraints in respect of architectural, structural, civil, traffic, safety, electrical and mechanical requirements are to be highlighted and addressed.
- 5.5 Pre-Final Stage
- 5.5.1 This stage is the detailed development of the design from Preliminary Stage. The detailed spatial experiences of the Bus Interchanges and the transitional areas are to be illustrated. These include the illustration of the ceiling design, floor wall finishes and material use.
- 5.5.2 There shall be confirmation that all comments made on the preliminary submissions have been addressed prior to the pre-final submissions, if not, the reasons why it has not been possible to address.
- 5.5.3 Where a Design & Construct tender arrangement is adopted, the drawings and documents shall be suitable for construction.
- 5.5.4 For Construction tender arrangement, submission drawings and documents shall contain all necessary details to minimise downstream variations.
- 5.5.5 At this stage, Development Control Provisional Permission shall be obtained and the Building Plan shall be submitted and Building Plan Number allotted. Relevant land allocation/ TOL shall be obtained. Details of authorities consulted and the information obtained from them shall be compiled.
- 5.5.6 A Pre-Final Design Status report, an updated version of the Preliminary Design Status report, shall be submitted, incorporating amendments as appropriate.
- 5.6 Final Stage
- 5.6.1 The Final Design Submission shall provide a complete design that is fully compliant with the relevant authorities' requirements. All relevant authorities' submissions, including Building Plan and FSSD, shall be approved.
- 5.6.2 There shall be confirmation that all comments made on the earlier submissions have been addressed prior to the final submissions, if not, the reasons why it has not been possible to address.
- 5.6.3 The submission shall include all drawings and specifications that describe the layout of the public, non-public and surroundings external areas of the Bus Interchanges, including spatial provisions for M&E plant and equipment.
- 5.6.4 The submission shall include multi-media presentation, models, etc, to fully demonstrate the final product.
- 5.7 Format of Deliverables
- 5.7.1 The format of the drawings and CAD data shall comply with the requirements of the Drafting and CAD Standards (Microstation) in accordance to LTA's guidelines.
- 5.7.2 The format of the multi-media presentation, models, etc, shall be directly openable (without conversion of format) with Microstation Software, 3D Studio Max or Digital Beta.
- 5.7.3 Reports, calculations, specifications, technical data and similar documents shall be provided.

- 5.7.4 All revisions to documents submitted shall be clearly marked in the body of the documents and recorded in the index or title page.
- 5.7.5 The following drawings shall be submitted:
- a) Five full-size (A1) sets of architectural, civil & structural and M&E as-built drawings;
 - b) Five full-size (A3) sets of architectural, civil & structural and M&E as-built drawings;
 - c) One set of drawings in CAD digitised format;
 - d) Three sets Design Status Report at the various stages;
 - e) One complete set of the multi-media presentation at the Final Design Stage; and
 - f) As-built drawings shall be submitted in soft and hard copies. The Qualified Persons shall duly endorse the hard copies of the submission(s).

6 COST REIMBURSEMENT AND PROCUREMENT REQUIREMENTS

6.1 Cost Reimbursement

6.1.1 The successful tenderer shall not include the construction cost of the Bus Interchanges in his tender price for the Land Sale.

6.1.2 LTA will separately reimburse the successful tenderer the cost of construction of the Temporary Bus Interchange, the Integrated Bus Interchange and the cost to demolish the Existing and Temporary Bus Interchange.

6.1.3 The price of the construction and demolition works shall be obtained by competitive tender.

6.1.4 *Temporary Bus Interchange*

6.1.4.1 LTA will fully reimburse all costs related to the design and construction for the Temporary Bus Interchange and its associated works as stated under Section 2 – Scope of Works.

6.1.5 *Integrated Bus Interchange*

6.1.5.1 LTA will fully reimburse all costs only related to the construction for the Integrated Bus Interchange and its associated works carried out as stated under Section 2 –Scope of Works.

6.1.5.2 For the Integrated Bus Interchange, the construction cost of the shared component shall be computed based on the cost apportionment formula stated in Appendix E.

6.1.5.3 For the avoidance of doubt, the amount paid by LTA for the Integrated Bus Interchange shall exclude all design fees, professional and consultant fees, charges, fees paid to all statutory and regulatory bodies, levies, tests, studies, reviews, tender arrangement of selection of contractors, costs of supervision, project management cost, co-ordination and attendance upon contractors and diversion cost of services and utilities.

6.2 Procurement Procedure

6.2.1 Prior to the commencement of the design and construction of the Bus Interchanges and associated works, the successful tenderer shall submit the estimated budget of the Bus Interchanges and associated works to LTA for approval.

6.2.2 The successful tenderer shall structure the tender document such that the cost of the Temporary Bus Interchange and Integrated Bus Interchange are clearly identified.

6.2.3 At least one month prior to the calling of any tender, the successful tenderer shall submit the documents that will be used for tendering for LTA's approval.

