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600. Introduction

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600.1. Design Criteria

600.1.1 Federal Funding

Design AIP projects funded wholly or in part with federal funds in accordance with the FAA Advisory Circulars and Chapter 25 of the *Alaska Highway Preconstruction Manual*. Chapter 25 contains FAA approved interpretations, amendments, and supplements to the advisory circulars.

Airway Improvement Act, recodified at 49 USC 47105(b)(3) states in part, “An application for a project grant under this subchapter may propose airport development only if the development complies with the standards the Secretary prescribes or approves, including standards for site location, airport layout, site preparation, paving, lighting, and safety approaches.” The design and construction standards of AIP projects are contained in advisory circulars listed in the Current FAA Advisory Circulars for AIP Projects (<http://www.faa.gov/arp/150acs.cfm>).

To carry out the intent of the act, the Department must certify that “the plans and specifications were developed in accordance with all applicable federal standards and requirements, and no deviation from or modification to standards set forth in the advisory circulars was necessary other than those previously approved by FAA.” In addition, Order 5100.38, *AIP Handbook*, paragraph 35, provides that “... a sponsor is required to comply with all appropriate technical guidelines incorporated into identified ACs; and these standards become mandatory for the project being funded. Standards in effect on the date of allocation of AIP funds to a project apply to that project. Standards which become effective after the date of allocation may be applied to the project by mutual agreement between the FAA and the sponsor.”

State standards may be developed for airports that are nonprimary airports, in accordance with 49 USC 47105(c), and AC 150/5100-13A, *Development of State Standards for Nonprimary Airports*. Standards appropriate for consideration include airport configuration, pavement design and drainage design.

Excluded for consideration is the development of standards that relate to safety of airport approaches. Chapter 25 of the *Alaska Highway Preconstruction Manual* is the preeminent FAA-approved state design standard for nonprimary airports.

600.1.2 Nonfederal Funding

Aviation capital improvement projects funded with nonfederal funds must comply with advisory circulars and Chapter 25 of the *Alaska Highway Preconstruction Manual*.

600.2. Standard Specifications

Airport Standard Specifications are based on the latest edition of, and published changes to, FAA Advisory Circular (AC) 150/5370-10A, *Standards for Specifying Construction of Airports*. The Department has obtained FAA approval of a modified version of these standards, under the authority of FAA Order 5300.1, *Approval Level for Modification of Agency Airport Design and Construction Standards*. This publication is the *Standard Specifications for Airport Construction*, and is managed by the Division of Design and Engineering Services, Design and Construction Standards.

The *Standard Specifications for Airport Construction* is supplemented, as necessary, by appropriate special provisions included in contracts. Special provisions include statewide and project special provisions. Statewide special provisions are preapproved for use either in state-funded or AIP projects and are issued by the Division of Design and Engineering Services.

If a federal requirement would conflict with a state requirement or cause substantial additional expense or administrative burden on state projects, it is usually issued as a statewide special provision and prescribed for AIP contracts only. Examples: Buy American, DBE Program.

Similarly, a state requirement that would conflict with a federal requirement or cause substantial additional expense or administrative burden is usually issued as a statewide special provision and prescribed for state-funded contracts only. Examples: Alaska Wood Product Preference and Alaska Bidder Preference.

The FAA must approve project special provisions, prior to advertising, under the requirements of FAA Order 5300.1.

Specifications included in the *Standard Specifications for Airport Construction* are effective as of the date shown on the page footers. Subsequent changes to AC 150/5370-10A, issued by the FAA, will govern these specifications.

The *Standard Specifications for Airport Construction* are designed to meet the requirements for primary airports, but are generally suitable for the construction of all commercial service airports (both primary and nonprimary) as well as general aviation airports. However, they will not fit every situation. It is intended that the designer refer to the “notes to the engineer” in the most current AC 150/5370-10A to ensure the specifications for the project will meet applicable FAA standards, and review other acceptable specification options.

