



Federal Aviation Administration

Memorandum

Date: May 1, 2026

To: All Regions
Attn: Director, Airports Division

From: Tom Rainey, Ground Based and Satellite Navigation Team, AJW-152
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Date: 2026.04.24 09:35:42 -0400
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Date: 2026.04.24 08:08:08 -0400
Kevin Le, Manager (A), Visual Guidance Lighting Systems Team, AJM-322

Subject: Precision Approach Path Indicator (PAPI) Power and Control Assembly
(PCA) Siting Clarification Update

Background:

- [Title 14 CFR Part 139 §139.309](#) states, in part:
 - (b) *Each certificate holder must maintain its safety areas as follows:*
 - (4) *No objects may be located in any safety area, except for objects that need to be located in a safety area because of their function. These objects must be constructed, to the extent practical, on frangibly mounted structures of the lowest practical height, with the frangible point no higher than 3 inches above grade.*
- [Advisory Circular \(AC\) 150/5300-13, Airport Design](#) establishes design standards which reflect and support the above regulatory requirements.
- Precision Approach Path Indicator (PAPI) infrastructure enhances aviation safety by providing visual vertical guidance to approaching pilots and reduces the likelihood of aircraft undershoots.
- PAPI siting criteria specifies Lamp Housing Assemblies (LHAs) that *need to be located in safety areas because of their function.*

- PAPI LHAs are *constructed on frangibly mounted structures of the lowest practical height, with the frangible point no higher than 3 inches above grade* by design, as established by [AC 150/5220-23, Frangible Connections](#).
- PCAs designed in accordance with [Advisory Circular \(AC\) 150/5345-28, Precision Approach Path Indicator \(PAPI\) Systems](#) are certified to work at a maximum distance of up to 100 feet between the PCA and the outboard LHA¹. These systems are engineered to function properly with the PCA located outside of the safety area.
- PAPI Power and Control Assemblies (PCAs) are to be located outside of safety areas and Runway Object Free Areas (ROFAs) when functionality requirements allow.
- Certain legacy models of federally acquired PAPI systems were engineered with maximum distance requirements of 25 feet or 50 feet between the PCA and LHA #4². These early PAPI designs did not address PCA location in safety areas. Where design distance limitations indicate the PCAs for these legacy system models will not function properly if located outside the safety area, siting within the safety area is justified *because of their function*.

Legacy systems with a maximum 25-foot limitation between the PCA and the LHA #4 by design include:

Facility ID Code	Manufacturer	Facility Type
3191	Sonicraft	PAPI
3192	Crouse-Hinds	PAPI
3193	AVW	PAPI
3194	NBP (FA-10620)	PAPI
3195	NBP (FA-17700)	PAPI
NC01	DME Corp. (FA-24000)	PAPI

Legacy systems with a maximum 50-foot limitation between the PCA and the LHA #4 by design include:

Facility ID Code	Manufacturer	Facility Type
-	Multi Electric Mfg., Inc.	PAPI Style A (1984-2002)

¹ [Advisory Circular 150/5340-30, Design and Installation Details for Airport Visual Aids](#), Chapter 7 defines the *outboard LHA* as the LHA farthest from the runway for 2-box and 4-box economy PAPI facilities.

² [FAA Order 6850.2, Visual Guidance Lighting Systems](#), Chapter 5 defines LHA #4 as the LHA located farthest from the runway edge for federal PAPI facilities.

- A number of existing federal legacy PAPI systems have been or will be upgraded to Ferroresonant PAPIs (FPAPIs). The upgrade does not increase the maximum distance between the PCA and LHA #4 from the legacy design limitations.

