Southampton International Airport

Aerodrome Safeguarding

Obstacle Management Strategy
Marlhill Copse

Contents

Introduction to Safeguarding

Aerodrome safeguarding ensures the safety of aircraft when in the vicinity of an aerodrome by controlling potentially hazardous development and activity around it.

There are three main types of aerodrome safeguarding; physical safeguarding which protects a set of flight safety surfaces up to a 30km radius around the airfield, technical safeguarding which protects aircraft navigational equipment from any interference or disruption, and wildlife management which prevents any development areas from creating an environment attractive to birds.

Aerodrome Safeguarding is a legal requirement and is required under ICAO (International Civil Aviation Organisation) Regulations, EASA (European Aviation Safety Agency) Regulations, and the Civil Aviation Act.

Obstacle Limitation Surfaces

Obstacle Limitation Surfaces (OLS) represent the lower limit of the blocks of protected airspace around an aerodrome. They are designed to protect airborne aircraft to ensure their flight paths remain obstacle free in the interests of air safety.

The OLS at Southampton International Airport extend out to a maximum distance of 30km from the Aerodrome Reference Point (ARP).

Obstacle Limitation Surfaces follow an internationally agreed specification that is outlined in the following documents:

- European Aviation Safety Agency (EASA) 'Certification Specifications & Guidance Material for Aerodrome Design CS-ADR- DSN, Book One Chapters H & J and Book Two Chapters H & J
- Civil Aviation Authority Publication CAP168 'Licensing of Aerodromes'

Example of the Obstacle Limitation Surfaces at Southampton Airport overlaid on Google Earth

For the purpose of this document, the surfaces directly related to the Marlhill Tree works have been summarised.

Take Off Climb Surface

The purpose of the take-off climb surface is to protect an aircraft on take-off and during climb-out.

The specifications for this surface vary depending on the specification/code number of the runway.

Runway 20 at Southampton Airport is a code 3 runway and *Table J-1. Dimensions and slopes of obstacle limitation surfaces*, within CS-ADR-DSN/4 Book 1 specifies the following details for the Take-off climb surface:

Code Number	**3**
Length of Inner edge	180m
Distance of inner edge from end of take-off run	60m
Divergence (each side)	12.5%
Final Width	1800m
Length	15000m
Slope	**2% (1:50)**

Approach Surface

EASA Guidance explains: *The purpose of the approach surface is to protect an aircraft during the final approach to the runway by defining the area that should be kept free from obstacles to protect an aeroplane in the final phase of the approach-to-land manoeuvre.*

The specifications for this surface vary depending on the characteristics of the runway.

Runway 20 at Southampton Airport is a Category 1 Precison Approach Code 3 runway.
Table J-1. Dimensions and slopes of obstacle limitation surfaces, within CS-ADR-DSN/4 Book 1 specifies the follow details for the approach surface:

	Precision instrucment approach runway
	Code 3 or 4
Distance before threshold	60m
Divergence each side	15%
Length of first section	3000m
Slope of first section	**2% (1:50)**
Length of second section	3600m
Slope of second section	2.5% (1:40)
Length of horizontal section	8400m

Transitional Surface

A transitional surface is a complex surface sloping up to from the side of the runway strip and from part of the side of the approach surface. The slope of the transitional surface is measured in the vertical plane above the horizontal, and normal to, the centreline of the runway.

Southampton Airport has a code 3 precision approach runway and therefore as per the EASA regulations the transitional slope is 14.4% (1:7).

Type A Surface/Chart

The Type A chart provides data necessary to enable the aircraft operator to comply with the operating limitations of ICAO Annex 6 - Operation of Aircraft. The Type A Chart requires obstacles above 1.2% to be recorded for an ongoing monitoring purposes and these obstacles are required to be managed.

Further surfaces and OLS information

It is important to note that there are further surfaces that are associated with this site however the above are the most onerous and applicable to the Marlhill Tree works.

