AC 150/5390-1

HELIPORT DESIGN GUIDE

November 1964

FEDERAL AVIATION AGENCY

U.S. FEB 1968

Federal Aviation Agency

ADVISORY CIRCULAR

AC NO: AC 150/5390-1

AIRPORTS

EFFECTIVE: 11/3/64

SUBJECT: HELIPORT DESIGN GUIDE

1. PURPOSE. This advisory circular contains design guidance material for the development of heliports, both surface and elevated, to serve single and multiengine helicopters operating under visual flight rules (VFR). The provisions of this Guide are for the advice of the public. The guidance material described is acceptable in accomplishing a project meeting the eligibility requirements of the Federal-aid Airport Program.

2. CANCELLATION. This advisory circular cancels the FAA publication, "Heliport Design Guide," dated December 1959.

3. REFERENCES.

    a. "Administration Buildings for General Aviation Airports," 1960.

    b. "Airport Design," 1961, and Supplement No. 1, 1962.

4. HOW TO GET THIS PUBLICATION. To obtain additional copies of this circular, AC 150/5390-1, "Heliport Design Guide," send request to the Federal Aviation Agency, Printing Branch, HQ-438, Washington, D. C. 20553.

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HELIPORT DESIGN GUIDE

CHAPTER 1. INTRODUCTION

1. GENERAL. This advisory circular is issued as a guide for the preparation and construction of heliports of various types and to assist public and private groups to understand the need for heliport development. The Federal Aviation Agency (FAA) has prepared this material in cooperation with industry groups in order to provide a centralized source of heliport design criteria for those desiring this information. The guide is also intended to encourage the development of heliports as part of the national transportation system. It will help to acquaint heliport owners and developers with the Federal Government's responsibilities in this field.

2. SCOPE.

a. The guide outlines the basic physical, technical, and public interest factors which should be considered in establishing heliport sites. The heliports considered range from modest exclusive use types (the vast majority in use today) to fully developed facilities suitable for multiple operations. The information offered here is based on known helicopter performance and sound operating practices. It is a summation of many years of experience at helicopter landing sites representing the varied types in use in the United States.

b. The information provided is advisory in nature and does not establish regulatory requirements. Furthermore, the specific recommendations presented are for the average or usual situation and may not be appropriate in every case. To assist in the interpretation of this information, it is suggested that technical advice be obtained from helicopter operators, helicopter manufacturers and FAA District Office technical personnel. Through consultations, the community can be assured of professional assistance in developing a heliport that is safe, practical, and useful. Information about many of the items mentioned throughout the circular is referenced in the Bibliography.

3. TERMINOLOGY. The following are definitions of terms as they are used in this advisory circular:

a. Airport. This term means an area that is used or intended to be used for the landing and takeoff of aircraft.

b. Approach-Departure Path. An approach-departure path is a clear path selected for flight, extending upward and outward from the edge of the landing and takeoff area.

c. Ground Effect. Ground effect or "ground cushion" is an improvement in flight capability that develops whenever the helicopter flies or hovers near the ground or other surface. It is produced by the reaction of the rotor downwash against the surface that increases the lifting pressure of that section of air.

d. Heliport. A heliport is an area, either at ground level or elevated on a structure, that is used or intended to be used for the landing and takeoff of helicopters and includes some or all of the various facilities useful to helicopter operation such as helicopter parking, waiting room, fueling, and maintenance equipment.

e. Helistop. A helistop is a heliport, either at ground level or elevated on a structure, for the landing and takeoff of helicopters but without auxiliary facilities such as waiting room, hangar, parking, maintenance, or fueling equipment.

f. Landing and Takeoff Area. The landing and takeoff area is that area of the heliport where the helicopter actually lands and takes off and includes the touchdown area.

g. Obstruction Clearance Surface. Obstruction clearance surfaces are planes extending outward and upward from the landing and takeoff area at angles compatible with the flight characteristics of the helicopter. They are used by the FAA to evaluate approach-departure paths for clearance of obstructions.

h. Off-Heliport Landing Site. An off-heliport landing site is a takeoff and landing area intended for temporary or occasional helicopter use.

i. Taxiing. Taxiing is a powered movement of an aircraft from one area to another usually just before takeoff or after landing. Helicopters equipped with skid-type landing gear are taxied in a hovering position a few feet above the ground, and this is referred to as "air taxiing" or "hover taxiing." Larger helicopters usually are equipped with wheel landing gear, and these frequently ground taxi as well as air taxi.

j. Touchdown Area (Helipad). The touchdown area is that part of the landing and takeoff area where it is preferred that the helicopter alight.

4. BACKGROUND.

a. Helicopter Operations. The first practical helicopter was developed in the United States just prior to World War II and was placed into operation by the military services in 1943. Civilian helicopters were introduced in 1946 and immediately found their way into a wide range of uses. Helicopter operations have expanded rapidly since that time, and a large part of this activity is performed by commercial operators. In recent years, there has been a notable increase in the number of helicopters flown for personal use and as private business aircraft.

b. Public Transportation Service. Scheduled helicopter airline service was initiated in 1947 to expedite mail delivery in the Los Angeles area. Scheduled passenger service was added there in 1954 after being inaugurated in New York City the year before. Similar services were begun in Chicago in 1956 and in San Francisco/Oakland in 1961. Scheduled passenger traffic has shown rapid increases since these beginnings. At present, passenger transportation also is being provided by helicopter air taxi operators in many cities and towns throughout the country on a charter and contract basis.

c. Heliport Development. The helicopter's growing position as an important element in the national transportation system has brought about a keen awareness of the enthusiasm for this versatile aircraft. A major factor in developing the full potential of the helicopter is the provision of an adequate system of heliports.

(1) By January 1964, nearly 800 heliports in the United States and possessions had been listed in industry publications, and hundreds of temporary or occasional landing sites are being used. In selecting future locations for helicopter landing sites, it must be borne in mind that the function served by the helicopter is not the same as that served by other aircraft. Instead, it is more akin to the taxicab or the delivery truck and is capable of going where passengers or shippers require.

(2) The helicopter cannot serve effectively if it is limited to edge-of-town heliports, for example, but must have landing areas located near the actual origins and destinations of traffic. This fact means that heliports, whether for private, commercial, or airline use, definitely will be needed in certain of the congested and highly developed areas of a community.

d. Heliport Construction.

(1) Heliport facilities do not require a large area and usually are inexpensive to construct because they need not be elaborate installations. Experience has shown that safe and useful heliports can be established using a small sod or paved plot, fenced to exclude unauthorized personnel, and marked as to use. Rooftop or elevated heliports can be economically advantageous in some areas because they minimize the cost of land acquisition and usually do not involve high additional structural expense expecially if included in the original structural design of the building.

(2) The need for facilities such as waiting rooms, parking lots, etc., is determined by the type of service to be provided. Prospective heliport developers will find valuable assistance available from the helicopter industry. Before proceeding with heliport development and construction, expert advice should be sought.

e. Local Authority.

(1) In those communities seeking a heliport facility, a careful study of the community's local laws, rules, and regulations should be made to determine whether they permit or properly provide for the establishment of a permanently located heliport. It is important that local regulations also permit off-heliport landings on a temporary or occasional basis. Since helicopters do not require prepared runways, etc., landings can be made safely in a variety of clear sites without formally declaring the site a "heliport." Federal Aviation Regulations (FAR) and most state jurisdictions permit this type of operation in order to allow for accomplishment of many valuable helicopter services. For instance, rescue and ambulance missions often require such off-heliport landings.

(2) The main difference between a heliport and an off-heliport landing site is that the heliport has been formally approved for continual use at the permanent location whereas use of the off-heliport site is for a limited time period.

CHAPTER 2. THE ROLE OF GOVERNMENT

5. FEDERAL AND LOCAL GOVERNMENTS. Federal and local governments have similar objectives in the field of heliport development, not only to ensure that public interests are protected but also to assist the public in understanding helicopter operations as an important part of the transportation system. The Federal Government through the FAA has established safety rules for aircraft and helicopter operations. These regulations concern such matters as minimum safe altitudes, weather ceiling and visibility limitations, right of way in the air, and related standards needed for safety of persons and property both in the air and on the ground. The Federal safety regulations are comprehensive. The premise for such broad Federal regulation of the navigable airspace is to achieve safety through uniform and centralized control of aviation operations. Most State and local jurisdictions find their safety-of-flight requirements covered by the Federal regulations. It is quite common, however, for State and local authorities to have detailed rules governing the establishment and licensing of heliports.

6. FEDERAL AVIATION REGULATIONS. The FAA does not license heliports. However, the Agency does prescribe through its regulations various requirements which must be observed by the user which indirectly affect the heliport design. Under certain conditions, through the Federal-aid Airport Program, the FAA may be able to assist in the development of specific heliports designed for public use. Specific regulations of interest to heliport developers are as follows:

   a. FAR Part 157. Part 157, "Notice of Construction, Alteration, or Deactivation of Airports," requires that any proposal to establish, reactivate, alter, or deactivate a heliport be submitted in the form of a notice to the nearest FAA Airports District Office at least 90 days before the date on which work is to begin on the project. A facsimile of the form, FAA Form 2681, used for this purpose is contained in Figure 1. This Regulation does not apply to a privately owned heliport limited to VFR operations that is not open to the public and is located more than 5 miles from any other airport or heliport, or to one which is more than 20 miles from any airport or heliport for which an instrument approach procedure is authorized by FAA. However, the FAA must be notified of the project for record purposes within 30 days after completion.

   b. FAR Part 77. Part 77, "Notice of Construction or Alteration Affecting the Navigable Airspace," sets forth the requirements for notice to the FAA Administrator for certain proposed construction or alteration of structures that would affect the navigable airspace. Part 77 requires persons intending to erect certain structures near a heliport to notify the FAA of their intentions. The notice form, FAA Form 117, used in connection with this Regulation is shown in Figure 2.

c. FAR Parts 27 and 29. These Parts of the FAR set forth the airworthiness standards for the manufacture of helicopters. Part 27 (formerly CAR 6), "Rotorcraft Airworthiness; Normal Category," covers helicopters up to a maximum size of 6,000 pounds gross weight, and Part 29 (formerly CAR 7), "Rotorcraft Airworthiness; Transport Categories," covers those of larger size.

d. Operating Regulations. FAR Part 91 prescribes general operating rules for all aircraft. FAR Parts 125, 133, and 135 set forth the requirements for various types of commercial operations, and FAR 127 contains the operating rules for scheduled air carrier service by helicopters. FAR Part 61 pertains to certification requirements of pilots and flight instructors.

e. FAR Part 151. FAR Part 151 prescribes the policies and procedures for administering the Federal-aid Airport Program under the Federal Airport Act. Under this Program, the FAA provides financial assistance for needed heliport as well as airport development. Such assistance is available to local public agencies such as States, municipalities, and other political subdivisions on a matching basis. Normally, Federal participation in the allowable cost of such development is 50 percent. In order to be eligible, the land comprising the site of the heliport must be publicly owned and be under the control of a public agency. In addition, the site must not be found objectionable from an airspace utilization standpoint. FAA policy does not require that a location be served by scheduled air carriers to be eligible for Federal assistance under this Program.

7. STATE REQUIREMENTS. The establishment of a heliport usually will require prior approval or the issuance of a license from the appropriate State Aeronautics Commission or similar authority. In some instances, State licensing requirements apply only to airports and heliports open to the public; others, however, apply to all airports and heliports within the State.

8. LOCAL REQUIREMENTS. Some local jurisdictions have rules and regulations governing the establishment of a heliport. Zoning laws and the related provisions of building codes, fire regulations, and similar ordinances should be taken into account by the heliport planner.

9. GOVERNMENT ASSISTANCE. In view of the above, it is apparent that heliport developers should seek the cooperation and assistance of the FAA, State, and local authorities in the early stage of planning in order to proceed with full knowledge of both the regulatory and economic needs. The FAA is prepared to give technical advice on request. Preliminary coordination may be accomplished with the FAA District Airport Engineer. Most State aviation authorities have established procedures for handling airport and heliport applications and are experienced in aviation matters. Local governmental authorities often do not have an

established procedure for handling heliport applications, and it may be necessary to explain to them the special nature of helicopter operations. In some communities, education of the public, particularly of the immediate neighbors of the heliport, may be needed to point out the advantages of helicopter services to a community and to clarify any misunderstandings related to the services.

10. PROCURING LOCAL APPROVAL. Heliport developers may find the following checklist helpful in pursuing their objectives. In some instances, all of these listed steps will not be necessary because circumstances vary in different parts of the country. In certain cases, additional steps may be necessary.

a. Review local rules and regulations (city and county) regarding zoning, city planning, building requirements, ordinances, etc., to determine local compliances required.

b. Select a suitable heliport site.

c. Contact a local helicopter operator or helicopter manufacturer's representative to check the operational feasibility of the site being considered.

d. Submit prior notice of heliport development to the FAA Airports District Office.

e. Refer to subsequent sections of this guide for information on the technical criteria for construction of heliports. Discuss with helicopter operators and FAA representatives the selection of routes and operating procedures.

f. Submit application with information summary on proposed operating procedures to State and/or local authorities for license or approval of heliport including request for local request for local rezoning if needed. Information summary should be in sufficient detail to answer pertinent questions about intended heliport operations.

CHAPTER 3. HELICOPTER CHARACTERISTICS

ELICOPTER DESIGN. Helicopter designs vary considerably, but all heli-
opters achieve flight by approximately the same means. The rotor
lades serve as a rotary wing for the helicopter, eliminating the need
or a fixed wing such as is used on airplanes. The helicopter gains
irect, upward lift from the rotor blade system. Change in direction
s achieved by tilting the rotor disc (tip-path-plane) in the desired
irection of turn.

. Helicopter Airworthiness. All civil helicopters manufactured or operated in the United States must meet the airworthiness requirements of the FAA before being certificated for operation. A flight manual is supplied by the manufacturer for every approved model helicopter certificated by the FAA. In addition, every operating aircraft must at all times possess a valid Airworthiness Certificate indicating that the aircraft continues to meet the safety standards prescribed by the regulations. Airworthiness Certificates are reissued periodically by FAA inspectors following a maintenance inspection of the aircraft. The FAA maintains field offices in numerous locations throughout the country to ensure adequate inspection and surveillance of the civil aircraft fleet.

