APPENDIX G – NAVAIDS

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G-1. OVERVIEW

Navigational aids (NAVAIDs) include a range of equipment that is vital to safe aircraft operations by offering visual and electronic guidance during landings and takeoffs. Weather equipment is essential for identifying and reporting on airport conditions and weather.

This appendix outlines the requirements for specific communications, navigation, surveillance, and weather (CNSW) equipment.

G-2. GENERAL ELIGIBILITY AND JUSTIFICATION

See: 49 U.S.C. §§ 47101, 47102, 47110, and 44502

NAVAIDs can be owned by either the FAA or airport sponsors. AIP funds sponsor-owned NAVAIDs and weather systems, which could be eligible for transfer to the FAA after commissioning if the transfer meets statutory requirements. To be accepted into the National Airspace System (NAS), certain sponsor-owned NAVAIDs and weather systems must be coordinated with the FAA's Non-Federal Program Office.

For eligibility and justification requirements applicable to all projects funded with AIP, see Chapter 2, *Eligibility & Justification*.

G-2.1. ELIGIBILITY CRITERIA

TABLE G-2.1. GENERAL ELIGIBILITY REQUIREMENTS FOR NAVAID PROJECTS

Item	Description
Ownership & Operator	The sponsor must own and maintain the AIP-funded facility, unless the facility is eligible for and transferred to FAA. See Table G-3.1. for more information on transfer eligibility concerning specific equipment. **Alaska and Hawaii Only:** General aviation airports classified as basic and local under the current National Plan of Integrated Airport Systems (NPIAS) may transfer ownership of eligible systems and equipment that meet FAA requirements to the Air Traffic Organization (ATO) regardless of funding source used to purchase the systems and equipment. See the current version of Advisory Circular (AC) 170-9A, Criteria for Assumption of Ownership of Non-Federal Systems, for guidance on acceptance of eligible systems.
Use	The NAVAID must be for nonexclusive public use.
Scope	The project supports congressionally directed priorities and aircraft operations for landing at or taking off from an airport by providing visual and electronic guidance as well as airport and weather identification and reporting.
On-Airport	▪ The NAVAID must be on airport property and depicted on the latest FAA-approved ALP. ▪ The runway must be eligible (see Appendix B, Aircraft Operational Surfaces).

Item	Description
Off-Airport	If NAVAIDS will be installed or relocated off-airport property, sufficient property rights acceptable to the FAA, such as an easement are required. The easement must be shown on the Exhibit A Property Inventory Map.

G-2.2. JUSTIFICATION REQUIREMENTS

TABLE G-2.2. GENERAL JUSTIFICATION REQUIREMENTS FOR NAVAID PROJECTS

Item	Description
Objective	▪ The project must achieve at least one of the congressionally directed priorities: ○ accommodate capacity; ○ achieve compliance with standards; or ○ address safety determinations; and ▪ There is an actual need for the project and a timeframe for the need; and ▪ Only the elements required to obtain the full benefit of the project are included in the scope.
Instrument Runway Designation	Runway must be designated as an FAA instrument runway, with certain NAVAID equipment being necessary to establish instrument capabilities (e.g., instrument landing system or ILS, area navigation or RNAV, approach lighting system or ALS, and runway visual range or RVR).

G-2.2.1. SCOPE & ALLOWABLE COSTS

The project scope must align with the project's justification. Project scope includes allowable costs the FAA has determined are necessarily incurred in carrying out the project and reasonable in amount.

Allowable temporary construction costs include the acquisition and installation of interim non-Federal or Federal NAVAIDs deemed necessary by relevant authorities to maintain visual or instrument capability during extended construction periods of an AIP project.

Generally Excluded Work:

- Routine work, including light bulb replacement, erosion control, and minor replacement of parts.
- Obstacle removal efforts are typically not allowable unless certain criteria are met (see Appendix C, Airport Infrastructure).
- NAVAID Relocation: AIP participation to move or replace FAA-owned NAVAIDs that impede an AIP-funded project must not include refurbishing, enhancing, or upgrading the system.