6.2.4 The successful tenderer shall take all necessary measures to ensure that all procurement procedure is as follows:

- a. Transparency - Procurement procedure, whether at the invitation stage, in the qualification of tenderers, at the evaluation stage or at the post-award stage shall be clear and transparent.
- b. Value for Money - Procurement procedures shall yield the best returns in terms of quality, timeliness, reliability, upgradeability, price and source.
- c. Open and Fair Competition - Procurement procedures shall offer equitable access opportunities to all tenderers, goods, services and construction services.

- d. Opening of Tenders - LTA shall be informed of the opening and award of all tenders relating to the Bus Interchanges and associated Works, including provisional sum items. Sufficient notice shall be given to LTA so as to allow LTA to be present and witness the opening of tenders.
- 6.2.5 The successful tenderer shall submit to LTA three sets (one hard copy and two CDs) of all tender evaluation and recommendation reports pertaining to the Bus Interchanges and associated Works.
- 6.2.6 Upon award of the Bus Interchanges' contract, the successful tenderer shall prepare and furnish to LTA, without additional cost, three sets (one hard copy and two CDs) of all necessary documents including drawings relating to tender acceptance and contract administration.
- 6.3 Variations to the Works
- 6.3.1 Variations
- 6.3.1.1 The term "variation" shall mean any change in the original Agreement intention as deduced from the Agreement as a whole describing or defining the Works to be carried out and shall include but is not restricted to:
- (a) an increase or decrease in the quantity of any part of the Works;
 - (b) an addition to or omission from the Works;
 - (c) a change in the character, quality or nature of any part of the Works;
 - (d) a change in the levels, lines, positions and dimensions of any part of the Works;
 - (e) the demolition of or removal of any part of the Works no longer desired by the LTA OIC;
 - (f) a requirement to complete the Works or any phase or part by a date earlier than the relevant Time for Completion.
- 6.3.1.2 For the avoidance of doubt the term "variation" shall include any changes as aforesaid which may be designed to alter the use to which the Works will be put, but shall exclude any instruction (which would otherwise be a variation) which has arisen due to or is necessitated by or is intended to cure any default of or breach of contract by the successful tenderer.
- 6.3.1.3 LTA OIC may at any time, before the calling of the construction contract, amend the design of the Works. All works as a result of such an amendment shall not be considered a variation.
- 6.3.1.4 For the submission of claims, it is the successful tenderer's responsibility to provide evidence of completion of the variations, failing which variations shall not be reimbursed by LTA.
- 6.3.2 Power to Order Variations
- 6.3.2.1 LTA OIC may at any time issue an instruction in writing requiring a variation. If or to the extent that an instruction does not state that it requires a variation but the successful tenderer considers that it does require a variation, the successful tenderer shall within 14 days from the date of receipt of the instruction notify in writing the LTA OIC who may, if he thinks fit, within 14 days from the date of receipt of the successful tenderer's notification, confirm, modify, rescind or contradict in writing the instruction and the successful tenderer shall then comply forthwith.
- 6.3.3 Submission of Quotations
- 6.3.3.1 LTA OIC may, before issuing an instruction for any variation, require the successful tenderer to submit a quotation for any proposed variation and the successful tenderer shall be obliged

to submit such quotation in writing at his own cost. The LTA OIC may before or after issuing an instruction under Clause 6.3.2 accept in writing the successful tenderer's quotation and the provisions of Clause 6.4 shall not apply to the valuation of that variation nor shall the successful tenderer be entitled to any Loss and Expense in respect of that instruction or any other compensation, damages or other amount whatsoever other than a valuation made in accordance with the accepted quotation. An instruction requiring a variation shall not be treated as an acceptance of any quotation.

6.3.4 Alternative Proposals by Successful Tenderer

6.3.4.1 The successful tenderer may submit in writing to LTA, at his own cost, a detailed proposal for variations to the works, which is likely to offer significant benefits (including long-term or life-cycle cost benefits) to the Integrated Bus Interchange.

6.3.4.2 If LTA requires it, and if the successful tenderer wants to proceed with the proposal, the successful tenderer shall provide (at no cost to LTA) a report on the details, implications and benefits of the proposal including the estimated cost savings that would arise from any proposed variations.

6.3.4.3 The proposal shall not include anything which might adversely affect or compromise the safety or quality of construction or operation or maintenance of the Integrated Bus Interchange or which may be inconsistent with any provision of this Agreement or the purpose and intent of the Integrated Bus Interchange.

6.3.4.4 LTA shall consider the successful tenderer's proposal, but is not bound to accept any proposal or proposed variations. No claim by the successful tenderer will arise out of the LTA's failure to accept any proposal or proposed variations.

6.3.4.5 LTA may accept all or any part of the proposal subject to such conditions or modifications as it thinks fit. If such conditions or modifications are accepted by the successful tenderer, LTA OIC shall issue an instruction in writing requiring all or any part of the proposed variations to be carried out and the successful tenderer shall comply with such instructions.

6.3.4.6 The successful tenderer's responsibilities and obligations in respect of the Bus Interchanges under the Agreement shall continue to apply notwithstanding LTA's acceptance of the whole or any part of the successful tenderer's proposal.