. Helicopter Types. Helicopters currently in civil use vary in the number of main rotors, the number and type of engines, and in size and weight.

(1) Early helicopter designers experimented with a variety of configurations. However, the only designs found suitable for production have been those using either one or two main rotors. Most small helicopters under 3,500 pounds maximum gross weight employ a single main rotor system. Larger helicopters are manufactured in various designs: single main rotor, tandem rotor (one main rotor forward and one aft), and intermeshing rotors (two rotors mounted side by side). Various advantages accrue to each type and all have effective uses. At present, the intermeshing main rotor design is used only for military helicopters, but the single and tandem rotor designs are flown by both civil and military users.

(2) Before 1962, all civil helicopters were of the single-engine design; but during that year, two new twin-engine types went into service with the helicopter airlines. These new designs have gas turbine engines which provide greater power per pound of engine weight than conventional, reciprocating engines. At the same time, other new helicopters came into operation featuring a single gas turbine engine.

c. Helicopter Configuration. Helicopter dimensions and photographs appear in Figures 3, 4, and 5. Although subject to change whenev modifications are made or new models are introduced, this informa tion is helpful in providing a general picture of the size and configuration of helicopters in current use. It should be noted that the 2-, 3-, and 4-place helicopters comprise 95 percent of t civil helicopter fleet, and that the large transport type heli- copters are used primarily by the scheduled helicopter airlines. Commercial helicopter services and private and business helicopte owners are located in nearly every State and comprise the bulk of helicopter activity; scheduled helicopter airline services consti tute a small portion of the total activity.

12. HELICOPTER PERFORMANCE.

a. Operation. The characteristics of helicopters with their capabil of essentially vertical flight make it possible for them to takec safely from areas only slightly larger than the craft itself. Or takeoff, the helicopter usually rises vertically a few feet above the heliport surface then accelerates forward and upward on a slc path to climb-out speed and on to the enroute altitude. On landi the helicopter usually descends from enroute altitude at reduced speed to a hovering condition (zero forward speed) several feet above the surface. The actual landing is then made by a vertical descent to a selected point on the heliport or on the parking apı of the heliport. Sideward flight can be performed easily during the final landing phase to place the helicopter in the most desiı able position.

b. Speeds. Normal speeds for the helicopter range from zero (in hovering flight) to 90+ knots (nautical miles per hour) for the small helicopters and from zero to 120-145 knots for the larger types. Helicopters seldom have need to fly more than 1,000 to 1,500 feet above the ground although many have the ability to fly more than 10,000 feet above ground.

c. Safety Features. The helicopter has several unique safety featuı not possessed by other aircraft, a major one being the ability tc hover a few feet above the ground and perform a number of importa safety checks prior to committing the helicopter to full takeoff. A helicopter uses almost full power to hover, and the pilot is al to hold the aircraft in this position while he checks all instru- ments to ensure that the engine and other accessories are func- tioning properly. Also, he can easily determine that all flight controls are operating properly and that the aircraft is loaded within safe control limits of weight and balance. Other aircraft make only simulated checks of these items on the ground, but the helicopter can be checked for each item in flight in a hovering position before flying from the landing site. Another key advant of the helicopter is that a precautionary landing can be made when a pilot receives any indication that a component is not functioning exactly as it should. It is not necessary to locate and fly to an airport as is the case with fixed-wing types of aircraft.

d. Emergency Operation. In the event of engine stoppage or other emergency conditions in flight, the helicopter can glide to a safe landing by means of autorotation. During this maneuver, the main rotor continues to turn free of the engine and produces sufficient lift to enable the helicopter to glide to a satisfactory landing. Single-engine helicopters are not able to continue level flight if engine stoppage occurs and must perform an immediate autorotation landing. Under most conditions, today's multiengine helicopters can continue level flight with one engine inoperative. There are certain times, however, when they cannot continue level flight but must descend gradually to a clear landing area. It is necessary that flight routes for all single-engine and some multiengine helicopters be selected so as to provide adequate enroute emergency landing sites.

CHAPTER 4. CLASSES OF HELIPORTS/HELISTOPS

13. GENERAL. Classification of heliports/helistops is provided to indicate the major differences between kinds of installations for helicopter operations. The differences lie mainly in use, types of helicopters served, and the nature of supporting facilities included on the heliport. Classification is helpful in planning and zoning for heliports and serves to relate the operational factors involved to land use considerations.

a. Use. A heliport/helistop is either a privately operated exclusive use facility, on which the operator has control over the type and number of helicopters which may use it, or it is a publicly owned and operated facility open to any helicopter operator.

b. Size. A heliport/helistop may be any size down to the minimum recommended in this chapter and defined in Chapter 6. The size refers to the dimensions of the landing and takeoff area.

c. Helicopter Types. Helicopter types refer to those in the normal category as defined in FAR Part 27 or those in the transport category as defined in FAR Part 29.

(1) Normal category helicopters are machines 6,000 pounds or less maximum gross weight operated principally in private, business, charter, or commercial flying other than air carrier operations.

(2) Transport category helicopters are single-engine or multi-engine machines of unlimited weight operated in scheduled or nonscheduled passenger service.

d. Supporting Facilities. These refer to passenger and/or cargo facilities, helicopter parking, fueling, and maintenance provisions on the heliport. A helistop has none of these facilities except that it may be a pickup and discharge point for passengers or cargo.

14. HELIPORT CLASSIFICATION. Heliports are classified in accordance with uses, as follows:

Class I - Private
Class II - Public (Small)
Class III - Public (Large)

They are further subclassified in accordance with their available support facilities, as follows:

Subclass A - Minimum support facilities - no buildings, maintenance or fueling (a helistop).

Subclass B - Limited support facilities- no maintenance or fueling.
Subclass C - Complete support facilities.

Note: Any heliport may be either privately or publicly owned or operated. Whether it is private or public does not affect its subclassification.

CHAPTER 5. SITE SELECTION

15. GENERAL. The selection of a heliport site involves consideration of four major elements: (1) the desired location and physical layout; (2) operational safety; (3) the effect on navigable airspace; and (4) the effect on the surrounding community. Each of these elements is discussed briefly to provide a general background for site selection.

16. LOCATION AND PHYSICAL LAYOUT.

a. Heliports may be sited on the ground or on suitable structures on land or over water. Ground level sites usually are the easiest sites to prepare and normally provide the most convenient access for individuals using the heliport (Figure 6). In comparison, rooftop or other elevated structures can reduce or eliminate the factor of land cost and frequently provide better flight access to the heliport.

b. The layout of the heliport is primarily dependent on the operating characteristics of the helicopters and the type of support facilities desired. Thus, if a minimum landing facility for a single helicopter is desired and no support facilities are required, a relatively small site will suffice.

17. OPERATIONAL SAFETY. The major safety consideration of a heliport lies in the availability of suitable approach-departure paths leading to and from the heliport. The routes to heliports should be over terrain which affords suitable emergency landing areas no farther away than a glide angle of one foot vertically to two feet horizontally from the proposed altitude (unless the manufacturer's autorotative performance data indicate other than such a glide angle). This provision is necessary for all but multiengine helicopters capable of continued flight on one engine. Heliport approach-departure routes usually are sought over waterways, beaches, parks, golf courses, industrial yards, and vacant land. Usually avoided are routes over residential developments, playgrounds, shopping districts, and other highly populated areas. An accurate evaluation of a heliport site and its routes and possible obstacles to flight is best determined by a helicopter flight check coupled with a detailed on-site inspection.

18. EFFECT ON NAVIGABLE AIRSPACE. It is necessary to study most proposed heliport sites to determine what effect their operation might have on other users of the navigable airspace. This type of study is conducted by the FAA following the submittal of a notice of construction under the requirements of FAR Part 157. This element of site selection is mainly of concern only when the proposed site is near an active airport or other established aeronautical activity. Heliport locations that would interfere with landing and takeoff operations at an established airport or would conflict with instrument approach patterns are

generally considered unsuitable. Except for these operations, other aircraft normally operate well above the altitudes utilized by helicopters.

19. EFFECT ON SURROUNDING COMMUNITY. The fact that helicopters can operate safely at sites of limited size means that heliports frequently will be planned for areas that previously have not experienced any degree of aviation activity. Consequently, if the heliport plan is to be successful, the developer most likely will have to take a substantial part in educating the public, especially the neighboring property owners, about the specialized characteristics of the helicopter that make it acceptable at close-in locations.

a. Zoning.

(1) As might be expected, few existing zoning ordinances contain provisions for heliports. Some zoning ordinances deal with airports, but this normally provides for more restrictive zoning criteria than are appropriate for heliports. Consequently, a revision to the zoning regulations is one of the most obvious and necessary steps in pursuing a sound heliport development plan (see Chapter 2, Paragraph 8).

(2) In general, zoning regulations should treat heliports as a permitted use in industrial, manufacturing, agricultural, or unzoned areas. In addition, some heliports (especially those without support facilities or with limited facilities) should be a permitted use in certain commercial, retail, and business districts (Figure 6). Heliports also should be eligible for consideration in other zones (including residential) under conditional use procedures. Provisions for the occasional or infrequent use of off-heliport landing sites on short notice also should be covered in a reasonable manner by appropriate ordinances.

b. Sound Levels. Sound caused by helicopter operations within or adjacent to populated areas is an important factor in planning for heliports. A heliport should be located so that the noise generated by helicopters will not cause excessive disturbance to surrounding neighbors. Helicopter sound is greatest directly underneath the flight path on takeoff and landing but is of short duration because a takeoff or landing involves only a few seconds. Engineering studies made by the FAA and private organizations indicate that outside the immediate vicinity of the heliport, people are routinely exposed to higher noise levels in a normal city environment than those produced by helicopter flight. Many people will give special notice to helicopter sound initially since it is a different type of sound than they are accustomed to hearing. Once people become familiar with this new sound, it usually goes unnoticed at distances beyond the immediate area surrounding the heliport. It is within this adjacent area, therefore, that consideration must be given to the sound levels involved. Each situation should be evaluated according to its particular circumstances. If in a particular area the helicopter noise from ground operations persists in being a problem, lessening of the noise may be achieved by erecting special sound-deadening fences, shrubbery, or other sound absorbent material.

20. HELIPORTS AT AIRPORTS.

a. Large and medium sized communities are beginning to recognize the need for helicopter services. If such services warrant the operation of a substantial number of helicopters into airports, designated heliport areas should be established at the airports. The helicopters, in shuttling traffic to and from downtown areas and the surrounding communities, should land and takeoff at locations convenient to the terminal facilities.

b. The landing and takeoff area should be located so as to:

(1) Provide adequate separation from fixed-wing traffic. The recommended clearances between runway centerline and building line are contained in current FAA airport design criteria.

(2) Be as close as possible to passenger check-in areas for fixed-wing aircraft.

(3) Avoid as much as possible the mixing of taxiing fixed-wing aircraft and helicopters.

c. Alternative locations for heliports at an airport are:

(1) The roof of the terminal building.

(2) The apron adjacent to the terminal building used by the fixed-wing aircraft.

(3) A roof over the auto parking area.

(4) Other ground level areas near the terminal building separated from the fixed-wing aircraft apron.

d. There are advantages and disadvantages to all four locations. Normally, a ground level site is preferred. The most convenient and least expensive way to obtain this type of site is to reserve a part of the fixed-wing terminal apron for the landing and takeoff of helicopters. Another plan is to build a special pad for helicopter operations on the airside of the terminal building.

21. ORIENTATION. Although helicopters can maneuver in relatively high crosswinds, the landing and takeoff areas should be oriented preferably to permit operation into the wind. Other considerations affecting orientation are adjacent populated areas, restricted areas, topography, and obstructions.

CHAPTER 6. PHYSICAL CHARACTERISTICS OF HELIPORTS

22. GENERAL. A heliport is recognized and defined as an area for the landing and takeoff of helicopters, but not every site used for this purpose need be designated a heliport. Many clear areas normally used for other purposes can accommodate occasional or infrequent helicopter operations. To differentiate these sites from heliports, they are termed "off-heliport landing areas." The distinction is explained to emphasize that it is neither necessary nor feasible to establish a heliport for all helicopter operations. To restrict helicopters solely to areas officially designated as heliports would limit unnecessarily the usefulness of these versatile aircraft.

a. Application. It is impractical to recommend criteria for landing sites which would be used infrequently. This guide applies only to sites that are developed to serve helicopters regularly during the foreseeable future.

b. Stage Development. Stage development of heliports is encouraged when it is deemed unnecessary or uneconomical to construct a facility to its full potential in the beginning. Heliports developed on a modest scale for present needs can usually be enlarged or modified to meet increased future requirements provided sufficient ground space is available. In the case of privately owned facilities, the greatest anticipated need is for more new sites; the expansion of initial sites is secondary. If space is available to meet present needs but does not provide for future expansion, additional sites should be planned so that the overall community heliport plan can be kept responsive to developing needs.

23. HELIPORT LAYOUT. The size, shape, and appurtenances of heliports are determined by a variety of interrelated factors--principally the nature of the site available, size and performance of the helicopter, and the buildings or other objects in the surrounding area. Although heliports may be square, rectangular, or circular, an irregular-shaped site may be equally functional. Minimum operational safety requirements will not vary from one design to another (Figures 6 and 7).

a. Landing and Takeoff Area. Since landing and takeoff areas should provide sufficient space for the helicopter to maneuver, size depends to a large extent on the overall length of the helicopter, i.e., the tip to tip dimension of the rotor system. These dimensions vary considerably according to the type of helicopter (Figures 3 and 4).

b. Heliport Dimensions. Heliport landing and takeoff area dimensions are influenced by heliport usage (private or public), category of helicopters served, and their corresponding operational requirements. A private heliport could be developed by an individual or corporation to accommodate a small or large helicopter; therefore, recommendations as to private heliport size are expressed in terms of the size of the helicopter. A public heliport developed by a municipality or individual should be related to the various types of helicopters that will be served. This distinction is reflected in the following heliport dimensional recommendations.