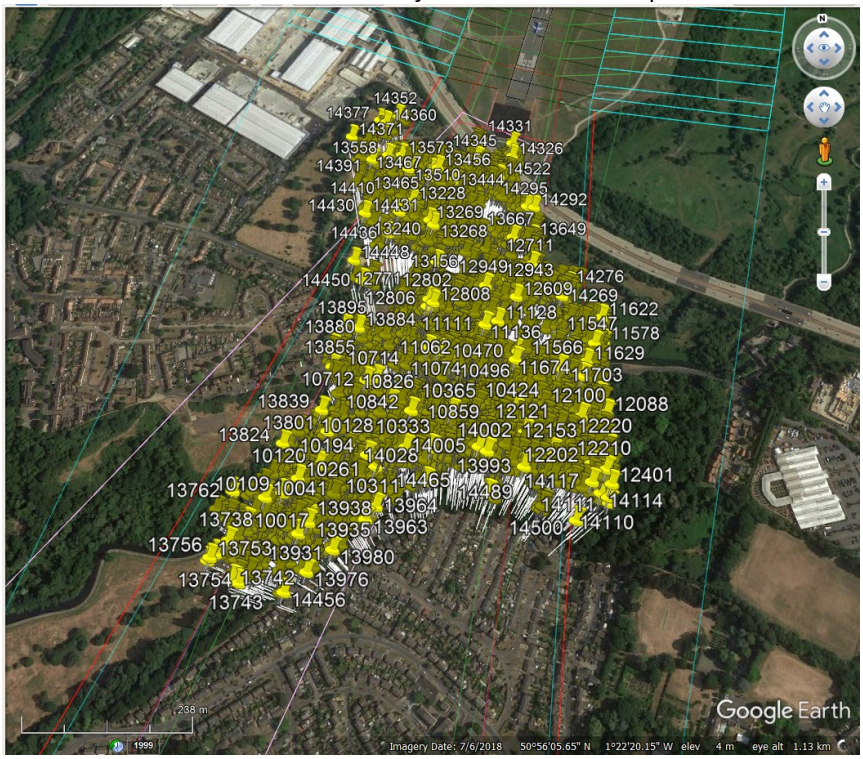
For the full information about how the surfaces are determined, please refer to the full CS-ADR-DSN — BOOK 1 CHAPTER J — OBSTACLE LIMITATION REQUIREMENTS document alongside the dimensions provided in appendix A.

It is also important to note that as outlined in CAP 168 and 738 the aerodrome is required to safeguard against future operations and following the announcement of the Masterplan the airport will be revising its safeguarded surfaces to reflect the planned changes. For the purposes of the assessment in this document, the current safeguarded surfaces have been used.

Marlhill Copse

Marhill Copse is located immediately south of Southampton Airport's runway a critical location with regards to Approach and Take-off climb. To understand the obstacle environment within the Copse, a specific LiDAR survey of the trees was undertaken:

Obstacle Limitation Surfaces over Marlhill Copse.



Outcome of the Tree Survey Work overlaid on Google Earth

Obstacle Limitation Surface Assessment

Using the data generated by the site specific survey of the area, the obstacles have been assessed against the airport's Obstacle Limitation Surfaces.

The TOCS is the most onerous surface OLS surface within the airspace around Marlhill Copse and therefore the following assessment has been undertaken based on obstacle penetrations of the TOCS:

Obstacle Identifier	Description	Pen (m)	Easting	Northing	Penetrates Surface
10041	TREE	12.03	444591.6	115336.8	Yes
10201	TREE	9.19	444739.9	115408.9	Yes
10260	TREE	10.08	444629	115355	Yes
10261	TREE	13.65	444632	115357.7	Yes
10262	TREE	10.5	444637.5	115360.4	Yes
10263	TREE	9.23	444642	115363.7	Yes
10318	TREE	10.03	444753.6	115405.5	Yes
10326	TREE	8.11	444786.7	115417.5	Yes
10327	TREE	9.55	444792.1	115410.1	Yes
10328	TREE	8.63	444785	115404.5	Yes
10333	TREE	16.75	444765.1	115388.5	Yes
10334	TREE	7.76	444778.8	115393.3	Yes
10348	TREE	8.7	444804.2	115412.8	Yes
10352	TREE	9.64	444815.6	115413.7	Yes
10353	TREE	8.51	444811.1	115416.9	Yes
10355	TREE	7.68	444817.8	115425.2	Yes
10356	TREE	8.82	444821.6	115421.1	Yes
10357	TREE	10.1	444823.4	115415.9	Yes
10359	TREE	7.79	444827.6	115400.5	Yes
10360	TREE	7.95	444829	115408.6	Yes
10361	TREE	10.15	444833.1	115415.3	Yes
10362	TREE	8.47	444836.3	115421.7	Yes
10363	TREE	8.89	444828.8	115422	Yes
10365	TREE	16.38	444824.5	115433.3	Yes
10375	TREE	11.67	444854.1	115437.1	Yes
10381	TREE	10.38	444882.9	115430.9	Yes
10382	TREE	9.98	444890.3	115434.7	Yes
10383	TREE	7.34	444874.7	115423.8	Yes
10385	TREE	7.18	444870.2	115418.5	Yes
10386	TREE	8.66	444863.2	115413.5	Yes
10387	TREE	8.34	444855.3	115416.9	Yes
10388	TREE	7.26	444852.3	115411.9	Yes
10389	TREE	8.96	444847.2	115418.1	Yes
10390	TREE	9.57	444842.2	115417.7	Yes
10391	TREE	9.13	444842.6	115411.2	Yes

