# Appendix A

Notice of Preparation and Comments

**DEVELOPMENT SERVICES – PLANNING**
**8401 LAGUNA PALMS WAY • ELK GROVE, CALIFORNIA 95758**
**TEL: 916.683.7111 • FAX: 916.691.3175 • www.elkgrovecity.org**

# NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT

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| **DATE:** | **May 29, 2019** |
| **TO:** | **Responsible and Trustee Agencies, Organizations, and Interested Parties** |
| **LEAD AGENCY:** | **City of Elk Grove**<br>**Contact: Sarah Kirchgessner, Project Planner**<br>**8401 Laguna Palms Way**<br>**Elk Grove, CA 95758** |
| **SUBJECT:** | **Environmental Impact Report for the California Northstate University Medical Center Project** |

In discharging its duties under Section 15021 of the California Environmental Quality Act (CEQA) Guidelines, the City of Elk Grove (as lead agency, hereinafter City) intends to prepare an Environmental Impact Report (EIR), consistent with Section 15161 of the State CEQA Guidelines (Division 6 of Chapter 3 of Title 14 of the California Code of Regulations, hereinafter the CEQA Guidelines), for the California Northstate University Medical Center Project (the "Project," described later in this document). In accordance with Section 15082 of the CEQA Guidelines, the City has prepared this Notice of Preparation (NOP) to provide to the Office of Planning and Research, responsible and trustee agencies, and other interested parties with sufficient information describing the Project and its potential environmental effects.

The City made the determination to prepare an EIR following preliminary review of the Project. Pursuant to CEQA Guidelines Section 15063(a), because an EIR is needed an initial study has not been prepared. Probable environmental effects of the Project are described in the attached Project summary.

As specified by the CEQA Guidelines, the NOP will be circulated for a 30-day review period. The comment period runs from Wednesday, May 29, 2019, to Thursday, June 27, 2019. The City welcomes public input during the review period. In the event the City has not received either a response or a well-justified request for additional time by a responsible agency by the end of the review period, the City may presume that the responsible agency has no response (CEQA Guidelines Section 15082[b][2]).

Comments may be submitted in writing during the review period and addressed to:

City of Elk Grove
Development Services Department
c/o Sarah Kirchgessner
8401 Laguna Palms Way
Elk Grove, CA 95758

A scoping meeting for the Project will be held from 5:30 p.m. to 7:30 p.m. on Monday, June 24, 2019, at the Elk Grove City Council Chambers located at 8400 Laguna Palms Way in Elk Grove.

# PROJECT LOCATION AND SETTING

The Project site is located in the City of Elk Grove in Sacramento County, California within Township 6 North, Range 5 East, as depicted on the Florin 7.5' United States Geological Survey (USGS) topographic quadrangle. The approximately 25-acre Project site is situated on the western boundary of the City, approximately 4.75 miles west of the City center (Figure 1). The Project site consists of 12 parcels (assessor parcel numbers 132-2480-001, -002, -003, -004, -005, -007, -008, -010, -011, 132-2160-001, -002, 132-0460-076) and is bordered by Elk Grove Boulevard to the north, Interstate 5 to the west, West Taron Drive to the east, and the Laguna Stone Lake subdivision to the south, and Riparian Court provides access to the interior of the site (Figure 2). The area is fully developed except one approximately 0.5-acre undeveloped parcel on the southwest corner of Riparian Court and West Taron Drive.

The Project site is occupied by a total of nine structures, including the 109,800-square foot California Northstate University (CNU) School of Medicine building at 9700 West Taron Drive, a 76,000-square-foot office building at 9650 West Taron Drive, and seven additional buildings comprising 2501 through 2619 West Taron Drive. A gas station, fast-food restaurants, and a church occupy the area directly adjacent to the northwest portion of the Project site near the corner of Elk Grove Boulevard and West Taron Drive. Other development on the site includes driveways, parking lots, landscaping, and sidewalks.

The principal roads serving the Project site include Elk Grove Boulevard, West Taron Drive, and Riparian Drive.

