ENR 3.5 OTHER ROUTES

1 SINJON CROSSING BY MILITARY AIRCRAFT

1.1 Introduction

1.1.1 In order to facilitate the movement of various types of military traffic operating through the Changi Control Zone without impeding the flow of procedural traffic operating into and out of the Zone, the following procedures have been established for strict compliance by pilots-in-command (refer to chart ENR 3.5-3).

1.2 Crossing by Slow-moving Military Aircraft (Slow-lane Crossings)

1.2.1 All slow-moving military aircraft are permitted to cross the Changi CTR 8.1NM and 6.7NM south of the extended centreline of RWY 02L and RWY 02C respectively. EASTBOUND and WESTBOUND flights at 500ft AMSL without reference to Singapore Tower or Singapore Approach.

1.2.2 The EASTBOUND is from PULAU AYER MERBAU (011600.00N 1034340.00E) on track of 110° MAG to the northern tip of Lazarus Island (SINJON). Thereafter, the track is 89° MAG to Point “E1” (10 DME SJ) and then direct to NEXUS [34 DME SJ R-077 (23 DME VTK R-100)] (012048.00N 1042424.00E).

1.2.3 The WESTBOUND is from NEXUS direct to Point “E1”. Thereafter, the track is 269° MAG to the northern tip of Lazarus Island (SINJON) and then 290°MAG until entering Tengah Aerodrome Traffic Zone.

1.3 Crossing by Fast-moving Military Aircraft (Fast-lane Crossings)

1.3.1 All fast-moving military aircraft are permitted to cross the Changi Control Zone 9.4NM and 8NM south of the extended centreline of RWY 02L and RWY 02C respectively. EASTBOUND flights are to operate at 1,000ft AMSL and WESTBOUND flights at 500ft AMSL without reference to Singapore Tower or Singapore Approach.

1.3.2 The EASTBOUND is from PULAU SAKRA (011545.00N 1034200.00E) on a track of 115° MAG to Pulau Bukom Kechil and then track 110° MAG to 1NM south of the southern tip of Lazarus Island (SINJON). Thereafter, the track is 089° MAG to Point “E” (011221.00N 1040121.00E) and then direct to SIERRA (011830.00N 1042600.00E).

1.3.3 The WESTBOUND is from Point “E” on the reciprocal of the eastbound track to PULAU SAKRA.

1.4 SINJON Crossings at 1,500 FT

1.4.1 Eastbound and Westbound military aircraft are permitted to cross Changi Control Zone via the Low Level track at 1,500ft without reference to Singapore Tower or Singapore Approach. The Low Level track is established from SIERRA to SJ DVOR via Point "E" and a point 0.5NM north of PULAU SAMBU (011045.00N 1035356.00E). Aircraft on the Low Level track are only allowed to maintain 1,500ft and below between SJ DVOR and PULAU SAMBU.

1.5 Operating Hours of SINJON Crossings

1.5.1 SINJON Crossings are applicable at all times of the day.

1.6 Suspension of Unrestricted Military Crossings

1.6.1 In view of military traffic crossing the Changi CTR to the south, whenever it is known or has been made known that procedural or civil training traffic are unable for reasons of load or performance, etc., to effect a normal climb on RWY 20R/20C, the unrestricted crossings shall be suspended and the RSAF FIS Controller be informed immediately.

1.6.2 All aircraft departing on RWY 20R/20C on SID are required to cross 8 DME VTK at or above 2,000ft. If the height restriction cannot be complied with, the pilot-in-command of an aircraft departing on RWY 20R/20C shall inform ATC during the time when the aircraft commences taxiing to the holding point for departure.

1.7 Altimeter Setting

1.7.1 The Singapore QNH setting shall be used by military aircraft crossing the Changi CTR under the above procedures.

1.8 Emergency

1.8.1 In the event of an emergency occurring to a procedural aircraft in the area e.g. an engine cut on takeoff or landing etc., all unrestricted military crossings under these procedures shall be forthwith suspended. Such suspensions shall be notified immediately to the Duty RSAF FIS Controller, SATCC.

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2 TRANSIT CHANNEL

2.1 Introduction

2.1.1 To ensure safety of aircraft operations and minimise interruptions to aircraft operating in Light Aircraft Training Area A, a transit channel is established for military traffic to transit through. The Transit Channel will be all the airspace within Area A north of Mandai Road.