(1) Private Heliport (Class I). The landing and takeoff area dimensions are selected by the owner and are based on the overall length of the helicopter. Minimum length of the area should be at least 1.5 times the overall length of the helicopter and the width equal to the length. For example, if the largest helicopter to be served has an overall length of 60 feet, the minimum dimensions would be 90 feet by 90 feet (Figure 8).

(2) Small Public Heliport (Class II). The landing and takeoff area dimensions should be sufficient to accommodate any of the various models of helicopters in the normal category, the airworthiness requirements of which are defined in FAR Part 27 (formerly CAR 6). These heliports should have a minimum landing and takeoff area length of 2.0 times the overall length of the helicopter and a width of 1.5 times the overall helicopter length (Figure 9).

(3) Large Public Heliport (Class III). The landing and takeoff area dimensions should be sufficient to accommodate any model helicopter in the normal and transport categories, the airworthiness requirements of which are defined in FAR Parts 27 and 29 (formerly CARs 6 and 7). These heliports should have a minimum landing and takeoff area length of 2.0 times the overall length of the helicopter and a width of 1.5 times the overall helicopter length (Figure 10).

(4) Exceptions to Landing and Takeoff Area Recommendations. Lesser dimensions than are indicated for the three classes of heliports described above may be acceptable upon thorough FAA evaluation of the proposed site if it is one where an unusually extensive peripheral area surrounds the heliport. An example of such a heliport is a waterfront pier which may project out into the water and has unobstructed approaches on three sides.

(5) Circular Heliports. For circular heliports, the diameter of the landing and takeoff area should be equal to the larger dimension recommended above for each of the heliport classes.

(6) Heliports at Elevations Less Than 1,000 Feet Above Sea Level. Minimum recommended landing and takeoff area dimensions shown above are applicable to all heliports 1,000 feet above sea level or less.

(7) Heliports at Elevations More Than 1,000 Feet Above Sea Level. For elevations of more than 1,000 feet above sea level, it is recommended that consideration be given to increasing the length of the landing and takeoff area or diameter (if circular) by 15 percent per 1,000 feet of sea level elevation above 1,000 feet or that part thereof, in order to prevent drastic off-loading of non-supercharged helicopters. For example, on a heliport 3,000 feet above sea level, the minimum length would be increased by 30 percent.

24. APPROACH-DEPARTURE PATHS.

a. General. Approach-departure paths are selected to provide the most advantageous lines of flight to and from the landing and takeoff area. These paths are considered as beginning at the edge of the landing and takeoff area and usually are aligned as directly as possible into the prevailing winds. It is generally necessary to have at least two paths which should be separated by an arc of at least 90 degrees for Class I and Class II heliports and 135 degrees for Class III heliports (Figure 11). Curved paths are quite practical and are necessary in many cases to provide a suitable route. Emergency landing areas must be available along all approach-departure paths for all heliports except those heliports serving multiengine helicopters able to continue flight and meet certain climb performance on one engine.

b. FAA Study. Where an FAA study is required, approach-departure paths will be examined to determine the availability of suitable emergency landing areas. If there is any doubt as to landing area availability along the proposed approach-departure paths, it is advisable to contact the FAA or an experienced helicopter operator in the early stages of planning.

25. OBSTRUCTION CLEARANCES.

a. General. Imaginary obstruction clearance planes are established for each heliport that is subject to the notice (paragraph 6a) for the purpose of identifying those objects that may be obstructions to helicopter flight. These planes define vertical and transitional clearances above the ground surface in the vicinity of the heliport (Figure 11).

b. Approach-Departure Clearance Surfaces. Obstruction clearance planes in the direction of the approach-departure paths extend outward and upward from the edge of the landing and takeoff area to the enroute altitude at an angle of eight feet horizontally to one foot vertically (8:1). The width of the sloping plane surface coincides with the dimension of the landing and takeoff area at the heliport boundary and flares uniformly to a width of 500 feet at the enroute altitude. The planes are symmetrical about the centerlines of the approach-departure paths.

c. Transitional Surfaces. Obstruction clearance planes normal to the centerline of the approach-departure clearance surfaces are transitional surfaces or "side slopes" to identify those objects that penetrate the planes as obstructions. Such obstructions may or may not be compatible with safety of flight depending upon a study of the site. The side slopes extend outward and upward from the edges of the landing and takeoff area and approach-departure clearance planes at an angle of two feet horizontally to one foot vertically (2:1) to a distance of 250 feet from the center of the landing and takeoff area and 250 feet from the centerline of the approach-departure clearance surfaces.

26. PERIPHERAL AREA. A peripheral area surrounding the landing and takeoff area, with a width not less than one-quarter the overall length of the helicopter, is recommended as an obstruction free safety zone. For ground heliports, a safety barrier along the outside edge of the peripheral area is recommended to exclude unauthorized persons from the helicopter operational surface. The area should be kept free of hazardous objects and operations not compatible with the safe operation of the helicopters maneuvering on the heliport.

27. HELICOPTER PARKING AREA. The need for a parking area is dependent upon the operational requirement of a particular heliport and the needs of the users. Helicopter parking positions normally are adjacent to the landing and takeoff area. The length and width of each position is equal to the overall length of the helicopter, and five-foot clearance between adjacent positions is suggested.

28. ADMINISTRATION BUILDING AND SERVICE AREAS. An administration building and service area, if needed, includes an apron which provides space for helicopter maneuvering and parking. In some locations, service and storage hangars and a maintenance building also may be required. The need for these various facilities, their size, and the space required for them is dependent upon the overall purpose of the heliport, the frequency of present and anticipated operations, and the volume of

passengers, mail, and cargo. Many of the principles and procedures presently employed in the planning and development of airports can be used in planning for the above requirements. The FAA publication, "Administration Buildings for General Aviation Airports," is a recommended reference.

29. CONSTRUCTION OF HELIPORT SURFACE. Briefly outlined below are the basic requirements for constructing the landing and takeoff area, taxiway, and apron for ground surface heliports.

a. Grading and Drainage. The purpose of grading is to provide areas on which aircraft can operate safely and to ensure adequate drainage control. Helicopter operating areas should be free of abrupt grade changes and excessive grades. The grading should be planned to provide for runoff of surface water to the fullest extent possible in order to minimize ponding and saturation. When grading alone cannot provide satisfactory drainage, some system of ditches and/or an underground drainage system may be utilized to prevent surface and subsurface water from inconveniencing helicopter operations.

b. Pavement Construction. The effects of rotor downwash and turbine engine ingestion suggest some kind of stabilization of the landing and parking surfaces if the heliport is not turfed. If the facilities will be utilized frequently, most sites will require paving. The pavements may consist of stabilized local soil or aggregate with a bituminous surface treatment. The pavement thickness varies with the type of soil and climatic conditions. A type of surface should be selected that will serve the needs of the heliport most economically from the standpoint of initial cost and maintenance required.

CHAPTER 7. ELEVATED HELIPORTS

30. DESIGN CONSIDERATIONS.

a. Whenever ground level sites are not available or are generally unsuitable, an elevated site may be practical. Privacy of the heliport site, quick access to upper floor building areas, and more open flight routes are some of the reasons why rooftop or other elevated sites may be preferred.

b. Elevated heliports may be located on piers (Figure 12) and other structures over water as well as on buildings. As in ground level heliports, the landing area dimensions are keyed to the size of the helicopter; but in most cases, the natural open areas around a roof or elevated platform permit smaller elevated landing and takeoff areas without the usual peripheral area associated with ground level sites. Approximately the same requirements for approach-departure paths apply to both elevated and ground level heliports.

c. In planning rooftop heliports, it is important to consider local building codes regarding construction, occupancy, use, egress, and fire regulations. Furthermore, designers should consider the effect of rooftop construction such as elevator-shafts, penthouses, air conditioning towers, etc., on the approaches to the heliport (Figure 13). For any rooftop operation, particularly scheduled operations, an FAA study of the site and operational procedures will be necessary in accordance with FAR Parts 127 and 157 (Figure 14).

31. LANDING AND TAKEOFF AREA.

a. Area Configuration. The landing and takeoff area may cover the entire area of the elevated or roof surface, or it may be only a part of that area specifically marked as a helicopter operational site. Also, the entire landing and takeoff area may be the same size as the touchdown area, or it may include more space than the touchdown area. If the heliport is other than square or round in shape, it is usually desirable to orient the long axis of the landing and takeoff area into the direction of the approach-departure paths.

b. Dimensions.

(1) The dimensions of the landing and takeoff areas recommended for elevated or rooftop heliports are the same as for the comparable class of ground heliport, see paragraphs 23b (1) through (7).

(2) The dimensions referenced above represent minimum clear areas. Where a load distribution pad (Figures 15 and 16) is utilized, the pad (actually the touchdown area) may be smaller, commensurate with the configuration of the landing gear dimensions and spacing, but the clear area recommended above should be maintained. Load distribution pads as small as 20 feet by 20 feet have been found satisfactory in a number of instances.

32. STRUCTURAL DESIGN. The landing and takeoff area must be designed for the aircraft that will use it and the added loads incident to the personnel traffic to and from the helicopter. In the case of small craft, the live loads other than the helicopter (i.e., snow, crowds of people, or freight) may govern. With larger craft, the loads from the helicopter normally will be the governing factor.

a. Strength. The strength requirements for an elevated surface are determined through consideration of the helicopter's gross weight and landing-gear strength. Most small- and some medium-sized helicopters are equipped with skid- or float-type landing gear. Large helicopters are equipped with wheel landing gear consisting of two main gear of one or two wheels each and one tail or nose gear of one or two wheels each. Each main gear assembly supports 40 to 45 percent of the weight of the helicopter, and the tail or the nose gear the remainder. Sometimes a helicopter is equipped with a four-wheel landing gear assembly. In this instance, each main gear supports a maximum of about 35 percent of the gross weight of the helicopter. Gross weight is the total weight of the helicopter fully loaded and for which it is certificated for operation under FAA regulations.

b. Support.

(1) In general, the operation of small helicopters has not required the modification of existing roof structures except to strengthen the actual landing surface to resist the concentrated load applied by the landing gear. Existing buildings with roofs designed for normal live loads often can be adapted to receive helicopters by merely installing a simple load distributing pad to spread the concentrated loads over the existing structures. Such a pad may be of wood or metal or a combination of these materials. The superimposed loads will be limited by existing conditions of the building's structure, but most helicopters can be accommodated in this way without major reconstruction. Figure 15 illustrates an installation of this type which has been used satisfactorily for some years.

(2) If a load distribution pad or other platform is constructed, it is recommended that the height of the finished structure be at least as high as the surrounding parapet walls or roof coping to assure adequate clearance for the helicopter on takeoff and landing (Figure 16). In some cases, however, the roof may be sufficiently large to make this unnecessary.

33. IMPACT LOAD.

a. Normal landings and takeoffs impose loads on the roof that are not more than the static loads of the helicopter at rest. In the case of a hard landing, however, it is conceivable that loads up to the buckling load of the helicopter landing gear may be imposed on the roof. The roof should be designed so that it will not fail under these impact loads. The impact load is expressed in terms of a percent of the gross weight of the helicopter. The landing surface will have an adequate margin of safety if it is designed to support a concentrated load equal to 75 percent of the gross weight of the helicopter on any one square foot of the surface (Figure 16). This does not mean that an impact load is imposed upon every square foot of the roof surface simultaneously; but the load is concentrated only at the points of contact under each main landing gear. It is assumed that helicopters will land so that two separate points of the pad receive impact simultaneously. This concentrated loading allows for the worst condition that could develop if a helicopter makes a hard landing following power failure. In this case, the roof structure should remain intact if the landing gear fails.

b. Live loads due to snow and traffic of personnel and equipment will be accounted for in accordance with local building codes. Judgment must be exercised in deciding whether these loads are applied simultaneously with the concentrated load due to the helicopter. In general, it is recommended that heavily snowladen roofs be cleared prior to helicopter operations to eliminate extra weight and guard against reduced visibility due to the blowing of snow.

34. LANDING SURFACE.

a. Elevated heliport surfaces of various kinds of materials have been used successfully. Portland cement top surface over concrete slab, asphalt surfacing, and treated wood surfaces are among those most frequently employed. In general, where night operations will be conducted, a light-colored surface is suggested to aid depth perception in landing.

b. If a wooden load-distribution pad or other platform is used, it is recommended that the materials be treated to be weather and fire resistive. If a metal surface is used, it is suggested that areas used for walkways have an abrasive surface applied. Except for roof drains, it is preferred that the surface be solid so that the rotor downwash will produce the maximum ground effect or ground cushion. An open metal grating, for example, may cause too great a dissipation of the rotor downwash.

35. TURBULENCE AND VISIBILITY.

a. If a heliport site is in proximity to other buildings or to other structures on a rooftop, it may be necessary to conduct flight tests to determine whether any adverse turbulence will unduly affect the operation. Occasional high wind conditions may create a flight problem at some elevated sites during certain periods, even though the site may be quite satisfactory most of the time. Under these circumstances, it is suggested that the heliport be approved for use up to a predetermined wind velocity limit. This is a generally accepted procedure in many aviation activities and would permit the use of an otherwise acceptable site except during periods when high winds might produce adverse turbulence.

b. Flight visibility is another factor to consider for sites on buildings 100 feet or more in height. The cloud deck seldom reaches the ground, or even down to 100 feet, but at the higher levels the heliport might be obscured when the ground level is clear.

CHAPTER 8. VISUAL AIDS

36. GENERAL. The suggestions for marking and lighting outlined here are based on the best information currently available, and they are set forth as suggestions only. Coordinated Government and industry efforts are now underway which will eventually establish optimum requirements for methods of marking and lighting heliports.