# PROJECT DESCRIPTION

CNU is a private educational institution that currently operates a pharmacy and medical college at 9700 West Taron Drive and an approximately 15,000-square-foot event center in the office building at 9650 West Taron Drive. The establishment of CNU at its current location was permitted via a conditional use permit (CUP) (EG-11-003) approved by the City Planning Commission on March 3, 2011.

CNU is proposing to expand its facilities and services to provide emergency and other medical related services in the western portion of the City. At buildout, the Project will consist of an expanded pharmacy and medical college, medical center (hospital) with a helicopter landing pad (helistop), out-patient clinic, medical office building, two parking structures with accessory retail, a dormitory, one parking structure with roof-top sports facilities, a central plant and mechanical yard, public gathering spaces, and surface parking. The Project would be implemented in three phases as follows:

## Phase 1

- **Existing Building Demolition:** As part of Phase 1 the following buildings would be demolished: 2501 West Taron, 2505 West Taron, 2513 West Taron, and 2525 West Taron. The following buildings would remain: 2521 West Taron, 2615 West Taron, 2619 West Taron, 9650 West Taron Drive, and 9700 West Taron Drive.
- **Hospital Building:** This building would be approximately 563,500 square feet in size and 12 stories in height with a mechanical penthouse and a partial basement for parking which would use a semi-automatic stacked parking system. The hospital would be designed to a level II trauma standard and would include approximately 250 patient beds and a helistop. The first floor of the building would be raised to provide protection from the 200-year flood event (flood magnitude with a 0.5-percent chance [or 1 in 200 chance] of occurring in any given year).
- **Central Plant:** The central plant would be 22,000 square feet in size with the main level designed to house support equipment for the hospital and one basement floor parking level that would use a semi-automatic stacked parking system. The main level would be raised to provide protection from the 200-year flood event. An exterior mechanical yard approximately 15,500 square feet in size would be constructed adjacent to the central plant.
- **Parking:** A total of 1,554 parking spaces are planned in Phase 1, including 1,079 surface parking spaces and 475 parking spaces on the lower levels of the hospital and central plant buildings.

## Phase 2

- **Existing Building Demolition:** The following buildings would be demolished in Phase 2: 2521 West Taron and 9650 West Taron. The following buildings would remain: 2615 West Taron, 2619 West Taron, and 9700 West Taron Drive.
- **Patient Bed Tower:** This additional tower would be approximately 136,500 square feet in size and include seven stories. It would be built on top of the existing Phase 1 Hospital podium starting at the fourth-floor level and would add approximately 150 patient beds for a total of 400 beds upon completion of Phase 2.
- **Out-Patient Clinic:** This ambulatory care building would be 125,000 square feet in size and four stories in height with one basement floor parking level that would use a semi-automatic stacked parking system. This building would contain outpatient medical services.
- **Medical Office Building**: This building would be 123,000 square feet in size and five stories in height, and would contain outpatient medical clinics and house hospital administration.
- **Parking Structure 1:** This structure would be 257,000 square feet in size and would contain approximately 1,500 parking spaces. It would be four stories in height and would also include a basement level and approximately 50,000 square feet of ground floor retail, medical offices, and other supporting uses. A semi-automatic stacked parking system would be used on the three stories above the ground level and the basement level would be standard parking.
- **Parking:** Upon completion of Phase 2, there would be a total of 2,744 parking spaces, including 557 surface parking spaces, 675 parking spaces on the lower levels of the hospital, out-patient clinic, and central plant buildings, and 1,500 parking spaces in parking structure 1.

## Phase 3

- **Existing Building Demolition:** The following buildings would be demolished in Phase 3: 2615 West Taron and 2619 West Taron. The school of medicine building at 9700 West Taron Drive would remain.
- **Parking Structure 2:** This structure would be 207,000 square feet in size and would contain approximately 1,000 parking spaces. It would be four stories in height and would also include a basement level and approximately 40,000 square feet of ground floor retail, medical offices, and other supporting uses. A semi-automatic stacked parking system would be used on the three stories above the ground level and the basement level would be standard parking.
- **Dormitory:** This building would include approximately 150 units to house 300 students and would be located adjacent to the school facilities. The structure would be five stories in height and 172,500 square feet in size.
- **Parking / Sports Structure:** This structure would be 67,000 square feet in size and one story in height with basement and above ground level parking that would accommodate 250 parking spaces. The roof would be occupied by basketball, tennis and volleyball courts for student use.
- **Administration Expansion:** Expand the existing school of medicine building at 9700 West Taron Drive. The administration expansion would be three stories in height and 43,500 square feet in size.
- **Parking:** Upon completion of Phase 3, there would be a total of 3,390 parking spaces, including 340 surface parking spaces, 300 parking spaces on the lower levels of the out-patient clinic and central plant buildings, and 2,750 parking garage spaces in the parking/sports structure and parking structures 1 and 2. The basement level of the hospital is anticipated to be used for support services in Phase 3 and would no longer be used for parking.