2.2 Activation

2.2.1 The Transit Channel will be activated only when there is a military aircraft crossing. Activation will be initiated by Paya Lebar Approach. All aircraft operating within the area are advised to vacate the channel on receipt of the activation. Such aircraft shall report their intentions to Paya Lebar Approach.

2.2.2 To ensure safety of operation, all aircraft operating within the lateral and vertical limits of the channel shall notify Paya Lebar Approach.

2.3 Dimensions

2.3.1 The co-ordinates for the Channel are:

012714N 1034752E 012442N 1034705E 012438N 1034556E 012650N 1034619E.
(refer to chart ENR 3.5-3).

2.4 Vertical Limits

2.4.1 Ground level to 2,000ft.

3 HORSBURGH LIGHTHOUSE

3.1 Horsburgh Lighthouse (011949N 1042420E) is a visual reference point for VFR flights.

3.2 For the purpose of safe navigation, all VFR traffic in the vicinity of the Horsburgh Lighthouse shall exercise extra caution when approaching the area.

3.3 Vertical Limits: Ground/sea level to 2,000 feet for VFR flights.
Note: Minimum flight altitude on ATS Route G580 above the Horsburgh Lighthouse is 3,000 feet.

3.4 The Singapore QNH shall be used by all aircraft in the vicinity of Horsburgh Lighthouse.

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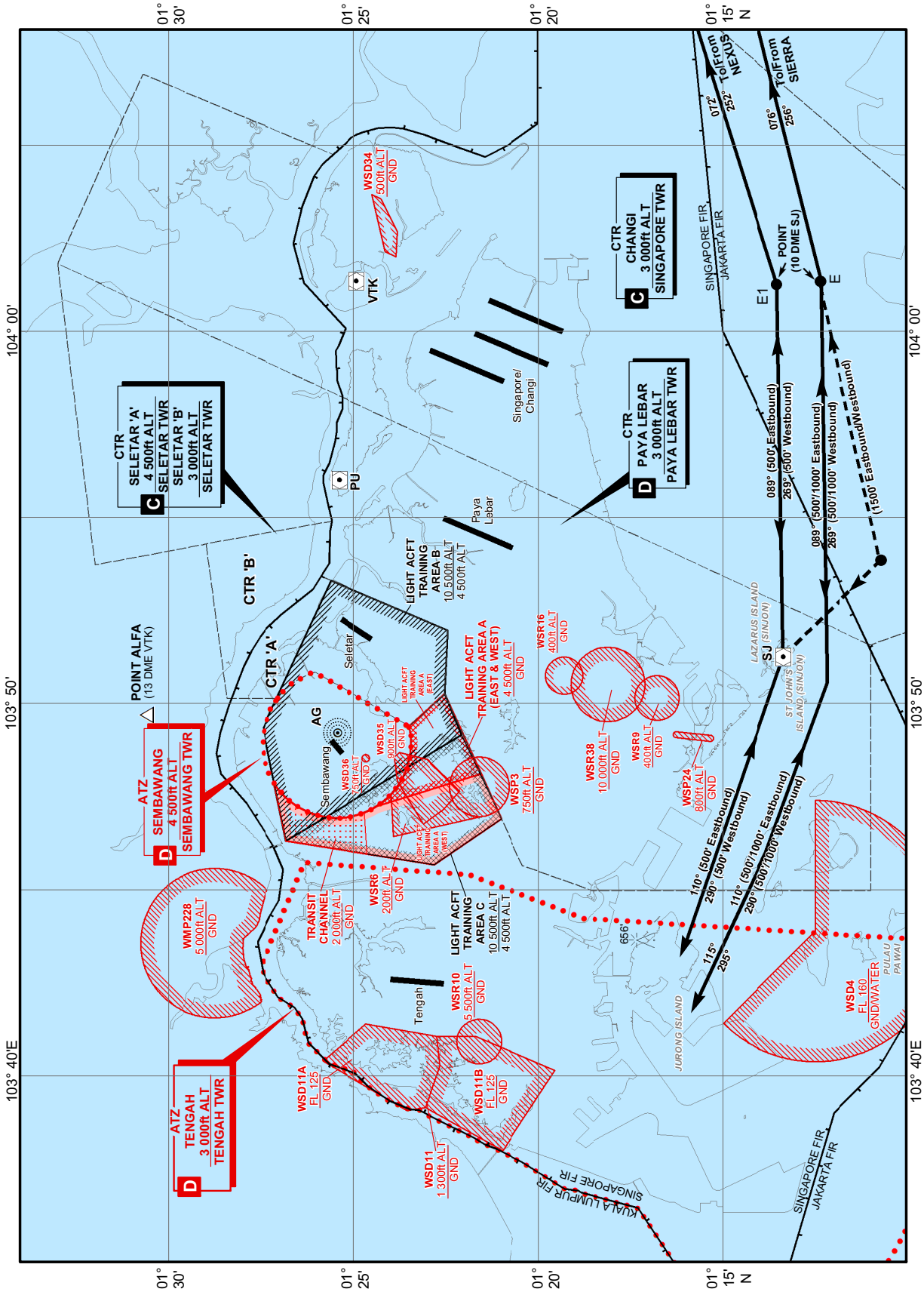
VMC CROSSING BY MILITARY AIRCRAFT



