

S.O.1589(E).-- In exercise of the powers conferred by section 9-A of the Aircraft Act, 1934 (22 of 1934) and supersession of the notification of the Govt. of India in the Ministry of Civil Aviation No. S.O. 988 dated the 5th January, 1988, the Central Govt., being of opinion that it is necessary and expedient so to do for the safety of aircraft operations hereby direct that:-

1) No building or structure shall be constructed or erected, or no tree shall be planted on any land within the limits specified in Annexure I to this notification in respect of Civil and Military Aerodromes existing as listed in Annexure VII to this notification, aerodromes to be constructed or developed and notified by the Competent authority in future where there is any building, structure or tree on such land, the owner or the person having control of such building, structure or tree shall demolish such building or structure or, as the case may be, cut such tree, forthwith but not later than a period of one month from the date of publication of this notification in the Official Gazette.

2) No building or structure higher than the height specified in Annexure II to this notification shall be constructed or erected, or no tree which is likely to grow or ordinarily grows higher than the height specified in the said Annexure II, shall be planted, on any land within a radius of twenty kilometers* from the aerodrome reference point (ARP) of the aerodromes listed in Annexure VII to this notification excluding the land covered by Annexure I to this notification or aerodromes which would be constructed or developed and notified by the competent authority from time to time, where the height of any building or structure or tree on such land is higher than the height specified in the said Annexure II, the owner or the person having control of such building, structure, or tree shall forthwith but not later than a period of one month from the date of publication of this notification in the Official Gazette, reduce the height there of so as not to exceed the specified height.

* **Note**:- Refer Annexure II para 1.8

3) Airports Authority of India shall be responsible for issuing the NOC on behalf of Central Govt. for any construction in respect of all civil aerodromes in India, including the State Govt. aerodromes and the private aerodromes where civil commercial flights have been operating and listed at Annexure VII. In case of a private aerodromes where commercial operations are not taking place, the issue of NOC shall be dealt by AAI provided the aerodrome operator makes a specific request

with the confirmation from the local authorities/State Govt. under whose jurisdiction the aerodrome is located indicating that it is in agreement with such proposal and have mechanism in place for ensuring the implementation of height cleared through NOC for protection of obstacle limitation surfaces.

For military aerodromes, defence authorities shall be responsible for issue of NOC. Defence authorities shall follow the guidelines as specified in this notification in addition to any other additional restriction as deemed fit for issue of NOC

4) State Govt authorities shall be responsible for taking action in respect of any building, tower, installation or chimney that have been constructed/erected, or any tree that has been grown, in violation of the provisions of this notification. Any structures constructed in the surfaces after one month of issue of this notification should automatically be considered as illegal and has to be dealt with by the District Administration / local authorities for removal/reduction of height.

5) A certified copy of the construction of the building shall be deposited with AAI and State Govt. on completion of the project. The State Govt. authorities shall be responsible to ensure that heights granted as per HOC issued by AAI are fully complied with

[F. No. AV-20036/66/2000-AAI]

R.K. SINGH.

Jt. Secy.

ANNEXURE I

1.1 The land comprising within the Rwy strip of uniform width of 150M on either side of centerline which extends to 60M beyond each extremity of Rwy end along extended centerline of the Rwy for a instrument Rwy code 3 & 4.

1.2 The land comprising within the Rwy strip of uniform width of 75M on either side of centerline which extends to 60M beyond each extremity of Rwy end along extended centerline of the Rwy for instrument Rwy code 1 & 2 and for non-instrument Rwy code 3&4.

1.3 The land comprising within the Rwy strip of uniform width of 40M on either side of centerline which extends to 60M beyond each extremity of Rwy end along extended centerline of the Rwy for a non-instrument Rwy code 2.

1.4 The land comprising within the Rwy strip of uniform width of 30M on either side of centerline which extends to 30M beyond each extremity of Rwy end along extended centerline of the Rwy for a instrument Rwy code 1.

Note 1: The definition of Rwy strip and Rwy code no. has been specified at Annexure III.

1.5 The rectangular area of land enclosed within the approach funnel of the Rwy within a maximum distance of 300M from the extremity of the Rwy and 60M on either side of the extended Rwy centerline for code 3 & 4 and 45M on either side of extended Rwy centerline for code 1 & 2,

Note 2: In this Annexure:-

(a) "approach funnel".

(i) In relation to an instrument Rwy code 3 & 4, means the area in the shape of an isosceles trapezium having the longer parallel side 4800 meters long (2400 meters on either side of the extended centerline of the runway) and smaller parallel side 300 meters long (150 meters on either side of the extended centerline of the runway) where the smaller and longer parallel sides are placed at a distance of 60 meters and 15060 meters respectively, from the end of the runway and at right angles to the extended centerline.

(ii) In relation to an instrument Rwy (precision) code 1 & 2 means the area in the shape of an isosceles trapezium having the longer parallel side 4650 meters long (2325 meters on either side of the extended centerline of the runway) and smaller parallel side 150 meters long (75 meters on either side of the extended centerline of the runway) where the smaller and longer parallel sides are placed at a distance of 60 meters and 15060 meters respectively, from the end of the runway and at right angles to the extended centerline

(iii) In relation to an instrument Rwy (non precision) code 1 & 2 means the area in the shape of an isosceles trapezium having the longer parallel side 900 meters long (450 meters on either side of the extended centerline of the runway) and smaller

parallel side 150 meters long (75 meters on either side of the extended centerline of the runway) where the smaller and longer parallel sides are placed at a distance of 60 meters and 2560 meters respectively, from the end of the runway and at right angles to the extended centerline.

(iv) In relation to an non instrument Rwy code 3 & 4 means the area in the shape of an isosceles trapezium having the longer parallel side 750 meters long (375 meters on either side of the extended centerline of the runway) and smaller parallel side 150 meters long (75 meters on either side of the extended centerline of the runway) where the smaller and longer parallel sides are placed at a distance of 60 meters and 3060 meters respectively, from the end of the runway and at right angles to the extended centerline.

(v) In relation to an non instrument Rwy code 2 means the area in the shape of an isosceles trapezium having the longer parallel side 580 meters long (290 meters on either side of the extended centerline of the runway) and smaller parallel side 80 meters long (40 meters on either side of the extended centerline of the runway) where the smaller and longer parallel sides are placed at a distance of 60 meters and 2560 meters respectively, from the end of the runway and at right angles to the extended centerline.

(vi) In relation to an non instrument Rwy code 1 means the area in the shape of an isosceles trapezium having the longer parallel side 320 meters long (160 meters on either side of the extended centerline of the runway) and smaller parallel side 60 meters long (30 meters on either side of the extended centerline of the runway) where the smaller and longer parallel sides are placed at a distance of 30 meters and 1660 meters respectively, from the end of the runway and at right angles to the extended centerline.

* The diagrams of Rwy strips and approach funnel of instrument Rwy code 1, 2,3 & A and non-instrument Rwy code 3 & 4 have been shown at Appendix VI.

(b) "instrument runway" means a runway served by visual aid or non visual aids providing directional guidance adequate for a straight in approach and intended for the operation of aircraft using instrument approach procedures,

(c) "non-instrument runway" means a runway intended for operations of the aircraft using visual approach procedures.

Note 3: Any equipment or installation required for air navigation purposes which must be located:

a) on that portion of the strip within:

1) 75M of the Rwy centerline where the code No. is 3 or 4;

2) 45M of the Rwy centerline where code No. is 1 of 2; or

b) on a runway end safety area, a taxiway strip or within the distances specified in Annex 14; or

c) on a clearway and which would endanger an aircraft in the air;

shall be frangible and mounted as low as possible

Note 4: Any equipment or installation required for air navigation purposes which must be located on or near a strip of precision approach Rwy category I, II or III and which:-

(a) Is situated on that portion of the strip within the 77.5M of the Rwy centerline where the code No. is 4 and code letter is F; or

(b) Is situated within 240M from the end of the strip and within:-

1) 60M of the extended Rwy centerline where code No. is 3 or 4; or

2) 45M of the extended Rwy centerline where code No. is 1 of 2; or

(c) Penetrates the inner approach surface, the inner transitional surface or the balked landing surface ;

shall be frangible and mounted as low as possible.

1.6 In an aerodrome where:-

(a) VOR/DME/VHF DF facilities are available land, within the 305M radius of the facility.

(b) Localizer facilities are available, area bounded by following:-

i) A line 300m in the direction of approach or nearest end of the runway whichever is greater from localizer antenna and perpendicular to the runway.

- ii) A line 60 mtrs from the centerline of localizer antenna on either side and parallel to the runway.
- iii) A line containing centre of localizer antennas and perpendicular to the runway.
- iv) Area within circle of 75 mtrs radius with centre at middle of the antenna system.

(c) GLIDE PATH facilities are available,

Area bounded by the following:

- i) A line 300 mtrs in the direction of the approach from the glide path facility and perpendicular to the runway.
- ii) A line containing glide path antenna and perpendicular of runway.
- iii) Near edge of the runway from the glide path.
- iv) A line 30 mtrs in the directions away from the runway and parallel to it.

(d) Locators/Markers Beacons facilities are available, the land within a radius of 30 mtrs of the site of the markers and locator beacons.

(e) ASR facilities are available, no structure will be permitted above the level of 5 mtrs below the pedestal height upto the distance of 500 mtrs.

(f) ARSR/SSR facilities are available, no structure will be permitted above the level of 5 mtrs below the pedestal height upto the distance of 500 mtrs.

(g) Microwave Link facilities are available, no corridor of 30 mtrs on either side of the direct line of the azimuth and 10 mtrs below from the direct line of sight in the vertical plane.

(h) UHF Link facilities are available, on a corridor of 30 mtrs on either side of the direct line of azimuth and 10 mtrs below from direct Sine of sight in the vertical plane.

(i) Beacons facilities are available, within a radius of 30 mtrs around the antenna,

(j) Remote Receiver facilities are available, within a radius of 1525 mtrs of the site.

NOTE:

1. Location of Navigational Aids shall be determined as per the provisions of Annex-10.
2. The coordinates of locations of all navigational facilities have been published in AIP India.
3. As and when a new facility is commissioned. Its location is notified through NOTAM.

ANNEXURE II

The permissible elevations shall be calculated based upon the Annex 14 obstacle limitation surfaces, the radio navigation aids based on Annex 10 and the operational requirements for minimum altitudes of various segments of published instrument approach procedures based on DOC 8168, VOI II.

1. Based on Annex 14 Obstacle Limitation surface (for description and characteristics of the surfaces refer Annex IV).
 - 1.1 Take-off climb surface - The dimensions of the take-off climb surface shall no: be less than the dimensions specified in the table given below:-

Dimensions and slopes of obstacle limitation surfaces

RUNWAYS MEANT FOR TAKE-OFF

	Code number		
Surface and dimensions*	1	2	3 or 4

(1)	(2)	(3)	(4)
TAKE-OFF CLIMB			
Length of inner edge	60 m	80 m	180 m
Distance from runway end	30 m	60 m	60 m
Divergence (each side)	10%	10%	12.5%
Final width	380 m	580 m	1200 m 1800m**
	1600m	2500m	15000m
Length	5%	4% I 2%	
<p>•All dimensions are measured horizontally.** 1800 m when the intended track includes changes of heading greater than 15 deg for operations conducted in IMC, VMC by night.</p>			

1.2 Transitional surface

1.2.1 The outer limit of the transitional is determined by its intersection with the plane containing inner horizontal surface. The slopes of transitional surfaces are given below:-

- (i) Precision approach Rwy - 14.396 (1:7)
- (ii) Non precision
- (iii) 14.3 % (1:7) for code 3 & 4. -20% (1:5) for code 1 & 2.
- Non-instrument Rwy 14.3 % (1:7) for code 3 & 4.
- 20% (1:5) for code 1 & 2.