Obstacle Identifier	Description	Pen (m)	Easting	Northing	Penetrates Surface
10392	TREE	9.65	444836.8	115406.4	Yes
10393	TREE	9.02	444833.7	115408.5	Yes
10394	TREE	8.93	444831.5	115404.8	Yes
10395	TREE	10.49	444832.7	115400.9	Yes
10396	TREE	10.02	444838	115400.2	Yes
10397	TREE	7.68	444841.4	115403.6	Yes
10398	TREE	17.86	444845.2	115401	Yes
10399	TREE	15.82	444846.6	115404.2	Yes
10400	TREE	12.45	444853.1	115403.6	Yes
10401	TREE	12.45	444847.8	115396.5	Yes
10402	TREE	11.74	444851.1	115392.2	Yes
10403	TREE	9.58	444857.8	115395.8	Yes
10404	TREE	11.26	444866.4	115404.6	Yes
10405	TREE	10.13	444871.2	115411.6	Yes
10406	TREE	10.23	444874.1	115405.7	Yes
10407	TREE	11.08	444872.7	115399.5	Yes
10408	TREE	11.75	444864.8	115396.7	Yes
10409	TREE	14.18	444860	115393	Yes
10410	TREE	14.52	444861.3	115390.3	Yes
10411	TREE	18.47	444872.3	115386.2	Yes
10412	TREE	17.78	444879.2	115395.2	Yes
10413	TREE	14.16	444878.5	115401.3	Yes
10414	TREE	8.05	444881.1	115408.2	Yes
10415	TREE	12.22	444883.1	115404.9	Yes
10416	TREE	10.8	444886.9	115411	Yes
10417	TREE	9.28	444882.9	115413.9	Yes
10418	TREE	9.19	444878.2	115411.1	Yes
10419	TREE	8.12	444876.8	115416.6	Yes
10420	TREE	11.16	444883.2	115421.1	Yes
10421	TREE	8.41	444891.7	115423.3	Yes
10422	TREE	10.98	444893.7	115414.5	Yes
10423	TREE	11.82	444903.1	115425.2	Yes
10424	TREE	12.23	444907.1	115435	Yes
10425	TREE	16.78	444891.4	115398.4	Yes
10426	TREE	20.53	444887.9	115383.6	Yes
10427	TREE	11.38	444901.9	115380.7	Yes
10428	TREE	10.31	444902.5	115387.7	Yes
10429	TREE	8.66	444902.4	115392	Yes
10430	TREE	9.4	444907.9	115401.7	Yes
10431	TREE	9.11	444923.2	115417.8	Yes
10432	TREE	8.37	444912.9	115419.7	Yes
10435	TREE	11.69	444914	115428.2	Yes
11111	TREE	11.85	444878.9	115563.5	Yes