4 HELICOPTER OPERATIONS OVER SINGAPORE ISLAND

4.1 INTRODUCTION

4.1.1 The rapid building development in many parts of Singapore has made it necessary for helicopter operations to be more stringently regulated in order to enhance safety. All helicopter operators are required to adhere strictly to the following procedures.

4.2 RESTRICTED AREA -SINGLE-ENGINE HELICOPTER OPERATIONS RESTRICTED

4.2.1 Single-engine helicopters are restricted from operating over and within the city area enclosed in the triangle bounded by the following locations:

a) South of Rochor River/Kallang River (011817N 1035205E);
b) Shenton Way/Keppel Road (011623N 1035045E); and
c) Scotts Road/Orchard Road (011818N 1034954E).

4.2.2 Part of this triangle lies within the existing Restricted Area WSR38 (see charts ENR 3.5-8 and ENR 3.5-9).

4.3 ROUTINGS

4.3.1 All helicopters must fly over water or use routes approved by the CAAS. There are two over-water and one over-land helicopter routes.

4.3.2 These helicopter routes are to be flown in VMC and in daylight hours. They could either be flown separately or in combination (see chart ENR 3.5-8).

4.4 OVER-WATER ROUTES

4.4.1 One of the two over-water routes is to the north of Singapore Island for helicopter flights into and out of Seletar Aerodrome. The other route is along the southern shore of Singapore. They are as described below.

4.4.1.1 **Heli-Route Alpha**

4.4.1.2 This route covers the area from Johor Causeway eastbound over water along Selat Johor, following the coastline of Singapore Island via the northern contour of Pulau Ubin and along the eastern coastline, down to Bedok Jetty (011819N 1035632E) and vice versa. Within the vicinity of Changi Naval Base (CNB), transiting helicopters are to keep laterally clear by tracking along the following markers located about 1km from the Naval Base (see table below and diagram on page ENR 3.5-5).

	Markers Description	*Coordinates*	*Remarks*
a)	CHANGI BEACON	011909.00N 1040206.00E	WHITE lights, 3 flashes every 15 sec
b)	BUOY CNB-04	011844.00N 1040224.00E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
c)	BUOY CNB-03	011809.00N 1040224.00E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
d)	BUOY CNB-02	011806.00N 1040100.00E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
e)	BUOY CNB-01	011829.00N 1040059.00E	YELLOW buoy, 3m above waterline YELLOW lights, 1 flash every 2 sec
f)	Singapore Armed Forces Yacht Club Jetty	011851.00N 1040058.00E	Yellow lights, 3 lamp posts along jetty
Note: Pilots are to adhere strictly to the above transit routes.			

Height: Minimum 200ft AMSL or as specified by the appropriate air traffic control authority.

