

Parc éolien Courtis Neufs VS

# Évaluation de l'influence du parc éolien Courtis Neufs VS sur les équipements CNS de Skyguide.

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abstract	

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# Table des Matières

<b>1</b>	<b>Introduction .....</b>	<b>4</b>
<b>1.1</b>	<b>But .....</b>	<b>4</b>
<b>1.2</b>	<b>Description du projet éolien .....</b>	<b>4</b>
<b>2</b>	<b>Analyse.....</b>	<b>5</b>
<b>2.1</b>	<b>Résumé .....</b>	<b>5</b>
<b>2.2</b>	<b>Systèmes CNS concernés .....</b>	<b>5</b>
<b>3</b>	<b>Validité.....</b>	<b>6</b>
<b>4</b>	<b>Bibliographie .....</b>	<b>7</b>

# 1 Introduction

## 1.1 But

Ce document contient une analyse de l'impact potentiel du parc éolien Courtis Neufs sur les systèmes CNS de Skyguide. Exclus de cette analyse sont les systèmes CNS du DDPS ou des prestataires de services de navigation aérienne voisins.

## 1.2 Description du projet éolien

La Figure 1 présente l'emplacement du parc. Les coordonnées et dimensions des éoliennes sont résumées dans le Tableau 1.

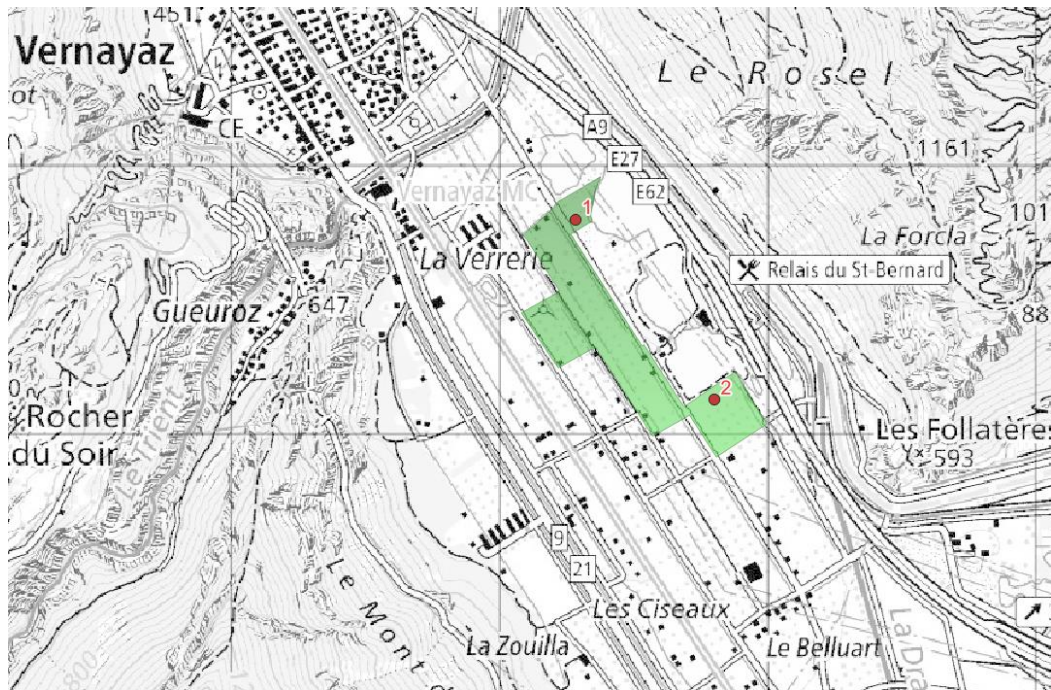


Figure 1: Parc éolien Courtis Neufs VS

N° d'installation (n° RPC si disponible)	Coordonnées E (MN95) - axe est	Coordonnées N (MN95) - axe nord	Altitude du terrain (m au-dessus niveau mer)	Hauteur totale max. (m)	Altitude sommet éolienne (m au-dessus niveau mer)
E1	2'570'282	1'108'801	453	250	703
E2	2'570'802	1'108'128	455	250	705

Tableau 1: Coordonnées et dimensions des éoliennes selon Formulaire B

## 2 Analyse

### 2.1 Résumé

Le parc éolien de Courtis Neufs VS se trouve à l'intérieur de la zone de protection du radar primaire de l'aéroport de Genève GV1P. Toutes les éoliennes restent en dessous de la visibilité du signal radar. En conséquence, aucun impact n'est attendu.

**Skyguide donne un préavis positif par rapport à ses systèmes CNS pour le parc éolien Courtis Neufs VS.**

### 2.2 Systèmes CNS concernés

Le parc éolien de Courtis Neufs VS se trouve à l'intérieur de la zone de protection du radar primaire de l'aéroport de Genève (GV1P). Aucun autre système CNS n'est concerné.

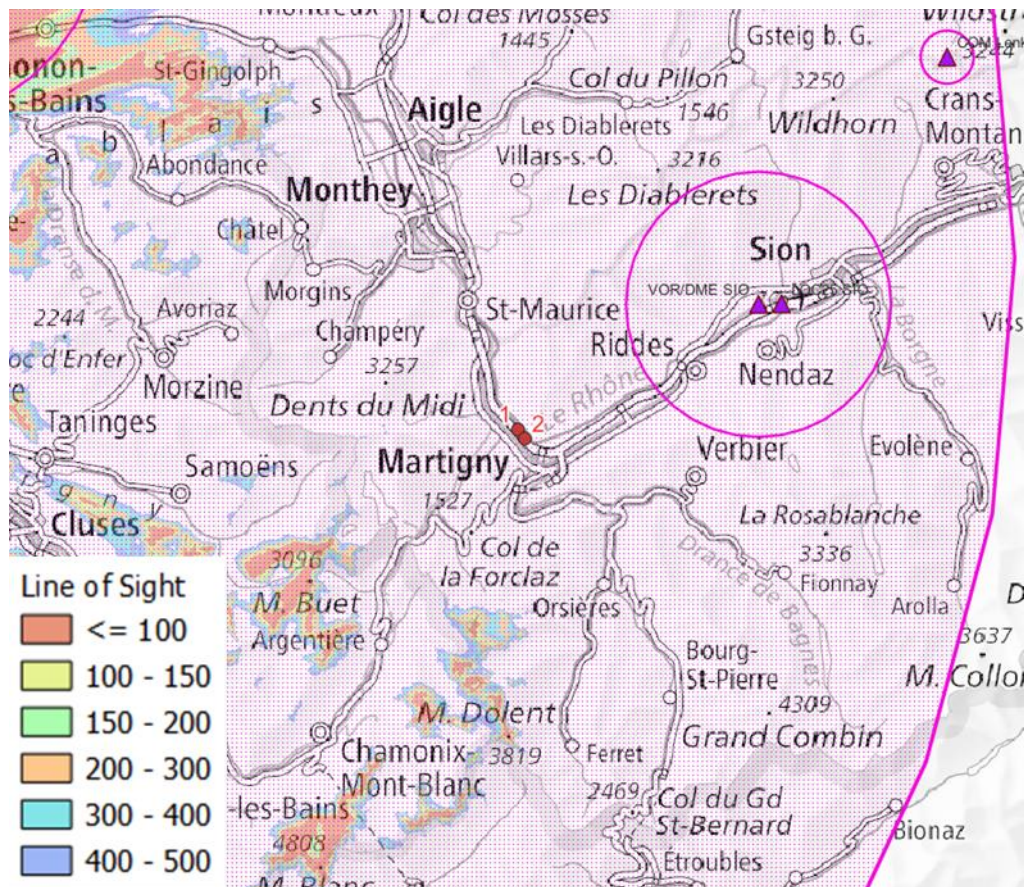


Figure 2: Analyse de visibilité du signal du Radar primaire de l'aéroport de Genève GV1P.