The Project would also include addition of a turn pocket for emergency vehicles on Elk Grove Boulevard, traffic signal modifications, streetscape modifications to West Taron Drive, modifications to existing parking areas, driveway improvements to Riparian Court, modifications to bicycle and pedestrian facilities, drainage improvements, and construction of new landscaped public gathering areas.

### Entitlements

CNU is requesting the following entitlements:

- General Plan Amendment of six parcels from Community Commercial (CC) to Employment Center (EC)
- Rezoning of nine parcels from General Commercial (GC) to Industrial Office Park (MP)
- Text Amendments to General Plan Policy ER 2-3 and EGMC Section 23.42.040 related to development within the 200-year flood plain
- District Development Plan to provide for overall site plan approval and to establish development elements including, but not limited to, parking, landscaping, pedestrian improvements, and other features that are common across the site;
- Major Design Review for the architecture of the proposed Phase I buildings (Hospital and Central Plant);
- Conditional Use Permit to allow a hospital, helistop, and expansion of the existing medical school;
- Major Uniform Sign Program to provide signage for the project; and
- Abandonment of Riparian Court (also known as West Taron Court).

## PROBABLE ENVIRONMENTAL EFFECTS

The EIR will evaluate whether the proposed Project would potentially result in one or more significant environmental effects. The following issues will be addressed in the EIR:

- Aesthetics
- Air Quality
- Biological Resources
- Archaeological, Historical, and Tribal Cultural Resources
- Geology and Soils
- Energy
- Greenhouse Gases and Climate Change
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise and Vibration
- Population and Housing
- Public Services
- Transportation and Traffic
- Utilities and Service Systems

### Issues Scoped Out from Analysis in the EIR

The City anticipates that the following environmental issues would result in less-than-significant or no impacts and would not be discussed in the EIR for the reasons discussed below.

#### Agriculture and Forestry Resources

No farmland, forest land, or timberland exists on the Project site. Therefore, there would not be a significant impact related to agriculture and forestry resources, and this issue will not be discussed in the EIR.

#### Landslides

Based on the Project's topography (relatively flat), there would be no impact related to landslides. Therefore, this impact will not be discussed in the EIR.

#### Mineral Resources

The Project site is not used for mineral extraction, nor is it designated as an important mineral recovery site. Therefore, there would not be a significant impact on mineral resources, and this issue will not be discussed in the EIR.