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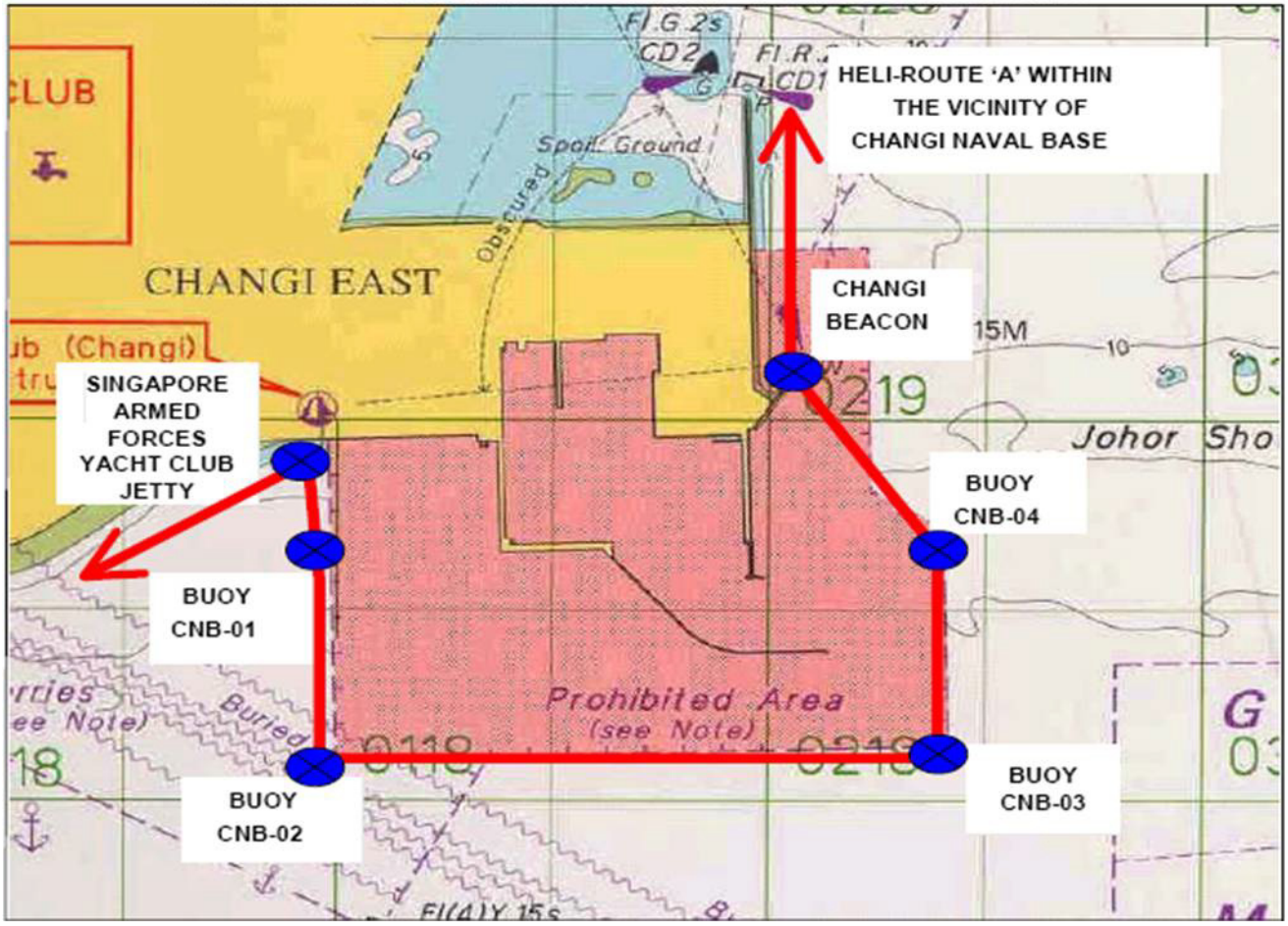
HELI-ROUTE 'A' WITHIN THE VICINITY OF CHANGI NAVAL BASE



4.4.1.3 **Heli-Route Bravo**

Originates from Bedok Jetty (011819N 1035632E), following the coastline of Singapore Island via the southern tip and contour of Sentosa towards Tuas and vice versa.

Height: Minimum 200ft AMSL or as specified by the appropriate air traffic control authority.

4.5 OVER-LAND ROUTE

4.5.1 The over-land transit route established to facilitate helicopter movements across the Singapore Island is as follows:

4.5.1.1 **Heli-Route Charlie**

Originates from Johor Causeway, southbound to Murnane Reservoir (012104N1034710E) along the eastern side of Bukit Timah Expressway. From Murnane Reservoir, southbound to PIE. Overfly PIE westbound to Anak Bukit Flyover (011956N1034552E). From Anak Bukit Flyover southbound to Pandan River (011920N1034507E). Fly over the Pandan River to Pandan Reservoir (011819N1034438E) and vice versa. To avoid overflying built-up areas and the Unmanned Aircraft Flying Area (UAFA) established at Pandan Reservoir (please refer to ENR 5), en-route by routing over open areas / nature reserve areas or as specified by the appropriate air traffic control authority. Height: Pilots to maintain minimum 1,500ft AMSL or as specified by the appropriate air traffic control authority. For southbound, commence descend after passing Pandan River (011920N1034507E). For northbound, to ascend to an altitude of 1,500ft AMSL prior to passing Pandan River (011920N1034507E).