Il n'existe aucune visibilité du signal dans le périmètre jusqu'à une hauteur de 300 mètres au-dessus du sol. En conséquence, aucun impact n'est attendu.

### 3 Validité

Le présent rapport a une validité de 5 ans à compter de sa date d'émission.

Si le projet devait être bloqué en raison d'une opposition formée contre le plan d'affectation et/ou contre le permis de construire et que le promoteur en fait la demande à Skyguide, le délai cesse de courir pendant la durée de la procédure.

Afin d'assurer cette suspension du délai, le promoteur doit impérativement informer Skyguide dès qu'il a connaissance de l'ouverture d'une telle procédure, respectivement de la fin de celle-ci (décision définitive rendue par un tribunal compétent ou octroi du plan d'affectation / permis de construire). Les pièces justificatives relatives à la procédure dont il est question devront être fournies sans délai avec la demande de suspension.

Par ailleurs, et sur demande du promoteur, Skyguide peut, après une réévaluation, prolonger sa prise de position pour une nouvelle période de 5 ans. Cas échéant, les frais de réévaluation seront mis à charge du promoteur.

Pendant la durée de validité de sa prise de position, Skyguide s'engage à prendre en compte le parc éolien lors des révisions périodiques ou du développement de procédures de vol aux instruments et de systèmes CNS.

Si de nouveaux impacts étaient détectés à la suite de la mise en œuvre de nouveaux critères ou de nouvelles technologies pendant la période de validité, Skyguide en informera le promoteur.

Une nouvelle analyse est nécessaire dans les cas suivants :

- Déplacement des éoliennes de plus de 50 mètres (tolérance latérale)
- Augmentation de la hauteur des éoliennes

## 4 Bibliographie

- [1] European Guidance Material on Managing Building Restricted Areas, Third Edition, 2015 (ICAO EUR DOC 015), ICAO, 2015.
- [2] ICAO Annex 10 Volume I: Radio Navigation Aids, 6th Edition, Amendment 86, 2011-07-18., ICAO, 2011.
- [3] ICAO Annex 10 Volume IV: Surveillance and Collision Avoidance Systems, 4th Edition, Amendment 86, 2011-07-18, Corrigendum 2010-07-28 Incorporated, ICAO, 2011.
- [4] EUROCONTROL, «Guidelines How to Assess the Potential Impact of Wind Turbines - EUROCONTROL-GUID-130,» 2014.
- [5] Bundesamt für Landestopographie, *Swiss Map 50. Landeskarte der Schweiz 1:200'000*.
- [6] ICAO, Procedures for Air Navigation Services (PANS) - Aircraft Operations - Volume II Construction of Visual & Instrument Flight Procedures (Doc 8168), 7th Edition, ICAO, 2020.

## History of Changes

Changes and Reviews				
Version	Status	Date of issue	Author	Details
1.0	Released	19. 12. 2023	M. Fries	

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## Table of Contents

<b>1</b>	<b>Obstacle overview</b>	<b>2</b>
<b>2</b>	<b>Summary</b>	<b>2</b>
<b>3</b>	<b>Wind Turbines location and elevation</b>	<b>3</b>
<b>4</b>	<b>Environment</b>	<b>3</b>
<b>5</b>	<b>Impact on IFP</b>	<b>4</b>
5.1	ATS routes	5
5.2	Low Flight Network (LFN routes)	6
5.3	SID	7
5.4	STAR	8
5.5	Approach	9
5.6	Holding	10
5.7	Circling	11
5.8	ATC Surveillance Minimum Altitude (ASMA)	12
5.9	Minimum Sector Altitude (MSA)	13
<b>6</b>	<b>Conclusion</b>	<b>14</b>
<b>7</b>	<b>Notification</b>	<b>14</b>
<b>8</b>	<b>Validity</b>	<b>14</b>
<b>9</b>	<b>References</b>	<b>15</b>
9.1	Processes, Standards and Criteria	15
9.2	Software	15
9.3	Integrated Aeronautical Information Package	15
9.4	IFP reports	15
9.5	Abbreviations and Acronyms	17
<b>10</b>	<b>History of Change</b>	<b>18</b>

# 1 Obstacle overview



Figure 1: Plan view Courtis Neufs wind farm project on ICAO chart

# 2 Summary

ICAO location indicators	LSAS, LSGG, LSGS, LSHV, LSMP and LSNR
Workspace	T-P-685-2023 Courtis Neufs.lws

### 3 Wind Turbines location and elevation

Name	X [m]	Y [m]	Z [m]	Wind turbine height [m]	Vertical tolerance <sup>1</sup> [m]	Total height [m]	Lateral tolerance [m]
E1	2570282	1108801	453	250	4	707	50
E2	2570802	1108128	455	250	4	709	50