1.2.2 The slope of the transitional surface shall be measured in a vertical plane at right angles to the centre line of the Rwy.

1.2.3 The elevation of a point on a lower edge shall be

(a) along the side of approach surface - equal to the elevation approach surface at the point; and

(b) along the strip - equal to the elevation of nearest point of the centre line of the Rwy or its extension.

1.3 Approach surface

1.3.1 The approach surface shall be established for each Rwy strip in the direction of intended landing of the aeroplanes. The limits and slopes are given in table below:-

1.3.1.1 INSTRUMENT RUNWAY (DIVERGENCE 15% ON EITHER SIDE)

Length of Inner edge - 150M for code No. 1 & 2

300M for Code No. 3 & 4

Distance from THR - 60M

RUNWAY		Precision approach Rwy				Non- Precision approach Rwy				
Code NO	Length (Metre)	First Section Length (Metre)	Slope	Second Section Length (Metre)	Slope	First Section Length (Metre)	Slope	Second Section Length (Metre)	Slope	Horizontal Sec. (Metre)
1.	<800	300	2.5%	1200	3%	250	3.3%			
2.	800x	300	2.5	1200	3%	250	3.3		-	-

	1200	0	%	0**		0	3%			
3.	1200<1 800	300 0	2%	3600	2.5 %	300 0	2%	360 0	2.5 %	8400*
4.	1800 & above	300 0	2%	3600	2.5 %	300 0	2%	360 0	2.5 %	8400*

*Total length of approach surface for code No. 3 & 4 (precision & non-precision) shall be 15000 Mtrs.

**Total length of approach surface for Precision approach Rwy code No. 1 & 2 shall be 15000 Mtrs.

1.3.1.2 NON-INSTRUMENT RUNWAY

Length of Inner edge - 80M for code No. 1 & 2

150M for Code No. 3 & 4

Distance from THR - 60M

RUNWAY		(DIVERGENCE 10% ON EITHER SIDE)	
Code No.	Code Length No. (Metre)	Length (Metre)	Section Slope
1.	<800	1600	5%
2.	800<1200	2500	4%
3.	1200<1800	3000	3.33%
4.	1800 & above	3000	2.5%

1.3.1.3 Aerodrome where there are more than one runway with over-lapping approach areas and associated surface the applicable criteria shall be as prescribed for the main runway.

1.3.1.4 For determining the approach surface, the physical extremities of the runway shall only be considered. However, in case of displaced threshold the

permissible height shall be calculated based on approach surface and transitional surface w.r. to the Rwy extremity as well as the displaced threshold and the lower of the two shall be the permissible value.

1.3.1.5 At Aerodrome, where the proposals for runways extension exist, the requisite surface shall be determined from the proposed extension as well as the existing runway strip/associated clearway, as applicable and the lower of the two elevations shall be permitted.

1.3.1.6 The elevation of the associated Rwy extremity/displaced threshold/proposed extension of Rwy shall be the datum for approach surface.

1.3.2 The slope of the approach surface shall be measured in a vertical plane containing the centerline of the runway.

1.4 Inner Horizontal Surface

1.4.1 Dimensions and permissible heights of I.H.S are given in the table below:-

DIMENSIONS AND PERMISSIBLE HEIGHTS OF INNER HORIZONTAL SURFACE

RUNWAY		INSTRUMENT RUNWAY		NON-INSTRUMENT RUNWAY	
	Code Length No. (Metre)	Radius (Metre)	Height (Metre)	Radius (Metre)	Height (Metre)
1.	<800	3500*	45	2000*	45
2.	800<1200	3500*	45	2500*	45
3.	1200<1800	4000*	45	4000**	45
4.	1800 & above	4000**	45	4000**	45

*Radius shall be measured from the ARP.

** Radius shall be measured from the extremities Of the Rwy

1.4.1.1 The reference datum for Inner Horizontal Surface shall be the elevation of nearest runway end for code 3 & 4 and the aerodrome elevation for code No. 1 & 2.

1.4.2 For Rwy code No. 3 & 4. the Inner Horizontal Surface shall be a composite pattern, which consists of two circular areas centered at the two ends with a radius of 4000 mtrs. These areas shall be joined tangentially to form an elliptical shape.

1.4.3 Where it is required to protect two or more widely spaced long runways, an even more complex pattern involving four or more circular areas are formed. These areas should be joined tangentially by straight lines and the I.H.S. shall be defined by the external limits of the resulting pattern.

1.4.4 When two aerodromes are close to each other with overlapping circuits the I.H.S. will be drawn as prescribed in para 1.4.2. The inner horizontal surfaces of these two aerodromes shall be joined tangentially to form one common I H S.

1.4.5 In case of common horizontal surface serving two aerodromes, the elevation of the I.H.S. will be the lower of the two aerodromes.

1.4.6 In case of complex I.H.S. for two runways at the same aerodrome, a common surface need not be worked out. However, when these surfaces overlap each other, the lower surface be regarded as over-riding.

1.5 Conical Surface

1.5.1 The conical surface shall be projected upwards and outwards from the periphery of the Inner Horizontal Surface (I.H.S). The slope (5% /1:20) of the conical surface shall be measured in a vertical plane perpendicular to the periphery of inner horizontal surface. The outer limits and permissible heights of the conical surface are given in the table below:

OUTER LIMITS AND PERMISSIBLE HEIGHTS OF CONICAL SURFACE

RUNWAY	INSTRUMENT RUNWAY	NON-INSTRUMENT RUNWAY
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Code No.	Length (Metre)	Precision Rwy		Non-Precision Rwy		Horizontal Distance of Conical Surface beyond I.H.S. (Metre)	Maximum Height above I.H.S (Metre)
		Horizontal Distance of Conical Surface beyond I.H.S. (Metre)	Height above IHS(M)	Horizontal Distance of Conical Surface beyond I.H.S. (Metre)	Height Above IHS(M)		
1.	<800	1200	60	1200	60	700	35
2.	800<1200	1200	60	1200	60	1100	55
3.	1200 x 1800	2000	100	1500	75	1500	75
4.	1800 & above	2000	100	2000	100	2000	100

The reference datum for Conical Surface shall be the elevation of nearest runway end for code 3 & 4 and the aerodrome elevation for code No. 1 & 2.

Note:- Where a part of inner horizontal surface and conical surface lies below the approach/ take-off climb surface, the permissible heights shall be the lowest of the applicable surfaces.

1.6 OUTER HORIZONTAL SURFACE

1.6.1 The Outer Horizontal Surface (OHS) shall extend to 15000 mtrs from the Aerodrome Reference Point (ARP) for Aerodrome with runway code 3 & 4.

1.6.2 In case of Aerodrome with Runway code-2, the Outer Horizontal Surface (OHS) shall extend to 14740 mtrs from Aerodrome Reference Point (ARP) for instrument runways and 13740 mtrs for Non-Instrument runways.

1.6.3 Where combined OHS is established for two Aerodromes, the OHS shall be centred on the ARP of the Aerodrome of higher category.

1.6.4 Outer Horizontal Surface (OHS) Aerodrome with runway code no. 1 shall not be established.

1.6.5 The height of the OHS, except within the take off climb surface and final approach surface including VOR/NDB effective area, is recommended to be 150 mts. above aerodrome elevation. The constructions protruding above these surfaces shall normally not be permitted. Obstructions existing in the area should be marked/ lighted.

Note: for major aerodromes of Runway code 4, with dense air traffic having regular international air operations, the OHS datum of 150 mts. above aerodrome elevation shall be maintained.

1.6.6 The datum for Outer Horizontal Surface shall be the aerodrome elevation.

1.7 The inner approach, inner transitional and Balked landing surfaces (OFZ).

1.7.1 Obstacle free zone shall be established for precision approach Cat II & III operations. The zone shall be kept free from fixed objects other than light weight frangibly mounted aids to air navigation which must be near the Rwy to perform their functions, and from transient objects such as aircraft and vehicles when the Rwy is being used for Cat II or III operations.

1.7.2 The dimensions and slopes of the OFZ (Code 3 & 4) are given below:-

Note:- OFZ for Rwy Code No. 1 & 2 are not established.

1.7.2.1 The inner approach surface

Width	-	120 mtrs
Distance from THR	-	60 mtrs
Length	-	900 mtrs
Slope	-	2%

1.7.2.2 The inner transitional surface

Slope	-	33.3%
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1.7.2.3 Balked landing Surface

Length of Inner edge	-	120 mtrs
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Distance from THR	-	60 mtrs
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Diversions	-	10%
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Slope	-	3.33%
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1.8 Objects outside the obstacle limitation surfaces

The limits of the obstacle limitation surface are applicable upto the outer boundary of outer horizontal surface. However, in order to provide a safe buffer zone, and to take into account the CNS criteria of Annex 10 and to cater for future expansion of runway length where applicable the obstacle height of 150 mtrs shall extend upto 20Kms. In areas beyond the limits of OLS those objects which extend to height of 150mtrs or more above aerodrome elevation should be regarded as obstacle unless an aeronautical study indicates that they do not constitute safety hazard to aircraft operation.

2 Based on Annex 10 (Navigational Aids)

2.1 VOR/TVOR/VOR DME - An area beyond the radius of 305M from the facility and upto a distance of 8km from the facility, no structure shall sustain vertical angle greater than 1.2 degree measured from the horizontal plane passing through the counterpoise. Beyond 8Km, the procedure guidelines is to be referred."

2.2 Stand alone DME - Beyond 150 meters no steel towers, power lines, metal buildings shall protrude elevation angle of 3 degree measured from the base of DME antenna.

2.3 Localizer

2.3.1 Beyond the area specified in Annexure I and within ± 10 degrees azimuth in front of antenna, and object should not sustain an angle of elevation more than 0.75 degrees at the centre of antenna array.

2.3.2 Beyond areas specified in Annexure 1 and from ± 10 degrees to ± 35 degrees azimuth in front of antenna an object should not sustain an angle of elevation more than 1.1 degree at antenna array.

2.4 Glide Path

Beyond the area specified in Annexure I and within ± 8 degrees azimuth in front of the glide path antenna, a building/structure should not subtend an angle of elevation of more than 1.1 degree at antenna base.

2.5 ASR:

i) Beyond 500 meters and up to 1000M from RADAR site the height of structure may be increased at the rate of 0.005M per meter.

ii) Beyond 1000M large structure should not protrude 0.25 degrees above the RADAR horizon. Large object means the structure subtending azimuth angle of 0.4 degrees at RADAR antenna.

2.6 SSR:

Same as ASR. In addition, it is essential that structures within 1000 meters of SSR be constructed with non metallic materials having low reflectivity at frequencies from 1.0 GHZ to 1.1 GHZ.

2.7 Advance Surface movement Guidance and control system

The system used in India consists of Surface Movement RADAR (SMR) and multi lateration system.

No structure should be built on the airport that blocks the line-of-sight from the SMR and critical multi-lateration antenna to any runway, taxiway intersection, etc. Relaxation may be given if the obstruction is judged to be operationally insignificant.

2.8 INLUS/INRES of GAGAN System

No structure will be permitted to protrude the above the plane inclined at elevation angle of 2 degree from the horizontal surface drawn at the level of antenna of INLUS and INRES of GAGAN System part of GNSS (Global Navigation Satellite System).