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4.6 CONDITIONS GOVERNING THE USE OF HELI-ROUTE CHARLIE

4.6.1 The over-land route is established based on evidence of ground features and is therefore subject to CAAS's review. Approval to use the route is given with the following conditions:

a) The operator is fully satisfied that the route can be flown within the flight capability of the helicopter and that there are adequate suitable emergency landing sites along the route when in use. It remains the responsibility of the operator to ensure that his pilots are familiar with the route and the conditions governing them.
b) The route is to be flown in VMC and in daylight hours.
c) Prior ATC clearance from the appropriate controlling authority must be obtained.

4.7 FLIGHTS OPERATING OUTSIDE THE ESTABLISHED ROUTINGS

4.7.1 With the exception of an emergency situation, at all times, a helicopter shall not be operated within the Changi Control Zone or overland and outside of Heli-Route Charlie, unless prior permission has been obtained from the Director-General, CAAS.

4.7.2 While this requirement is not applicable for helicopter training flights operating within a designated aircraft training area (Light Aircraft Training Areas A, B or C), flight planning requirements per paragraphs 1.1.2 and 1.1.3 in page ENR 1.10-1 remain applicable.

4.7.3 An application for permission can be submitted to caas_ats_ansp@caas.gov.sg. CAAS may ask for a flight inspection of the proposed route and / or areas of operation. The applicant shall provide the means and bear the cost of the flight inspection. Each case would be considered on its own merits and unless CAAS is satisfied that there are very good justifications, approval would normally not be given.

4.8 FLIGHT PLAN REQUIREMENTS

4.8.1 For Flight Plan requirements, refer to ENR 1.10 FLIGHT PLANNING.

5 PROCEDURES FOR THE CONTROL OF HELICOPTER OPERATIONS AT SINGAPORE CHANGI AIRPORT

5.1 APPROACH AND DEPARTURE PROCEDURES

5.1.1 Before entering the Changi Control Zone, a helicopter pilot is to advise Singapore Tower of his direction of approach, distance from the airport, altitude and type of helicopter. Singapore Tower will pass to the pilot the runway in use, QNH (QFE on request), surface wind and direction and if necessary the position of the helicopter alighting area:

Example:	RWY 20R QNH 1008, Wind 020/7kt, light on the runway, Clear to make an approach or hold clear of the Control Zone until advised.

5.1.2 All alightings and take-offs are to be made in a north/south direction as determined by the prevailing wind. The approach from and the turn after take-off shall be made clear of all airport buildings, aprons and obstructions. Requests for approach into and take-offs from Singapore Changi Airport shall be made to Singapore Tower.

5.1.3 Helicopters intending to cross the Changi Control Zone must cross the runway immediately on receipt of clearance and cross at right angles to the runway. Helicopters would be cleared to cross the runway up to the time when a fixed wing aircraft has reached 4NM final approach and Singapore Tower has the landing aircraft in sight. If the weather condition is such that it is not expected that Singapore Tower can see the landing aircraft at 4NM final approach, crossing will only be cleared up to the time the landing aircraft reports leaving the SAMKO Holding Area or NYLON Holding Area inbound.

5.1.4 After take-off, the helicopter is to make a turn-off right or left as appropriate as soon as possible and proceed until well clear of the Changi Control Zone. On reaching the boundary of the zone, the pilot will report 'clearing your zone' and normal clearance will be given.

5.2 GROUND OR AIR TAXIING

5.2.1 After landing, the helicopter is required either to ground or air taxi via the taxiways into its allocated aircraft stand.

5.2.2 For take-offs, the helicopter will either ground or air taxi away from its aircraft stand and move out of the parking area via taxiways to the runway or helicopter area for take-off.

5.3 ALLOCATION OF AIRCRAFT STANDS

5.3.1 The allocation of aircraft stands for helicopters rests with the Apron Control Unit. In allocating aircraft stands the Duty Officer at the Apron Control Unit shall take into consideration the type of helicopter, stand occupancy time and the nature of the flight i.e. passenger carrying, training or for maintenance purposes.