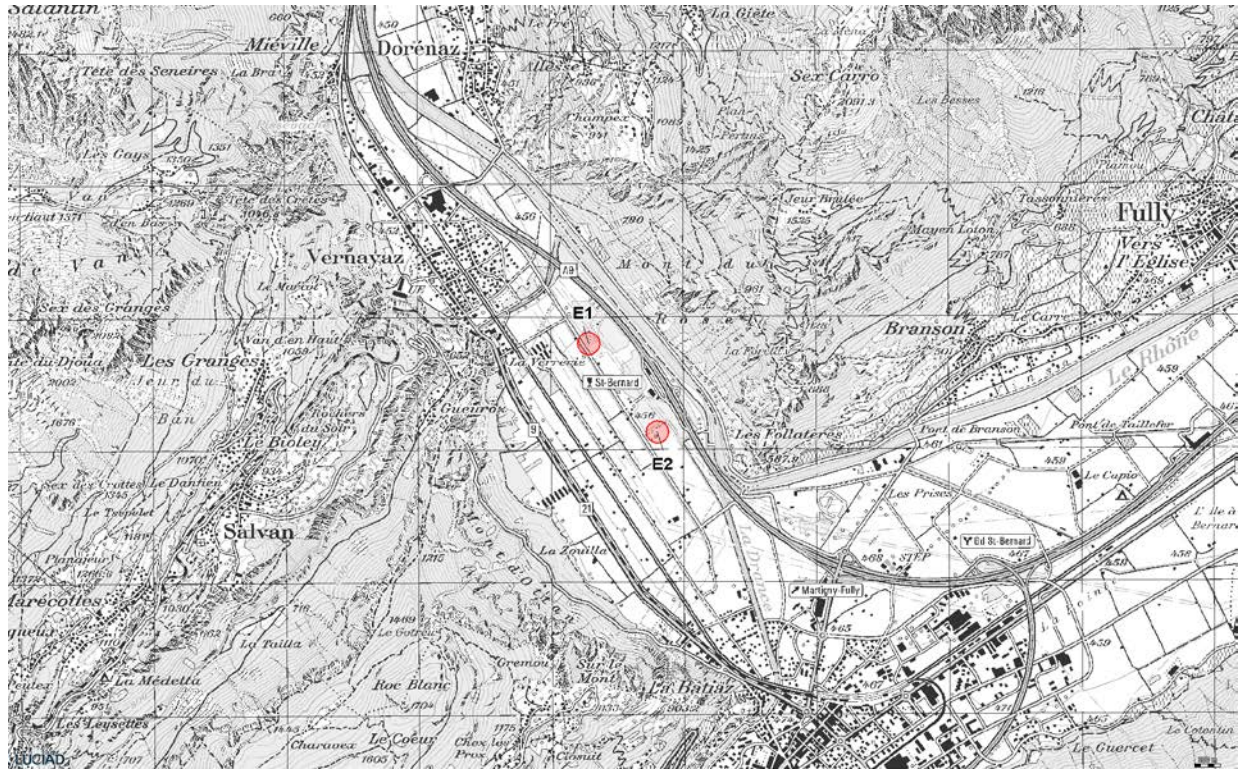


Figure 2: Courtis Neufs wind farm project: location of wind turbines

### 4 Environment

Temperature	ISA + 15° C
Horizontal reference system	LV95
Vertical reference system	LN02
Remarks	NIL

## 5 Impact on IFP

Name	AWY	LFN	SID	STAR	APCH	HLDG	Circling	ASMA	MSA	Possible mitigation	Notification
E1	No	No	No	No	No	No	No	No	No	N/A	Positive
E2	No	No	No	No	No	No	No	No	No	N/A	Positive
Remarks	NIL										

## 5.1 ATS routes

IFP name	Remarks
L50	
Y1	ATS Route Y1 (segment GVA-VALOR) is considered for this study, as it is the closest one to the obstacles.
Y223	
Y224	

Top of obstacle altitude [m]	Minimum Obstacle Clearance (MOC) [m]	Minimum Overflight Altitude	Minimum Altitude considered	Effective Obstacle Clearance
707 (E2)	145	852 m ≈ 2796 ft	4176 m ≈ 13700 ft	3469 m ≈ 11381 ft

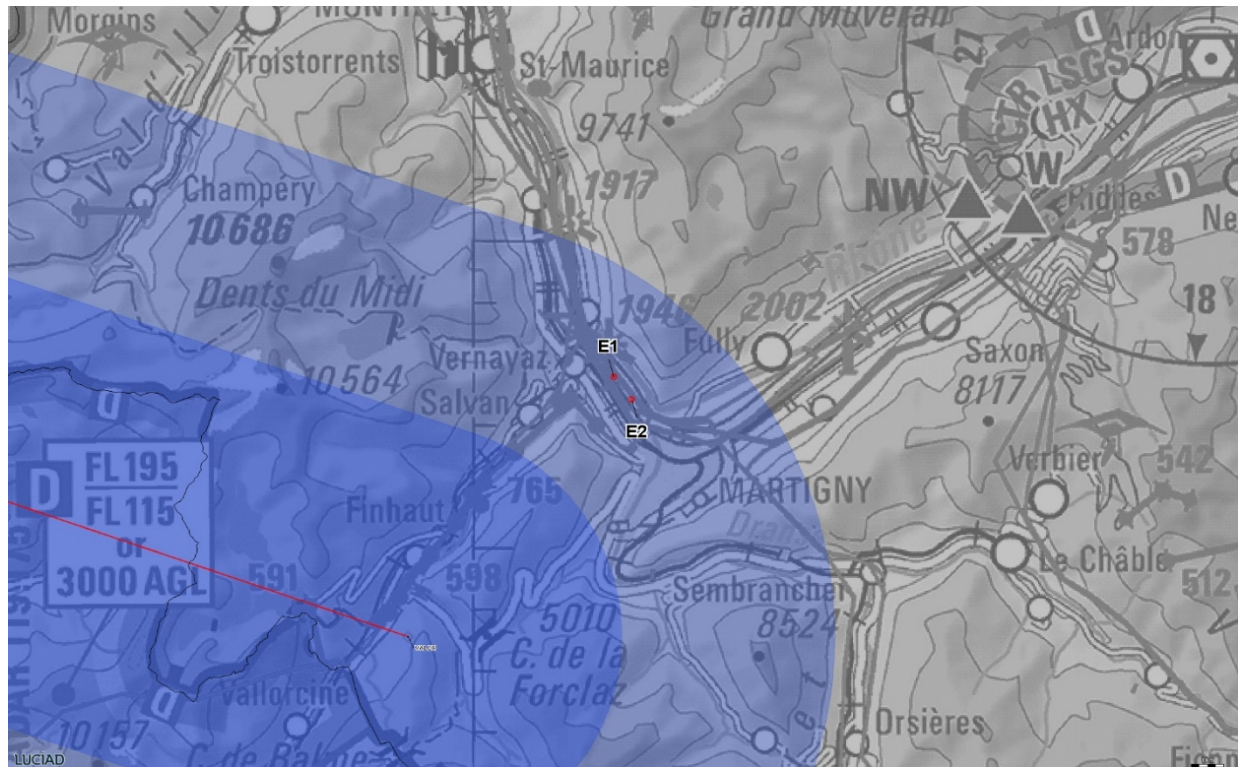


Figure 3: Protection area of ATS route Y1 with Courtis Neufs wind farm project

Analysis	
Although obstacles are located inside the PANS-OPS protection area of the considered procedures, Minimum Obstacle Clearance Altitude (MOCA) is granted; therefore, there is no PANS-OPS impact to be reported on ATS routes.	
Remarks	NIL

## 5.2 Low Flight Network (LFN routes)

IFP name	Remarks
LFN GREEN Extension	LFN Route GREEN Extension is considered for this study, as it is the closest one to the obstacles.

Top of obstacle altitude [m]	Minimum Obstacle Clearance (MOC) [m]	Minimum Overflight Altitude	Minimum Altitude considered	Effective Obstacle Clearance
709 (E2)	300	1009 m ≈ 3310 ft	2134 m ≈ 7000 ft	1424 m ≈ 4672 ft