3 Operational criteria based on DOC 8168, Vol II

In order to achieve the lowest possible operating minima for aircraft operation, it is necessary to protect not only the Annex 14 Obstacle Limitation Surfaces but also to safeguard the PANS OPS (DOC 8168) Surfaces. Considerations need to be given to the objects which penetrate the PANS OPS Surface, regardless whether or not they penetrate Annex 14 Obstacle Limitation Surfaces. Such obstacle may result in an operational penalty like higher OCA/H and introduction of longer approach segment. Therefore, while examining the cases for issue of NOC from the considerations Annex 14 and Annex 10 criteria as provided at para 1 & 2, the operational criteria needs to be considered based on the provisions of DOC 8168, Vol. II. It needs to be ensured that the minimum altitude of the following segments of published or the proposed instrument approach procedures are not infringed by the proposed constructions either within the OLS or outside of it.

- (i) Minimum Sector Altitude (MSA)
- (ii) Minimum Holding Altitude (MHA)
- (iii) Minimum Vectoring Altitude (MVA)
- (iv) Minimum Altitude of Initial and Intermediate Segments
- (v) OCA/H (Straight-in and Circling) for all aircraft categories

NOTE:

1. Instrument approach procedures of all the civil aerodromes in India have been published in the AIP India under the section Aerodrome. In the published procedures, the minimum altitudes of

the various segments of instrument approach procedures have been specified.

2. The minimum obstacle clearance criteria are applied as per the provisions of ICAO DOC 8168 Vol II. Normally, for minimum sector altitudes (applicable upto 30NM from the facility on which procedure is designed), minimum vectoring altitudes, minimum holding altitudes and for the initial approach an obstacle clearance of 1000 feet is applied.

3. Final approach areas of VOR/NDB have been illustrated in Annexure VI.

4. Shielding Benefit

4.1 Shielding principles are employed with respect to natural terrain/obstacle which penetrates above one of the obstacle limitation surfaces described in Annex 14.

4.2 The following criteria shall be applied for the purpose of applying shielding benefits for the proposed building or structure w.r.t. existing natural terrain/building structures.

4.2.1 The principle of shielding will not be applied in the transitional surface area.

4.2.2 The principle of shielding may be applied in the approach areas beyond 4000 mtrs of the inner edge of runway strip.

4.2.3 The principle of shielding may be applied in the IHS beyond radius of 3000 mtrs from the nearest runway end/ARP as the case may be.

4.2.4 The principle of shielding may be applied in conical and outer horizontal surfaces.

4.2.5 Shielding benefit shall be provided in a negative slope of 10% towards the runway and on a horizontal plane projected from the top of each obstacle

away from the runway. The following guidelines are provided to draw the areas for shielding benefit.

i) Draw a line from the highest point of the reference terrain/ obstacle to the nearest runway end/ARP as applicable.

ii) Draw a line perpendicular to the line drawn above at para 4.2.5(i)

iii) The shielding benefits of 10% negative slope shall be provided in the area located between the line drawn as per para 4.2.5 (ii) and the aerodrome.

iv) The shielding benefits of a horizontal plane shall be provided in the area located in the opposite side of the area drawn at para 4.2.5 (iii).

4.2.6 The shielding benefit shall be restricted within a radius of 600 mtrs from the datum Terrain/obstacle.

4.2.7 Tall and skeletal obstructions such as isolated towers, chimney, masts, electric pylons, telephone and power lines and poles will not provide any shielding.

4.2.8 Clearance of the object after aeronautical study by the appropriate authority will not provide automatic shielding effect to objects as the aeronautical study will be specific to the object covered in particular aeronautical study.

4.2.9 While providing the shielding benefit it shall be ensured that the minimum altitude of the various segments of the published instrument approach procedures are not adversely affected.

5. Procedure for granting exemption and the competent authority

New objects or extension of existing objects may be permitted above the inner horizontal surface, conical surface and outer horizontal surface when in the opinion of competent authority in the public interest, after conducting aeronautical study, is satisfied that the object would not adversely affect the safety or significantly affect the regularity of operations of aircraft. The competent authority for the purpose shall be the Central Government.

The following guidelines are provided for conduct of aeronautical study.

- i) The request for aeronautical study shall be processed by AAI on case to case basis.
- ii) Aeronautical study shall be undertaken as per guidelines contained in Annex VIII of this Notification.
- iii) Recommendations of aeronautical study after approval of the competent authority, the clearance for the height sought will be issued by the AAI.

6. Procedure for determining the maximum permissible heights

6.1 The following steps shall be taken for calculating the maximum permissible heights for cases relating to the issue of NOC for building/installations.

6.2 Annex 14 Criteria

- i) The site of the proposed buildings/installations shall be marked on the zoning map of the aerodrome where Annex 14 surfaces have been drawn.
- ii) If the location is within the approach/take off surface, the permissible applicable height of the approach /take-off climb surface, transitional surface, I.H.S/Conical surface shall be calculated. The permissible height shall be the lowest of the applicable surface.
- iii) If the site is located outside the approach/take-off climb surface, the height shall be determined as per the location applicable to the relevant surface (transitional, I.H.S, Conical or O.H.S).

6.3 Annex 10 criteria

- i) Determine the distances of the proposed site from the each navigational aid separately and calculate the applicable heights based on the provisions of the para 2 of Annexure II.

ii) The permissible heights shall be the lowest applicable to individual navigational aid.

6.4 PANS OPS CRITERIA:

i) After having determined the permissible heights based on the Annex 14 OLS criteria and Annex 10 criteria, it shall further be ensured that the PANS OPS Surface are not infringed and the minimum altitudes of the published/proposed segments of instrument approach procedures are fully protected. This has also be mentioned at para 3.

ii) For the obstacles located outside the limits of Annex 14 OLS, it shall be ensured that PANS OPS Surfaces of the published instrument approach procedures are not penetrated.

iii) For consideration of obstacle clearance in the final approach area for the proposed construction the criteria of primary area shall be applicable.

iv) The limits of the PANS OPS surfaces extend upto 30NM from the facility (VOR & NDB) serving the aerodrome based on which the procedure is designed. This is to ensure that the minimum sector altitudes and the minimum vectoring altitudes are not adversely affected by the proposed constructions.

6.5 The lowest height determined based on Annex 14, Annex 10 and PANS OPS shall be the permissible heights of the proposed building/installations.

ANNEXURE III

Definitions

Aerodrome elevation - The elevation of the highest point of the landing area.

Aerodrome Reference Point - The designated geographical location of an aerodrome.

Displaced Threshold - A threshold not located at the extremity of a runway.

Frangible Object - An object of low mass designed to break, distort or yield on impact so as to present the minimum hazard to aircraft.

Obstacle - All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for surface movement of aircraft or that extend above a defined surface intended to protect aircraft in flight.

Obstacle Free Zone (OFZ) - The airspace above the inner approach surface, inner transitional surfaces, and balked landing surface and that portion of the strip bounded by these surfaces, which is not penetrated by any fixed obstacle other than low mass and frangibly mounted one required for air navigation purposes.

Runway - A defined rectangular area on a land aerodrome prepared for the landing and takeoff aircraft.

Runway End Safety Area (RESA) - An area symmetrical area about the extended runway centerline and adjacent to the end of the strip primarily, intended to reduce the risk of damage to an aeroplane undershooting or overrunning the runway.

Runway Strip - A defined area included the runway and stopway, if provided, intended:-

- a) To reduce the risk of damage to aircraft running of a runway; and
- b) To protect aircraft flying over it during take-off or landing operations.

DIMENSION OF RWY STRIP

RUNWAY		INSTRUMENT RUNWAY		NON-INSTRUMENT RUNWAY	
Code No.	Length (Metre)	Width extending laterally	Length beyond Runway End/	Width extending laterally on either	Length beyond Runway

		on either side of Runway Centre Line (Metre)	Stopway (Metre)	side of Runway Centre Line (Metre)	End/Stopway (Metre)
1.	<800	75	60	30	30
2.	800<1200	75	60	40	60
3.	1200<1800	150	60	75	60
4.	1800 & above	150	60	75	60

Stopway - A defined rectangular area on the ground at the end of take-off run available prepared as a suitable area in which an aircraft can be stopped in case of an abandoned takeoff.

Take-off Runway - A runway intended for take-off only.

Obstacle Clearance Altitude / Height (OCA/H) - The lowest altitude or the lowest height above the elevation of the relevant runway threshold or the aerodrome elevation as applicable used in establishing compliance with appropriate obstacle clearance criteria.

Critical area - critical area is an area of defined dimensions about the localizer and glide path antenna where vehicles including aircraft are excluded during ILS operations. The critical area is protected because the presence of vehicles and / or aircraft inside its boundary will cause unacceptable discrepancies to the ILS signal in space.

ANNEXURE - IV

Description of Annex 14 Obstacle Limitation Surfaces

Conical Surface - A surface sloping upwards and outwards from the periphery of the inner horizontal surface.

The limits of the conical surface shall comprise:

- a) a lower edge coincident with the periphery of the inner horizontal surface; and
- b) an upper edge located at a specified height above the inner horizontal surface.

The slope of the conical surface shall be measured in a vertical plane perpendicular to the periphery of the inner horizontal surface.

Inner horizontal surface - A surface located in a horizontal plane above an aerodrome and its environs. The radius or outer limits of the inner horizontal surface shall be measured from a reference point or points established for such purpose.

Inner approach surface - A rectangular portion of the approach surface immediately preceding the threshold. The limits of the inner approach surface shall comprise:

- a) an inner edge coincident with the location of the inner edge of the approach surface but of its own specified length;
- b) two sides originating at the ends of the inner edge and extending parallel to the vertical plane containing the centre line of the runway; and
- c) an outer edge parallel to the inner edge.

Transitional surface - A complex surface along the side of the strip and part of the side of the approach surface, that slopes upwards and outwards to the inner horizontal surface. The limits of a transitional surface shall comprise:

- a) a lower edge beginning at the intersection of the side of the approach surface with the inner horizontal surface and extending down the side of the approach surface to the inner edge of the approach surface and from there along the length of the strip parallel to the runway centre line;
- b) an upper edge located in the plane of the inner horizontal surface.

Inner transitional surface - A surface similar to the transitional surface but closer to the runway. The limits of an inner transitional surface shall comprise:

- a) a lower edge beginning at the end of the inner approach surface and extending down the side of the inner approach surface to the inner edge of that surface, from there along the strip parallel to the runway centre line to the inner edge of the balked landing surface and from there up the side of the balked landing surface to the point where the side intersects the inner horizontal surface; and
- b) an upper edge located in the plane of the inner horizontal surface.

Balked landing surface - An inclined plane located at a specified distance after the threshold extending between the inner transitional surface. The limits of the balked landing surface shall comprise:

- a) an inner edge horizontal and perpendicular to the centre line of the runway and located at a specified distance after the threshold;
- b) two sides originating at the ends of the inner edge and diverging uniformly at a specified rate from the vertical plane containing the centre line of the runway; and
- c) an outer edge parallel to the inner edge and located in the plane of the inner horizontal surface.

Take-off climb surface - The surface shall be established for a runway meant for take-off. The limits of the take-off climb surface shall comprise:

- a) an inner edge horizontal and perpendicular to the centre line of the runway and located either at a specified distance beyond the end of the runway or at the end of the clearway when such is provided and its length exceeds the specified distance;
- b) two sides originating at the ends of the inner edge diverging uniformly at a specified rate from the take-off to a specified final width and continuing thereafter at that width for the remainder of the length of the take-off climb surface; and

c) an outer edge horizontal and perpendicular to the specified take-off track.