### Recreation

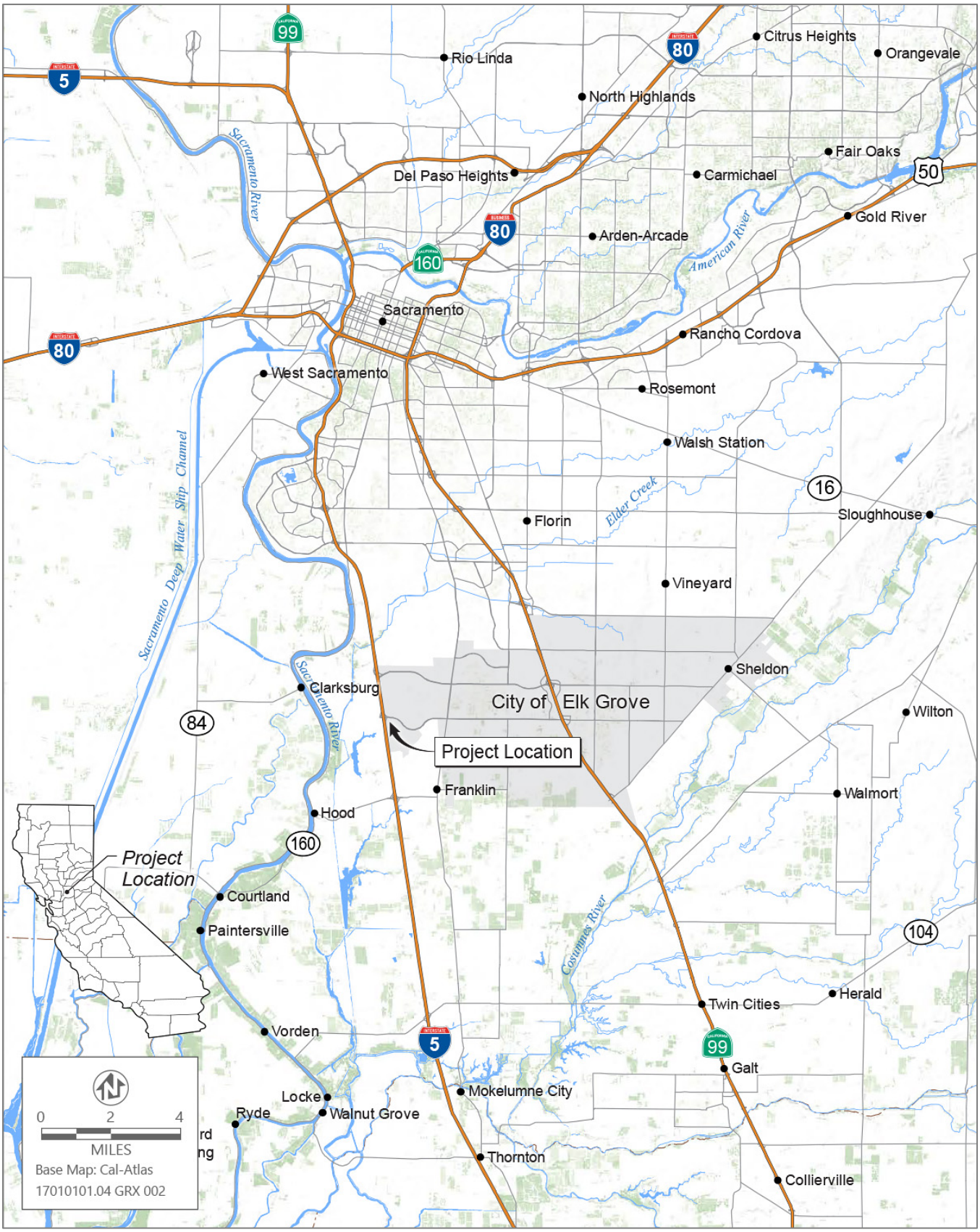
The Project would not contribute to unplanned growth and would not include new housing that would increase the use of existing recreational facilities or demand for new recreational facilities that would adversely affect the environment. Therefore, there would not be a significant impact related to recreation, and this issue will not be discussed in the EIR.

### Seiche, Tsunami, and Mudflow

Based on the Project's location (inland, away from any water bodies) and topography (relatively flat), there would be no impact related to seiche, tsunami, or mudflow. Therefore, this impact will not be discussed in the EIR.