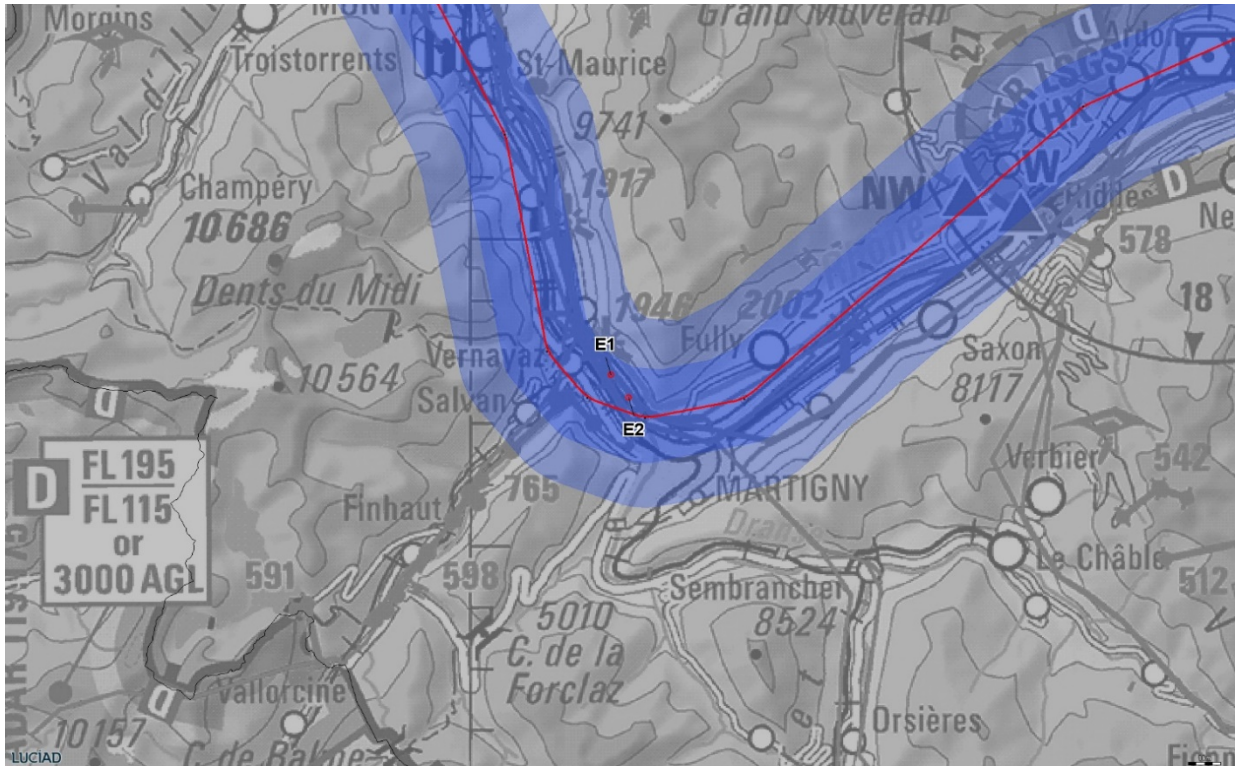


Figure 4: Protection area of LFN route GREEN Extension with Courtis Neufs wind farm project

Analysis	
Although obstacles are located inside the PANS-OPS protection area of the considered procedures, Minimum Obstacle Clearance Altitude (MOCA) is granted; therefore, there is no PANS-OPS impact to be reported on LFN routes.	
Remarks	NIL

### 5.3 SID

IFP name	Remarks
LSGS SID GOLEB J/K/L and U/V/W	
LSGS SID RNAV GOLEB D and V	
LSGS SID ROCCA J/K/L and U/V/W	
LSGS SID RNAV ROCCA D and V	
LSGS SID SPR J and U	
LSGS SID RNAV SPR D and V	
LSHS SID OLLAC H (AR)	LSHS SID OLLAC H (AR) is considered for this study, as it is the closest one to the obstacles.

Top of obstacle altitude [m]	Distance DERXX ⇨ Obstacle (dr+do) [m]	Minimum Obstacle Clearance (MOC) [m]	Minimum Overflight Altitude	Requested PDG after initial climb
709 (E2)	24809	199	908 m ≈ 2979 ft	0% from 3000 ft

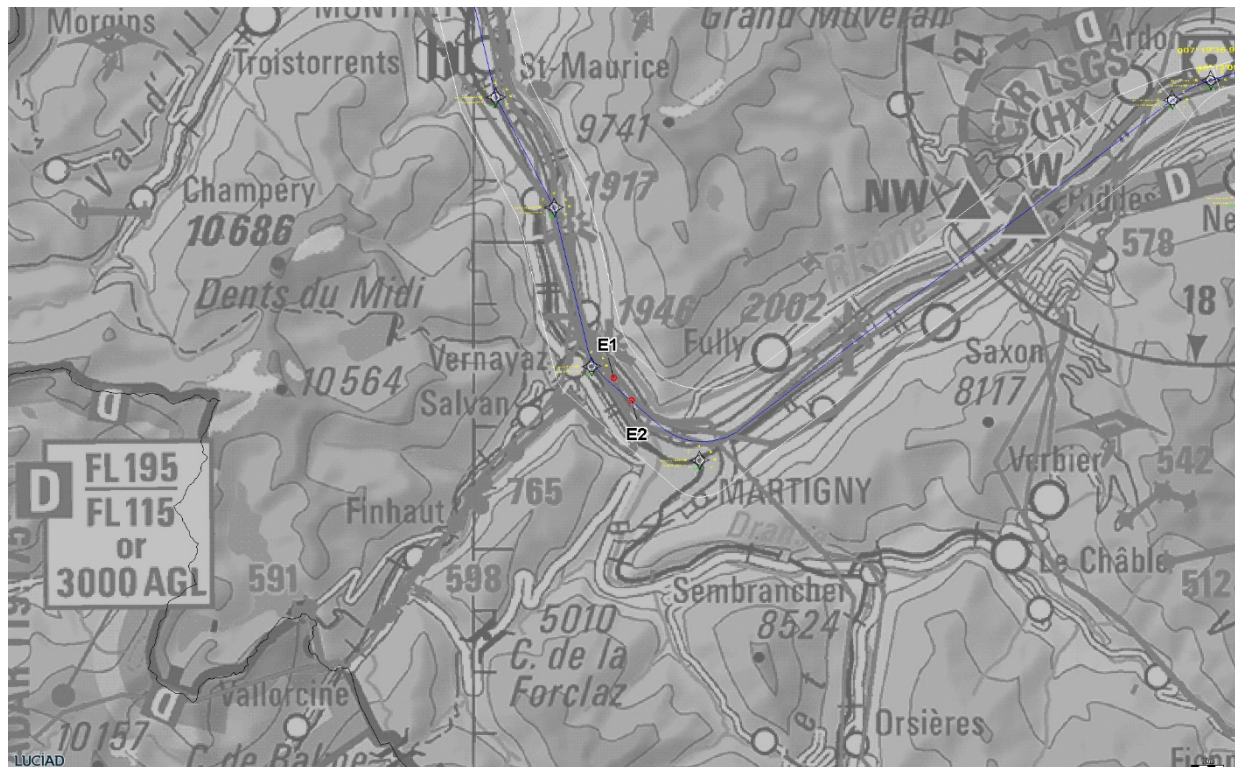


Figure 5: Protection area of LSHS SID OLLAC H with Courtis Neufs wind farm project

Analysis	
Although obstacles are located inside the PANS-OPS protection area of the considered procedures, Minimum Obstacle Clearance (MOC) is granted; therefore, there is no PANS-OPS impact to be reported on LSGS and LSHS SIDs.	
Remarks	Initial climb gradient: 5.0% up to 5000 ft.

## 5.4 STAR

IFP name	Remarks
LSGS STAR VALOR W	
LSGS STAR RNAV VALOR R	LSGS STAR RNAV VALOR R is considered for this study, as it is the closest one to the obstacles.