6.3.4.7 The actual cost savings (being the actual reduction in the amount of direct relevant costs of labour, plant, materials or goods) arising from any proposed variations accepted by LTA under this Clause shall be shared by the successful tenderer and LTA in equal proportions. The successful tenderer shall be entitled to claim payment of half the amount of the actual cost savings.

6.3.4.8 For the avoidance of doubt, Clause 6.4.1 and 6.4.2 shall apply to the valuation of the variations carried out pursuant to Clause 6.3.4.5 for the purposes of determining the actual cost savings arising from the variations. The successful tenderer shall not be entitled to any Loss and Expense in respect of an instruction or any other compensation, damages or other amount whatsoever other than a valuation determined in accordance with Clause 6.4.1 and 6.4.2.

6.4 Valuation of Variations

6.4.1 Valuation Methods

6.4.1.1 Subject to Clause 6.3, all variations shall be valued as follows:

- (a) Where the varied work is of a similar character to, is executed under similar conditions as and does not significantly change the quantity of work described in the Agreement, the rates for the works as set out in the Construction Contract shall determine the valuation; or

- (b) Where the varied work is of similar character to work described in the Agreement but is not executed under similar conditions of such work described in the Agreement or involves significant changes in the quantity of such work described in the Agreement, the rates for the works as set out in the Construction Contract shall be the basis for determining the valuation but with a fair allowance for any differences in such conditions and/or quantity; or
- (c) Where (a) and (b) above do not apply, then by measurement and valuation at fair market rates and prices;
- (d) Where none of the above methods is applicable or appropriate in the circumstances of the particular varied work, then the valuation shall be based on the cost of necessary Plant, materials or goods, labour and any additional equipment necessary for the execution of the varied work plus 15 per cent. This percentage shall be deemed to compensate adequately the successful tenderer in respect of all supervision, the use of Construction Equipment, overheads, profit and all other costs or damages incurred in or connected with the execution of the varied work;
- (e) The rates for the works as set out in the Construction Contract shall determine the valuation of items omitted; provided that if omissions vary the conditions under which any remaining items of work are carried out, the values for such remaining items shall be determined under Clauses 6.4.1.1 (b) or (c) or (d) as the case may be.

6.4.2 Agreement on Valuation

6.4.2.1 The successful tenderer shall carry out all variations instructed by the LTA OIC pending the valuation of the variations by the LTA OIC.

6.4.2.2 Upon progressive completion of the variation works, the successful tenderer may submit his claim for the variations in his Payment Claims in accordance with Clause 7.1 of the Agreement. The LTA OIC shall certify such amounts as are due to the successful tenderer for the variations in accordance with Clause 7.2 of the Agreement.

6.4.2.3 When the successful tenderer considers that the respective variation works have been substantially completed, he may give notice in writing to that effect to the LTA OIC. The LTA OIC shall either:

- (a) certify in writing that the variation works in his opinion were substantially completed; or
- (b) give instructions in writing specifying the works which in his opinion are required to be done.

Provided that the LTA OIC may, at his discretion and without the receipt of any notice from the successful tenderer, exercise either Clause 6.4.2.3(a) or Clause 6.4.2.3(b).

6.4.2.4 The successful tenderer shall, within 30 days from the date of the LTA OIC's certification, submit to the LTA OIC a valuation of the said variations (with such details and particulars including invoices and receipts as the LTA OIC may require for the purpose of valuing the said variations) based on the completed variation works. Thereafter, the successful tenderer shall include his claim for the said valuations in the next Payment Claim to be submitted by the successful tenderer under Clause 7.1 of the Agreement.

6.4.2.5 The LTA OIC shall, within 60 days from the date of his certification, value the total amount due for the said variations based on the completed variation works and shall notify the successful tenderer in writing of the value of the variations. Thereafter, the LTA OIC shall certify the amounts due to the successful tenderer for the said variations in the next Payment Certificate to be issued by the LTA OIC under Clause 7.2 of the Agreement.

6.4.2.6 The successful tenderer shall, within 30 days of the receipt of the LTA OIC's notice of the value of the variations, give notice of any disagreement in writing to the LTA OIC and shall at the same time set out the valuation which he considers should have been made, giving full details and particulars and the appropriate Agreement references. If the successful tenderer does not give notice of his disagreement with the valuation of the LTA OIC within 30 days of receipt of the LTA OIC's valuation, he shall be deemed to have accepted the valuation and such valuation shall be final and binding on the successful tenderer and shall not thereafter be disputed or questioned by the successful tenderer in any way whatsoever.

6.4.2.7 Following receipt of the successful tenderer's notice of disagreement, the LTA OIC may amend the whole or any parts of any valuation previously made and make the necessary adjustment in the next Payment Certificate.

6.4.3 Provisional Sum Items

6.4.3.1 Where the successful tenderer is instructed by the LTA OIC to execute or provide some or all of the Plant, materials, goods or work described as a Provisional Sum Item, the valuation of that instruction shall be made in accordance with Clause 6.4 (unless otherwise provided in the construction contract).