ANNEXURE-V

Description of Radio Navigation facilities:-

1. VOR/TVOR/DVOR:- VHF Omni Radio Range (VOR), Terminal VHF Omni Radio Range (TVOR), and Doppler VHF Omni Radio Range operating in the VHF band of frequencies 112 to 118.0 MHz radiate signals whereby an aircraft with the help of an instrument in its cockpit when tuned to the ground equipment frequency automatically gets his direction with respect to the facility. This helps an aircraft to navigate on a predetermined course or to home to an airport served by the facility.

2. ILS:- It is an abbreviation for "Instrument Landing System". It serves to help an aircraft to make a safe landing on the runway served by the ILS in conditions of poor visibility. It comprises of the following component facilities.

(i) Localizer:- This facility radiates VHF signals which when picked up by an aircraft, guide it onto the centerline of the runway in the horizontal plane. Normally situated about 305 mtrs from the runway end.

(ii) Glide Path:- This facility radiates UHF (Ultra High Frequency) signals. It is normally situated about 275 mtrs to 305 mtrs from the runway threshold and offset about 122 mtrs to 137 mtrs from the centerline of the runway. This provides the glide angle information to a landing aircraft with the help of an instrument in the cockpit which when tuned to the glide path frequency indicates whether the aircraft is flying up/down/along the correct glide angle.

(iii) Outer Marker/Outer Locator:- Outer Marker facility operating on 75 MHz in the VHF band is normally installed along the extended centerline of the runway at a distance between 3.5 and 6 nautical miles (1 nautical mile = 1853 mtrs). It produces radiation pattern to indicate the landing aircraft the predetermined distance from the threshold along the ILS glide path.

3. RADAR

(i) ASR:- It is a radar facility serving an aerodrome to scan the air traffic within 50 to 60 nautical miles of the aerodrome.

(ii) ARSR/SSR:- Air Routes Surveillance Radar is a high power long-range radar covering a distance of 200 nautical miles approximately. It scans air traffic to a larger distance than ASR.

4. Communication/Navigational Facilities:-

(i) Microwave Link: It is radio facility whereby mostly radar intelligence is carried to the Air Traffic Control Display site.

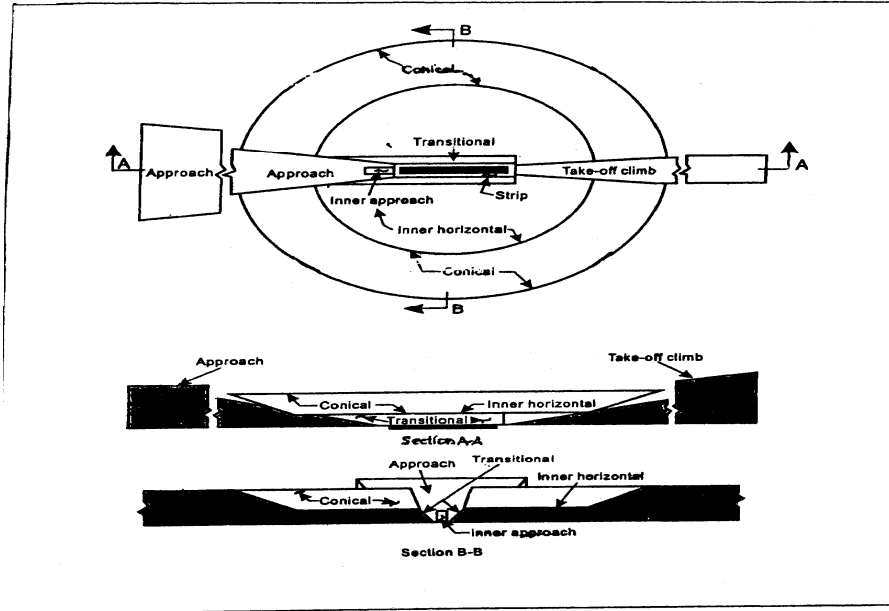
(ii) UHF Link: A radio relay facility operating in Ultra high frequency Band.

(iii) Beacons:- These are radio transmitters operating in the MF band from 200 to 400 KHz radiating omni directionally in the horizontal plane. An aircraft equipped with a suitable cockpit instrument can get its directional automatically with respect it.

(iv) Remote Receivers:- These are radio receiving stations (HF Band) installed at remote sites away from factory/industrial areas to avoid interference like man made state etc.

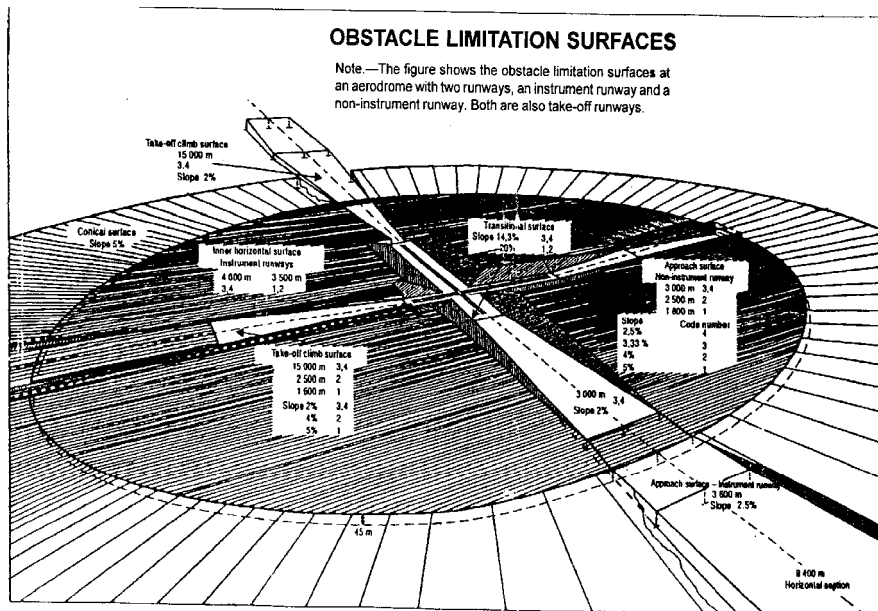
ANNEXURE VI

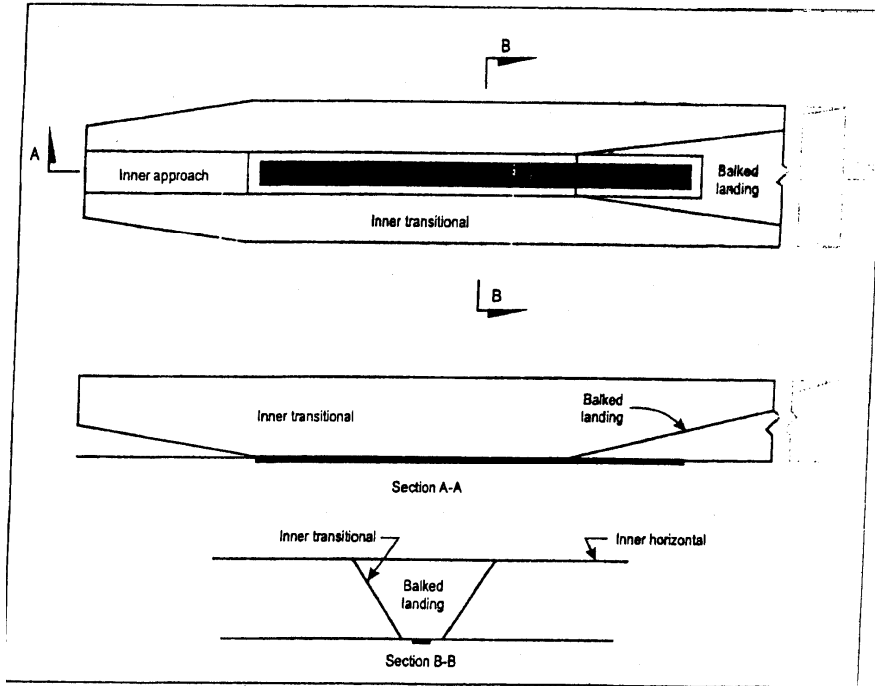
Diagrams of Obstacle Limitations Surfaces, ILS Critical Areas and Shielding Benefits



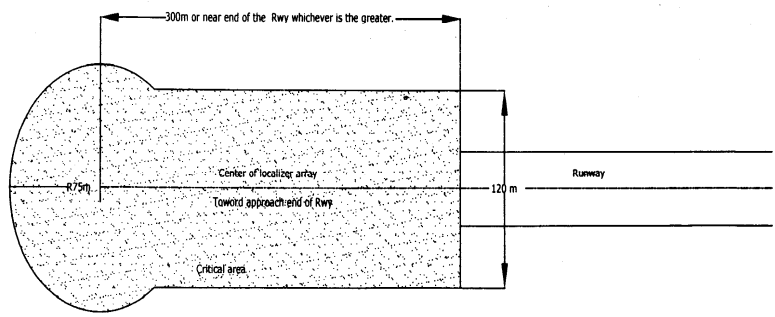
Obstacle Limitation Surfaces

Note.--The figure shows the obstacle limitation surfaces at an aerodrome with two runways, an instrument runway and a non-instrument runway. Both are also take-off runways.

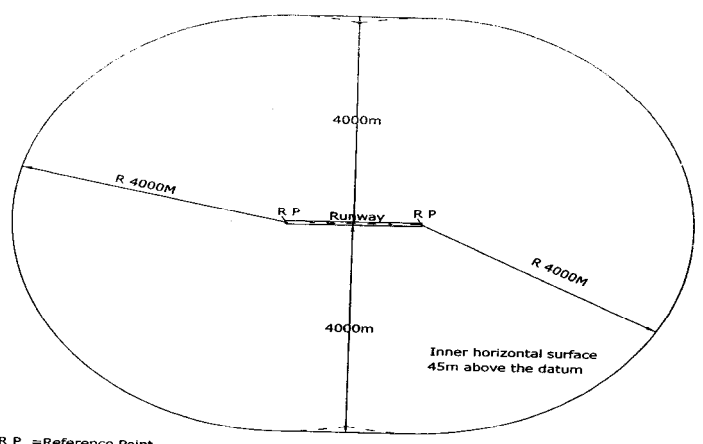
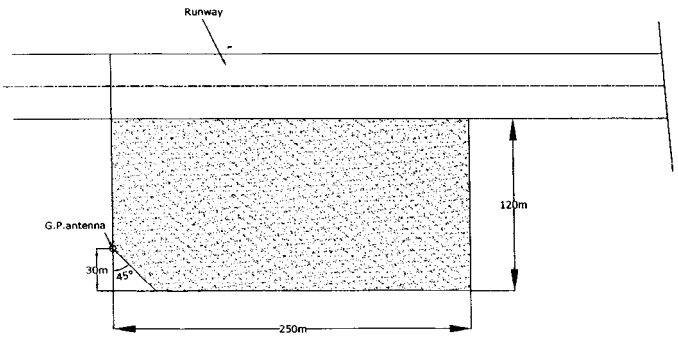




Critical Area of LLZ

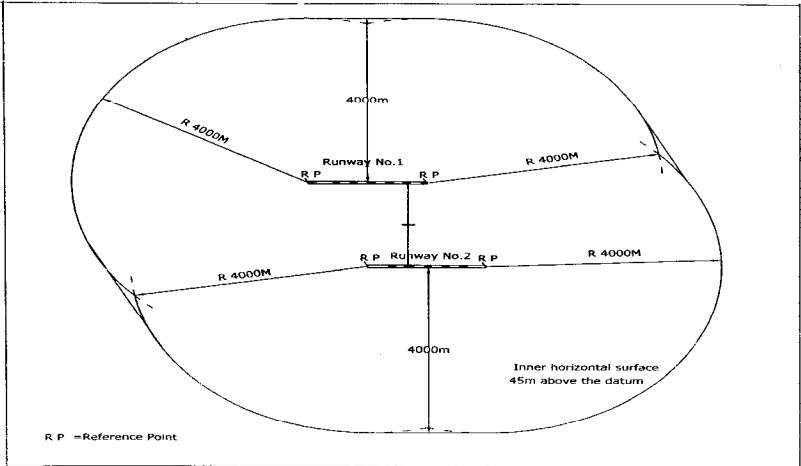


Critical Area of G.P.