AC 150/5370-10A will govern for standard FAA items not included in the *Standard Specifications for Airport Construction*.

Designers must include the Materials Sampling & Testing Frequency table in each advertised contract. This table is located in the appendix to the *Standard Specifications for Airport Construction*.

600.3. Modification of Standards

For a specific project where local conditions preclude compliance with airport design, construction, and/or equipment standards, the designer may request a modification of standards. For federally funded projects, the request must be in accordance with Order 5300.1. For non-federally funded projects, the request must be in the format of Order 5300.1 (8) and approved by the regional preconstruction engineer.

600.4. Definitions

AIP: Airport Improvement Program

Airport: An area of land or water that is used or intended for use for the landing and takeoff of aircraft, and any appurtenant areas that are used or intended for airport buildings or other airport facilities or rights-of-way, together with airport buildings and facilities located thereon

Commercial Service Airport: A public airport that has at least 2,500 passenger boardings each year and is receiving scheduled passenger aircraft service

Community Airport: The main class of rural community airports. See the DOT&PF *Alaska Aviation System Plan* and the 1996 update to the

System Plan for detailed definition of community class airports.

Department: The Alaska Department of Transportation and Public Facilities

FAA: Federal Aviation Administration

Frangible NAVAID: A navigational aid (NAVAID) that retains its structural integrity and stiffness up to a designated maximum load, but on impact from a greater load, breaks, distorts, or yields in such a manner as to present the minimum hazard to aircraft. The term NAVAID includes electrical and visual air navigational aids, lights, signs, and associated supporting equipment.

General Aviation Airport: For the purpose of this manual, a civil airport not designated as a commercial service airport

Nonprimary Airport: For the purpose of this manual, all civil airports with 10,000 passenger boardings or fewer per year

Passenger boardings: Revenue passenger boardings on an aircraft in service in air commerce, including passengers who continue on an aircraft in international flight that stops at an airport in the contiguous states, Alaska, or Hawaii for a nontraffic purpose

Primary Airport: A commercial service airport that has more than 10,000 passenger boardings each year

Public Airport: An airport used or intended to be used for public purposes that is under the control of a public agency; and/or one in which the area used or intended to be used for the landing, taking off, or surface maneuvering of aircraft is publicly owned

Runway (RW): A defined rectangular surface on an airport prepared or suitable for the landing or takeoff of airplanes

Shoulder: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement; enhanced drainage; and blast protection

Standard Specifications for Airport Construction: AC 150/5370-10A, *Standards for Specifying Construction of Airports*, as modified by the Department, and approved by the FAA for AIP contracts in Alaska

Taxiway (TW): A defined path established for the taxiing of aircraft from one part of an airport to another

Threshold (TH): The beginning of that portion of the runway available for landing. When the threshold is located at a point other than at the beginning of the pavement, it is referred to as either a displaced or relocated threshold.

610. Elements of Design

610.1. Community Airport Runway Length

610.1. Community Airport Runway Length

At community airports, provide a minimum primary runway length of 3,300 feet or in accordance with the length provided in the FAA Advisory Circulars, whichever is greater. The regional preconstruction engineer may provide written approval of primary runway lengths less than 3,300 feet at community airports if local site conditions warrant it. In no case may the primary runway length at community airports be less than that provided in the FAA Advisory Circulars unless previously approved by the FAA.

Provide runway lengths exceeding the above stated minimums when necessary to address specific geographic or climatic site conditions, or when coordination with interested parties in accordance with Section 420 of this manual indicates a need for a longer runway.

620. Drainage Design

620.1. Erosion and Sediment Control Plans (ESCP)

620.1. Erosion and Sediment Control Plans (ESCP)

Develop an ESCP for all projects with disturbed ground that meet either of the following conditions:

- Owned by the Department
- Designed (or design administered by) and constructed (or construction administered) by the Department

Projects not owned by the Department (such as utilities projects constructed separately from, but in consort with, a Department project) do not require Department involvement in development of an ESCP.