Top of obstacle altitude [m]	Minimum Obstacle Clearance (MOC) [m]	Minimum Overflight Altitude	Minimum Altitude considered	Effective Obstacle Clearance
709 (E2)	300	1009 m ≈ 3310 ft	5182 m ≈ 17000 ft	4472 m ≈ 14672 ft

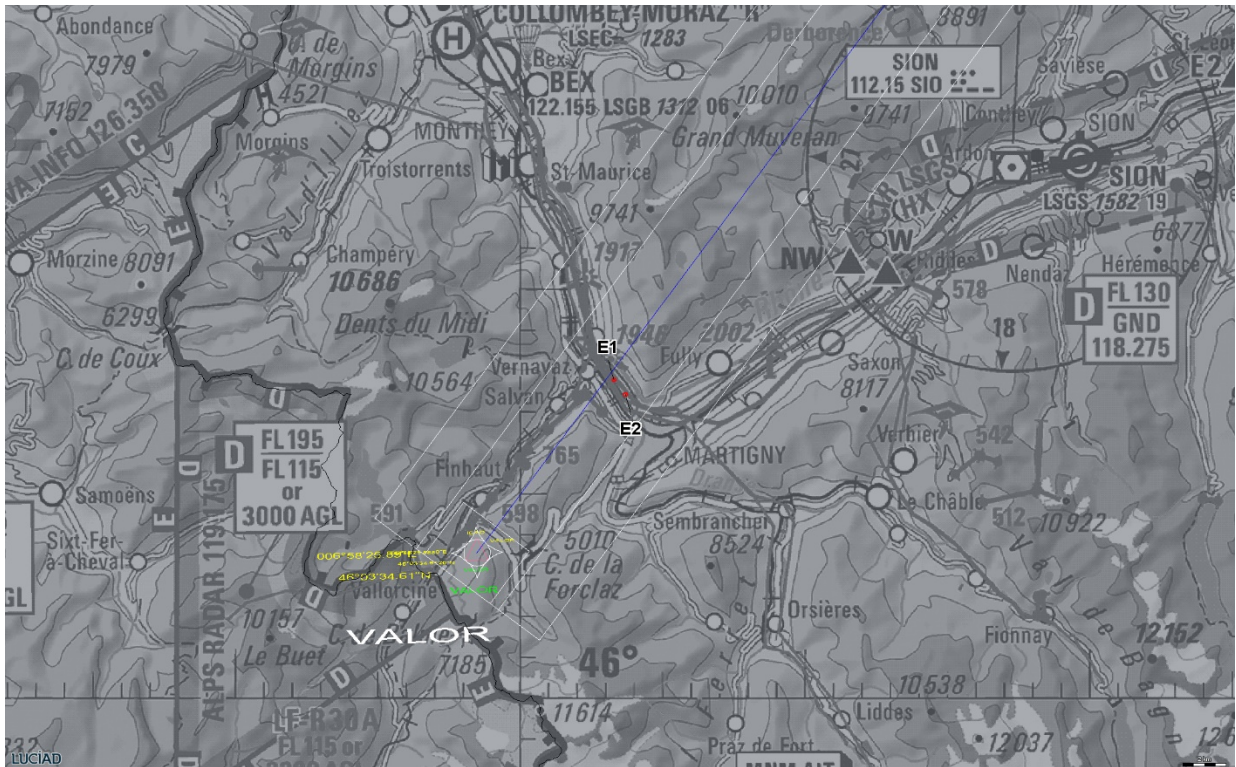


Figure 6: Protection area of LSGS STAR RNAV VALOR R with Courtis Neufs wind farm project

Analysis	
Although obstacles are located inside the PANS-OPS protection area of the considered procedures, Minimum Obstacle Clearance (MOC) is granted; therefore, there is no PANS-OPS impact to be reported on LSGS STARS.	
Remarks	NIL

## 5.5 Approach

IFP name	Remarks
LSGS IGS RWY25	Show which procedure is used for the assessment and why (rationale).
LSGS RNP APCH RWY25 (AR)	
LSGS RNP APCH RWY25 LPV 5.5°	
LSHS RNP APCH 053 (AR 0.1)	
LSHS RNP APCH 233 (AR 0.1)	LSGS RNP APCH 233 (AR 0.1) is considered for this study, as it is the closest one to the obstacles.

Top of obstacle altitude [m]	Distance DERXX ⇄ Obstacle (dz+do) [m]	Minimum Obstacle Clearance (MOC) [m]	Minimum Overflight Altitude	Requested MACG (after initial climb)
709 (WT-nn)	27206	218	927 m ≈ 3040 ft	0.0% from 3040 ft

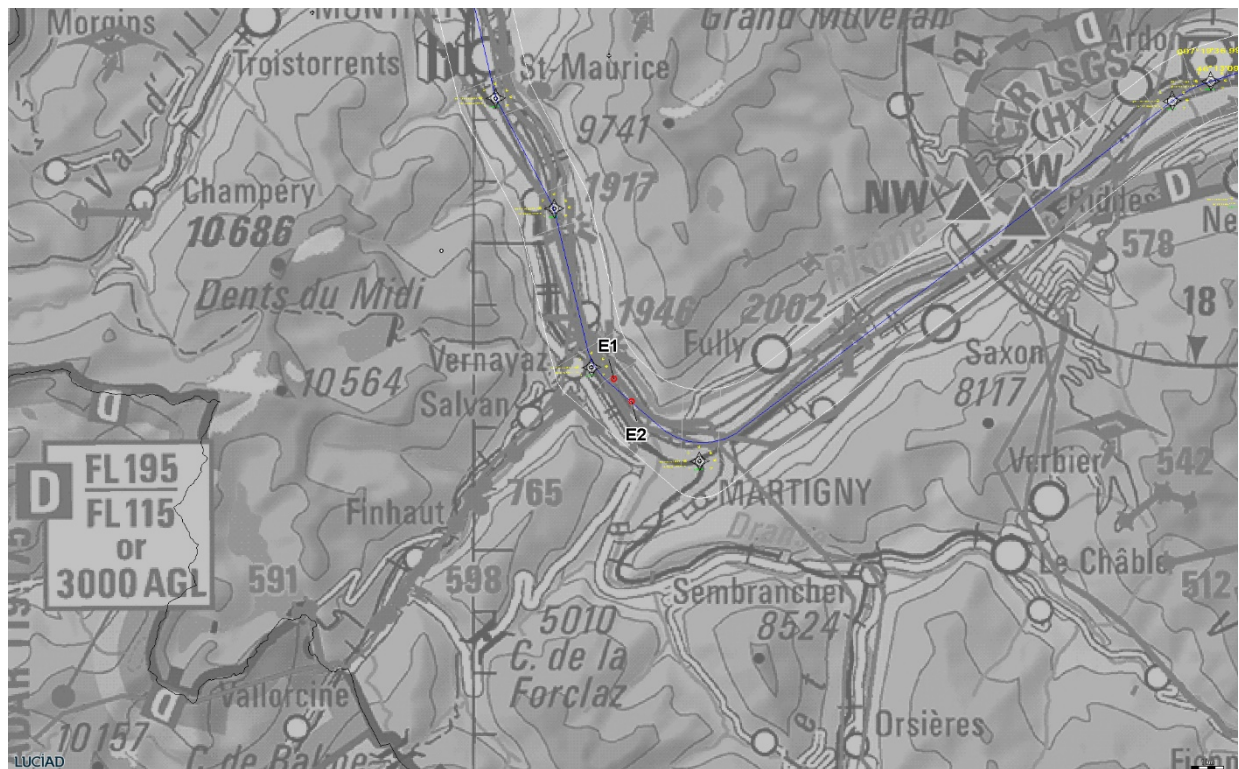


Figure 7: Protection area of LSHS RNP APCH 233 (AR 0.1) with Courtis Neufs wind farm project