37. MARKING.

a. The primary marking for a landing and takeoff area is one which clearly identifies the area as a facility for helicopters. The standard marker shown in Figure 17 is recommended for all ground level and elevated helicopter landing facilities. It is described in greater detail in the FAA Technical Standard Order (TSO) N22, "Heliport Day Marker."

b. For rooftop sites, particularly relatively small ones, it is suggested that the standard marker be circumscribed by a circle as shown in Figure 18. Experienced pilots of large helicopters attest that the addition of a circle provides improved reference to the touchdown area.

c. A marker to indicate a hospital helistop has been suggested by members of the medical profession. The marker illustrated in Figure 19 is recommended as an acceptable substitute for those markers described above.

d. Markings on the takeoff and landing area should be white. Taxiway and service area markings should be yellow. Experiments with all white markings in cases where there is no possibility of confusing the landing and taxi areas have been initiated. Use of retroreflective paint is desirable for heliports which do not have lighting and which may be used for occasional night landings. Retroreflective paint or markers reflect only back to the light source; thus, to be effective a source of light must be on the helicopter.

e. Guide and position lines for helicopters are of primary value to assist pilots in judging clearance between rapidly turning rotors and adjacent aircraft or fixed facilities. Painted taxiway guidelines and apron position lines may be desirable where operations are numerous.

f. Conspicuous boundary day markers are recommended to enable pilots to identify the outlines of the landing and takeoff area. These are particularly desirable where the area is unpaved. Boundary markers to outline the area should be placed at intervals of not over 100 feet. Spacing down to 25-foot intervals may be necessary in some instances, depending upon the size and configuration of the landing and takeoff area. The markers should not constitute an operational hazard. Individual boundary markers can be constructed of locally available materials. In some cases, a hedge or fence may be sufficient to provide adequate boundary marking.

38. WIND DIRECTION INDICATOR. A wind indicator, such as a wind cone, flag, or other suitable device adjacent to the landing area, is usually desirable. This should be so located that it will be prominent but will not be a hazard to flight. In addition, the wind indicator should be located so that possibility of it being blocked by any building or structure is eliminated.

39. HELIPORT LIGHTING.

a. If operations are planned during the hours of darkness, the takeoff and landing area should be provided with distinctive lighting to define the area and to permit positive identification during landing operations. Yellow lights spaced about 25 feet apart around the periphery of the landing and takeoff area provide satisfactory lighting in most locations. These lights should have hemispherical light distribution.

b. Another type of boundary lighting which has been used produces a linear effect around the landing and takeoff area. The lights are a fluorescent or cold cathode lamp in a suitable, weather-proof horizontal fixture. A yellow plastic cover is used. In some settings, these lights are spaced less than 25 feet apart.

40. OBSTRUCTION LIGHTING. All objects in the immediate vicinity of the heliport that penetrate the prescribed obstruction clearance surfaces should be obstruction marked and lighted if there are to be night operations. In the case of rooftop heliports, such obstructions as flagpoles and elevator housing, etc., should be lighted.

41. FLOODLIGHTING.

a. Floodlighting has proved effective for night operations where the touchdown area was not more than 200 feet wide. Where floodlighting is employed, the touchdown marking configuration should be designed to provide good contrast. In addition, a slight roughness of the surface will help the pilot's depth perception.

It is advisable that good shielding of the floodlighting be provided, either by location or by equipment design, so that the pilot is not blinded by the source of light when landing or taxiing.

b. Floodlighting may be needed for ramps and aprons used for loading and unloading operations. These floodlights can be of standard commercial types, portable or mounted on poles or on the administration building. The floodlights should be shielded or focused to prevent stray light from disturbing the pilot during landing, takeoff, and taxiing operations. These floodlights may be similar to those used on aprons at fixed-wing airports.

c. The intensity of lights in the landing and takeoff area lighting systems should be controllable. These lighting controls and the switches for other lights should be readily accessible to ground personnel.

CHAPTER 9. SAFETY CONSIDERATIONS

42. SAFETY BARRIERS.

a. Landing and takeoff areas or the peripheral areas, if any, should be surrounded by barriers to restrict unauthorized persons from these areas. If the barrier is a fence, it should be approximately three feet high.

b. Elevated touchdown areas which do not have the protection of parapet walls should be provided with a safety device extending horizontally from the edges of the areas (Figure 13). Fabricated walkways on rooftops to provide access to the operational areas should be equipped with handrails as necessary (Figure 15).

43. FIRE PROTECTION.

a. General.

(1) The criteria in this chapter outline the minimums suggested to provide a reasonable degree of fire and rescue protection to the aeronautical operations on the landing and takeoff areas. To the extent of their capabilities, these facilities can also be used in fighting a fire that might occur near these areas.

(2) When a heliport is located on an airport, the fire and rescue protection available to the airport may be used for the heliport as well.

(3) It is advisable to have emergency communications available between the heliport/helistop and the fire department having local jurisdiction. These facilities may consist of a standard fire alarm box or a direct-line telephone.

(4) When portable fire extinguishers are provided, they should be installed in weather-proof boxes painted red and adequately labeled. These boxes should have a break glass front which would permit ready access in an emergency and, to an extent, reduce the unauthorized use and pilferage of or damage to the fire extinguishers.

(5) Fueling and maintenance facilities are not recommended for rooftop heliports/helistops.

(6) Rooftop heliports/helistops should be provided with a means to prevent possible helicopter fuel spillage from flowing on to other areas of the roof. This may be accomplished by constructing a raised lip approximately six inches in height around the periphery of the landing and takeoff area. In those instances where access openings are required in this area, these openings should be protected by a similar lip.

b. Fire Equipment Recommendations for Landing and Takeoff Areas Not Located on Airports.

(1) For ground level landing and takeoff areas.

	Helicopter Gross Weight	Protection Recommended
(a)	Under 3,500 lb.	Two 20-lb. dry chemical extinguishers.
(b)	3,500 to 10,000 lb.	Four 20-lb. dry chemical extinguishers.
(c)	Over 10,000 lb.	Two 20-lb. and one 150-lb. dry chemical extinguishers.

(2) For rooftop landing and takeoff areas.

	Helicopter Gross Weight	Protection Recommended
(a)	Under 3,500 lb.	Two 20-lb. dry chemical extinguishers.
(b)	3,500 to 10,000 lb.	Two 20-lb. and one 150-lb. dry chemical extinguishers.
(c)	Over 10,000 lb.	Two 20-lb. dry chemical extinguishers and an installed foam system capable of discharging 200 gpm through two 100 gpm nozzles for 15 minutes.

(3) When fueling and maintenance facilities are included at ground level landing and takeoff areas, it is recommended that two 20-lb. dry chemical extinguishers and an installed or mobile foam system capable of discharging 200 gpm through two 100 gpm nozzles for eight minutes should be provided.

(4) Where installed or mobile foam systems are provided, sufficient manpower should be available to man the two hose lines during those periods when aeronautical operations are being conducted on the landing and takeoff areas.

(5) Guide specifications for both the installed and mobile foam systems will be available at an early date and may be secured from the FAA upon request.

44. ROOFTOP EGRESS. Egress should be provided in accordance with local building codes. It is suggested that rooftop landing and takeoff areas have at least two exits at opposite sides of the area. Stairways should be at least 30 inches wide and be provided with handrails. They should be constructed of noncombustible materials.

45. COMMUNICATIONS. Although there is no requirement for radio communication facilities at a heliport, it is occasionally desirable to establish radio communications between the heliport and helicopter for advisory or dispatching purposes. For this reason, a table model radio system known as "Unicom" may be employed using the assigned frequency of 122.8 mc or 123.0 mc. Most aircraft radios are equipped to operate on this frequency, and the Unicom system can be easily adapted to any heliport operation unless the heliport is located at an airport that already has a Unicom station.

CHAPTER 10. BIBLIOGRAPHY

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Budget Bureau No. 04—R094

FEDERAL AVIATION AGENCY
NOTICE OF LANDING AREA

☐ ESTABLISHMENT
☐ ALTERATION } *Complete All Sections*
☐ DEACTIVATION *Complete Sections A and I only*

NAME OF PROPONENT *(Individual or Organization)*

ADDRESS *(Number, Street, City, Zone and State)*

A. LOCATION OF LANDING AREA *(Attach aeronautical chart showing plotted position)*

1. NEAREST CITY OR TOWN	2. COUNTY		3. STATE	4. DISTANCE AND DIRECTION FROM NEAREST CITY OR TOWN	
5. NAME OF LANDING AREA	6. LATITUDE ° ' "	7. LONGITUDE ° ' "	8. ELEVATION	Miles	Direction

B. PURPOSE *(If new landing area – state if landing area is for public or limited private use; list localities to be served. If alteration – briefly describe proposed changes and reasons therefor.)*

DATE CONSTRUCTION
To Begin:
Estimated to be Completed

C. OTHER LANDING AREAS WITHIN 20 MILES

1. NAME	2. MILES TO	3. DIREC. TO

D. LANDING AREA DATA

INDICATE MAG. BRG. OF R/WAYS					
1. LENGTH OF RUNWAY (Feet)	Actual				
	Proposed				
2. WIDTH OF RUNWAY (Feet)	Actual				
	Proposed				
3. TYPE OF SURFACE	Actual				
	Proposed				

4. DIRECTION OF PRINCIPAL APPROACH	5. DIRECTION OF PREVAILING WIND

6. DESCRIBE LIGHTING AVAILABLE, IF ANY

E. NOISE ABATEMENT FACTORS *(Distance and direction to schools, hospitals, churches and residential areas within 2 miles)*

1. IDENTIFY	2. MILES TO	3. DIREC. TO

F. OBSTRUCTIONS WITHIN 5 MILES *(If available, attach U.S. Geological Survey quad sheet or equivalent; show obstructions in accordance with applicable obstruction criteria. Also attach master plan if available.)*

1. TYPE OF OBSTRUCTION	2. MILES TO	3. DIREC. TO

G. OPERATIONAL DATA

	PRESENT *Append Letter E if estimated.*	ANTICIPATED 5 YEARS HENCE
1. NO. AND TYPE OF BASED AIRCRAFT *(Annually)* Multi-engine		
Single engine		
2. NO. AND TYPE OF LANDINGS *(Monthly)* Air Carrier		
General Aviation		

3. ARE IFR OPERATIONS ANTICIPATED ☐ NO ☐ YES, WITHIN YRS.

H. LICENSING *(Check applicable boxes)*

Application for airport licensing
☐ has been made to ☐ will be made to ☐ not required
☐ State ☐ County ☐ Municipal Authority

I. CERTIFICATION

I hereby certify that all of the above statements made by me are true, complete and correct to the best of my knowledge.

SIGNATURE OF PERSON MAKING CERTIFICATION

Date	Title

Form FAA-2681 (10-61)

GPO 820488

FIGURE 1. FORM FAA-2681, "NOTICE OF LANDING AREA ESTABLISHMENT, ALTERATION OR DEACTIVATION"

Form approved; Bureau of Budget No. 04-R001.1

FEDERAL AVIATION AGENCY **NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION** **PART 626, REGULATIONS OF THE ADMINISTRATOR**	NAME OF INDIVIDUAL, COMPANY, CORPORATION, ETC., PROPOSING CONSTRUCTION OR ALTERATION DESCRIBED BELOW ADDRESS *(Number, Street, City, Zone, State)*

A. TYPE OF STRUCTURE

1. CHECK APPLICABLE ITEM

☐ NEW CONSTRUCTION ☐ ALTERATION *(Change in height only)* ☐ PERMANENT ☐ TEMPORARY

2. NATURE AND COMPLETE DESCRIPTION

B. LOCATION OF STRUCTURE *(Submit a map or sketch)*

1. LATITUDE	2. LONGITUDE	3. NEAREST CITY OR TOWN, AND STATE	4. RELATION TO NEAREST TOWN OR CITY	
(To nearest second)			DIRECTION	DISTANCE
5. NAME OF NEAREST LANDING AREA			6. RELATION TO NEAREST BOUNDARY OF LANDING AREA	
			DIRECTION	DISTANCE

7. PROVIDE THE LAND RECORDER'S MAP DESCRIPTION AND/OR LEGAL DESCRIPTION BY METES AND BOUNDS OF PROPERTY ON WHICH STRUCTURE WILL BE OR IS LOCATED *(If more space is necessary, use reverse side or continue on a separate sheet of paper and attach to this notice.)*

8. DATE WORK WILL BE STARTED	9. DATE WORK WILL BE COMPLETED	10. OVERALL HEIGHT (IN FEET) OF COMPLETED STRUCTURE ABOVE		
		A. GROUND LEVEL	B. MEAN WATER LEVEL (IF SO SITUATED)	C. MEAN SEA LEVEL

11. CHECK WHETHER COMPLETED STRUCTURE WILL BE	YES	NO
A. MARKED FOR THE PROTECTION OF AIR NAVIGATION		
B. PAINTED AS SPECIFIED IN OBSTRUCTION MARKING MANUAL		
C. LIGHTED AS SPECIFIED IN OBSTRUCTION MARKING MANUAL		

C. CERTIFICATION: I hereby certify that all of the above statements made by me are true, complete, and correct to the best of my knowledge.

DATE	SIGNATURE OF PERSON MAKING CERTIFICATION	TITLE

GPO 808234 Form FAA-117 (11-60)

FIGURE 2. FORM FAA-117, "NOTICE OF PROPOSED CONSTRUCTION OR ALTERATION"

Manufacturer	Model	A Main Rotor Diameter (Feet)	B Overall Length (Feet)	C Overall Height (Feet)	D Tread of Main Gear (Feet)	E Wheel Base (Feet)	F Gross Weight (Pounds)	G Number Seats Crew/Pass.	H Fuel Capacity (Gallons)
Bell Helicopter Co.	204B	48'	57'	14.5'	8.4'	skid	8,500	1-9	165
P. O. Box 482	47G	37'	43'	9.3'	7.5'	skid	2,950	1-2	60
Fort Worth, Texas	47J-2	37'	43'	9.5'	7.0'	skid	2,950	1-3	47.5
Brantly Helicopter Corp. Frederick, Oklahoma	B2	23.7'	28'	7'	5.6'	skid	1,600	1-1	30
Hiller Aircraft Co. 1350 Willow Road	UH-12E	35.4'	40.7'	9.8'	7.1'	skid/ 7.5	2,800	1-2	46
Palo Alto, California	E4	35.4'	40.7'	9.8'	7.1'	skid/ 7.5	2,800	1-3	46
Hughes Tool Co.	269	25'	28'	8'	6.5'	skid	1,670	1-1	25
Culver City, California	300	25'	28'	8'	6.5'	skid	1,670	1-2	25
Sikorsky Aircraft Div.	S-55	53'	62.3'	15.3'	11'	10.5'	7,200	2 7-10	185
United Aircraft Corp.	S-58	56'	65.8'	16'	12'	28.3'	13,000	1-2 12	283
Stratford, Connecticut	S-61L	62'	72.6'	16.8'	13'	23.5'	19,000	3 28	410
	S-62A	53'	62.3'	16'	12'	18'	7,500	1-2 10	187
Boeing Vertol Div.	44	44'	86.3'	15'5"	14.3'	24.5'	15,000	2 19	300
Morton, Pennsylvania	107 II	50'	83.5"	16'10"	14.5'	25'	19,000	2 25	360

Note: This incomplete listing of helicopter models gives some indication of the range in helicopter size and weight. Measurements are subject to change with new models.