The ESCP for simple projects, such as lighting projects or overlays, may be shown directly on the plan and profile sheets. Develop more complex ESCPs on separate “site map” plan sheets.

Use Chapter 16 of the *Alaska Highway Drainage Manual* as a reference for design of erosion and sediment control structures. The *AASHTO Highway Drainage Guidelines* provide additional guidance.

Include the following items in the ESCP for projects with disturbed ground of 1 acre or more:

- A description of the nature and extent of the construction activity
- A general area location map and a site map
- The total area of the project in acres (to the nearest quarter acre). Include the area within the right-of-way and any known off-site disturbed areas supplied as materials sources, stockpile sites, etc. List the on-site and off-site areas of the project separately.
- Location of disturbed areas. Include areas of excavation, grubbing, embankment, waste, borrow/quarry sites (when known), stockpile sites (when known), etc.
- The area of disturbed ground in acres (to the nearest quarter acre). Include excavated areas, embankments, etc. Do not include the area of

pavement removal or overlay if the work does not remove the aggregate underlying the pavement. List on-site and off-site disturbed areas separately.

- Drainage patterns
- Slopes (both naturally occurring and constructed) anticipated after completion of grading activities. You may show slopes by contours, typical sections, or notation on the site map.
- The location of all known temporary and permanent erosion and sediment control measures to be included in the project. Include existing vegetation to be used in control of erosion and sediment. Provide an indication of temporary erosion and sediment control measures that may require installation, relocation, and/or removal during construction. Use symbols presented in Chapter 16 of the *Alaska Highway Drainage Manual* to identify erosion and sediment control measures on the ESCP.
- The location and known names of surface waters
- The location of any wetlands or wetlands that may be used for controlling erosion and sedimentation (provided by the regional environmental coordinator)
- The location of any impaired waters (provided by the regional environmental coordinator)
- The location of any waters with approved and final Total Maximum Daily Loads (TMDLs) for Alaska (provided by the regional environmental coordinator)
- Locations where storm water is discharged to a surface water
- Listed threatened or endangered species, or their critical habitat, found in proximity to the project (provided by the regional environmental coordinator)
- Information on historic or archaeological sites, including (1) whether any sites listed on the National Register of Historic Places may

be affected by storm water discharges, and (2) whether any written agreement is in place with the state historic preservation officer (provided by the regional environmental coordinator)

630. Pavement Design (Reserved)

640. Markings (Reserved)

650. Sign Systems (Reserved)

660. Lighting Visual Aids

- 660.1. Introduction
- 660.2. Unpaved Runway and Taxiway Edge Marking

660.1. Introduction

The elements of miscellaneous visual aids are described in AC 150/5340-21, Airport Miscellaneous Lighting Visual Aids.

660.2. Unpaved Runway and Taxiway Edge Marking

For unpaved runways, the Department requires airport designers to use the following standards for runway and taxiway markers.

660.2.1 Runway Threshold Marking

On lighted runways, the use of reflective markers (cones, flexible stakes or wands) is optional. The guidance in this subsection for placement of reflective markers on lighted runways applies when the designer determines augmentation of runway lighting is desirable. Consider installation of reflective markers in combination with lighting on airports with unreliable electrical power sources.

The use of cones over lights may be undesirable at some airports. Consult airport administrators and maintenance personnel to determine if use of cones over lights is desirable.

Unlighted Runways

Threshold cone markers: On unlighted runways, use reflective cone markers to mark the runway threshold.

1. Place three cone markers on each side of a threshold, for a total of six markers on each end.
2. Place the markers in a line perpendicular to the extended runway centerline and 10 feet from the designated runway threshold. Place the innermost threshold cone marker in line with the runway edge markers. Space the remaining threshold cone markers evenly at 10-foot intervals outbound from the runway (Figure 660-1).
3. Use markers that do not exceed 30 inches in height.
4. Use reflective cone markers with 180-degree green and 180-degree red reflective bands.