5.3.2 Helicopter ferrying passengers will normally be allocated remote aircraft stands, i.e. stands without aerobridges.

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5.4 RADIO FAILURE PROCEDURE

5.4.1 In the event of radio failure, the helicopter affected if on the ground shall not take-off

5.4.2 If radio failure occurs while in the air, alighting and taxiing clearances will be given by the Tower by the use of the appropriate light signals as described in page ENR 1.1-10, Appendix ‘A’.

5.5 NIGHT OPERATIONS BY HELICOPTERS

5.5.1 Helicopters that are required to operate into and out of Singapore Changi Airport at night shall land on the runway and ground taxi into its aircraft stand via the lighted taxiways.

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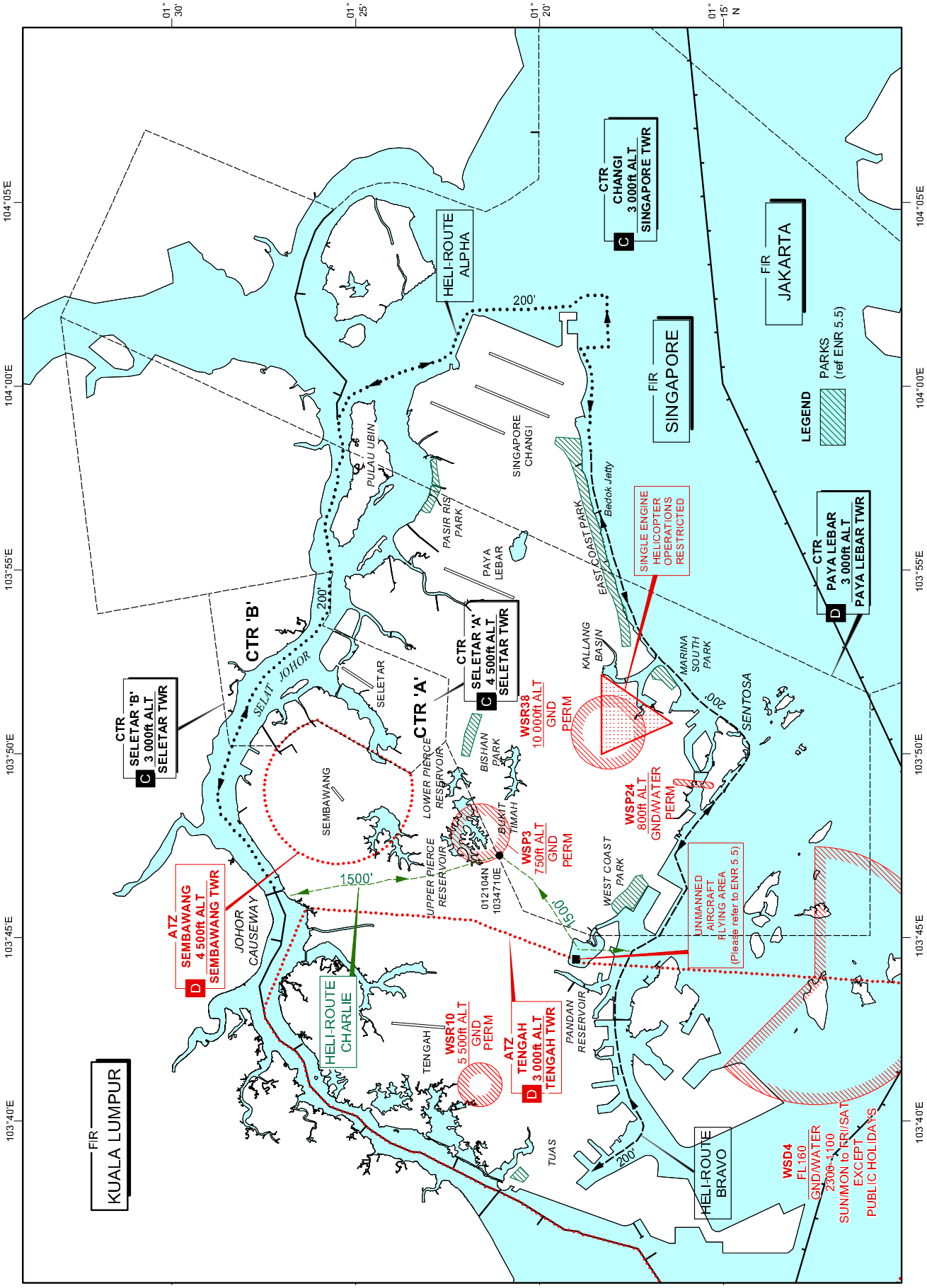
HELICOPTER ROUTES IN VMC