FIGURE 3. HELICOPTER DATA CHART

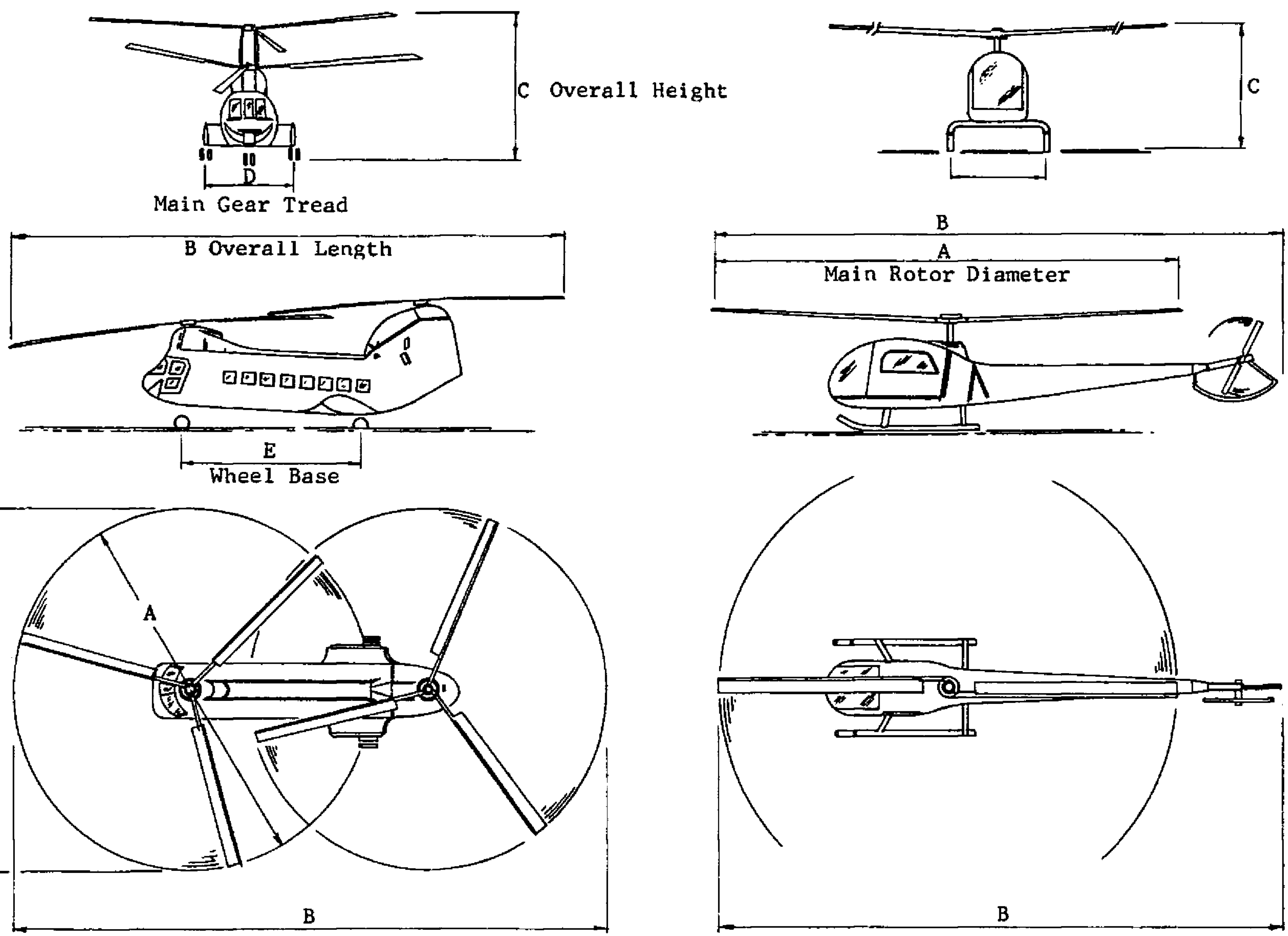
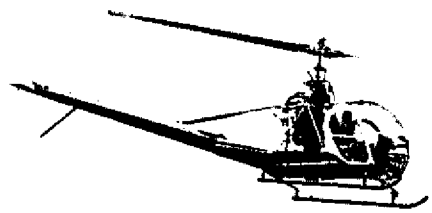
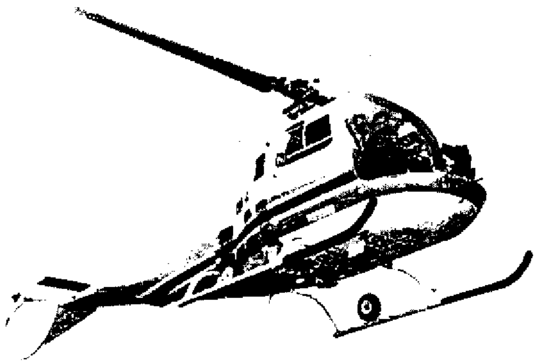


FIGURE 4. HELICOPTER CONFIGURATIONS

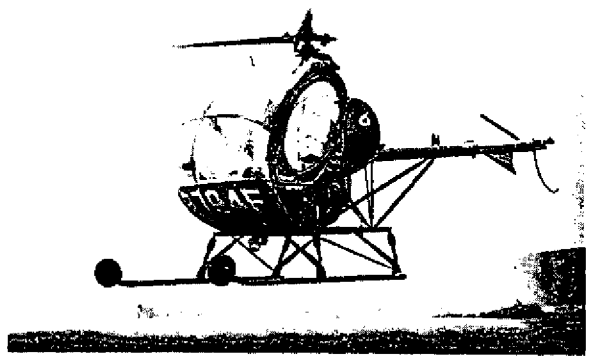
BELL 204B



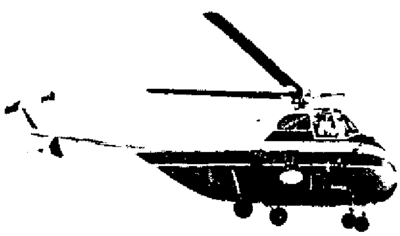
HILLER 12E



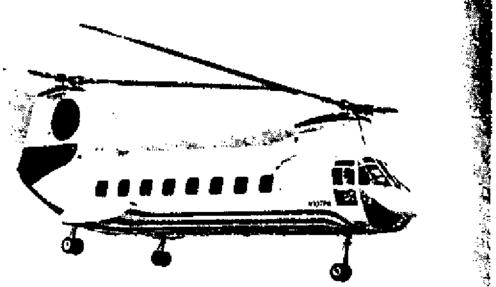
BELL 47J



HUGHES 269



SIKORSKY S55



BOEING VERTOL 107

FIGURE 5. TYPICAL HELICOPTERS IN CURRENT USE.