Analysis	
Although obstacles are located inside the PANS-OPS protection area of the considered procedures, Minimum Obstacle Clearance (MOC) is granted; therefore, there is no PANS-OPS impact to be reported on LSGS and LSHS approaches.	
Remarks	NIL

## 5.6 Holding

IFP name	Remarks
LSGS HLDG GRANA	LSGS HLDG GRANA is considered for this study, as it is the closest one to the obstacles.
LSGS HLDG NEPNE	

Top of obstacle altitude [m]	Minimum Obstacle Clearance (MOC) [m]	Minimum Overflight Altitude	Minimum Altitude considered	Effective Obstacle Clearance
709 (E2)	300	1009 m ≈ 3310 ft	5182 m ≈ 17000 ft	4472 m ≈ 14672 ft

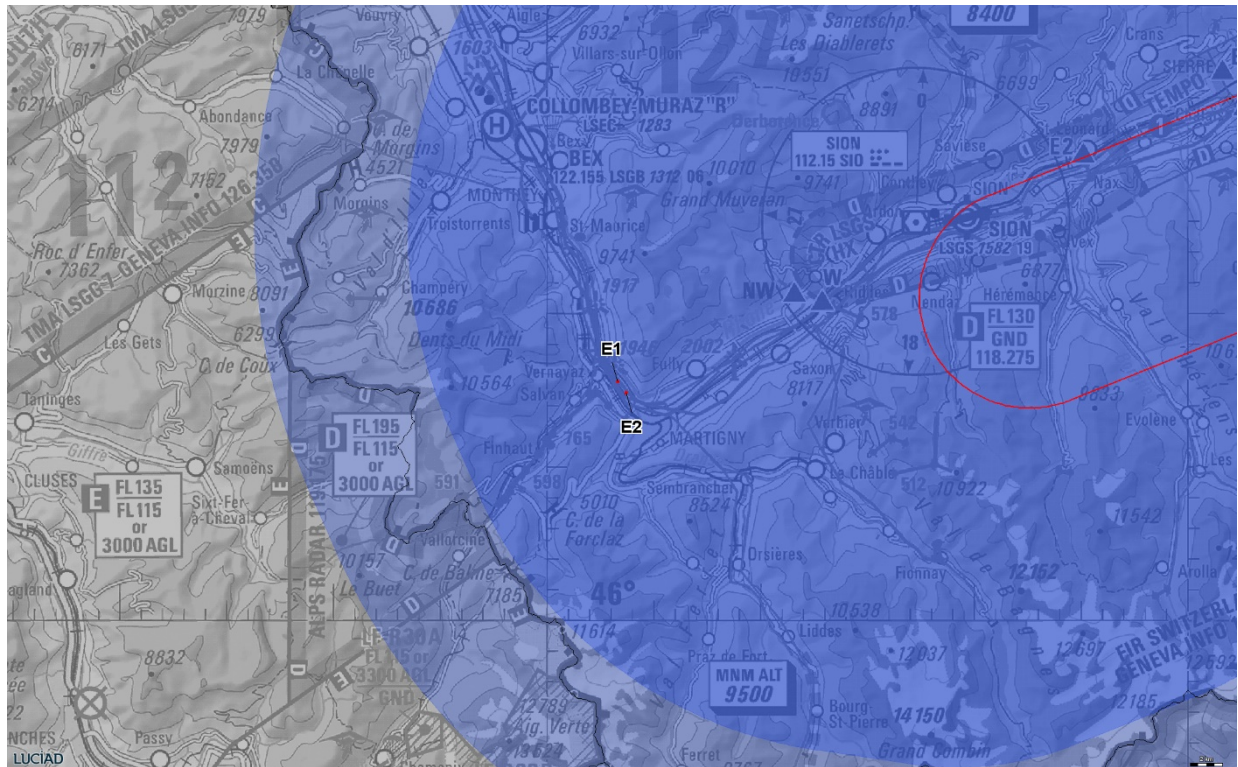


Figure 8: Protection area of LSGS HLDG GRANA with Courtis Neufs wind farm project

Analysis	
Although obstacles are located inside the PANS-OPS protection area of the considered procedures, Minimum Obstacle Clearance (MOC) is granted; therefore, there is no PANS-OPS impact to be reported on LSGS holdings.	
Remarks	NIL

## 5.7 Circling

IFP name	Remarks
None	NIL

Analysis	
No circling is potentially impacted by Courtis Neufs wind farm project.	
Remarks	NIL

## 5.8 ATC Surveillance Minimum Altitude (ASMA)

IFP name	Remarks
LSGG ASMA +2°C and -8°C	LSGG ASMA -8°C is considered for this study, as it is the closest one to the obstacles.
LSGS ASMA -6°C and -15°C	
LSMP ASMA -4°C and -14°C	

Top of obstacle altitude [m]	Minimum Obstacle Clearance (MOC) [m]	Minimum Overflight Altitude	Minimum Altitude considered	Effective Obstacle Clearance
709 (E2)	585	1294 m ≈ 4245 ft	4267 m ≈ 14000 ft	3558 m ≈ 11673 ft