Position the markers so that only the red color is visible from the runway side, and only green is visible from the approach path. Use a reflective band made of high-intensity sheeting of sufficient width to meet FAA specifications for reflective markers (AC 150/ 5345-39B for reflectivity specifications).

Lighted Runways

Threshold lights: Identify runway threshold by lighting.

1. On a runway used exclusively for visual operations, use six lights on each end (three on each side); on an instrumented runway, use eight lights on each end (four on each side). We advise using eight lights on each end whenever it is likely that a navigation aid and commissioned approach may be put in service at the airport.
2. Place threshold lights in a line perpendicular to the extended runway centerline and 10 feet from the designated runway threshold. Place the innermost runway threshold light in line with the runway edge lights, and space the remaining lights evenly at 10-foot intervals outbound from the runway (Figure 660-1).
3. Use threshold lights with green and red split lenses. Position the lights so that only the red color is visible from the runway side, and only green is visible from the approach path.

Threshold cone markers: On lighted runways, use reflective cone markers in conjunction with lights to identify the runway threshold.

1. Place a reflective cone marker over the top of each light so the light protrudes from the top of the cone marker (Figures 660-1, 2, and 3).
1. Use reflective cone markers with 180-degree green and 180-degree red reflective bands. Position the markers so that only the red color is visible from the runway side, and only green is visible from the approach path. Use a reflective band made of high-intensity sheeting of sufficient width to meet FAA specifications for reflective markers (AC 150/5345-39B for reflectivity specifications).

Lighted and Unlighted Runways

Reflective threshold markers: Mark the ends of lighted and unlighted runways with reflective threshold markers.

1. Use five markers on each side of a threshold, for a total of ten markers on each end (Figures 660-1 and 2).
2. Place the markers perpendicular to the runway centerline and space them at 1.7-foot intervals between the first two runway threshold cone markers or cone markers with lights (Figures 660-1 and 2). Use markers consisting of flexible posts, not to exceed 30 inches in height, covered by reflectivity enhancers.
3. Use orange markers with a 180-degree green reflective band toward the approach path and a 180-degree red reflective band toward the runway (Figure 660-1). Use reflective bands made of high intensity sheeting of sufficient width to meet FAA specifications for reflective markers (AC 150/5345-39B for reflectivity specifications).

660.2.2 Runway Edge Marking

Unlighted Runways

Reflective edge markers: Cones, flexible posts, wands, or other frangible markers are a visual substitute for lights. Position them similarly to runway edge lights (AC 150/5340-24).

1. Line each side of the runway with a row of reflective edge markers. Place each row of edge markers parallel to the centerline and from 2 feet and 10 feet outside the edge of the designated runway. Use equidistant longitudinal spacing not to exceed 200 feet, in accordance with AC 150/5340-24. Place markers from one edge row directly across from the markers on the opposite edge row.
2. The area between the edge of the designated runway and the markers must support an aircraft's weight without causing damage to the aircraft. If the area between the markers and the edge of the designated runway cannot support an aircraft, place the markers on the edge of the designated runway.
3. Use markers that are frangible and are not less than 14 inches or more than 30 inches in height (Figure 660-4).

Use white reflective bands made of high intensity sheeting of sufficient width to meet FAA specifications for reflective markers (AC 150/5345-39B for reflectivity specifications).

Lighted Runways

Combination reflective edge markers and lights:

Where runway lights are in place, install markers, as detailed in the previous section, either on the light (Figure 660-3) or slightly outboard (Figure 660-4). Use reflective bands that match the color of the runway lights (yellow/white) as appropriate. Install runway lights as per AC 150/5340-24.

660.2.3 Taxiway Edge Marking

Unlighted Taxiways

Reflective edge markers: Cones, flexible posts, wands, or other frangible markers are a visual substitute for lights. Position them similarly to taxiway edge lights (AC 150/5340-24).