FIGURE 6. HELIPORT, RADIO STATION WGN, CHICAGO, ILLINOIS
SHOWING PRIVATE HELIPORT IN URBAN AREA

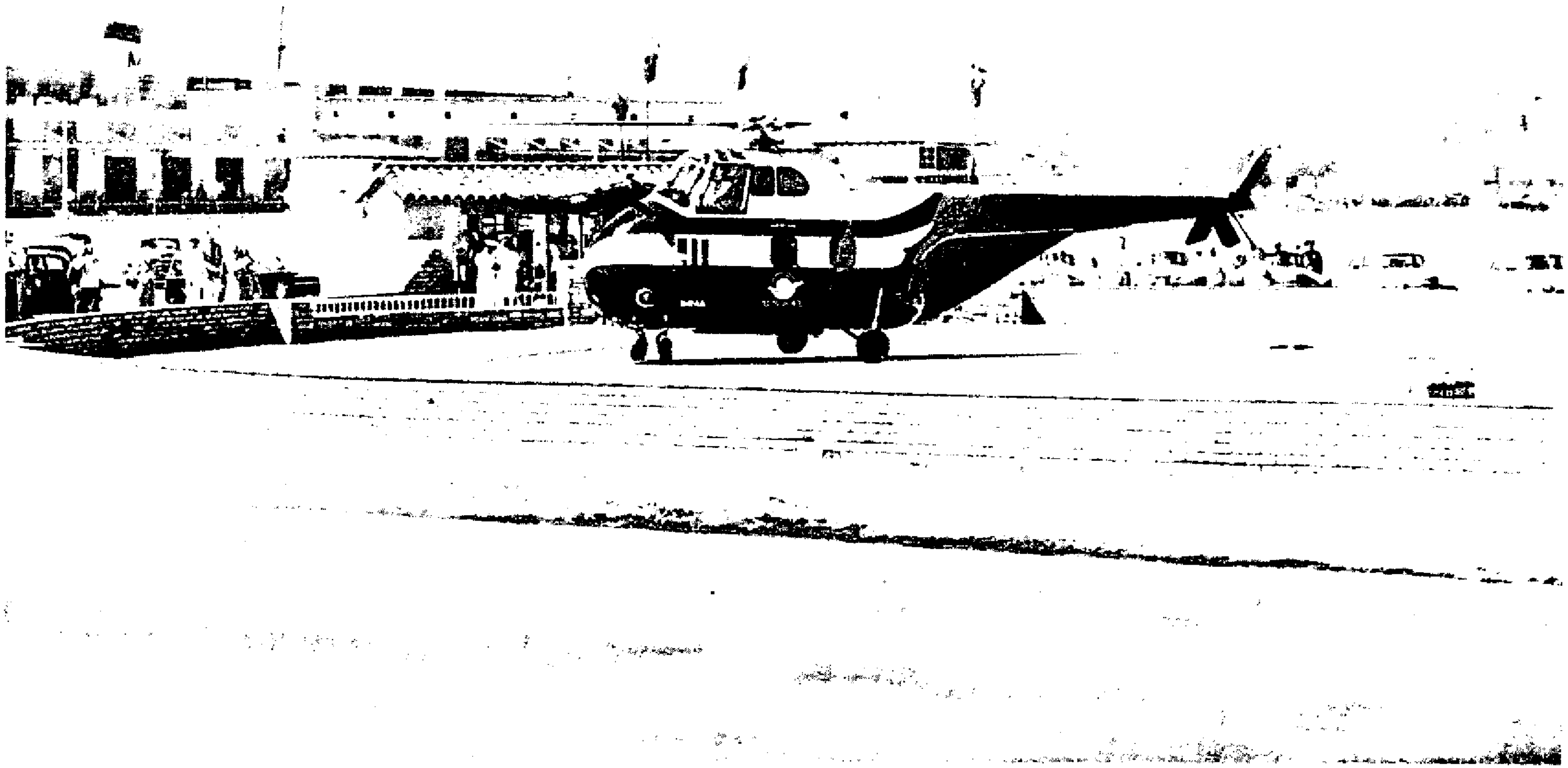


FIGURE 7. CIRCULAR HELIPORT, SAN PEDRO, CALIFORNIA, 55' DIAMETER TOUCHDOWN AREA

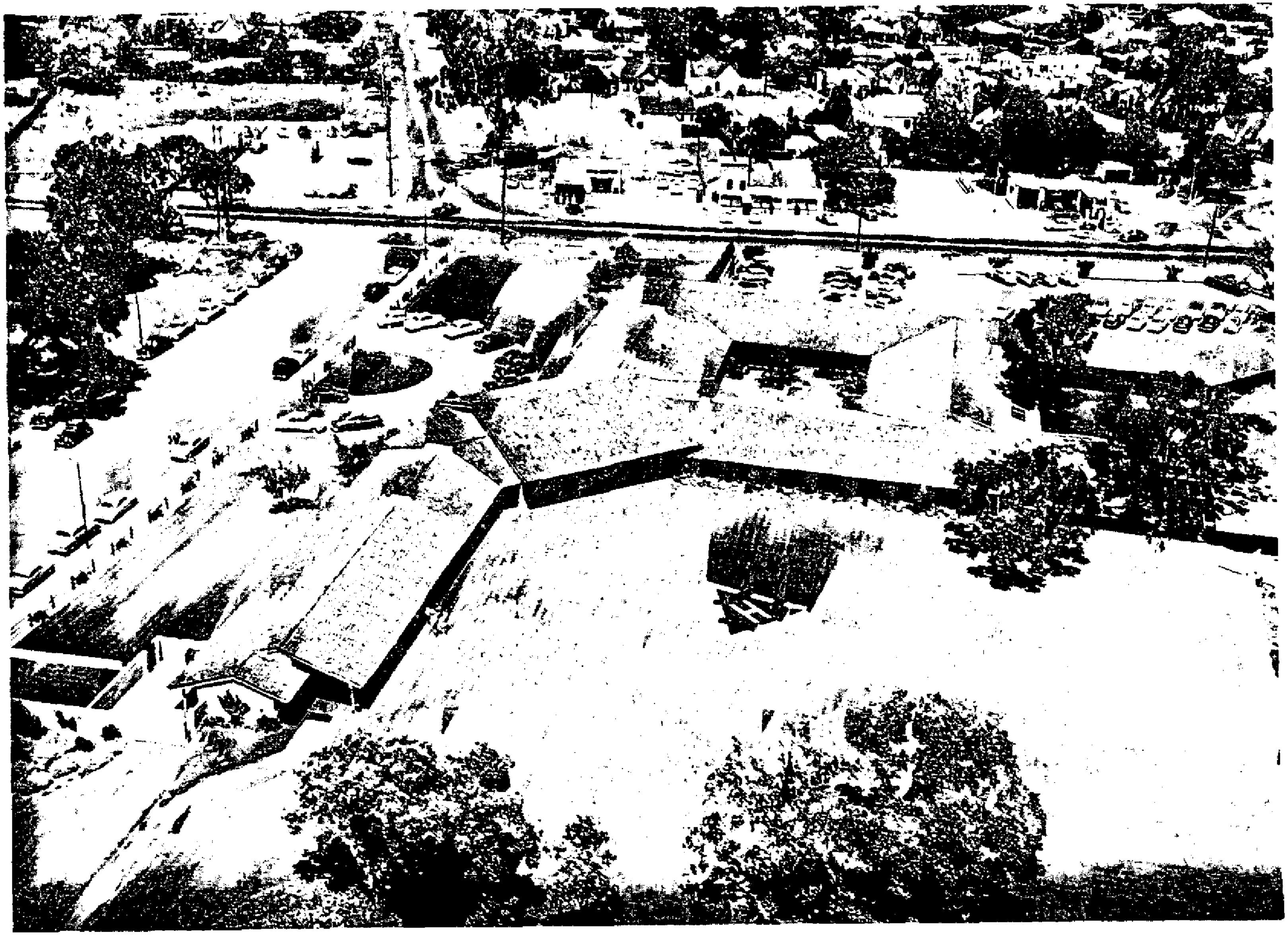
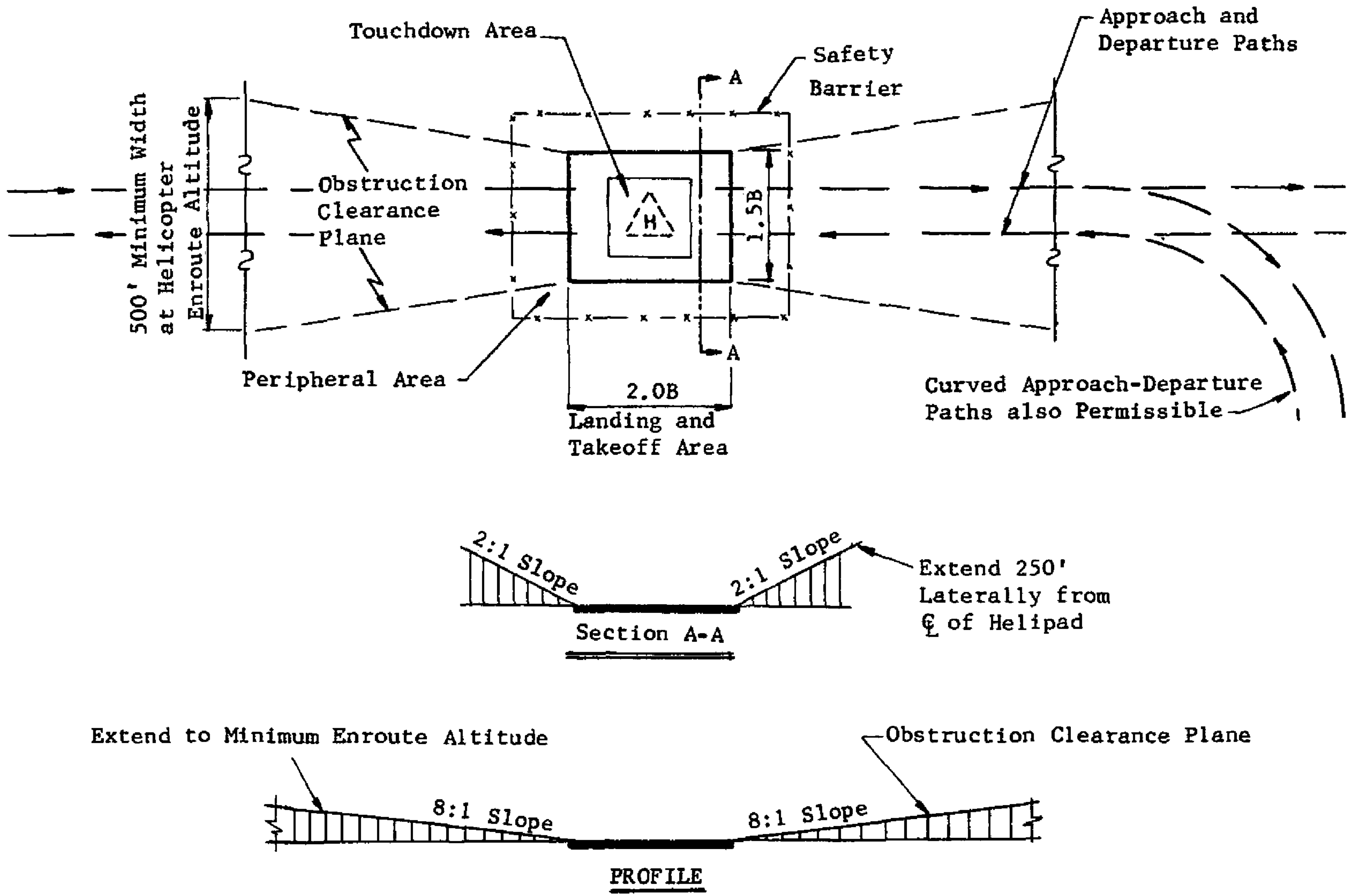
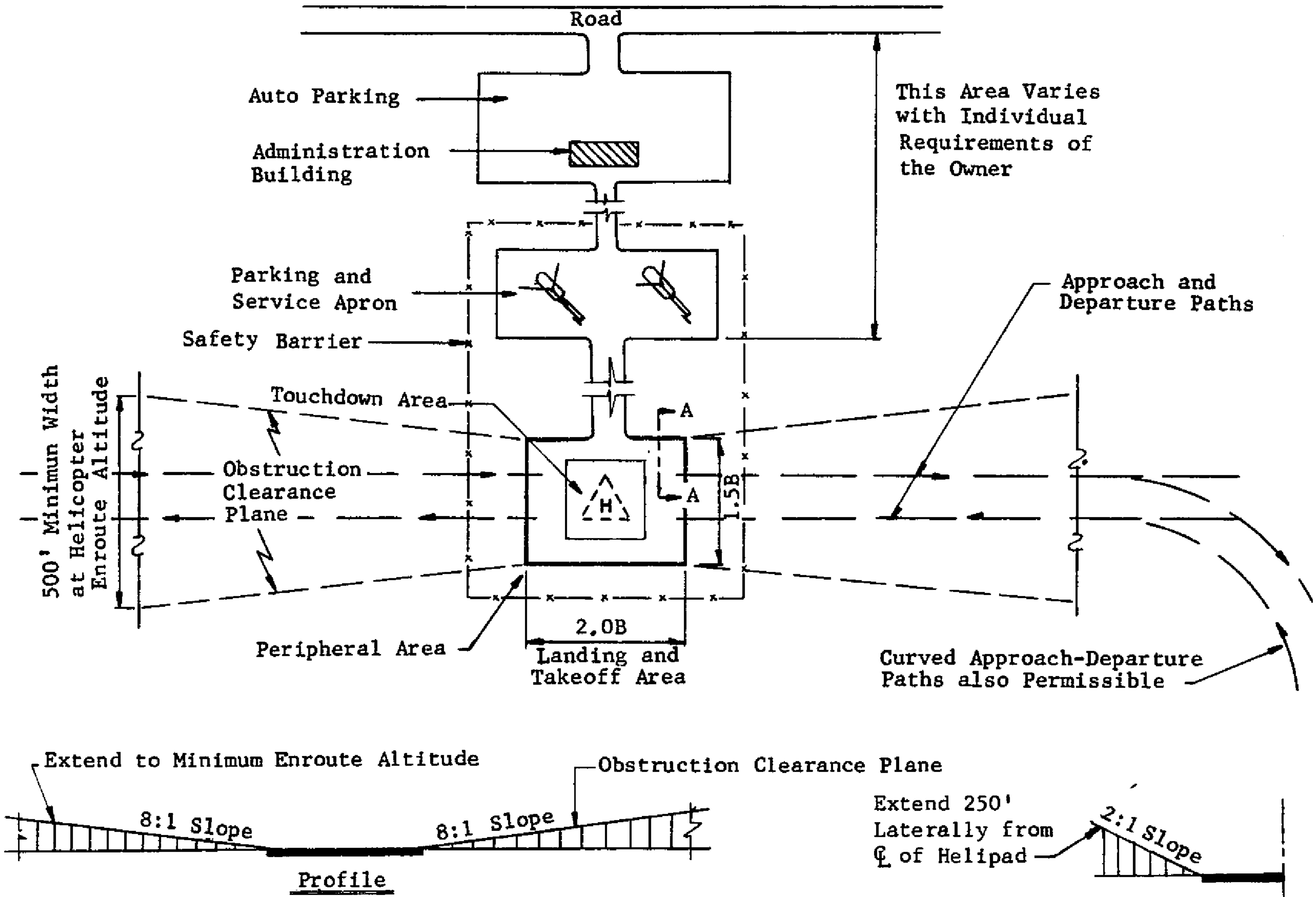


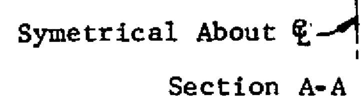
FIGURE 8. PRIVATE HELIPORT, LOS ANGELES, CALIFORNIA, SHOWING LANDING AND TAKEOFF AREA APPROXIMATELY 100' x 100'



NOTE: Dimension B Equals Overall Length of Helicopter

FIGURE 9. SMALL HELIPORT LAYOUT

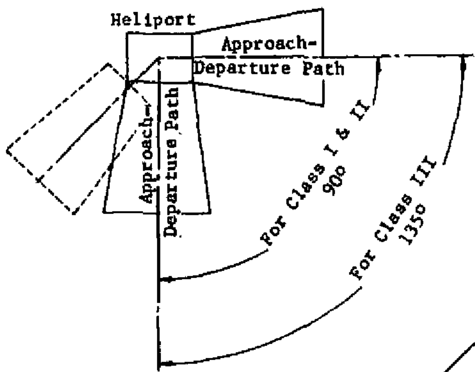


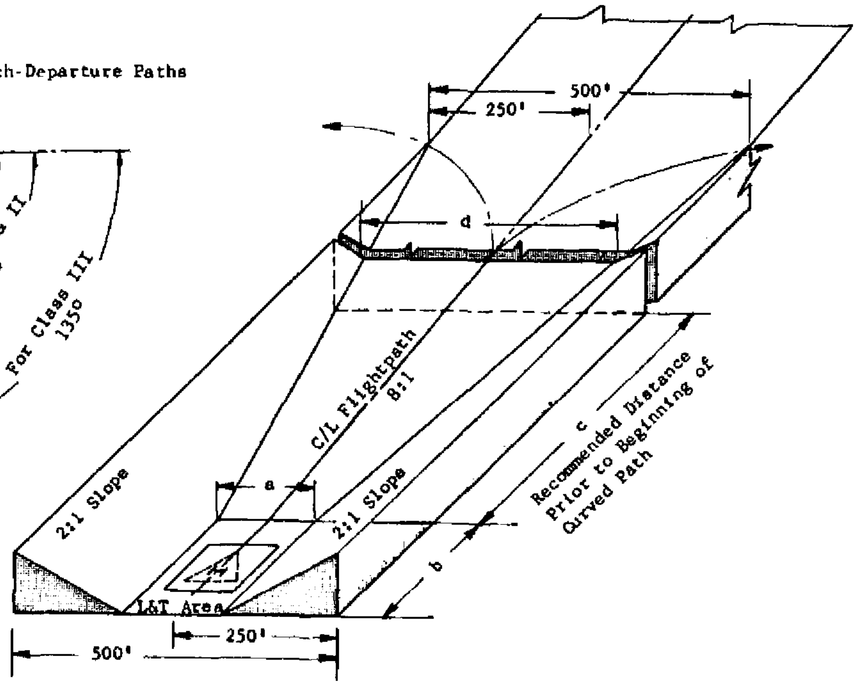


NOTE: Dimension B Equals Overall Length of Helicopter

FIGURE 10. LARGE HELIPORT LAYOUT

Minimum Angles Between Approach-Departure Paths





PERSPECTIVE VIEW OF APPROACH-DEPARTURE PATH

Heliport Class	FAR Category Helicopter	a	b	c	d	Minimum Angle Between Approach-Departure Paths
I Private	FAR Part 27, 29 (CAR 6 & 7)	1.5	1.5	300'	200'	90°
II Small Public	FAR Part 27 (CAR 6)	1.5	2.0	300'	300'	90°
III Large Public	FAR Part 27, 29 (CAR 6 & 7)	* 1.5	* 2.0	400'	300'	135°

Dimensions a and b:
(1) are expressed as multiples of overall helicopter length.
(2) may be increased or decreased upon evaluation of the site by FAA.

*For scheduled airline operations, other factors, related to a specific site would need to be considered.