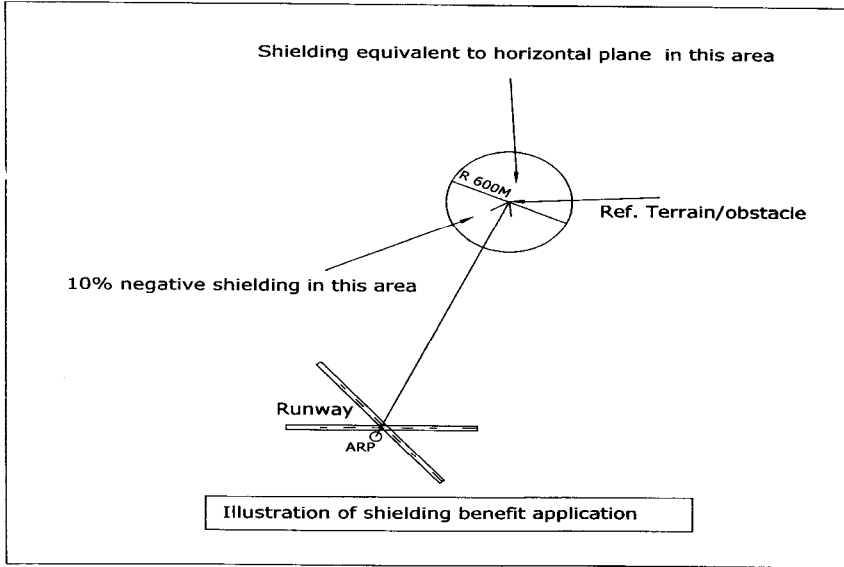
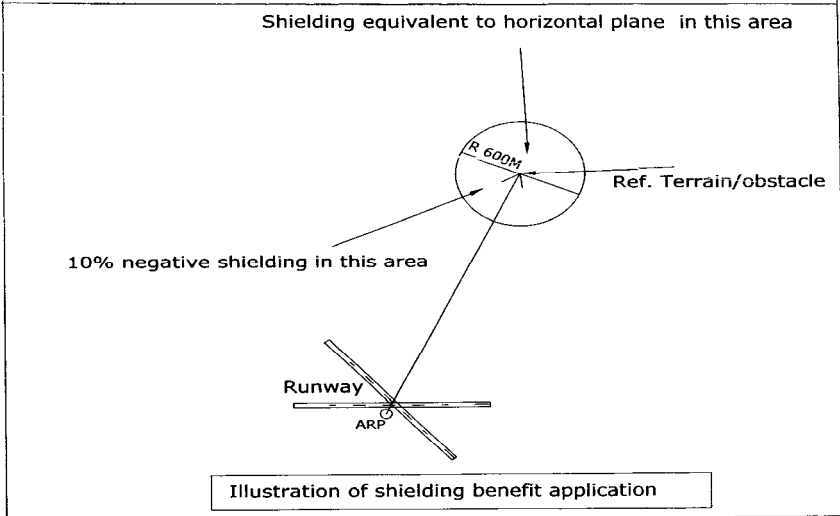
R.P. = Reference Point

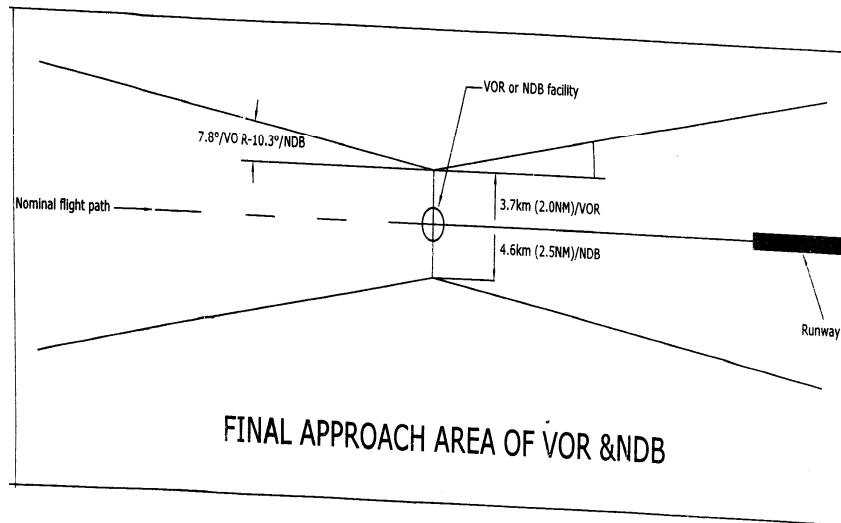
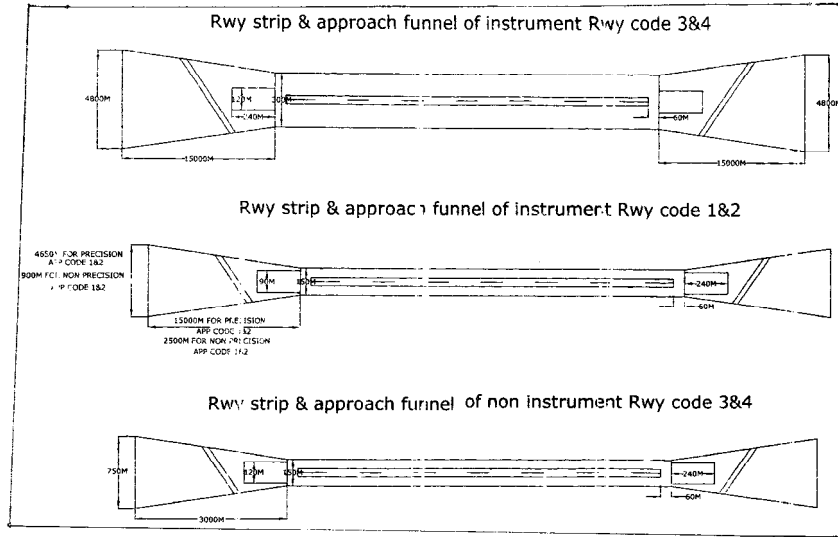
Inner horizontal surface for runway code 3 & 4



R.P. = Reference Point

Inner horizontal surface for two parallel runways





ANNEXURE VII

List of Aerodromes

ANNEXURE VII

RESTRICTED

PART-I

List of Defence Aerodromes indicating elevation of Airfield reference point (ARP) and Runway direction.

Sl. No.	Name of	ARP Elevation	R/W Direction
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	Aerodrome		
		(Metres / Feet)	(Magnetic)
1.	Adampur	247/811	13/31
2.	Adilabad	257/843	05/23
3.	Agra	167/549	05/23
			12/30
4.	Allahabad	97/319	12/30
			07/25
5.	Ambala	274/899	30R/12L
			12R/30L
6.	Awantipur	1649/5410	12/30
7.	Bagdogra	126/414	18/36
8.	Bahadurgarh	212/697	09/27
			13/31
9.	Bakshi Ka-Talab	123/404	09/27
10.	Banar	211/692	05/23
11.	Bareilly	173/568	11/29
12.	Barrackpore	6/18	02/20
13.	Bhatinda	205/666	18/31
14.	Bidar	664/2173	08/26
			02/20
15.	Bihta	54/177	10/28
16.	Bikaner (Nal)	215/706	05/23
17.	Car-Nicobar	13/42	02/20

18.	Chabua	110/361	05/23
19.	Chandigarh	314/1029	11/29
20.	Chushul	4337/14229	15/33
21.	Daman	11/36	03/21
			10/28
22.	Deolali (Nastik Road)	599/1968	09/27
23.	Dinjan	118/397	03/21
			12/30
24.	Diu	7/23	05/23
25.	Ferozpur	196/642	14/32
			04/22
26.	Fukcha	4178/13707	14/32
27.	Gorakhpur	78/255	11/29
28.	Gwalior (Maharajpur)	158/617	06/24
			11/29
29.	Hakimpet	613/2011	09/27
			14/32
30.	Halwara	239/784	13/31
31.	Hashimara	109/358	11R/29L
			11L/29R
32.	Hathwa	67/220	13/31
33.	Hindon	214/702	09/27
34.	Hyderabad (AFA)	613/2013	10L/28R

			10R/28L
35.	Jaisalmer	236/774	04/22
36.	Jalahalli	927/3042	10/28
37.	Jammu	291/956	18/36
38.	Jamnagar	15/49	06/24
			12/30
39.	Jodhpur	216/710	05/23
40.	Jorhat	91/300	04/22
41.	Kalaikunda	61/200	17/35
42.	Kachrapara	8/26	16/34
43.	Kanpur (Chakeri)	123/405	09/27
			01/19
44.	Kargil	2920/9579	02/20
45.	Khambelia	44/145	09/27
46.	Leh	3256/10682	07/25
47.	Manipur Road (Dimapur)	148/485	12/30
48.	Misamari	95/312	05/23
49.	Naliya	43/142	06/24
50.	Neemuch	493/1617	14/32
51.	Panagarh	73/240	15/33
52.	Pathankot	311/1020	01/19
53.	Phaphameu	94/307	11/29 05/23
54.	Punch	1003/3292	17/35
55.	Pune	592/1942	10/28

			14/32
56.	Purnea	36/119	09/27
57.	Salawes	201/660	05/23
58.	Sarsawa (Saharanpur)	271/890	09/27
59.	Shillong	1767/5795	04/22
60.	Sirsa	199/653	05/23
61.	Srinagar	1657/5436	13/31
62.	Sulur	380/1248	05/23
			10/28
63.	Suratgarh	180/600	05/23
64.	Tambaram	28/89	05/23
65.	Tezpur	70/230	05/23
66.	Turial (Aijal)	305/1000	01/19
67.	Udahampur	634/2079	18/36
68.	Utterlai	154/505	02/20
69.	Yelahanka	928/3045	09/27
70.	Aliaya	1420	03/21
71.	Bellary	465	12/30
72.	Cholavaram	29	12/30
			02/20
73.	Dharbanga	47	10/28
74.	Kolar	839	10/28
75.	Rampur Hat	74	09/27
			18/36

76.	Kumbhigram	104	06/22
77.	Thoise	2745	11/29
78.	Tezu	220	04/22
79.	Amla	746	08/26
80.	Along	214	05/23
81.	Bhuj	79	05/23
82.	Imphal	775	04/22
83.	Bhatinda Cantt.	204	090/270
84.	Dimapur (Ranagapahal)	168	050/230
85.	Jalandhar Cantt.	234	140/320
86.	Naororta	346	020/200
87.	Swevoke Road	145	150/330
88.	Bareilly Cantt.	170	112/292
89.	Dinjan Cantt.	110	070/250
90.	Sarifabad	350	300/120
91.	Jodhpur (Nag Talao)	250	030/210
92.	Dabolim	48	08/26
93.	Cochin	2	17/35
			13/31
94.	Visakhapattnam	3	05/23
95.	Port Blair	6	04/22
96.	Ramnad	4	01/19
97.	Arkonam	85	06/24