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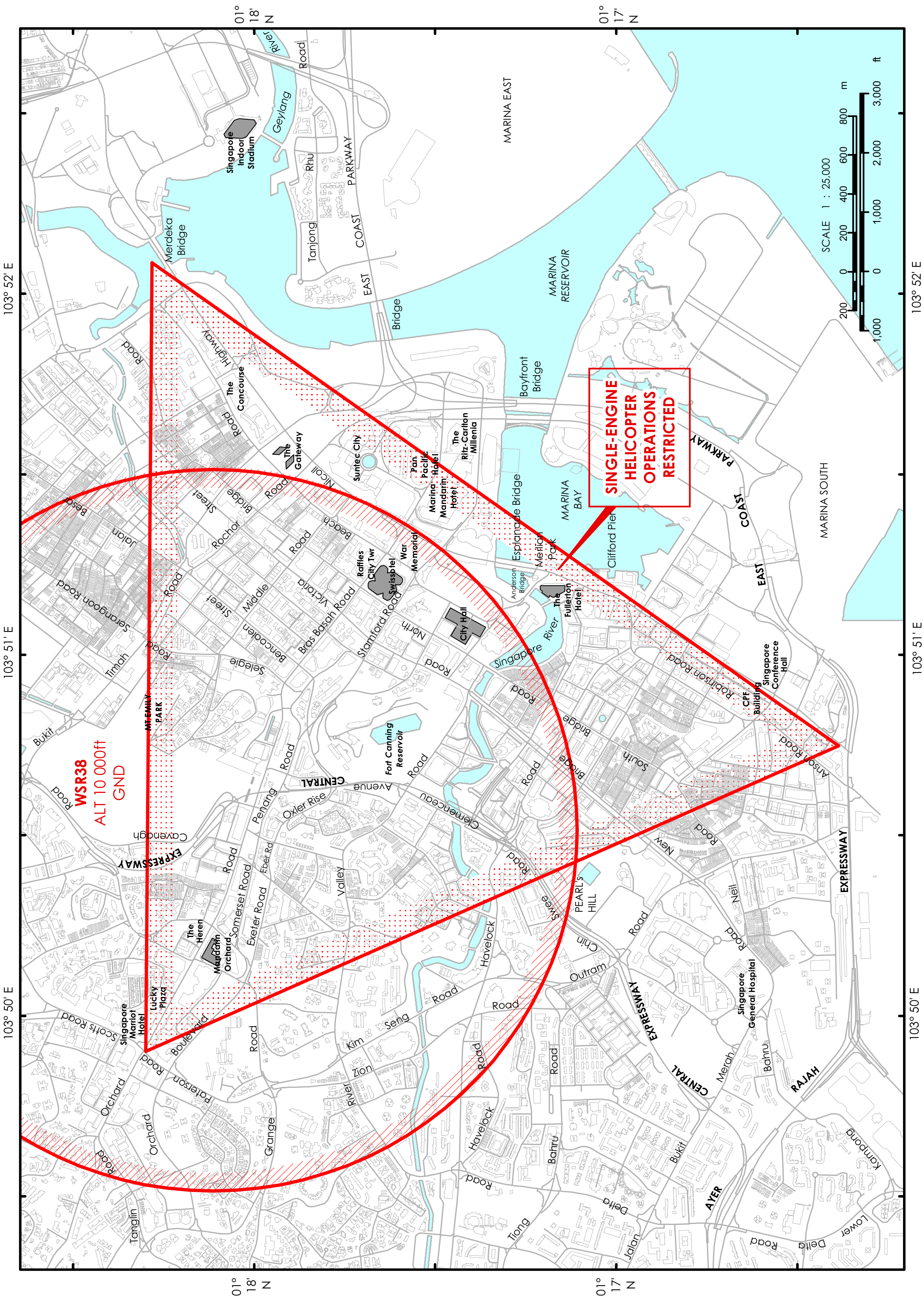
RESTRICTED AREA-SINGLE-ENGINE HELICOPTER OPERATIONS RESTRICTED



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