FIGURE 11. APPROACH-DEPARTURE PATH AND OBSTRUCTION CLEARANCE DIAGRAMS

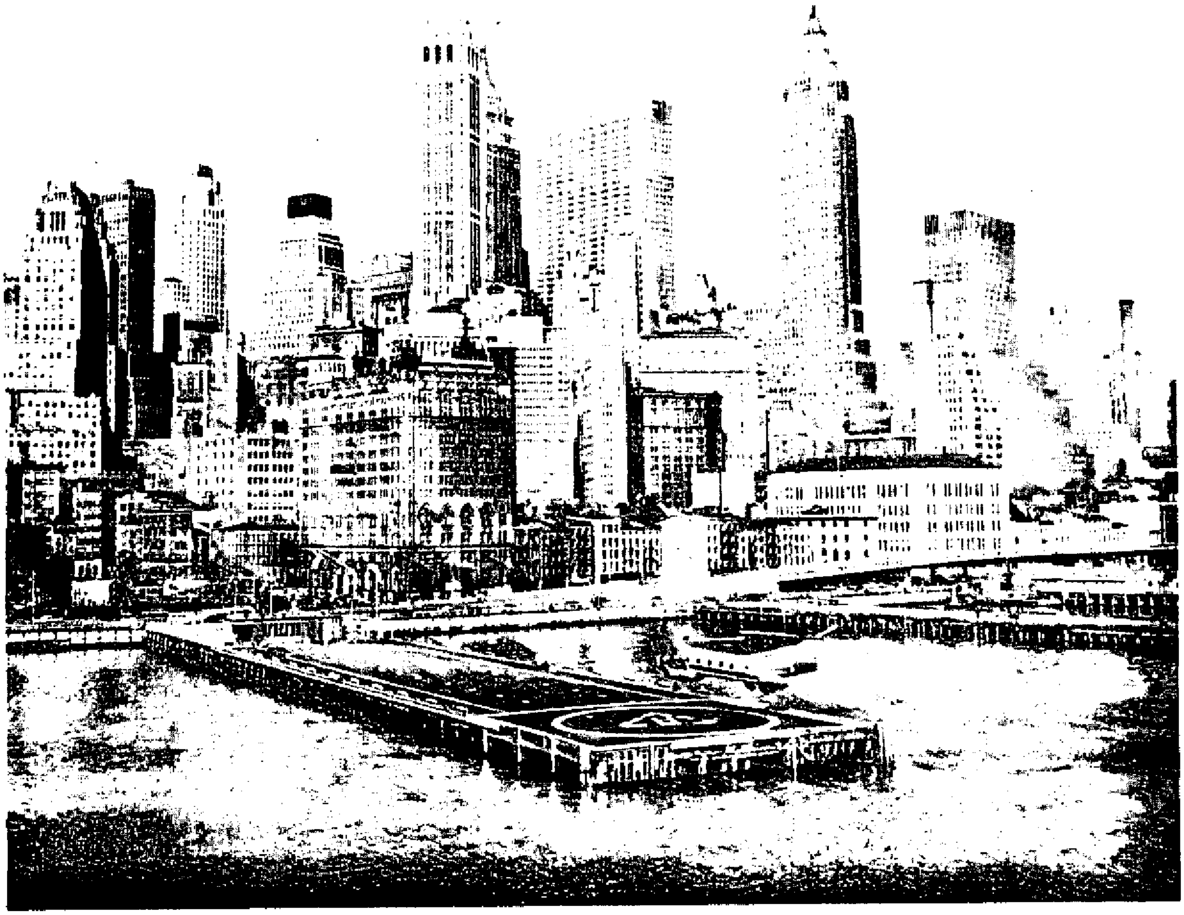


FIGURE 12. ELEVATED HELIPORT ON PIER IN EAST RIVER, NEW YORK, NEW YORK, ADMINISTRATION BUILDING AND AUTO PARKING ARE LOCATED AT SHORE LINE

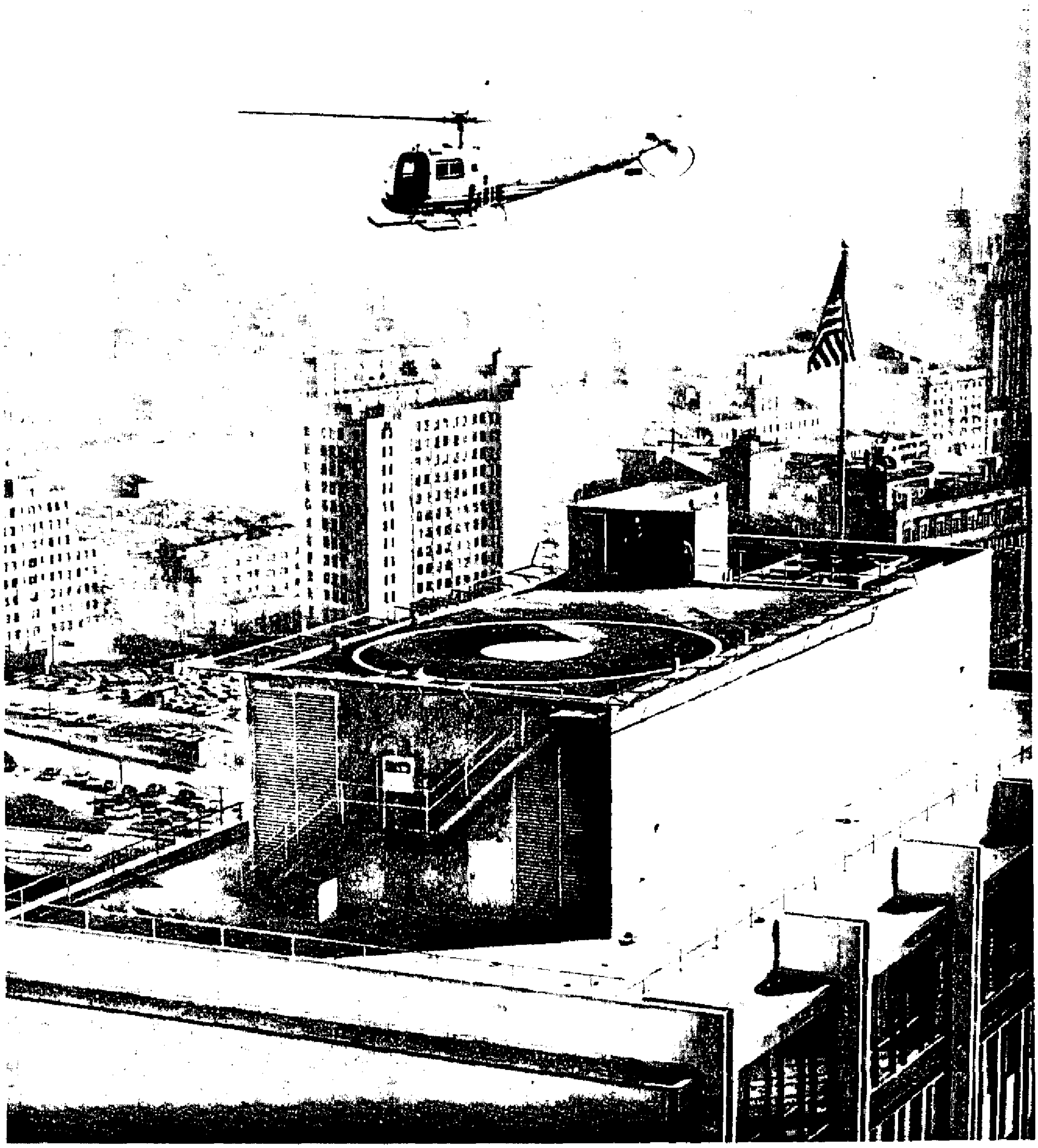


FIGURE 13. ROOFTOP HELIPORT, SIGNAL OIL AND GAS COMPANY, LOS ANGELES, CALIFORNIA, SHOWING CIRCLE MARKING AND HORIZONTAL SAFETY DEVICE EXTENDING FROM EDGES OF ROOFTOP

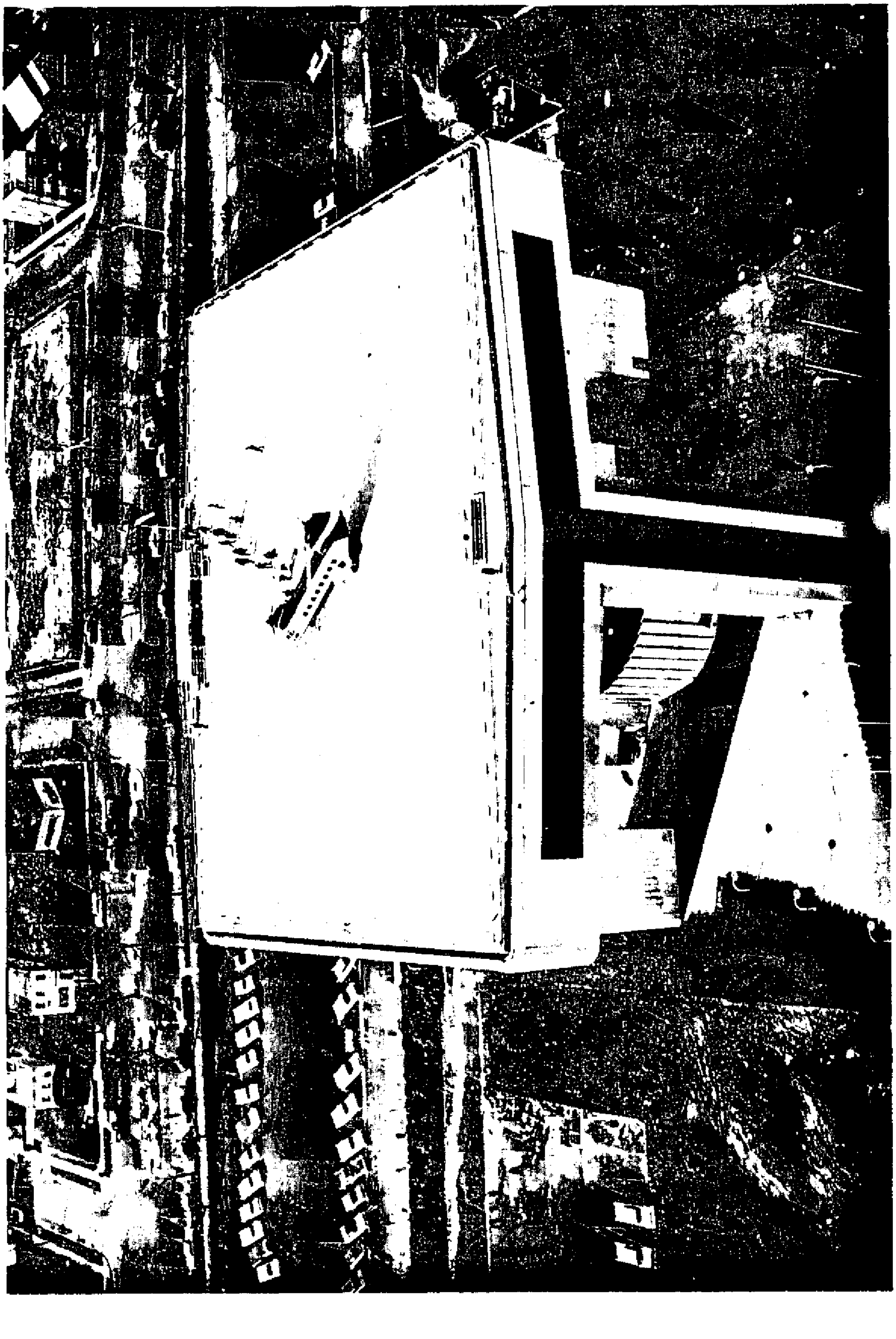


FIGURE 14. ROOFTOP HELIPORT, WORLD'S FAIR 1964, NEW YORK, NEW YORK. LANDING AND TAKEOFF AREA IS 200' x 150' AND IS 120' ABOVE THE GROUND.