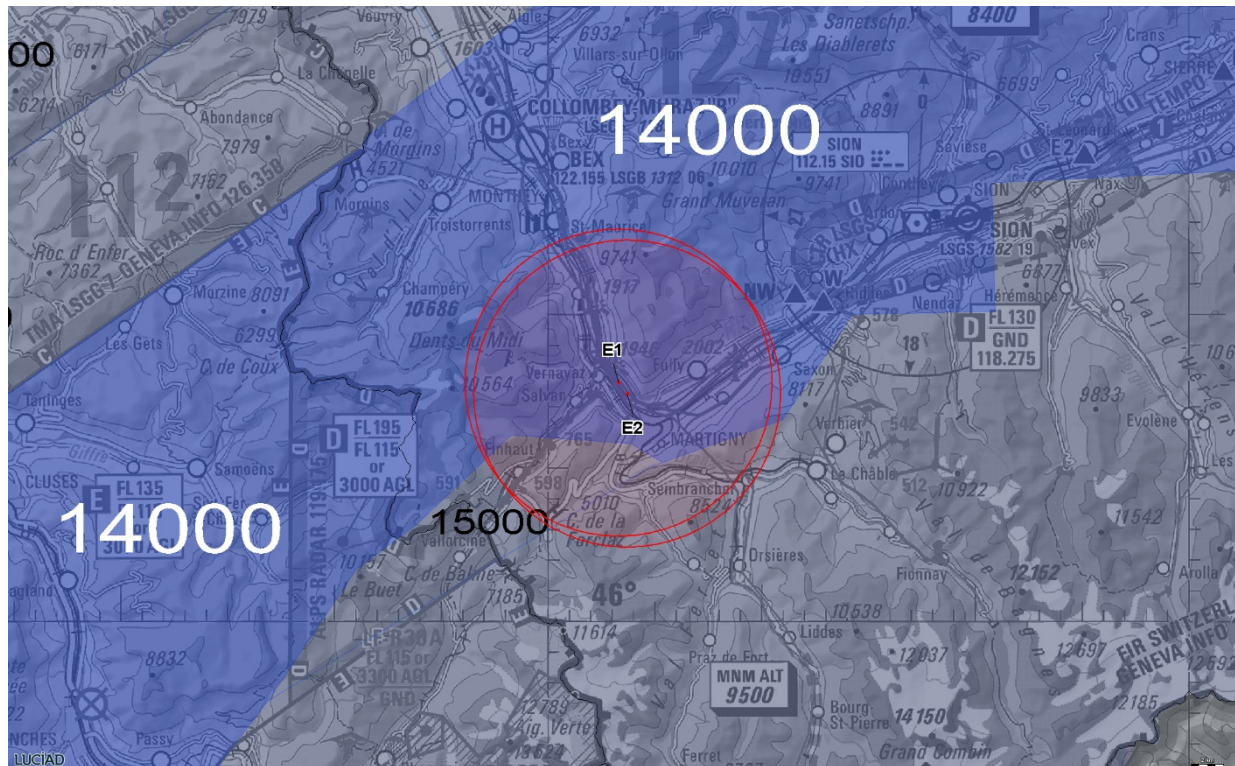


Figure 9: ATC Surveillance Minimum Altitudes LSGG ASMA -8°C with Courtis Neufs wind farm perimeter and 5 NM buffer

Analysis	
Although obstacles are located inside the PANS-OPS protection area of the considered procedures, Minimum Obstacle Clearance (MOC) is granted; therefore, there is no PANS-OPS impact to be reported on LSGG, LSGS and LSMP ASMA.	
Remarks	MOC is corrected by <b>285 m</b> in order to take the temperature into account. Effective Obstacle Clearance shall be at least 585 m ≈ 1919 ft.

## 5.9 Minimum Sector Altitude (MSA)

IFP name	Remarks
LSGS MSA SIO and ARP	LSGS MSA ARP is considered for this study, as it is the closest one to the obstacles.
LSHS MSA	
LSHV MSA	
LSNR MSA	

Top of obstacle altitude [m]	Minimum Obstacle Clearance (MOC) [m]	Minimum Overflight Altitude	Minimum Altitude considered	Effective Obstacle Clearance
709 (E2)	300	1009 m ≈ 3310 ft	3901 m ≈ 12800 ft	3192 m ≈ 10472 ft

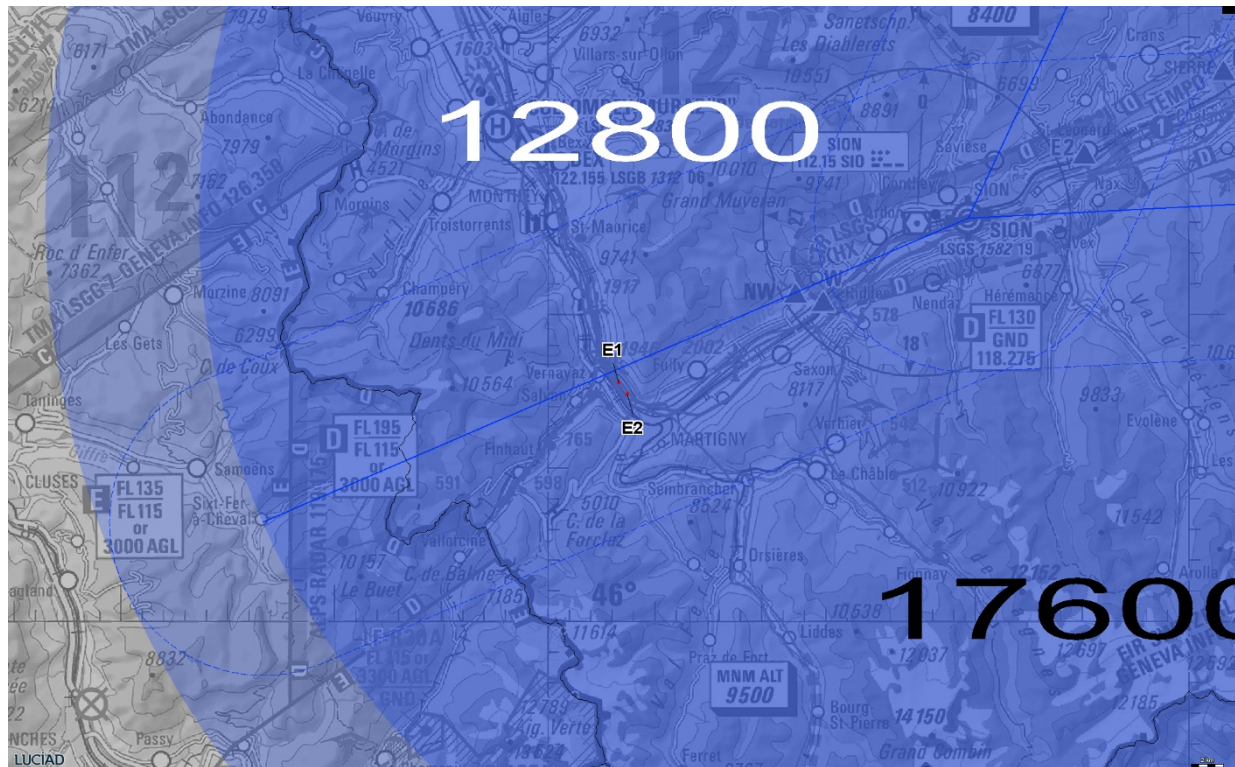


Figure 10: LSGS Minimum Sector Altitude (MSA) ARP with Courtis Neufs wind farm project

Analysis	
Although obstacles are located inside the PANS-OPS protection area of the considered procedures, Minimum Obstacle Clearance (MOC) is granted; therefore, there is no PANS-OPS impact to be reported on LSGS, LSHS, LSHV and LSNR MSAs.	
Remarks	NIL

## 6 Conclusion

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Wind farm project Courtis Neufs does not impact any of the assessed Instrument Flight Procedures.

All other procedures not mentioned in this report are not impacted by Project name wind farm project.

Any change to the project of more than 50 m laterally and 0 m vertically will invalidate this assessment.

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## 7 Notification

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Skyguide IFP can therefore grant a **positive notification** for WT E1 and E2.

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## 8 Validity

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This assessment is valid 5 years from its publication date.

If the project is blocked due to an objection to the zoning plan and/or a building permit and the developer applies to Skyguide, the validity period shall cease to run for the duration of the procedure.

In order to ensure that the time limit is suspended, the developer must inform Skyguide as soon as he becomes aware that such proceedings have been initiated or that they have been terminated (final decision by a competent court or granting of the zoning plan and/or building permit).