Legacy systems with Ferroresonant PAPI (FPAPI) upgrades and a maximum 25-foot limitation between the PCA and the LHA #4 by design include:

Facility ID Code	Manufacturer	Facility Type
3191 NC03	Soncraft (FA-10147) w/ FA-30100 retrofit	Ferroresonant PAPI (FPAPI)
3193 NC03	AVW (FA-10265) w/ FA-30100 retrofit	Ferroresonant PAPI (FPAPI)
3194 NC03	NBP (FA-10620) w/ FA-30100 retrofit	Ferroresonant PAPI (FPAPI)
3195 NC03	NBP (FA-17700) w/ FA-30100 retrofit	Ferroresonant PAPI (FPAPI)

Action:

- If a PCA *needs to be located in a safety area* to remain within the 25 to 50 foot maximum distance from LHA #4 for the PAPI facility to function properly, that specific PCA will be considered to be *located in the safety area because of its function*.
- PCAs located in a safety area because of their function must also meet the *frangibly mounted structures* requirements. [AC 150/5220-23, Frangible Connections](#), provides frangibly mounted structure standards.
- If a PCA may be located outside of the safety area while remaining within the 25 to 50 foot maximum distance from LHA #4, that specific PCA must be located outside of the safety area in accordance with the primary requirement that *no object may be located in any safety area*. **Frangibility within the safety area does not override the requirement to remove it from the safety area.**
- Runway Safety Area Determinations (RSADs) should reflect the above criteria.
- Airport certificate holders/airport sponsors who receive documentation from their PAPI manufacturer stating that the PCA must not be located more than 25 to 50 feet from the outboard LHA should follow the above guidance by substituting *outboard LHA* for *LHA #4*.

Future PAPI System Development:

- The primary requirement remains - *no objects may be located in any safety area*. Future PAPI systems must be engineered to allow the PCA to remain outside of all safety areas, and, ideally, outside of all object free areas (OFAs) to enhance the safety of the airfield environment in the event of an aircraft excursion. [Advisory Circular 150/5300-13, *Airport Design*](#), provides OFA standards. Modifications to existing PAPI system designs must also endeavor to meet the primary requirement to the extent practical.

Additional Information:

- The term Lamp Housing Unit (LHU) is considered synonymous with the term Lamp Housing Assembly (LHA).
- The terms Power Control Assembly (PCA) and Power and Control Unit (PCU) are considered synonymous with the term Power and Control Assembly (PCA).
- This Memorandum provides updated information to the information contained in the Memorandum titled, *Precision Approach Path Indicator (PAPI) Power Control Assembly (PCA) and Power and Control Unit (PCU) Siting Clarification*, dated December 8, 2011, and in the Memorandum titled, *Amendment to Engineering Clarification for Navigational Aids Runway Safety Area Improvements*, dated April 23, 2010.
- For further clarification on the proper siting of PAPI PCAs and their impact on RSADs, please contact the following Office of Airports personnel: John Merck, Civil Engineer, Airport Design and Construction Branch, AAS-110 at John.Merck@faa.gov, or D'Lorah Small, Manager, Airport Design and Construction Branch, AAS-110 at D'Lorah.D.Small@faa.gov.

Encl.

1. Memorandum titled, *Precision Approach Path Indicator (PAPI) Power Control Assembly (PCA) and Power and Control Unit (PCU) Siting Clarification*, dated December 8, 2011
2. Memorandum titled, *Amendment to Engineering Clarification for Navigational Aids Runway Safety Area Improvements*, dated April 23, 2010



Federal Aviation Administration

Memorandum

Date: DEC 08 2011

To: All Regions
Attn: Manager, Airports Division

From: *John R. Dermody*
John R. Dermody, Manager, Airport Engineering Division, AAS-1
Steven Wolfson
Steven Wolfson, Manager, Ground Based NAVAIDS and Lighting
Systems Group, AJW-914

Subject: Precision Approach Path Indicator (PAPI) Power Control
Assembly (PCA) and Power and Control Unit (PCU) Siting
Clarification

The purpose of this memorandum is to clarify the PAPI PCA/PCU siting requirements contained in the attached April, 23, 2010 memorandum entitled, "Amendment to Engineering Clarification for Navigational Aids Runway Safety Area Improvements" and their impact on airport runway safety area (RSA) determinations.

The following federally owned PAPI PCAs/PCUs are designed and certified to work at a maximum distance of 25 feet from the farthest Lamp Housing Unit (LHU). These 'legacy' units are listed in the table below:

Facility ID Code	Manufacturer	Facility Type
3191	Sonicraft	PAPI
3192	Crouse-Hinds	PAPI
3193	AVW	PAPI
3194	NBP (FA-10620)	PAPI
3195	NBP (FA-17700)	PAPI
NC01	DME Corp. (FA-24000)	PAPI

The following PAPI PCA/PCU is designed and certified to work at a maximum distance of 50 feet from the farthest LHU.