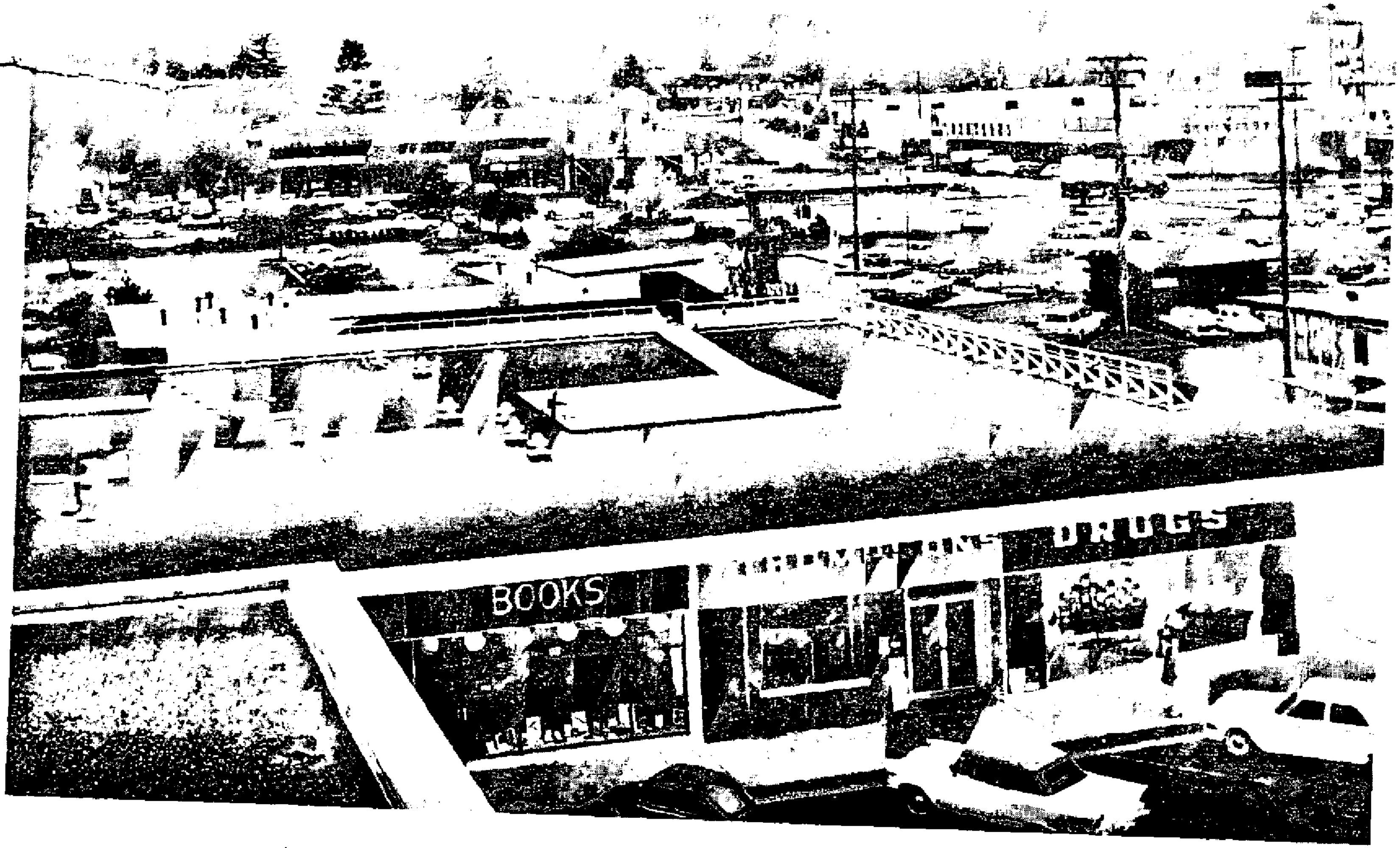
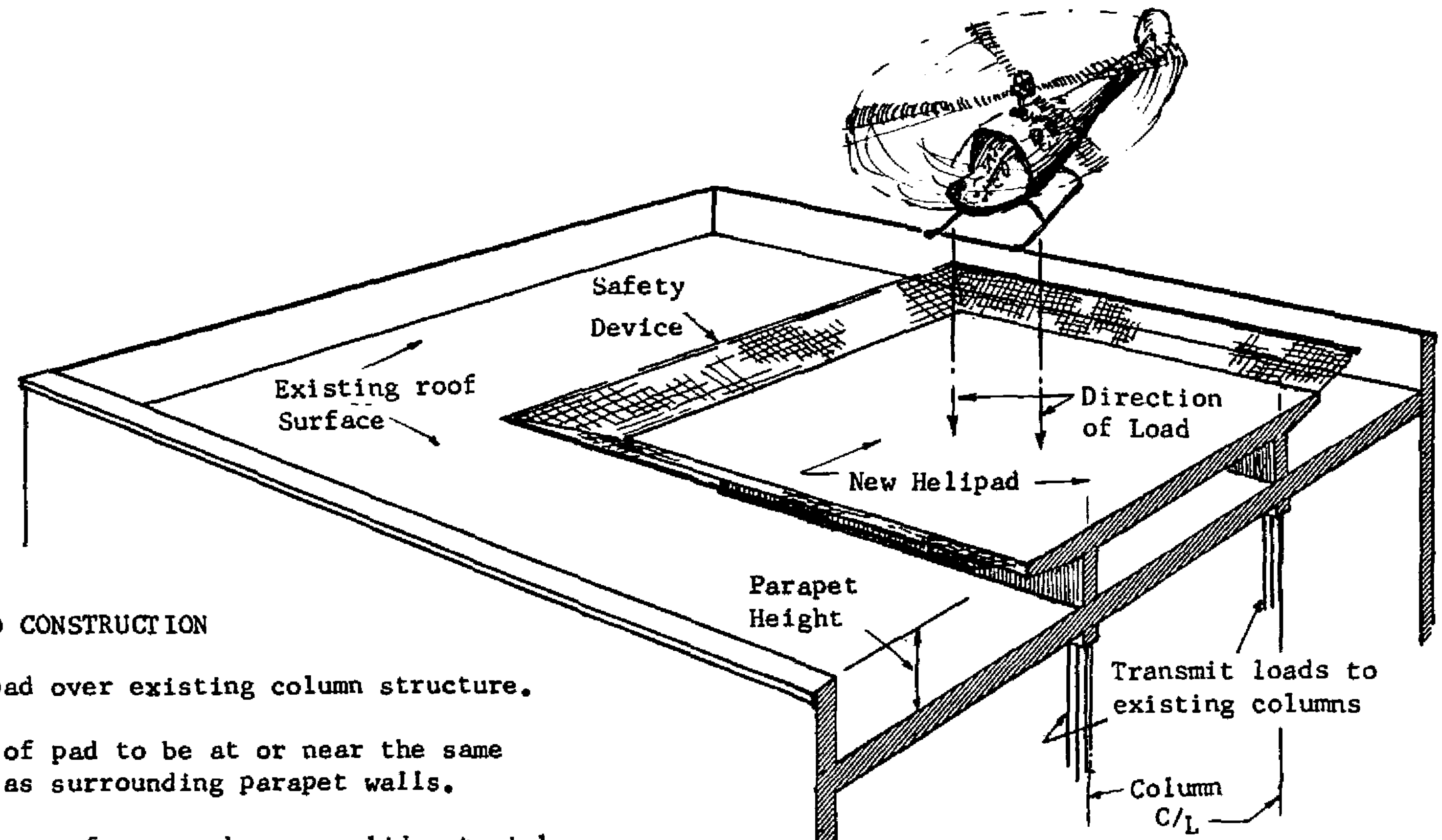


FIGURE 15. ROOFTOP HELIPORT, BELLEVUE, WASHINGTON, SHOWING 24' x 24' LOAD DISTRIBUTION PAD ON BUILT-UP ROOF AND HANDRAILS OR SAFETY BARRIERS



HELIPAD CONSTRUCTION

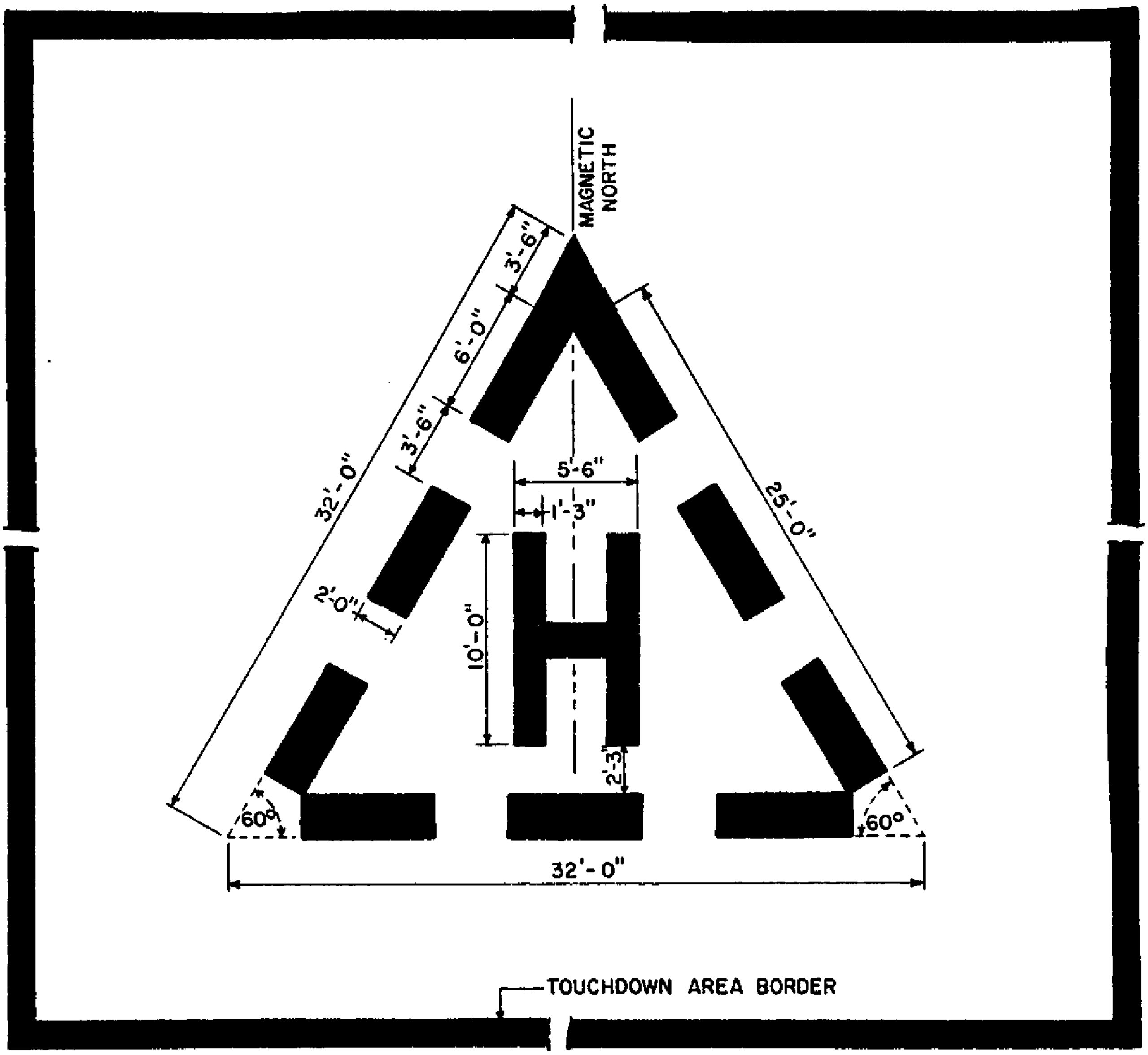
Erect pad over existing column structure.

Height of pad to be at or near the same height as surrounding parapet walls.

Platform surface may be any solid material that will resist puncture shear and provide "Ground Effect."

Structure should have sufficient strength to withstand a concentrated load of 75 percent of certificated gross weight of the helicopter on any one square foot of surface.

FIGURE 16. HELIPAD LOAD DISTRIBUTION ON ELEVATED SURFACE SHOWING RAISED HELIPAD AND PERSONAL SAFETY DEVICE



NOTES

The standard 32' triangular marker shall be placed in the approximate center of the touchdown area. The letter "H" shall be centered in the triangle as shown. The triangle shall always be oriented so that solid apex is pointed magnetic north.

Where necessary or desirable to confine the actual touchdown area of the helicopter landing area to a comparatively small area, as on roof tops, or specific portions of landing areas, the touchdown area should be clearly defined by a solid or segmented border at least 1' wide.

FIGURE 17. STANDARD HELIPORT MARKER

Circumscribe standard heliport triangle marker with circle marking 2' wide.

Allowable gross weight of helicopter can be indicated (in thousands of pounds) by numbers painted conspicuously in the center of the triangle or on another point on the landing area. Number markings should be similar in height and thickness of line to the letter H on the standard marker.

FIGURE 18. SUGGESTED MARKER FOR ROOFTOP SITE

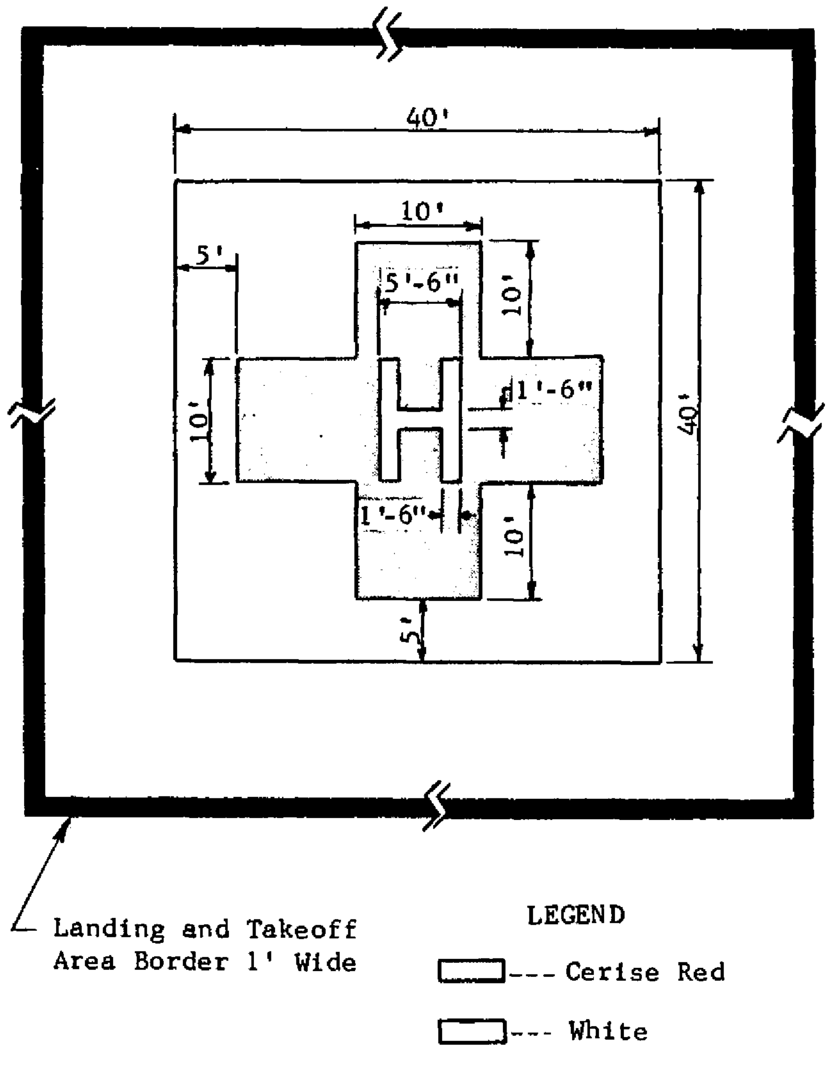


FIGURE 19. HOSPITAL HELISTOP MARKER

30884 6,830

ERRATA SHEET

Advisory Circular 150/5390-1A, titled Heliport Design Guide, dated November 1969, requires the following corrections to be made to the publication:

TITLE PAGE	-	Additional copies of the Heliport Design Guide, AC 150/5390-1A, may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, at $.75 per copy.
PAGE 38	-	Add Figure 19. Examples of Elevated Heliports.
PAGE 61	-	Bell 212
Line L		Change to 2 engines
PAGE 64	-	Kaman K-700 (Proposed)
Line U		Change 11,000 to 2,800
Line Y		Change 5,600 to 8,400
PAGE 70	-	Edge of Landing Area to Building Line
Class I		Varies - Building should not penetrate transitional surface.
Class II		50 feet - Assumes parking apron between building and landing area.
Class III		150 feet - Predicated upon ILS requirements.
PAGE 70	-	Edge of Landing Area to Property Line (Non-terminal Side)
Class I		Varies - Building at property line should not penetrate transitional surface.
Class II		50 feet - Provides clearance for two-story building at property line.
Class III		150 feet - Predicated upon ILS requirements.