The supporting documents relating to these proceedings in question must be provided without delay with the request for suspension.

In addition, Skyguide may, at the request of the developer, extend this statement for a further period of five years following a reassessment. The costs of such a reassessment shall be borne by the developer.

During the period of validity of this notification, Skyguide commits to take the wind farm into account during the periodical reviews or development of instrument flight procedures and CNS systems.

Skyguide will inform during the validity period the developer of any new impacts that may be identified as a result of the implementation of new criteria or technologies.

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## 9 References

### 9.1 Processes, Standards and Criteria

Document	Version	Issued by
Document 8168-OPS/611 Volume II	7th edition	ICAO
IFPDM	21.0	FOCA
IFPDM-MIL	4.0	FOCA
<u>C3WI5000E IFP Design and Airspace Design Service Delivery</u>	5.0	Skyguide
Annex to Wind Turbine Assessment	2020-03-04	Skyguide

### 9.2 Software

Name	Provider	Version
AutoCAD Map 3D 2023	Autodesk	26.0.37.9
Luciad Map	Luciad NV	1.4.4
PAAD	PAAD Soft	3.1.1B
Google Earth Pro	Google	7.3.6
Obstacle Clearance Calculation	Skyguide	13.0

### 9.3 Integrated Aeronautical Information Package

Type / Format	Source	Hor. / Ver. Reference System <sup>1</sup>	Hor. / Ver. Accuracy <sup>2</sup>	Vertical Resolution	Effective date
AIP / AIXM 5.1	AIM	LV95 / LNO2	ICAO	ICAO	2023-11-02

### 9.4 IFP reports

21008-LSAS_L50_v1.0.pdf	21008-LSAS_Y1_v1.0.pdf
21008-LSAS_Y223_v1.0.pdf	21008-LSAS_Y224_v2.0.pdf
SID visual GOLEB J K L.pdf	PR LSGS SID GOLEB J K L.docx (dap_85d4164e-fd1e-60da-8bb8-aabdadce3484.pdf)
SID RWY 25 GOLEB U V W.pdf	LSGS SID RNAV GOLEB D.docm (dap_872637fa-c570-7d76-f06d-218a4f96a3ce.pdf)
LSGS SID RNAV GOLEB V.docm (dap_feccceb2-dd9f-1d91-56f7-cc13e947f101.pdf)	SID visual ROCCA J K L.pdf
SID RWY 25 ROCCA U V W.pdf	LSGS SID RNAV ROCCA D.docm (dap_e73b5e36-893a-0a73-5a15-f10ac5256a38.pdf)
LSGS SID RNAV ROCCA V.docm (dap_c934afd5-4c15-1f27-b647-17594ec42037.pdf)	SID visual SPR J.pdf
SID RWY 25 SPR U.pdf	LSGS SID RNAV SPR D.docm (dap_d38b9d50-4353-1190-1f69-c9b2df431b20.pdf)
LSGS SID RNAV SPR V.docm (dap_b76f72b3-ea6d-70c4-1abd-03f0f2f64fcb.pdf)	LSHS SID OLLAC H (AR 0.1).docx
STAR VALOR W.pdf	PR LSGS STAR VALOR W.docx (dap_00fcb540-7dc4-22af-35c2-6d5ed03ff5ce.pdf)
LSGS STAR VALOR R.docm (dap_b2b25b2e-25d8-815a-a4ba-dfcaea62152a.pdf)	
APCH RWY 25 IGS.pdf	PR LSGS IGS RWY 25.docx (dap_adc7587b-509f-6371-cc38-a4280ad38bdf.pdf)
17002-LSGS_RNAV_RNP_RWY25_PR16_v3.0.pdf	LSGS APCH RNP LPV 5.5° RWY 25.docm (dap_959a2f14-a9cc-9618-a62e-b7e0fa589420.pdf)
LSHS APCH RNP 053 (AR 0.1).docx	LSHS APCH RNP 233 (AR 0.1).docx
HLDG GRANA.pdf	PR LSGS HLDG GRANA.docx (dap_66b1e036-2ead-8e36-e5ed-4ba965c92f05.pdf)
LSGS Holding NEPNE.docm (dap_2a88e764-c12b-d590-2be3-5906fd7bc96f.pdf)	
17007_LSGG_ASMA_report_v2.0.pdf	ASMA CIV.pdf (LSGS)
LSMP ASMA Payerne RADAR warm.docm (dap_b884c8b4-d6f6-049a-d868-4d447b505b4b.pdf)	LSMP ASMA Payerne RADAR cold.docm (dap_e03f4015-c9e7-6584-f00e-478efe3710ce.pdf)

<sup>1</sup> As per ICAO Annex 14 Vol I&II Chapter 2 and Appendix 5, and Annex 11 Chapter 2 and Appendix 5.

<sup>2</sup> As per ICAO Annex 15 Appendix 7.

17002-LSGS-LSMS_MSA SIO_PR16_v4.0.pdf	PR LSGS MSA (SIO).docx (dap_3e546b67-daca-2fc9-e1dd-c935b9b3082e.pdf)
LSGS MSA ARP.docm (dap_afee409b-29ad-2c10-cf87-e1fd881221c8.pdf)	LSHS MSA HRP.docx
210608 IFPD Report LSHV MSA V1.0.pdf	220320 IFPD Report LSNR MSA V1.0.pdf

## 9.5 Abbreviations and Acronyms

The abbreviations and acronyms in this report are according to ICAO Doc. 8400 (Ninth Edition - 2016), except the ones listed below.

Abbreviation	Meaning
AD	Aerodrome
AIP	Aeronautical Information Publication
APCH	Approach procedure
ARP	Aerodrome Reference Point
ASMA	ATC Surveillance Minimum Altitude
ATM	Air Traffic Management
ATS	Air Traffic Services
AWY	Airway
CNS	Communication, Navigation and Surveillance
DER	Departure End of Runway
FAF	Final Approach Fix
FAP	Final Approach Point
FOCA	Federal Office for Civil Aviation
HLDG	Holding procedure
ICAO	International Civil Aviation Organisation
IFP	Instrument Flight Procedure
IFPDM	Skyguide Instrument Flight Procedures Design Manual
ILS	Instrument Landing System
LFN	Low Flight Network
LOC	Localizer
MAA	Military Aviation Authority
MACG	Missed Approach Climb Gradient
MAX	Maximum
MNM	Minimum
MOC	Minimum Obstacle Clearance
MOCA	Minimum Obstacle Clearance Altitude
MSA	Minimum Sector Altitude
NAVAID	Navigational Aid
OBST	Obstacle
OCA/H	Obstacle Clearance Altitude/Height
PANS-OPS	Procedures for Air Navigation Services – Operations
PDG	Procedure Design Gradient
PSA	Preliminary Safety Assessment
RWY	Runway
SID	Standard instrument departure
STAR	Standard instrument arrival
TAA	Terminal Arrival Altitude

## 10 History of Change

Version	Date	Author	Details
0.1	2023-11-22	Laurent Favey	Wind turbines assessment
0.2	2023-11-28	Christophe Monnard	Assessment review
1.0	2023-11-29	Laurent Favey	Released version