TABLE G-2.3. GENERAL SCOPE OF WORK FOR NAVAID PROJECTS

Item	Description
Equipment	FAA-approved equipment.
Power and Control	Necessary for the NAVAID to function and meet FAA's electrical power policy to ensure high-quality, reliable, and backed-up electrical power for NAS facilities.
Spare Part Costs of Visual Aids	NAVAID spare part costs are allowable only if all the following criteria are met: ▪ The spare parts are for eligible airport visual aids listed in the current AC 150/5340-26, Maintenance of Airport Visual Aid Facilities; ▪ The spare parts are included in the same grant as the airport visual aid installation; ▪ The cost does not exceed the lesser of 10% of the total airport visual aid cost or $10,000; ▪ The spare parts are minor components that the sponsor's own staff can replace; and ▪ The sponsor can store or accurately account for the spare parts inventory.
Site Preparation	Trenching, boring, grading, etc.
Flight Check	FAA flight checks, when required to commission a NAVAID, must be conducted via a reimbursable agreement (RA). The cost for the FAA's ATO to conduct more than one flight check (also called flight inspections), including the associated costs for contractor participation, during the commissioning of a NAVAID is prohibited, unless an additional flight check is required through no fault of the sponsor.
Obstacle Removal	Controlling obstacles that penetrate airport design approach or departure surfaces and / or terminal instrument procedures (TERPS) surfaces.
Service Road	Necessary to access the NAVAID once the project is complete.
Non-Fed Coordination	Coordination with the FAA's Non-Federal Program Office.

G-2.2.2. USEFUL LIFE

Projects are eligible for initial acquisition and installation and reconstruction. Reconstruction or replacement of sponsor-owned equipment is eligible only after the useful life has expired and the equipment or infrastructure is no longer functional or maintainable. Airport rotating beacons may also be justified for rehabilitation.

Chapter 2 discusses minimum useful life requirements applicable to all AIP-funded projects. One component of the minimum useful life requirement for equipment or a facility being reconstructed is that the equipment or facility must no longer be operational or maintainable, while rehabilitation must extend the useful life. Chapter 2, Section 2-3.2., Minimum Useful Life, provides details on what factors the ARP Field Office must evaluate if the equipment or facility has not achieved its minimum useful life.

Table G-3.1. includes specific minimum useful life requirements applicable to NAVAID projects.

G-3. ELIGIBLE NAVAID PROJECTS

For scope of work requirements applicable to all AIP-funded projects, see Chapter 2.

Relevant Advisory Circulars (ACs) and Orders include, but are not limited to, the current version of:

- AC 150/5300-13, Airport Design;
- AC 150/5345-28, Precision Approach Path Indicator (PAPI) Systems;
- AC 150/5345-27, FAA Specification for Wind Cone Assemblies;
- AC 150/5340-26, Maintenance of Airport Visual Aid Facilities;
- AC 150/5340-30, Design and Installation Details for Airport Visual Aids;
- AC 150/5345-12, Specification for Airport and Heliport Beacons;
- AC 150/5220-16, Automated Weather Observing Systems (AWOS) for Non-Federal Applications;
- AC 150/5340-5, Segmented Circle Airport Marker System;
- AC 170-9A, Criteria for Assumption of Ownership of Non-Federal Systems;
- FAA Order JO 6030.20, Electrical Power Policy;
- FAA Order JO 7400.2, Procedures for Handling Airspace Matters;
- FAA Order 6700.20, Approval, Operation, and Oversight of Non-Federal Systems;
- FAA Order 7031.2, Airway Planning Standard Number One Terminal Air Navigation Facilities and Air Traffic Services;
- FAA Order 8260.3, United States Standard for Terminal Instrument Procedures (TERPS);
- FAA Order 8260.19, Flight Procedures and Airspace; and
- FAA Order 8200.1, United States Standard Flight Inspection Manual.

See the AC checklist for a list of the latest version of ACs applicable to AIP-funded projects.

TABLE G-3.1. ELIGIBLE NAVAID PROJECTS

Project Type	Justification and Useful Life	Additional Requirements and Considerations	Excluded Work
Instrument Approach Aid **Instrument Landing System (ILS)** *Acquire, Install, & Reconstruct* ***Unit of Measure:*** *Item Type & Quantity*	The runway must be eligible and instrument designated. The airport must be Large, Medium, or Small hub with the ILS serving a new or extended runway used primarily for arrivals or at a towered airport if the ILS is needed to provide Category II or III	The ILS provides electronic guidance for safe aircraft landing in reduced visibility, with components including localizer (LOC) and glide slope (GS) antennae offering horizontal and vertical guidance. Additional NAVAID components can enhance ILS approach minimums for Category II and III, including	Rehabilitation and routine work. Replacement of ATO-owned ILS is prohibited. The ARP Field Office must not program a new ILS on an existing runway.