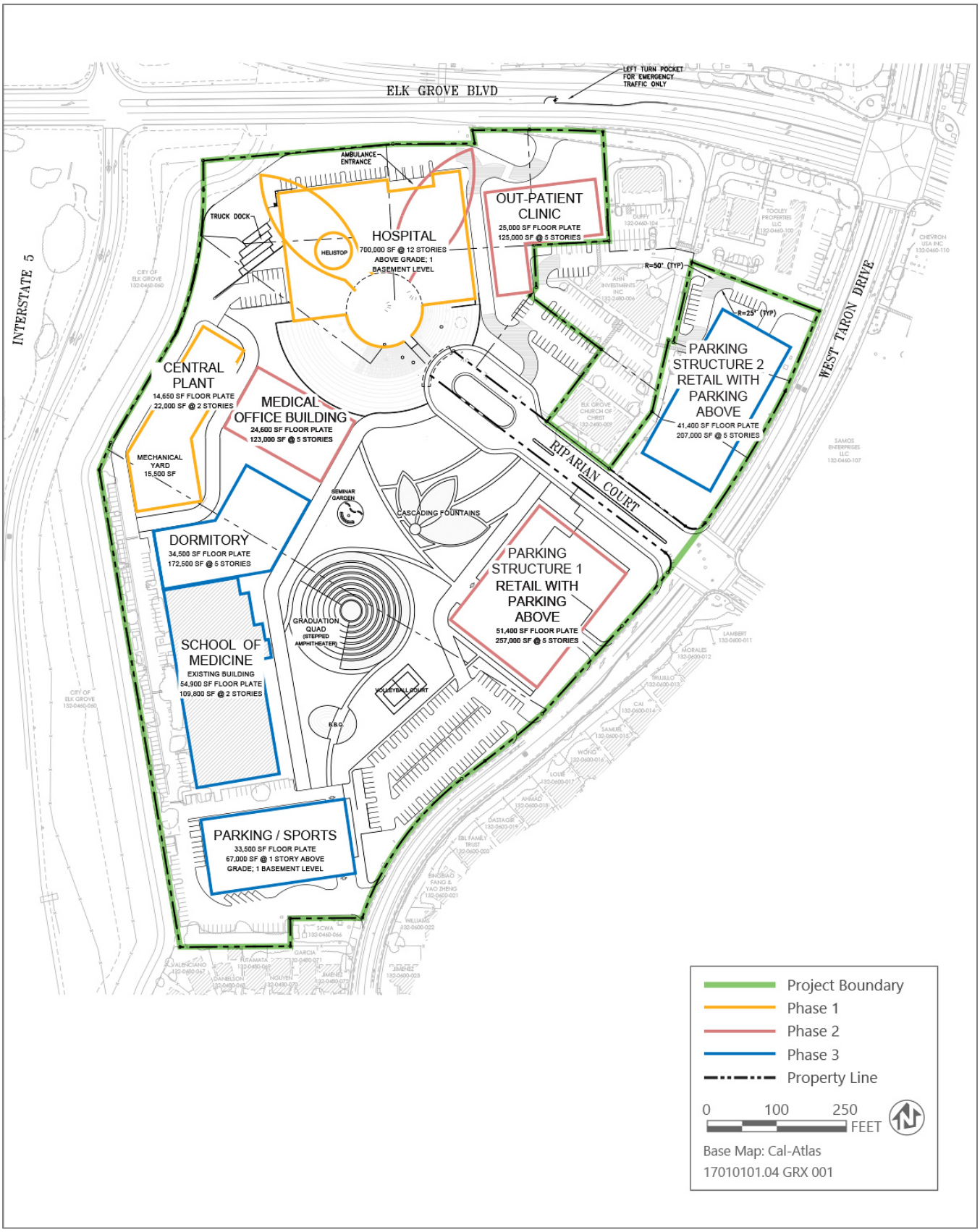
### Wildfire

The Project site is not located in or near a state responsibility area or lands classified as very high fire hazard severity zone. Therefore, there would not be a significant impact related to wildfire, and this issue will not be discussed in the EIR.