Obstacle Identifier	Description	Pen (m)	Easting	Northing	Penetrates Surface
11128	TREE	12.91	444896.5	115566.3	Yes
12118	TREE	9.04	444930.4	115423.6	Yes
12121	TREE	11.37	444917.7	115406.6	Yes
12122	TREE	7.21	444920.9	115397.8	Yes
12123	TREE	12.32	444913.3	115392.9	Yes
12124	TREE	10.9	444914.7	115383	Yes
12125	TREE	16.88	444907.7	115375.1	Yes
12126	TREE	13.14	444914.7	115370.9	Yes
12130	TREE	9.37	444921.1	115389.4	Yes
12620	TREE	5.07	444933.2	115635.5	Yes
12728	TREE	4.27	444962.8	115698.3	Yes
12801	TREE	5.69	444799.6	115618.2	Yes
12802	TREE	6.5	444805.2	115615.5	Yes
12803	TREE	6.09	444803.1	115617.6	Yes
12804	TREE	5.73	444801.4	115615.2	Yes
12808	TREE	6.82	444810.6	115609.6	Yes
12810	TREE	5.69	444813.7	115613.7	Yes
12815	TREE	6.31	444809	115624.2	Yes
12827	TREE	5.24	444817.6	115613.6	Yes
12828	TREE	5.45	444820.9	115612.2	Yes
12855	TREE	6.53	444820	115623.8	Yes
12856	TREE	5.73	444817.9	115627.2	Yes
12859	TREE	5.54	444822.3	115632.6	Yes
12860	TREE	5.99	444822.6	115628.4	Yes
12861	TREE	5.94	444824.8	115625.1	Yes
12863	TREE	5.47	444831.5	115629	Yes
12885	TREE	5.98	444843.3	115625	Yes
12886	TREE	5.93	444840.1	115628.3	Yes
12931	TREE	5.4	444903.6	115644.1	Yes
12932	TREE	5.02	444897.1	115647.1	Yes
12943	TREE	5.22	444905.9	115648.4	Yes
12949	TREE	6.11	444886.8	115635.4	Yes
12963	TREE	5.13	444847.7	115636	Yes
12964	TREE	5.56	444844.4	115632	Yes
12973	TREE	5.64	444829.3	115632.1	Yes
12980	TREE	5.8	444815.5	115636.1	Yes
12982	TREE	5.44	444811.4	115636.7	Yes
13043	TREE	5.39	444878.4	115638.2	Yes
13044	TREE	5.88	444879.5	115644.8	Yes
13045	TREE	4.87	444883.1	115641.4	Yes
13228	TREE	7.64	444787.9	115784.1	Yes
13238	TREE	5.07	444766.1	115770.5	Yes
13239	TREE	4.24	444762.1	115767.5	Yes

Obstacle Identifier	Description	Pen (m)	Easting	Northing	Penetrates Surface
13240	TREE	7.53	444768.4	115764.9	Yes
13268	TREE	5.11	444818.1	115745.3	Yes
13269	TREE	5.51	444812.6	115753.3	Yes
13270	TREE	5.95	444820.1	115756.6	Yes
13271	TREE	5.9	444811.7	115764.3	Yes
13329	TREE	6.34	444822.8	115777.1	Yes
13395	TREE	3.98	444833.5	115825.6	Yes
13456	TREE	10.34	444829.7	115839	Yes
13464	TREE	2.95	444813.9	115838.6	Yes
13465	TREE	4.44	444817	115836.3	Yes
13467	TREE	7.38	444821.8	115841.7	Yes
13508	TREE	3.25	444787	115846.5	Yes
13510	TREE	4.6	444784.9	115852.7	Yes
13513	TREE	3.35	444802.1	115855	Yes
13574	TREE	6.37	444783.5	115866.1	Yes
13575	TREE	6.53	444783	115872.6	Yes
13576	TREE	5.2	444788.2	115870.1	Yes
13577	TREE	6.48	444786.4	115873.6	Yes
13578	TREE	5.78	444790.4	115878.3	Yes
13579	TREE	5.78	444784.9	115880.2	Yes
13582	TREE	4.92	444792.9	115870	Yes
13583	TREE	5.28	444795.1	115873.9	Yes
13584	TREE	4.7	444795.5	115879	Yes
13585	TREE	7.21	444799.1	115876	Yes
13586	TREE	4.04	444800.6	115871.6	Yes
13592	TREE	4.22	444809.1	115859	Yes
13594	TREE	3.58	444812.9	115864.7	Yes
13595	TREE	4.92	444818.7	115859.1	Yes
13596	TREE	4.27	444818.6	115865.3	Yes
13606	TREE	4.12	444805.7	115872.3	Yes
13607	TREE	5.39	444830.9	115873.3	Yes
13608	TREE	4.14	444833.4	115868.7	Yes
13609	TREE	6.01	444831.6	115864.5	Yes
13610	TREE	6.5	444837.9	115872.3	Yes
13611	TREE	3.32	444846.3	115871	Yes
13612	TREE	2.92	444842.1	115860.6	Yes
13615	TREE	3.26	444855.6	115866.9	Yes
13616	TREE	2.55	444864.1	115858.9	Yes
13621	TREE	2.54	444875.8	115861.1	Yes
13711	TREE	3.17	444833.8	115856.1	Yes
13712	TREE	4.83	444824.7	115856.3	Yes
13738	TREE	11.87	444550.5	115287	Yes
13753	TREE	10.31	444528.3	115268.8	Yes