Project Type	Justification and Useful Life	Additional Requirements and Considerations	Excluded Work
	minimums during extended periods of low visibility. New ILS installations are only funded if an RNAV (e.g., localizer performance with vertical guidance or LPV) approach is unsuitable for more than 100 hours annually, with written concurrence from the ARP Field Office. ILS installations planned for ATO transfer require advanced ARP Field Office approval. A satisfactory benefit cost analysis (BCA) is required. Reconstruction is eligible after 15 years, and the equipment is no longer functional or maintainable.	special authorization capabilities. Projects may include design, equipment, power and control wiring, utility service, electrical power or control components, duct bank, conduit, manholes, handholes, grading, engine generator, platform, airfield lighting vault, airfield lighting control and monitoring system (ALCMS), and design surface clearances. The project must ensure a fully operational ILS upon completion. Coordination with the FAA's Non-Federal Program Office is required. The equipment installation must meet ATO RA conditions. Flight check via RA is required. The sponsor must secure a radio frequency spectrum assignment if needed. **Alaska and Hawaii Only:** If FAA has determined that a satellite navigation system cannot provide a suitable approach to the airport, the sponsor may transfer an ILS consisting of a GS and LOC to the ATO if Federal funds were used to purchase the system. If the airport is a general aviation airport classified as basic or local	An ALS to an existing runway end must be separately justified. New ground-based ILS installations are not funded where an RNAV approach can provide similar capabilities.

Project Type	Justification and Useful Life	Additional Requirements and Considerations	Excluded Work
		under the current NPIAS, the airport may transfer the ILS to the FAA's ATO even if Federal funds were not used to purchase the system.	
Instrument Approach Aid **Runway Visual Range (RVR)** *Acquire, Install, & Reconstruct* ***Unit of Measure:*** *Item Type & Quantity*	The runway must be eligible and instrument designated with instrument procedures having published RVR minimums. Normally installed to support RNAV and ILS approaches. Reconstruction is eligible after 15 years, and the equipment is no longer functional or maintainable.	Visibility information is made available to air traffic control (ATC) and pilots. The sponsor cannot transfer the ownership and maintenance of the RVR to the FAA's ATO unless installed as part of a complete ILS. Projects may include design, equipment, power and control wiring, utility service, electrical power or control components, duct bank, conduit, manholes, handholes, grading, platform, airfield lighting vault, and design surface clearances. **Funding Restrictions at Nonprimary Airports:** Only nonprimary commercial service or nonprimary general aviation airport apportionment funding (sometimes called entitlements) can be used at nonprimary airports.	Rehabilitation and routine work. An ILS must be separately justified.
Runway Visual Guidance System **Approach Lighting System (ALS)** *Install & Reconstruct* ***Unit of Measure:*** *Item Type & Quantity*	The runway must be eligible and instrument designated with instrument procedures that will have a reduction in visibility minimums of at least ¼ mile due to ALS, as	Includes ALS, approach lighting system with sequenced flashing lights (ALSF), medium intensity approach lighting system and runway alignment indicator lights (MALSR), and medium intensity	Rehabilitation and routine work.

Project Type	Justification and Useful Life	Additional Requirements and Considerations	Excluded Work
	verified in the Terminal Procedures Publication. Normally installed to support RNAV and ILS approaches. Only eligible on a runway with published instrument approach procedures and 300 or more recorded annual instrument approaches or 300 or more recorded annual instrument approaches predicted within five years. Medium intensity approach lighting system without runway alignment indicator lights (MALS) require additional justification because runway alignment indicator lights are an integral part of most ALS installations. A satisfactory BCA is required. Reconstruction and replacement are eligible after 15 years, and the equipment is no longer functional or maintainable.	approach lighting system with sequenced flashing lights (MALSF). **Operation / Maintenance**: The sponsor cannot transfer the ownership and maintenance of an ALS to the FAA's ATO unless it is installed as part of a complete ILS that includes an ALS. Required outcome requires complete ALS installation with clear approaches that reduce the visibility minimums and meet FAA installation standards. Flight check via RA when ALS is associated with new or modified instrument approach procedure (IAP). **Alaska and Hawaii Only:** May transfer a MALSR with runway alignment indicator lights to the FAA's ATO if Federal funds were used to purchase the system. If the airport is a general aviation airport classified as basic or local under the current NPIAS, the airport may transfer the MALSR to the FAA's ATO even if Federal funds were not used to purchase the system.	
Runway Vertical / Visual Guidance System **Runway End Identification Lights (REILs)**	The runway must be eligible. REILs help pilots positively identify the runway's approach end, especially during low visibility or at nighttime	The airport cannot transfer ownership of these systems to the FAA's ATO. Flight check is required if new or relocated REIL is sited to support an IAP.	Rehabilitation and routine work.