- Multi Electric Mfg., Inc. PAPI Style A, from 1984-2002

Other PCAs/PCUs, and several new systems undergoing FAA evaluation and testing, may work at distances greater than 25 feet.

The Office of Airports (ARP-1), PAPI PCA/PCUs designed in accordance with Advisory Circular (AC) 150/5345-28G are certified to work at a maximum distance of up to 100 feet from the Light Housing Assembly (LHA).

PCAs/PCUs limited to the 25 or 50 foot distance are fixed-by-function. Additionally, if an airport sponsor receives a letter from their PAPI manufacturer stating that the PCA/PCU is not to be located more than 25 or 50 feet from the LHU, those systems are also fixed-by-function. If these systems are located in airport RSAs, the design meets the requirements of AC 150/5220-23, Frangible Connections, and Engineering Brief 79, Determining RSA Navigational Aid (NAVAID) Frangibility and Fixed-By-Function Requirements.

For further clarification on the proper siting of PAPI PCAs/PCUs and the impact on RSA determinations, please contact the following Airport Engineering Division personnel: Mr. Michael Meyers at (202) 267-8785, michael.a.meyers@faa.gov, or Mr. Alvin Logan at (202) 267-8743, alvin.logan@faa.gov.



Federal Aviation Administration

Memorandum

Date: APR 23 2010

To: All Regions
Attn: Manager, Airports Division

Jeff Tague, Manager, Central Service Area
Program Implementation Manager, AJV-C35

From: *Rick Marinelli*
Rick Marinelli, Manager, Airport Engineering Division, AAS-100
Lansine Toure
Lansine Toure, Manager, Ground Based NAVAIDS and
Lighting Systems Group, AJW-45

Subject: Amendment to Engineering Clarification for Navigational Aids Runway
Safety Area Improvements

Background

This engineering clarification provides guidance for mitigating Runway Safety Area (RSA) violations for Navigational Aids (NAVAIDS) that are fixed-by-function. On July 13, 2009, the Airport Engineering Division distributed guidance for determining whether NAVAIDS are fixed-by-function and whether they meet frangibility requirements if located inside the RSA. A key part of this effort is to determine the corrective actions for NAVAIDS in the RSA and identify certain models that are fixed-by-function.

Fixed-By-Function Clarification

To optimize the operational performance of Precision Approach Path Indicator (PAPI) Power Control Assembly (PCA); Runway End Identifier Lights (REILs) Control Cabinet and Junction Box; Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) Individual Control Cabinets (ICC); High Intensity Approach Lighting System with Sequenced Flashers (ALSF-2) ICC; REIL ICC; End Fire Glide Slope (EFGS) subsystem and ancillary equipment, it is necessary for the ancillary items listed in attachment A to be considered fixed-by-function in accordance with the fixed-by-function definition in FAA Advisory Circular AC15/5300-13 Chapter 1, subsection 2 Definitions.

PAPI Power Control Assembly

The PAPI PCA was designed by the manufacturers to operate at a maximum distance of 25 feet from the farthest Lamp Housing Unit's. The Technical Instruction Book, which provides the installation instructions from the manufacturers, identifies the recommended distance limits for the PCA. The operational performance of the NAVAID may be adversely affected if the PCA installation deviates from the manufacturers recommendations. However, the installation of the PCA requires a frangibility point no greater than three inches above the surrounding grade in accordance with FAA Advisory Circular AC 150/5220-23 Chapter 3, subsection 3.2 Frangibility Requirements. Refer to attachment A for a list of Facility Services and Equipment Profile (FSEP) facility identification codes that are fixed-by-function.

REIL Control Cabinet

The control cabinets were designed in accordance with FAA-E-2159, to operate at a maximum distance of 3000 feet from the ICC. However, due to airport physical constraints, some facilities may require the control cabinet to be installed closer to the ICC. If the airport physical constraints limit the location of the control cabinet inside the RSA then the control cabinet must be installed with a frangible point no greater than three inches above the surrounding grade.