Obstacle Identifier	Description	Pen (m)	Easting	Northing	Penetrates Surface
13993	TREE	20.04	444908.1	115354.7	Yes
13994	TREE	18.14	444908.7	115362.3	Yes
13995	TREE	13.87	444901.3	115354.4	Yes
13996	TREE	18.26	444894.6	115364.4	Yes
13997	TREE	15.17	444888.7	115355.7	Yes
13998	TREE	15.25	444885.2	115361.1	Yes
13999	TREE	16.93	444879.7	115370.9	Yes
14001	TREE	10.68	444879.9	115364.1	Yes
14002	TREE	22.15	444864.2	115374.5	Yes
14003	TREE	16.67	444876	115381.1	Yes
14004	TREE	13.73	444864.4	115381.9	Yes
14005	TREE	21.81	444854.6	115381.2	Yes
14006	TREE	16.01	444853.6	115371.1	Yes
14007	TREE	17.58	444846.7	115377.6	Yes
14008	TREE	17.02	444843.3	115385.1	Yes
14009	TREE	19.26	444850.4	115386.7	Yes
14010	TREE	16.1	444834.5	115386.6	Yes
14011	TREE	16.64	444836.7	115380.4	Yes
14012	TREE	9.43	444847.5	115367.7	Yes
14013	TREE	11.72	444842.5	115372.2	Yes
14014	TREE	13.16	444838.2	115365.3	Yes
14015	TREE	12.17	444835.5	115372.8	Yes
14016	TREE	14.51	444829.8	115380	Yes
14017	TREE	16.49	444827.1	115384.3	Yes
14018	TREE	19.76	444815.7	115383.2	Yes
14019	TREE	15.3	444815.9	115392.7	Yes
14020	TREE	17.44	444830.6	115390.9	Yes
14021	TREE	11.7	444831.1	115366.6	Yes
14022	TREE	11.27	444824	115374.7	Yes
14023	TREE	14.24	444814.1	115375.4	Yes
14024	TREE	12.11	444807.1	115377.8	Yes
14025	TREE	12.2	444807.9	115382.5	Yes
14026	TREE	14.48	444809.2	115389.8	Yes
14027	TREE	14.99	444810.7	115397.5	Yes
14028	TREE	19.26	444797	115384.1	Yes
14034	TREE	8.56	444777.6	115387.7	Yes
14037	TREE	15.49	444757.1	115388.8	Yes
14038	TREE	13.61	444751	115389.2	Yes
14041	TREE	12.78	444748	115384.1	Yes
14042	TREE	12	444740.7	115385.6	Yes
14043	TREE	8.34	444741	115377.5	Yes
14044	TREE	13.83	444869.5	115379.1	Yes
14045	TREE	14.01	444836.5	115392.8	Yes

Obstacle Identifier	Description	Pen (m)	Easting	Northing	Penetrates Surface
14046	TREE	16.57	444858.9	115366.4	Yes
14048	TREE	12.43	444842.4	115393.6	Yes
14292	TREE	4.88	444971.9	115771.8	Yes
14326	TREE	2.93	444949.4	115876.4	Yes
14331	TREE	3.65	444951.5	115900.3	Yes
14402	TREE	5.05	444910.9	115828.5	Yes
14403	TREE	2.9	444919.7	115831.1	Yes
14448	TREE	6.2	444700.1	115685.4	Yes
14465	TREE	9.61	444788	115350.2	Yes
14492	TREE	11.84	444872.1	115364.9	Yes
14493	TREE	14.2	444866.4	115363.4	Yes
14522	TREE	3.18	444924.9	115836.6	Yes

Type A Chart Assessment

Due to the Type A surface being more onerous than the TOCS, there are further penetrations to the above data when the Type A assessment is run.