Project Type	Justification and Useful Life	Additional Requirements and Considerations	Excluded Work
Install, Reconstruct, & Replace ***Unit of Measure:*** *Item Type & Runway Threshold Location*	in areas with many lights or in areas without proximate light interference, such as featureless terrain. Justified on runway ends without an approach lighting system that are visual, have circling minima, or have straight-in instrument flight procedures. Reconstruction and replacement are eligible after 15 years, and the equipment is no longer functional or maintainable.		
Runway Vertical / Visual Guidance System **Precision Approach Path Indicator (PAPI)** *Install, Reconstruct, & Replace* ***Unit of Measure:*** *Item Type & Runway Threshold Location*	Justified on any eligible runway, as PAPIs enhance safety by providing beneficial vertical visual guidance to assist the pilot of an aircraft in flying a stabilized approach. Reconstruction and replacement are eligible after 15 years, and the equipment is no longer functional or maintainable.	Install a 4-box PAPI on runway ends with IAPs that provide vertical guidance (precision or approach procedure vertical), runway ends with a jet as its critical aircraft, or at Part 139 airports. Install a 2-box PAPI on runway ends that are visual or have only non-precision IAPs, or when obstacle mitigation is necessary in the runway approach. The airport cannot transfer ownership of these systems to the FAA's ATO. Flight check is required if the new or relocated PAPI is used to support an IAP or is being installed to mitigate 20:1 obstacle penetrations.	Visual approach slope indicators (VASI) are not eligible. Rehabilitation and routine work.

Project Type	Justification and Useful Life	Additional Requirements and Considerations	Excluded Work
Compass Calibration Pad *Install & Remark* ***Unit of Measure:*** *Item Type*	The aircraft operational surface (AOS) must be eligible. Site conditions and airport design criteria determine a suitable location for a compass calibration pad. Conducting a magnetic survey establishes the suitability of a final location. Remarking is eligible after 3 years (paint) or 7 years (thermoplastic). See Appendix F, Lighting, Signage & Markings, for additional information on thermoplastic markings.	Planned and constructed with adjacent, nonexclusive use taxiway or apron pavement. Can be a stand-alone project or can be funded through an AOS apron or taxiway project (see Appendix B, Aircraft Operational Surfaces).	Rehabilitation and routine work.
Wind Cone (also referred to as a windsock) *Install & Reconstruct* ***Unit of Measure:*** *Item Type & Quantity*	**Primary Wind Cone:** Required at all airports. **Supplemental Wind Cones:** Must meet standards or Part 139 requirements. **Lighting Requirements:** All wind cones must be lit at airports with runway lighting. Reconstruction is eligible after 15 years, and the equipment is no longer functional or maintainable.	Must result in a fully compliant installation, including necessary mounting and installation equipment like poles and power feed.	Rehabilitation and routine work.
Segmented Circle *Install & Reconstruct* ***Unit of Measure:*** *Item Type & Quantity*	Can be co-located with the primary wind cone for ease of location for pilots.	Includes necessary mounting and installation equipment.	Rehabilitation and routine work. Not eligible at heliports and seaplane bases.