1. Line each side of the runway with a row of reflective edge markers. Place each row of edge markers parallel to the centerline and from 2 feet and 10 feet outside the edge of the designated taxiway. Use equidistant longitudinal spacing not to exceed 200 feet, in accordance with AC 150/5340-24. The longitudinal spacing of the markers is influenced by the physical layout of the taxiway.
2. The area between the edge of the designated taxiway and the markers must support an aircraft's weight without causing damage to the aircraft. If the area between the markers and the edge of the designated taxiway cannot support an aircraft, place the markers on the edge of the designated taxiway.
3. Use markers that are frangible and are not less than 14 inches or more than 30 inches in height (Figure 660-4).
4. Use blue reflective bands made of high intensity sheeting of sufficient width to meet FAA specifications for reflective markers (AC 150/5345-39B for reflectivity specifications).

Lighted Taxiways

Combination reflective markers and lights:

Where taxiway lights are in place, install markers, as detailed in the previous section, either on the light

(Figure 660-3) or slightly outboard (Figure 660-4).
Install taxiway lights as per AC 150/5340-24.

EDGE SAFETY AREA

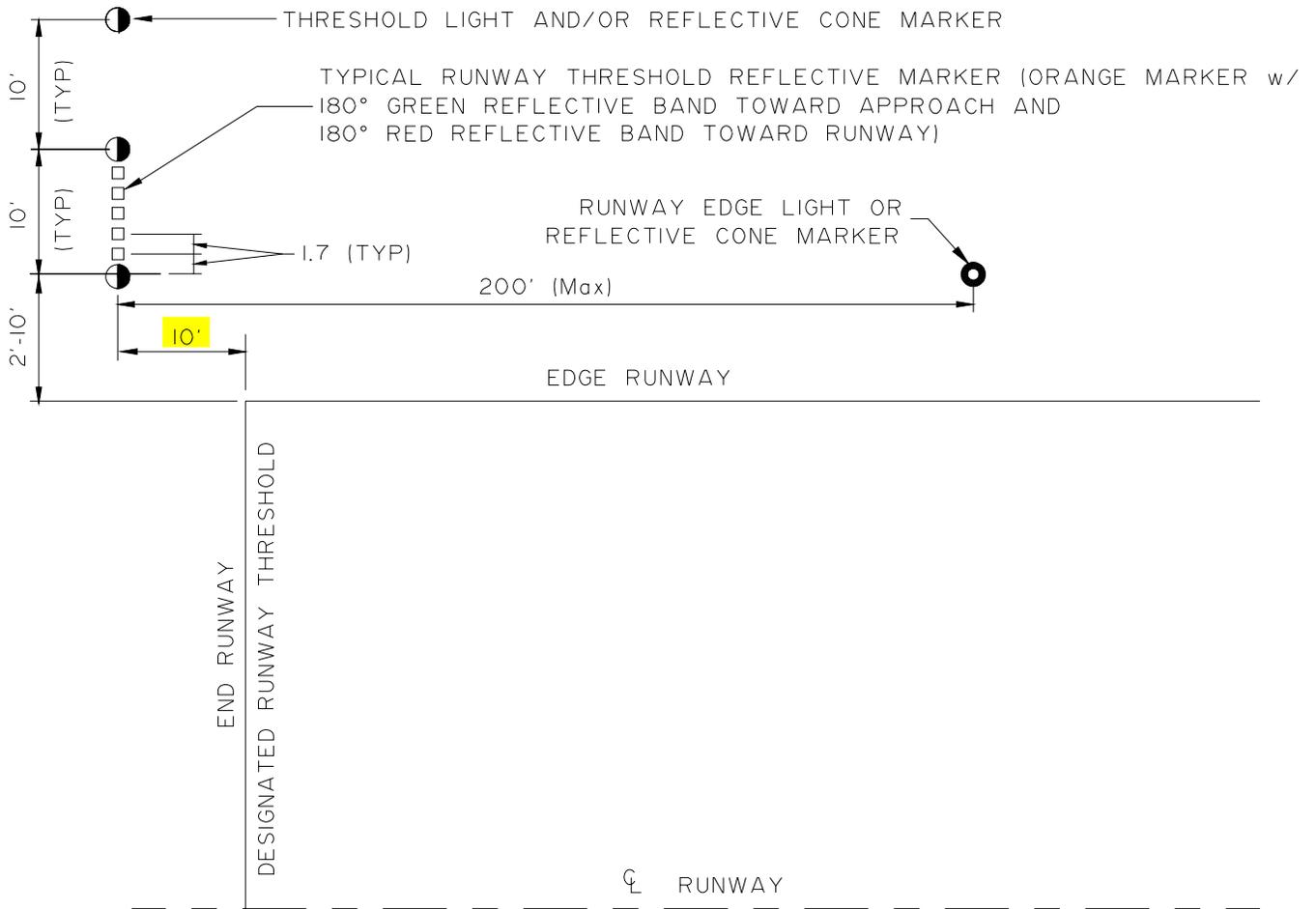


Figure 660-1
Typical Threshold Detail
No Scale

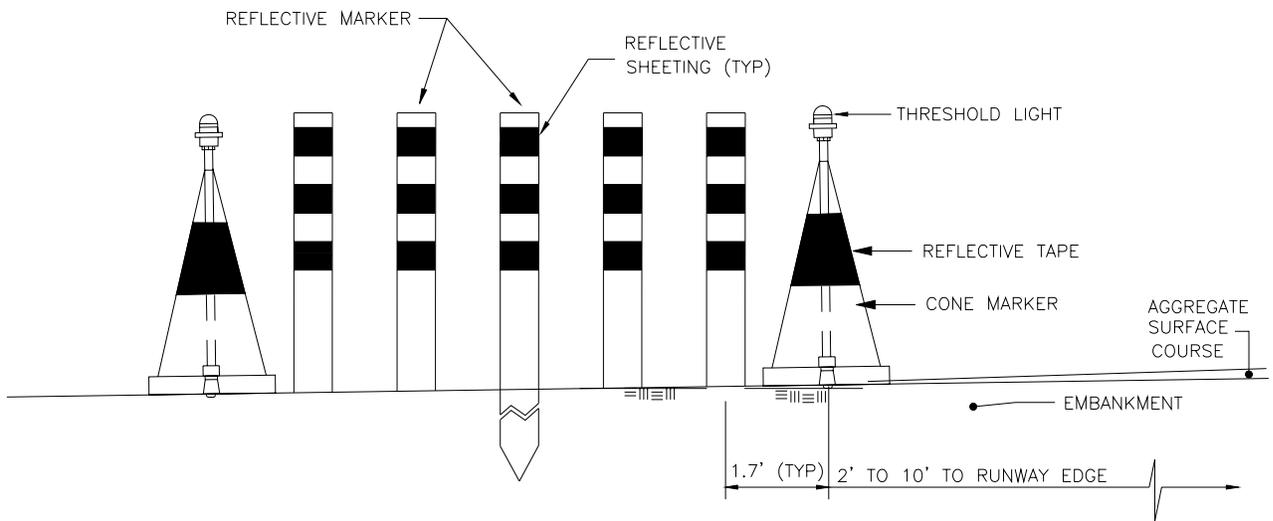


Figure 660-2
Threshold Reflective Marker Details
No Scale

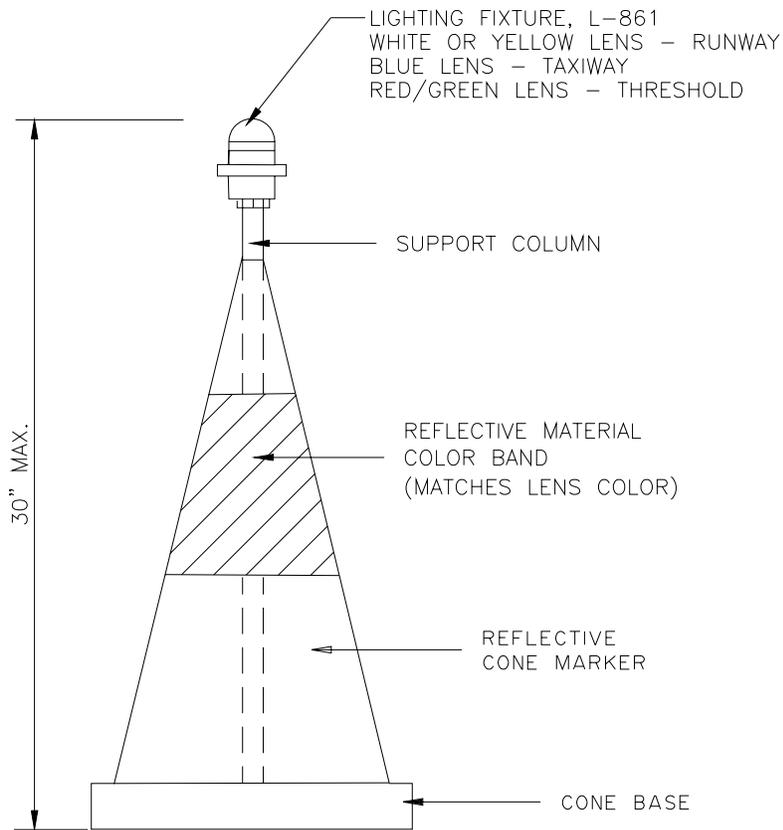


Figure 660-3
Reflective Cone Marker with Light
No Scale

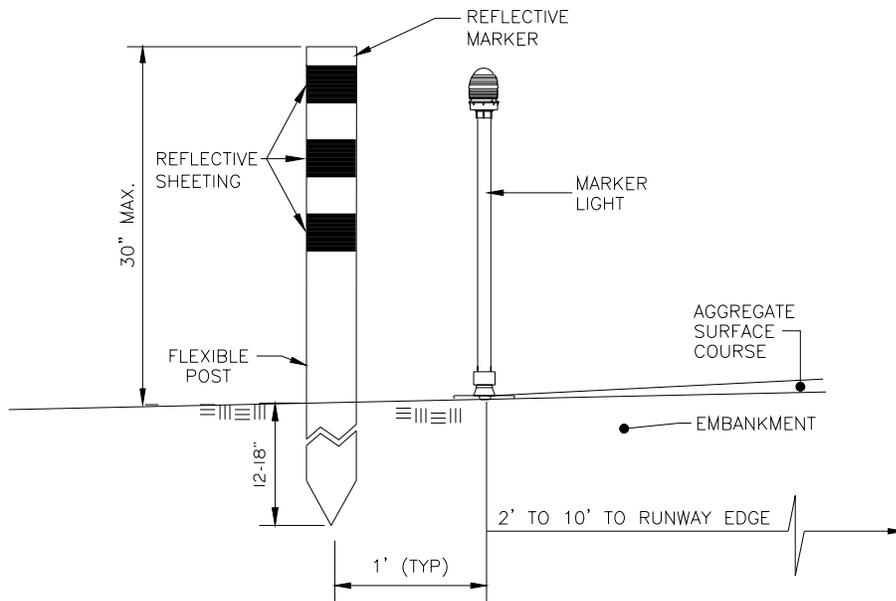


Figure 660-4
Example Detail for Runway/Taxiway Edge Reflective Marker
No Scale

670. Runway and Taxiway Edge Lighting Systems (Reserved)

680. Seaplane Facilities (Reserved)