2.	Ahmedabad	Gujarat	230416	723735	55M	05/23	3505m x 45m
					(180.4')		(11500' x 150')
						14/32	1477m x 46m
							(4860' x 150')
3.	Akola	Maharashtra	204152	770332	305M	10/28	1219m x 46m
					(1000')		(4000' x 150')
4.	Amritsar	Punjab	314216	7448 07.5	229M	16/34	3289m x 45m
					(752')		(10800' x 150')
						0,7/25	1402m x 30m
							(4600' x 98')
5.	Aurangabad	Maharashtra	195152.2	752351.3	581M	09/27	2286m x 45m
					(1907')		(7500' x 150')
6.	Balurghat	West Bengal	251547	884754	24M	09/27	1097m x 30.5m
					(78')		(3600' x 100')
7.	Barapani	Meghalaya	254211.5	915841	899M	04/22	1829m x

							45m
	(Shillong)				(2950')		(6000' x 150')
8.	Behala	West Bengal	223022	881748	3M	18/36	861m x 30.5m
					(10')		(2825' x 100')
9.	Belgaum	Karnataka	155130.9	743703.6	758.42M	08/26	1763m x 45m
					(2488')		(5780' x 150')
						18/36	1478m x 46m
							(4849' x 150')
10.	Bhavnagar	Gujarat	214515.3	721126.1	5.4M	07/25	1920m x 45m
					(18')		(6300' x 150')
						03/21	550m x 46m
							(1804' x 150')
						16/34	556m x 46m
							(1824' x 150')
11.	Bhopal	Madhya	231713	772012.9	523M	06/24	1835m x 46m

18.	Kolkata	West Bengal	223914.2	882648.1	5M	19R/01L	2399m x 45m
					(17.5')		(7870' x 150')
						19L/01R	3627m x 45m
							(11900' x 150')
						07/25	1524m x 46m
							(5000' x 150')
19.	Chakulia	Bihar	222736	864237	129M	17/35	2220m x 46m
					(424')		(7284' x 150')
20.	Coimbatore	Tamil Nadu	110136.9	770230.4	395.5M	05/23	2590m x 45m
					(1298')		(8500' x 150')
21.	Cooch Behar	West Bengal	261949	892815	41.5M	04/22	1068m x 30.5m
					(136')		(3505' x 100')
22.	Cuddapah	Andhra	14'31'	78"47'	131M	11/29	1097m x 30.5m
		Pradesh			(430')		(3600' x 100')
23.	Deesa	Gujarat	241603	721219	145M	06/24	856m x

							46m
	(Palampur)				(467')		(2808' x 150')
24.	Delhi /Palam	Delhi	283407.4	770643.6	227M	10/28	3810m x 45m
	IGI Airport				(744')		(12500' x 150')
						09/27	2813m x 45m
							(9230' x 150')
						15/33	2058m x 46m
							(6750' x 150')
25.	Delhi /	Delhi	283500	771229	212M	12/30	1180m x 45m
	Safdarjung				(696')		(3870' x 150')
						05/23	732m x 45m
							(2400' x 150')
26.	Dehradun	U.P.	30°1124. 7	78°10'48. 8	518m	08/26	2140m x 45m
	(Jolly Grant)				(1700')		(7000' x 100')
27.	Donakonda	Andhra	15°50'	79°30'	142.5m	NE/SW	914m x 30.5m

							150')
33.	Indore	Madhya	224324	754819.7	561m	07/25	2287m x 45m
		Pradesh			(1840')		(7500' x 150')
34.	Jabalpur	Madhya	231100.3	8003 37.1	494m	06/24	1988m x 45m
		Pradesh			(1622')		(6500' x 150')
						18/36	1128m x 46m
							(3560' x 150')
35.	Jaipur	Rajasthan	264927	754808.7	385m	09/27	2797m x 45m
					(1263')		(9180' x 150')
						15/33	1592m x 46m
							(5225' x 150')
36.	Jhansi	U.P.	25°29'	78°34'	244m	15/33	1296m x 46m
					(800')		(4252' x 150')
37.	Jharsuguda	Orissa	215451	840303	228m	06/24	1882m x 46m
					(748')		(6174' x 150')

38.	Jogbani	Bihar	26°18'	87°18'	59m	09/27	1525m x 153m
	(Forbesganj)				(193')		(5000' x 500')
39.	Junagadh	Gujarat	211852	701610	49.5m	05/23	1372m x 46m
	(Keshod)				(163')		(4500' x 150')
40.	Kailashahar	Tripura	241828	920034	27m	03/21	1006m x 30.5m
					(90')		(3300' x 100')
41.	Kamalpur	Tripura	240754	914851	39m	01/19	1372m x 30m
					(128')		(4500' x 100')
42.	Kandla	Gujarat	230642	70°06'05"	29m	05/23	1524m x 30m
					(95')		(5000' x 100')
43.	Kanpur	U.P.	262625	802153	125m	10/28	1082m x 46m
					(410')		(3550' x 150')
44.	Karipur	Kerala	110817	755701.5	100m	10/28	2860m x 45m
	(Calicut)				(328')		(9380' x 150')
45.	Khandwa	M.P.	215125	761959	329m	10/28	890m x

							30m
					(1080')		(2920' x 100')
46.	Khajuraho	M.P.	244911.8	795506.4	217m	01/19	1829m x 45m
					(713')		(6000' x 150')
47.	Khowal	Tripura	240342	913627	29m	18/36	915m x 30m
					(95')		(3000' x 100')
48.	Kolhapur	Maharashtra	163955	741729	607m	07/25	914m x 92m
					(1990')		(3000' x 300')
49.	Kota	Rajasthan	250935	755056	273m	08/26	1219m x 46.5
					(896')		(4000' x 150')
50.	Kulu (Bhuntar)	Himachal Pradesh	315237	770919.3	1084m	16/34	1052m x 30m
					(3557')		(3450' x 100')
51.	Lalitpur	U.P.	244258	782503	367m	10/28	1972m x 46m
					(1203')		(6469' x 150')
52.	Lucknow	U.P.	264542.6	805300.3	122m	09/27	2742m x 45m

					(400')		(7735' x 150')
							Actual length
							(7835' x 150')
						01/19	1097m x 46m
							(3600' x 150')
53.	Ludhiana	Punjab	3052	755728	254m	12/30	1463m x 46m
					(833')		(4800' x 150')
54.	Madurai	Tamil Nadu	095006.7	780517.9	136m	09/27	1826m x 45m
					(447')		(5990' x 150')
						13/31	1403m x 46m
							(4604' x 150')
55.	Malda	West-Bengal	250°4'40"	880750	24m	11/29	1099m x 30m
					(79')		(3605' x 100')
56.	Mangalore	Karnataka	12 5743.4	745323	102m	09/27	1625m x 45m
					(334')		(5330' x

61.	Nagpur	Maharashtra	210530.7	790253.8	308m	14/32	3200m x 45m
					(1012')		(10500' x 150')
						09/27	1957m x 46m
							(6420' x 150')
62.	North	Assam	271726.3	940548.9	100m	04/22	2286m x 45.72m
	Lakhimpur				(324')		(7500' x 150')
	(Lilabari)						
63.	Panagarh	West Bengal	232824	872547	73m	15/33	2192m x 46m
					(240')		(7190' x 150')
64.	Panna	Madhya Pradesh	243915	801546	424m	17/35	1539m x 18m
					(1391')		(5050' x 60')
65.	Pantnagar	U.P.	290155.7	792820.9	233m	10/28	1097m x 30m
					(764')		(3600' x 100')
66.	Pasighat	Arunachal Pradesh	2806	9523	157m	17/35	1005m x 24m
					(514')		(3300' x 75')

67.	Patna	Bihar	253537	850531	51m	07/25	1954m x 45m
					(167')		(6400' x 150')
68.	Porbandar	Gujarat	213901.4	693931	5m	19/27	1372m x 45m
					(17')		(4500' x 150')
						05/23	1003m x 37m
							3290' x 120')
69.	Raipur	Madhya	211052	814418.5	313.5m	06/24	1955m x 45m
		Pradesh			(1029')		(6400' x 1508')
						14/32	1792m x 46m
70.	Rajamundry	Andhra	170630	814916	44.5m	05/23	1829m x 46m
		Pradesh			(146')		(6000' x 150')
71.	Rajkot	Gujarat	221834.1	704645.7	134m	05/23	1846m x 45m
					(440')		(6060' x 150')
72.	Ranchi	Bihar	231851.3	851915.8	646m	13/31	2713m x 45m
					(2120')		(8900'x

							150')
73.	Raxual	Bihar	26°58'	84°50'	79m	10/28	1097m x 30.5m
					(260')		(3600' x 100')
74.	Rupsi	Assam	260824	895436	40m	05/23	1829m x 46m
					(132')		(6000' x 150')
75.	Satna	Madhya	243345	805116	319m	11/29	1752m x 46m
		Pradesh			(1047')		(5750' x 150')
76.	Sheila	Assam	251030	913830	24m	18/36	914m x 18m
					(80')		(3000'x 60')
77.	Shimla	H.P.	310440	770422	1524m	14/32	1036m x 46.5m
					(5000')		(3400' x 750')
78.	Sholapur	Maharashtra	173735	755606	481m	15/33	1310m x 46m
					(1578')		(4298' x 150')
79.	Silchar	Assam	245443	925845	102m	06/24	1785m x 46m
	(Kumbhigram)				(333')		(5857' x 150')

							37m
							(3589' x 120')
84.	Imphal	Manipur	244551.2	935358.4	773m	04/22	2746m x 45m
					(2536')		(9010' x 150')
85.	(Tural)	Mizoram	23°44'	92°48'	305m	01/19	1274m x 27m
	Aizawl				(1000')		(4180' x 90')
86.	Udaipur	Rajasthan	243703.2	735340	509m	08/26	2281m x 45m
					(1670')		(7480' x 150')
87.	Vadodara	Gujarat	221948	731308	37m	04/22	2469m x 45m
					(121')		(8100' x 150')
						09/27	1372m x 46m
							(4500' x 150')
88.	Varanasi	Uttar	252705	825131	80m	09/27	2206m x 45m
		Pradesh			(262')		(7240' x 150')
89.	Vellore	Tamil Nadu	125424	790406	233m	07/25	792m x 46m

					(764')		(2600 x 480)
90.	Vijayawada	Andhra	163139.1	804748.1	21m	08/26	1745m x 45m
		Pradesh			(69')		(5723' x 150')
91.	Visakhapatnam	Andhra	174316	831329	3m	05/23	1828m x 46m
		Pradesh			(10')		(6000' x 150')
						09/27	1462m x 46m
							(4800' x 150')
						18/36	342m x 46m
							(2761' x 15')
92.	Warrangal	Andhra	175452	793608	285m	09/27	1862m x 46m
		Pradesh			(935')		(6107' x 150')
						15/33	1774m x 46m
							(5818' x 150')
93.	Agatti	Lakshadwep	104940	721030	4m	04/22	3936' x 100'
					(13')		

94.	Dimapur	Nagaland	255300.2	934616.2	143m	12/30	2290m x 45m
					(471')		(7513' x 150')
95.	Tuticorin	Tamilnadu	084317	780140	25.6m	10/28	1350m
					(84')		(4430')

Part II of Annexure-VII ends-

Part-III of Annexure-VII

LIST OF PRIVATELY OWNED LICENSED AERODROMES

Sl. No.	Name	State/Union Territory	Location		levation Metres (Feet)	R/w Direction	Dimensions Metres (Feet)
			Latitude (North)	Longitude (East)			
1	2	3	4	5	6	7	8
1.	Ammasandra	Karnataka	103° 24'	76°45'	833M	09/27	1143m x 30m
					(2733')		(3750' x 100')
2.	Banasthali	Rajasthan	2624	7551	308M	09/27	1097m x 61m
	Vidyapith				(1010)		(3600' x 200')
3.	Bakshiwalla	Punjab	30° 20'	76°27'	267M	NE/SW	(1500' x 150')
					(875')		
4.	Bangalore	Karnataka	12° 57'03	773956	888M	09R/27L	3307m x