REIL/MALSR/ALSF-2 Individual Control Cabinet

The ICCs were designed to operate with a maximum distance of 200 feet from the flasher unit. To ensure optimum performance of the flasher unit, the ICC is required to operate within the limits defined in FAA-E-2689 paragraph 3.2.5.2.1 Individual Control Cabinet. If relocated beyond the specified maximum distance, the operational performance of the Flasher Unit will be adversely affected. However, the ICC must be installed with a frangibility point no greater than three inches above the surrounding grade and the farthest distance away from the centerline with out exceeding the maximum distance from the flasher unit. Refer to attachment A for a list of FSEP facility identification codes that are fixed-by-function.

REIL Junction Box (DME Corp FA-19900)

The FA-19900 REIL Identifier Unit Assembly (IUA) includes a small 10x8x6 junction box to terminate the conductors originating from the Control Cabinet. The IUAs were designed to operate with a maximum distance of 3,000 feet from the control cabinet. At this distance the power conductors required are #2 AWG to achieve a maximum voltage drop of three percent at the IUA junction box. The junction box contains the terminal blocks used to terminate the larger conductors coming from the control cabinet and transition to the smaller #22 AWG conductors that terminate into a quarter-turn quick-connect plug. The plug mates with a receptacle at the bottom of the IUA. There is no room available inside the IUA to install a terminal block to terminate the large conductors coming from the control cabinet. Therefore a junction box is required by the design to terminate the power and control conductors originating from the control cabinet. This design requirement makes the junction box fixed-by-function in accordance with AC 15/5300-13 Chapter I, subsection 2 Definitions.

End Fire Glide Slope Antenna

The EFGS are installed at runways where image type glide slopes are unable to perform, due to limited terrain or geographical terrain constraints. The EFGS antenna is sited within close proximity of the runway edge, with the front course antenna array located 25 feet off the runway edge. This distance is within the RSA. The operational requirements of the EFGS prevent relocation and is fixed-by-function in accordance with the fixed-by-function definition of AC 15/5300-13 Chapter 1, subsection 2 Definitions. The EFGS must be installed with a frangibility point no greater than three inches above the surrounding grade.

If you have any questions, please contact Rick Marinelli, Manager, Airport Engineering Division or Lansine Touré, Manager, Ground Based NAVAIDS and Lighting Systems Group, at (202) 267-7669 or (202) 493-4771 respectively.

Attachment A

NAVAIDs Fixed-by-Function

Facility ID Code	Manufacturer	Facility Type
3191	Soncraft	PAPI
3192	Crouse-Hinds	PAPI
3193	AVW	PAPI
3194	NBP (FA-10620)	PAPI
3195	NBP (FA-17700)	PAPI
NC01	DME Corp (FA-24000)	PAPI
313A	Sylvania	REIL
313B	Godfrey	REIL
313C	ADB-Alnaco	REIL
313E	DME Corp (FA-10264)	REIL
313F	DME Corp (FA-18300)	REIL
313G	Soncraft (FA-9955)	REIL
313H	Multi-Electric (FA-8767-1)	REIL
313J	Hughney Phillips	REIL
313K	Electric Light Inc.	REIL
313L	Unitro International	REIL
313M	Visual Vector	REIL
NEA0	DME (FA-19900)	REIL
326A	Multi-Electric	MALSR
326B	GTE-Sylvania	MALSR
326C	SEPCO-Crouse Hinds	MALSR
326E	AVW	MALSR
326F	ADB-Alnaco	MALSR
326G	Godfrey	MALSR
326H	DME-Corp (FA-11500)	MALSR
NW01	DME Corp (FA-17900)	MALSR
NW02	DME Corp (FA-17900) with NBP (FA-21000)	MALSR
NW03	Godfrey (FA-10098) with NBP (FA-21000)	MALSR
NW04	Godfrey (FA-10267) with NBP (FA-21000)	MALSR
317A	General Electric	ALSF-2
317B	Westinghouse	ALSF-2
317C	Heavy-Duty	ALSF
317D	Hollingsworth	ALSF
317E	Godfrey	ALSF
317G	Airflow	ALSF
317H	NBP	ALSF

Note: Manufacturer's not listed will be evaluated on a case-by-case basis.