Project Type	Justification and Useful Life	Additional Requirements and Considerations	Excluded Work
	Reconstruction is eligible after 15 years, and the equipment is no longer functional or maintainable.	Must result in a compliant installation that meets standards.	
Rotating Beacon *Install, Rehabilitate, & Reconstruct* ***Unit of Measure:*** *Item Type & Quantity*	The airport must be open at night and must have runway lights to justify a beacon. Needed to satisfy a current Part 139 requirement or a documented safety determination or finding. Reconstruction is eligible after 15 years, and the equipment is no longer functional or maintainable. Rehabilitation after 8 years to extend the useful life.	Rehabilitation may include overhauling the light, addressing structural issues with a pole or tower, updating the control cabinet, and / or the power feed. Must result in a fully functional airport beacon that meets standards.	Routine work.
Automated Weather Observing System (AWOS) *Install & Reconstruct* ***Unit of Measure:*** *Item Type & Quantity*	Requires prior notification to and concurrence from the Service Center Non-Federal Program Implementation Manager (PIM). The ARP Field Office must not program the project prior to verifying that the sponsor has completed PIM coordination including radio spectrum frequency assignment. No other FAA-owned or maintained weather reporting system must	Project may include site preparation (grading and removing obstructions). Automatic telephone answering systems or radio transmitters are an allowable cost if all approvals and frequency assignments are obtained. Install AWOS equipment and necessary electrical work. At airports that have aircraft or expect to have aircraft operating under 14 CFR Part 135, the sponsor must connect the AWOS-III via subscription using an	Rehabilitation and routine work. Subscription costs for WMSCR connection after the first 60 days.

Project Type	Justification and Useful Life	Additional Requirements and Considerations	Excluded Work
	exist or be planned at the airport (e.g., ASOS), excluding weather monitoring aids installed in the air traffic control tower (ATCT). Reconstruction is eligible after 15 years, and the equipment is no longer functional or maintainable.	approved third-party service provider to the Weather Messaging Switching Center Replacement (WMSCR) for dissemination of weather data to pilots, flight planning vendors, and the National Weather Service. Airports without current or expected instrument flight rules (IFR) operations under 14 CFR Part 135 are to use AWOS systems below AWOS III. These airports should not select systems that can be upgraded to AWOS III or higher to ensure fair manufacturer competition. If sponsors bid for AWOS-A, AWOS-A/V, AWOS-I, or AWOS-II without upgrade requirements and the lowest bid is for an upgradable system, they can use non-AIP funds for the upgrade. In that case, sponsors must work with their PIM on AWOS-III needs. **Alaska and Hawaii Only:** May transfer an AWOS to the FAA's ATO if Federal funds were used to purchase the system. If the airport is a general aviation airport classified as basic or local under the current NPIAS, the airport may transfer the AWOS to the FAA's ATO even if Federal	

Project Type	Justification and Useful Life	Additional Requirements and Considerations	Excluded Work
		funds were not used to purchase the system.	
Don Young Alaska Aviation Safety Initiative (DYAASI) **(1) AWOS** **(2) Visual Weather Observation Systems (VWOS)** **(3) Weather Cameras** **(4) Automatic Dependent Surveillance-Broadcast (ADS-B) Ground Stations** *Acquire & Install* ***Unit of Measure:*** *Item Type & Quantity*	The airport is in Alaska, Hawaii, Puerto Rico, American Samoa, Guam, the Northern Mariana Islands, or the Virgin Islands and classified in the most recent NPIAS. Funding requests can be made by sponsors of covered airports for general aviation apportionment and / or Alaska Supplemental funding.	Aims to enhance aviation safety at covered airports. **AWOS:** • Ensure each covered airport has an installed, operating, and reliable automated weather system by December 31, 2030. • Eligible systems must be approved for use by 14 CFR Part 121 and 135 aircraft operators. **VWOS:** • VWOS will be eligible once implementing operational specifications are available. **Weather Cameras:** • Must meet current technical specifications from the ATO's Weather Camera Program. **ADS-B Ground Stations:** • Sponsors may execute agreements with FAA's ADS-B vendor to install additional ground stations. Sponsor must obtain approval from the ARP Field Office and ARP Headquarters for ADS-B expansion initiatives.	Ownership, operation, and maintenance cannot be transferred to the FAA for VWOS, non-Federal weather cameras, or ADS-B ground stations.

G-4. RELATED PROJECTS

The projects in this section are not eligible for NAVAID development; however, references to related projects that may be eligible are provided as applicable.

TABLE G-4.1. RELATED PROJECTS

Project Type	When Scope of Work Includes	See Appendix
Area Navigation (RNAV)	Aeronautical Surveys	K, Planning
Compass Calibration Pad	Apron	B, Aircraft Operational Surfaces
	Markings	F, Lighting, Signage & Markings
Runway and Taxiway Lighting	Touchdown zone lighting, Land and Hold Short Operations (LAHSO) lighting, Airfield Lighting Control and Monitoring System (ALCMS), runway and taxiway center line and edge lights, and airfield lighting vault	F, Lighting, Signage & Markings