							61m
					(2914')		(10850' x 200')
						09L/27R	2126m x 46m
							(6975' x 150')
5.	Bhilai	Madhya	2118	8123	297M	05/23	1524m x 30m
		Pradesh			(975')		(5000' x 100')
6.	Birlagram	Madhya	23° 27'	75°25'	470M	NW/SE	1463m x 45m
	(Nagada)	Pradesh			(1541')	13/31	(4880' x 150')
7.	Bograjeng	Assam	2633	9338	67M	E/W	1280m x 91m
					(220')		(4200'x 300')
8.	Borengajuli	Assam	26°43'	91°51'	91.5M	02/20	1097m x 92m
							(3600'x 300')
							428m x 23m
9.	Burhar	Madhya	2314	8131	457M	13/31	975m x 30m
		Pradesh			(1500')		(3200' x 100')

10.	Burnpur	West Bengal	2339	8658	94m	E/W	1097m x 46m
					(310')		(3600' x 150')
11.	Dablan	Punjab	3015	7625	830m	NE/SE	1200m x 50m
					(253')		
12.	Doomur	Assam	2707	9454	67m	NE/SW	1097m x 91m
	Dullang				(220')		(3600' x 300')
13.	Jamshedpur	Bihar	22°49'	86°10'	142m	08/26	1040m x 23m
					(465')		(3415' x 75')
14.	Jayaypur	Orissa	1916	8325	239m	12/30	914m x 61m
					(785')		(3000' x 200')
15.	Jeypore	Orissa	18°52'	82°33'	594m	16/34	914m x 30m
					(1950')		(3000' x 100')
16.	Jullundur	Punjab	3117	7535	234m	14/32	1000m x 30m
					(765')		(3281' x 100')
17.	Kalyanpur	U.P.	2633	80°14'	131m	E/W	884m x 23m

	(Kanpur)				(330')		(2900' x 75')
18.	Kolapani	Assam	2649	9308	91m	04/32	914m x 91m
							(3000' x 300')
19.	Bokaro	Bihar	233826	860949	225m	13/31	1463m x 39m
	(Marahari)				(737')		(4800' x 100')
20.	Mithapur	Gujarat	22°24'40"	68°59'34"	4m	N/S	914m x 137m
	(Dwarala)				(12')		(3000' x 45m)
						07/25	1372m x 46m
							(4500' x 150')
21.	Nanaksar	Punjab	3036	7511	232m	N/S	427m x 18m
	(Samah Bhari)				(760')		(1600' x 166')
22.	Panga	W. Bengal)	2628	8838	84m	ENE/WSW	1122m x 91m
	(Jaipaiguri)				(275')		(3678' x 300')
23.	Pannery	Assam	2645	9155	46m	N/S	1000m x 91m
					(300')		(3280' x

							300')
24.	Rajhara	M.P.	2032	8105	361m	NE/SW	914m x 30.5m
					(1185')		(3000' x 100')
25.	Rourkela	Orissa	221540	844835	201m	09/27	1219m x 30m
					(655')		(4000' x 100')
26.	Sardar Nagar	U.P.	2642	8325	79m	11/29	823m x 36.5m
	(Gorakhpur)				(260')		(2700' x 120')
27.	Shahbad	Karnataka	1706	7700	396m	10/28	1097m x 27.5m
					(130')		(3600' x 90')
28.	Sindri	Bihar	233930	862945	180m	12/30	903m x 30m
					(590')		(2962' x 100')
29.	Cochin	Kerala	100914	0762425	9.22m	09/27	3400m x 45m
	International				(30')		(11000' x 155')
	Airport Ltd.						
30.	Hyderabad	A.P.	171426	0782544	603m	09/27	4260m x 60M
	International				(1978')		(14000' x

							200')
	Airport Ltd.						
31.	Bangalore	Karnataka	131156	0774220	900.4m	09/27	4000m x 45m
	International				(2954')		(13120' x 150')
	Airport Ltd.						
32.	Lengpui	Mizorum	235016.88	923736.38	418.7m	17/35	2500m x 45m
					(1460')		(8200' x 150')

Part-IV of Annexure-VII

STATE GOVT. AERODROMES NORMALLY MAINTAINED IN SERVICEABLE CONDITION

Sl No.	Name	State/Union Territory	Location		Elevation Metres (Feet)	R/w Direction	Dimensions Metres (Feet)
			Latitude (North)	Longitude (East)			
1	2	3	4	5	6	7	8
1.	Akbarpur	U.P.	2627	8234	101m	11/2 9	1829m x 40m
					(330')		(6000' x 150')
2.	Along	Arunachal	28°10	94°49'	214m	05/2 3	973m x 28m
		Pradesh			(702')		(3192' x 92')

3.	Alwar	Rajasthan	2730	7630	266m	L/A	640m x 46m
					(871')		(2100' x 150')
4.	Ambikapur	M.P.	2259	8312	588m	16/3 4	1371m x 91m
					(1922')		(4500' x 300')
5.	Behrampur	W. Bengal	2405	8815	15m	02/2 0	510m x 137m
					(50')		(1650' x 450')
6.	Bhagalpur	Bihar	2515	8701	46m	06/2 7	1006m x 137m
					(150.8')		(3300' x 150')
7.	Bharatpur	Rajasthan	2712	7733	177m	09/2 7	823m x 137m
					(580')		(2700' x 450')
8.	Bhawal	Rajasthan	2613	7340	270m	06/2 4	2012m x 183m
					(890')		(6600' x 600')
9.	Bhiwani	Haryana	2851	7611	213m	12/3 0	914m x 30.5m
					(695')		(3000' x 100')
1	Bhowrah	Bihar	2340	8623	140m	L/A	914m x

0.							55m
					(450')		(300' x 180')
1 1.	Bider	Karnataka	1754	7730	634m	08/26	1871m x 46m
					(2080')		(6142' x 150')
1 2.	Birpur	Bihar	2623	8701	75m	E/W	650m x 136m
					(246')		(2100' x 450')
1 3.	Bundi	Rajasthan	2524	7538	311m	N/W	732m x 37m
					(1020')		(2400' x 120')
						E/W	1189m x 55m
							(3900' x 180')
1 4.	Chaibasa	Bihar	2231	8551	244m	E/W	732m x 83m
					(800')		(2400' x 600')
						N/S	546m x 137m
							(1800' x 450')
1 5.	Chandrapur	Maharashtra	19°58'	7912	244m	08/26	1000m x 30m

					(800')		(3281" x 100')
1 6.	Dapo Rijio	Arunachal	2800	94011	244m	07/2 5	1000m x 30m
		Pradesh			(800')		(3000' x 100')
1 7.	Dhanbad	Bihar	2350	8626	233m	E/W	1128m x 23m
					(765')		(3700' x 75')
							457m x 91m
							(1500' x 390')
1 8.	Daltonga nj	Bihar	24°00'	84°05'	243m	E/W	3000' x 100'
					(300')		
1 9.	Dholapur	Rajasthan	2643	7756	177m	E/W	732m x 46m
					(580')		(200' x 150')
						N/S	914m x 46m
							(3000' x 150')
2 0.	Faizabad	U.P.	2645	8245	100m	NE/E W	1829m x 46m
					(330')		(6000' x 150')

						NW/S E	1463m x 46m
							(4800' x 150')
2 1.	Faridkot	Punjab	3011	7444	203m	E/W	1005m x 46m
					(664')		(3300' x 150')
						N/W	504m x 55m
							(1980' x 180')
2 2.	Fursatgan j	U.P.	2615	8122	107m	09/2 7	1829m x 47m
	(Raibareilly)				(350')		(6000' x 150')
2 3.	Giridih	Bihar	2413	8618	305m	09/2 7	1829m x 46m
					(1000')		(6000' x 150')
2 4.	Gadra Road	Rajasthan	2542	7033	142.5 m	L/A	457m x 457m
					(500')		(1500' x 1500)
2 5.	Ghazipur	U.P.	2527	8334	46m	07/2 5	1808m x 46m
					(219')		(5931' x 150')
2	Gondia	Maharash	2131	48°20	315m	05/2	1966m x

6.		tra				3	46m
					(1035')		(6208' x 150')
27.	Gopalpur	Orissa	19°15'	84°52'	30m	05/23	3042' x 500'
					(100')		
28.	Guna	M.P.	2439	7721	495m	14/32	3000' x 100'
					(1621')		
29.	Hissar	Haryana	29°10'48"		214m	12/30	1219m x 46m
					(700')		(4100' x 150')
30.	Isarda	Rajasthan	2609	7603	253m	E/W	640m x 46m
					(830')		(2100' x 150')
31.	Jagdalpur	M.P.	1904	8202	555m	06/24	1029m x 46m
					(1822')		(3375' x 150')
32.	Jakkur	Karnataka	1305	7736	922m	08/26	914m x 46m
					(3024')		(3000' x 150')
33.	Jaith	Maharashtra	1704	7512	673m	N/S	343m (1224')
					(2240')	E/W	663m

)		(2715')
						SE/N W	549m (1800')
						NE/S W	777m (2550')
3 4.	Jalgaon	Maharash tra	2058	7540	249m	09/2 7	1372m x 46m
					(850')		(4500' x 150')
3 5.	Jhalawar	Rajasthan	2436	7610	251m	N/W	792m x 47m
					(824)		(2600' x 150')
						E/W	- Do-
3 6.	Jhabua	M.P.	224730	743232	335m	E/W	914m x 30.5m
	(Ran pat)				(1100')		(3000' x 100')
3 7.	Jhunjun u	Rajasthan	2807	7523	338m	10/2 8	1006m x 46m
					(1110')		(3300' x 150')
3 8.	Karad	Maharash tra	1717	7409	576m	E/W	1280m x 30.5m
					(1890)		(4200'x 100')
3 9.	Karnal	Haryana	2943	7702	246m	13/3 1	914m x 46m
					(829')		(3000' x

4 5.	Merta Road	Rajasthan	2633	7355	323m	1/A	1097m x 46m
					(1059')		(3600' x 150')
4 6.	Muirpur	U.P.	2408	8305	406m	E/W	823m x 61m
					(1332')		(2700' x 200')
4 7.	Nabha	Punjab	3026	7613	252m	NNW	457m x 457m
					(828')	SSE	(1500' x 1500')
						NNW	610m x 2000m
4 8.	Nagarjun a	A.P.	1632	7919	201m	E/W	1646m x 30m
					(658')		(5400' x 100')
4 9.	Nagar	Rajasthan	2711	7343	252m	ESE	1097m x 46m
					(828')	WNW	(3600' x 150')
5 0.	Nanded	Maharash tra	1911	7719	381m	E/W	1250m x 31m
					(1250')		(4100' x 100')
5 1.	Nowgong	M.P.	2503	7925	228.5 m	04/2 2	1055m x 15m
					(750')		(4100' x

							100')
5 2.	Narnaul	Haryana	2805	76°10'	272m	09/2 7	914m x 30m
							(3000' x 100')
5 3.	Osmanab ad	Maharash tra	18°15'	76°05'		N/S	4000' x 150'
5 4.	Patiala	Punjab	3019	76°27'	250m	15/3 3	1097m x 46m
					(820')		(3600' x 150')
						03/2 1	1372m x 46m
							(4500' x 150')
5 5.	Phaltan	Maharash tra	1759	7425	567.5 m	L/A	843m x 30m
					(1862')		(2800' x 100')
5 6.	Plnjore	Haryana	3053	7652	500m	16/3 4	914m x 30m
					(1640')		(3000' x 75')
5 7.	Prithiganj	U.P.	2552	8201	94m	12/3 0	1829m x 46m
					(310')		(6000' x 150')
5 8.	Raichur	Karnatak a	1616	7722	375m	05/2 3	1950m x 46m