It is recognised that due to terrain, or a pre-existing obstacle environment in some aerodrome's cases it may not be reasonably practicable to remove all obstacles. This is the case at Southampton when considering the penetration of the TOCS and the Type A. The airport however is required to survey, manage and reduce where possible, the obstacle environment within the airspace and further information around this is provided in the next sections of this document.

Obstacle Management

Legislation - ICAO

Annex 4 & 6 (Aeronautical Charts) to the Convention on International Civil Aviation outlines standards and recommended practice for obstacle declaration, publication and management.

> *The heights of obstacles around airports are of critical importance to aircraft operations. Information about these are given in detail on the Aerodrome Obstacle Charts — ICAO, Types A, B, and C. These charts are intended to assist aircraft operators in making the complex take-off mass, distance and performance calculations required, including those covering emergency situations such as engine failure during takeoff. Aerodrome obstacle charts show the runways in plan and profile, take-off flight path areas and the distances available for take-off run and accelerate-stop, taking obstacles into account; this data is provided for each runway which has significant obstacles in the take-off area.*

With reference to Southampton Airport, the data produced in the Type A charts is used by airline performance engineers to run a safety assessment for single engine failure situations when departing both runways at Southampton. This assessment then determines the regularity of operations of aeroplanes that can safely use either runway. This assessment is unique to the aircraft type being used by the individual airline, so any one airline may have different assessments against the same obstacle environment. In order to comply with this international standard the airport needs to publish these charts and must then follow up with a management plan in order to satisfy EASA Certification Specifications:

Legislation - EASA

Under the provisions of the EASA Commission Regulation 139/2014 Southampton Airport is required to manage all obstacles impacting on the safeguarded surfaces.

> **2) ADR.OPS.B.075 Safeguarding of aerodromes**
> (a) The aerodrome operator shall monitor on the aerodrome and its surroundings:
> (1) obstacle limitation and protection surfaces as established in accordance with the certification basis, and other surfaces and areas associated with the aerodrome, in order to take, within its competence, appropriate action to mitigate the risks associated with the penetration of those surfaces and areas;
> (b) The aerodrome operator shall have procedures in place for mitigating the risks associated with obstacles, developments and other activities within the monitored areas that could impact safe operations of aircraft operating at, to or from the aerodrome.

Legislation – Civil Aviation Act 1982

The civil aviation act is the primary legislation regulating aviation and there are two sections that relate to the Marlhill site:

Section 46 Power to exercise control over land in interests of civil aviation.

(1) The Secretary of State may, if he is satisfied that it is necessary to do so in order to secure the safe and efficient use for civil aviation purposes (including the testing of aircraft designed for civil aviation) of any land, structures, works or apparatus vested in a relevant

authority or which such an authority proposes to acquire or install, by order declare that any area of land specified in the order shall be subject to control by directions given in accordance with the provisions of this section; and in this Part of this Act that authority, in relation to the making of such an order, is referred to as the person in respect of whom the order is or, as the case may be, is to be made.

(2) Where an order under subsection (1) above is in force, the Secretary of State may, in pursuance of any general or special authority given by the order, give directions—

(b) for restricting the height of trees upon any land within the area, or for requiring any tree upon any such land to be cut down or reduced in height;

Section 60

Work supporting compliance with the legislation: Obstacle Management Strategy

To support compliance with the above regulations and legislation, each year the airport undertakes an independent survey to ascertain the heights of all fixed and temporary obstacles within predetermined areas. The airport authority then produces a plan to address any infringements of these surfaces and allocate funds and resource to ensure compliance with the requirements.

Since the new European legislation came into effect in 2014 Southampton Airport has undertaken annual tree management works in different areas including Frog's Copse, land to the north of the airfield within the railyard, land to the south around the approach lights, and land close to Bitterne Park School.

The work planned to be undertaken at Marlhill Copse continues with the Airport's obstacle management strategy.

Appendix A

Southampton Airport Runway Dimensions