					(1231')		(6400' x 150')
59.	Ratangiri	Maharashtra	17°00'40"	73°19'44"	92m	05/23	1097m x 30m
					(306')		(3600' x 100')
60.	Ratalam	M.P.	23°20'	75°00'	493m		(4000' x 150')
					(1607')		
61.	Safiabad	Bihar	2520	8630	47m	L/A	732m x 183m
					(153')		(2400' x 600')
62.	Sarangarh	M.P.	2135	3806	229m	13/31	484m x 183m
					(750*)		(4870' x 600')
63.	Shahpur	Rajasthan	2536	7453	374m	04/22	1097m x 46m
					(1228')		(3600' x 150')
64.	Sidhi	M.P.	2423	8153	333m	E/W	1097m x 30.5m
					(1093')		(3600' x 100')
60.	Sirohi	Rajasthan	2453	7253	305m	L/A	1402m x 91m
					(1000')		(4600' x

)		300')
6 5.	Sawai	Rajasthan	2602	7622	266m	N/S	1159m x 46m
	Madhopur				(872')		(3200' x 150')
6 6.	Sitamaw	M.P.	2401	7520	480.5 m	L/A	823m x 46m
	(Mandasore)				(1570')		(2700' x 150')
6 7.	Sultanpur	U.P.	2615	8202	91m	11/2 9	1829m x 46m
	(Amhat)				(300')		(6000' x 150')
6 8.	Surat	Gujarat	2105	7245	5m	04/2 2	1006m x 30m
	(Dumus)				(18')		(4300' x 100')
6 9.	Tilda	M.P.	2123	8149	274m	06/2 4	1957m x 46m
					(900')		(6420' x 150')
7 0.	Utakala	Orissa	20064	831058	229m	L/A	914m x 46m
					(750')		(3000' x 150')
7 1.	Zero	Arunachal	27°53'3 "	93°45'5 6"	5145m	18/3 6	11219m x 30m
		Pradesh			(1524')		(4000' x 100')

7 2.	Hirakund	Orissa	2135	8400	202m	15/3 3	1097m x 46m
					(658')		(3600' X 150')
7 3.	Amarvati	Maharash tra	2043	7749		08/2 6	1371m x 30m
7 4.	S.S.S. Airprot	A.P.	1409	7748	475m	09/2 7	1525m x 30m
	Puttapart hi						

Part-V of Annexure-VII

**STATE GOVT. AERODROMES NOT NECESSARILY MAINTAINED IN A
SERVICEABLE CONDITION**

Sl . No.	Name	State/Uni on Territory	Locatio n	Elevati on Metres (Feet)	R/w Directi on	Dimensi ons Metres (Feet)	
			Latitud e (North)	Longitu de (East)			
1	2	3	4	5	6	7	8
1.	Abu Road	Rajastha n	2447	7249	266.5 m	L/A	1960' m x 1500'
					(875')		
2.	Amroli	Gujarat	2137	7113	129.5 m	NW/SE	914m x 46m

					(450')		(300 0' x 150')
3.	Arrah	Bihar	2434	8439	53.5m	L/A	549m x 137m
					(173')		(195 0' x 450')
4.	Babai	Rajasthan	2753	7544	374m	E/W	640m x 640m
					(1228')		(210 0' x 2100')
5.	Banswara	Rajasthan	23°35' 30"	74°20'	2134m	10/28	1140 m x 40m
					(700')		(374 0' x 150')
6.	Baripada	Orissa	2157	8649	76m	L/A	805m x 732m
					(250')		(264 0' x 2400')
7.	Bettiah	Bihar	2647	8432	72.5m	E/W	457m x

							91m
					(238')		(150 0'x 300')
8.	Begusarai	Bihar	2525	8605	41m	09/27	447m x 91m
					(134')		(150 0'x 300')
9.	Betul (Amla)	M.P.	2156	7808	594m	08/26	1067 m x 46m
					(1800')		(350 0' x 150')
1 0.	Bhabu	Bihar	2503	8337	81m	E/W	457m x 91m
					(266')		(150 0' x 300')
1 1.	Bihar Sharif	Bihar	2515	7530	58m	W/E	457m x 91m
					(191')		(150 0'x 300')
1 2.	Buxar	Bihar	2533	8358	63m	L/A	457m x 91m

					(206')		(150 0'x 300')
1 3.	Chapra	Bihar	2547	8446	53.5m	L/A	494m x 137m
					(175')		(195 0' x 450')
1 4.	Dehri (Suere)	Bihar	2455	8408	107m	L/A	1067 m x 137m
					(350')		(350 0' x 450')
1 5.	Deoghar	Bihar	2427	8647	228.5 m	L/A	457m x 91m
					(750')		(150 0' x 300')
1 6.	Dhana (Sagar)	M.P.	2345	7853	192m	18/36	914m x 91m
					(630')		(300 0'x 300')
1 7.	Dumka	Bihar	2424	8705	157m	E/W	777m x 137m

							(150 0'x 300')
2 2.	Jawai	Rajastha n	2506	7309	290.5 m	NE/EW	632m x 121m
	(Sumerpur)				(593)		(240 0' x 396')
2 3.	Jahanabad	Bihar	2513	8500	69.5m	E/W	457m x 91m
					(225')		(150 0'x 300')
2 4.	Jhingura	U.P.	2508	8239	91m	09/27	4000' x 300'
					(300')		
2 5.	Karad	Maharash tra	1717	7409	576m	E/W	1280 m x 30m
					(1890')		(420 0' x 100')
2 6.	Kanaha	Madhya	2213	8044	861m	N/S	1609 m x 91m
		Pradesh			(2825')		(528 0' x

							300')
27.	Kaithar	Bihar	2531	8734	30.5m	L/A	457m x 91m
					(100')		(150 0' x 300')
28.	Khargone	Madhya	2149	7534	267.5 m	EW/NS	914m x 30m
		Pradesh			(907.2 5')		(300 0' x 100')
29.	Kishanganj	Bihar	2605	8756	46m	L/A	1005 m x 91m
					(150')		(300 0' x 300')
30.	Madhubani	Bihar	2620	8604	53.5m	L/A	457m x 91m
					(176')		(150 0'x 300')
31.	Mehsana	Gujarat	2336	7226	85m	NE/SW	914m x 46m
					(280')		(300 0' x 150')

3 2.	Monghyr	Bihar	2521	8629	86.5m	L/A	732m x 18.3 m
					(153')		(200 0' x 600')
							549m x 137m
							(180 0'x 450')
3 3.	Morvi	Gujarat	2245	7050	53m	NNE/SS N	671m x 46m
					(175')		(220 0' x 150')
3 4.	Motihari	Bihar	2637	8434	66m	E/W	594m x 137m
					(217')		(195 0' x 450')
3 5.	Muzaffarpur	Bihar	2607	8524	51.5m	L/A	745m x 137m
	(Race Course)				(169')		(247 5' x 450')

36.	Muzaffarpur	Bihar	2607	8524	54m	L/A	557m x 341
	(Sikandarpur)				(177')		(1766' x 1100')
37.	Nawapara	Orissa	2052	8232	323m	NE/SW	1001m x 2.5m
					(1058')		(32861 x
38.	Pachmerti	Madhya Pradesh	2230	7825	1085m	SW/NE	914m x 46m
					(3360')		
39.	Purnea	Bihar	2549	8723	39.6m	10/28	871m x 91m
					(129')		(2858' x 300')
40.	Quilon	Kerala	0854	7636	9.1m	N/S	338m x 11
					(30')	E/W	273m x 90
41.	Radhanpur	Gujarat	2354	7136	39m	L/A	610m x 610
					(129')		(2000' x

							2000 ")
4 2.	Rakhikot	M.P.	2209	7829	762m	L/A	1006 m x 46m
					(2500')		(340 0' x 150')
4 3.	Saharsa	Bihar	2553	8635	40m	E/W	2400' x 30'
					(132')		

NOTE:-

- 1) L/A means Landing Area.
- 2) N means North
- 3) S means South
- 4) E Means East
- 5) W means West.

Annexure VIII

PROCEDURE FOR CONDUCTING AN ANNEX 14 AERONAUTICAL STUDY OF THE EFFECTS OF BUILDINGS, STRUCTURES AND TREES.

This aeronautical study procedure is considered in two separate, but related PARTS:

1. A study of the effects of a tall object penetrating an ICAO Annex 14, Volume 1, obstacle limitation surface.

This is an analysis of the effects on safety of aircraft operations and is carried out in accordance with safety management principles.

Note: ICAO standards do not permit an aeronautical study of the penetration of some obstacle limitation surface close to the runways.

2. A study of the effects of a tall object on the existing and future aerodrome PANS-OPS obstacle identification surfaces and, the minimum usable flight altitudes.

This is an analysis of the effects on the efficiency of aircraft operations and air traffic procedures at an aerodrome.

Note: An aeronautical study can examine any aspect of the effect of tall objects on instrument procedure designs.

PART 1.

The ICAO Annex 14 VOL 1 obstacle limitation surfaces are prescribed in the vicinity of an aerodrome to provide sufficient airspace, free of obstacles, to allow the aircraft to safely manoeuvre after takeoff and before landing during an entirely visual approach or in the visual segment of an instrument approach. These surfaces are defined from a height of 150 metres (492 feet), down to a level on the runway or the aerodrome surface. The obstacle limitation surfaces are intended to be of a permanent nature, and take into account the future development of the aerodrome so as to accommodate the intended operations of new aircraft.

The International standards contained in Annex 14 are considered to be essential to achieving the ICAO acceptable levels of safety and regularity of aircraft operations at aerodromes. While recommendations are considered desirable in achieving the intended levels of safety and regularity in aircraft operations. Therefore any penetration of the obstacle limitation surfaces must be assessed carefully by the aeronautical study to determine what adverse effects may be caused by infringements of the surfaces. In all cases this assessment this safety assessment is independent of the separate PANS-OPS assessment of efficiency.

Note that ICAO standards do not allow an aeronautical study to be undertaken for the purpose of possibly allowing a new object above the limitation surfaces closest to the runway.

Account will only be taken of shielding by an immovable object that has already been determined as safe and effective by an aeronautical study and approved by the Ministry of Civil Aviation.

PART 2.

PANS-OPS does not have the same status as Annex 14 standards and recommendations. There is no separate provision for aeronautical studies in PAN-OPS. Procedures for Air Navigation (PANS) are issued by ICAO for the purpose of specifying the international best practices for safe approach and departure instrument procedure designs and to foster the implementation of standard instrument procedures worldwide. Because of this, an aeronautical study's evaluation of the effects of new buildings, structure and trees on the regularity and efficiency of aircraft operations at an aerodrome, is primarily dependent on the effects of the new objects on PANS-OPS procedures.

The PAN-OPS obstacle identification surfaces are used by procedure designers to construct instrument approach and departure procedures and for specifying the minimum safe height for each flight segment of the procedures. PANS-OPS is also used to determine the lowest safe altitudes within 25 nautical miles of the aerodrome for the information of pilots.

The uncontrolled growth in the heights of objects below established aircraft instrument procedure flight paths can force the procedure designer to re-route the procedure or raise the lowest safe altitude of a segment in the procedure. Such actions will generally have an adverse effects on the efficiency of the instrument approach procedure, and therefore have an adverse effect on the regularity of aircraft operations that must be evaluated and reported in detail in all aeronautical studies.