Source: Image provided by Ascent in 2019

Figure 1 Regional Location Map




Source: Image provided by Wood Rodgers in 2019

Figure 2 Project Site Plan

| COMMENTER | Application | Project Description | Aesthetics | Agriculture | Air Quality | Biological Resources | Cultural Resources | Geology/Soils | Climate Change/GHGs | Energy | Hazards/Haz Materials | Hydrology/Water Quality | Land Use/Planning | Minerals | Noise | Population/Housing | Public Services | Recreation | Transportation/Traffic | Utilities Service Systems | Cumulative Impacts | Growth Inducement | Alternatives | Other | NOTES |
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| **INDIVIDUALS** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lynn Wheat<br>Wheat91@yahoo.com<br>No date | | • | | | | | | | | | | • | • | | | | | | | • | • | | | • | Indicate type of EIR. Indicate process for EIR consultant selection. Provide date application deemed complete. Describe hospital approval/permitting process, including mandatory state agency approvals. Describe elevation of access/parking relative to 200-yr floodplain and authority permitting not elevating above 200-yr floodplain if not elevated. Describe the GP Police ER 2-3 and EGMC Section 23.42.040 text amendments regarding development in the 200-yr floodplain. Analyze change in water consumption and impact on water supply at buildout. Include commitment letters from all responsible agencies providing utilities and services. Analyze cumulative impacts. Describe current baseline impacts that require overriding considerations. Describe how project is consistent with previous findings. |
| Lisa Shores<br>lisashores@icloud.com<br>May 29, 2019 | | | | | | | | | | | | | | | | • | | | | | | | | | The dormitory should be considered housing. |
| DeAna and David Melilli<br>Deana.spiess@sbcglobal.net<br>May 30, 2019 | | • | | | | | | | | | | | | | | | | | • | | | | | | Consider FAA Advisory Circular 150/5390-2C, which provides guidance for heliport design including notification requirements: https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.information/documentnumber/150_5390-2c. |
| Ed Klinenberg<br>eklinenberg@comcast.net<br>June 17, 2019 | | | | | | | | | | | • | | | | | • | • | | | | | | | | | Evaluate indirect effects of homeless populations attracted to the area by the level II trauma center on the surrounding community in terms of trash, sharps, hazardous waste, and fire. |
| DeAna Melilli<br>Heritage Lakeside Community<br>3013 Granite Park Lane<br>Elk Grove, CA 95758<br>June 20, 2019 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | Identify the intended uses of the EIR. Identify to what extent the proposed CNU project would be in compliance with each piece of legislation and General Plans (City of Elk Grove and Sacramento County). Identify the potential for the proposed project to (1) degrade the quality of the environment, (2) substantially reduce the habitat of a wildlife species, (3) cause a wildlife population to drop below self-sustaining levels in the area, (4) threaten to eliminate a plant (by pollutants) or animal community (wildlife preserve), (5) substantially reduce the number or restrict the range of a rare or endangered plant or animal, (6) eliminate important examples of the major periods of California history or prehistory due to magnitude of the project in depth and height primarily and other features, (7) have impacts that are individually limited, but cumulatively considerable, (8) cause substantial adverse effects on human beings, either directly or indirectly. Conduct a general plan analysis and related land use/feasibility/demand study prior to environmental review. Consider ballot measure to approve General Plan land use changes. Discuss the role of the General Plan in determining development for the long-term. Consider consistency of the proposed project with the Sacramento County General Plan and identify any required amendments. Discuss how the proposed project would How will this project affect the Sacramento County Emergency Evacuation Plan in the event of a levee breach. Identify any changes needed to the Sacramento County Emergency Evacuation Plans, since the general plan for Elk Grove, Laguna West, and Laguna using Interstate-5 from Elk Grove Blvd and Laguna Blvd in an emergency. Discuss and consider the following: (1) Resources Code §§ 21100.1, 21000(a) (“maintenance of a quality environment for the people of this state now and in the future is a matter of statewide concern”), (2) California Environmental Quality Act (California Public Resource Code, Div. 13 21100), as amended, (3) consistency with County (Contra Costa, Sacramento, Solano, and Yolo) General Plans, (4) Environmental Justice EO 12898 (February 11, 1994) to address Environmental Justice in |

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| | | | | | | | | | | | | | | | | | | | | | | | | | Minority Populations and Low-Income Populations currently in the City of Elk Grove. Also consider the affordable housing project going in on Maritime Dr. and Harbor Pointe Dr. off of Elk Grove Blvd and Interstate-5 per the Sacramento Business Journal and the Developer – They plan to use this EIR inconsideration of their plans if allowable by the City of Elk Grove, CA; (5) California Education Code (CEC) Section 17210 et seq. – DTSC must be involved in the environmental review process for the proposed acquisition and/or construction of school properties that will use state funding. The CEC requires that a Phase I Environmental Site Assessment be completed prior to acquiring a school site or engaging in a construction project. Depending on the outcome of the Phase I Environmental Site Assessment, a Preliminary Endangerment Assessment (PEA), including the collection and submittal of samples for analysis, may be warranted. Depending upon the results of the PEA, remediation may be necessary. Per the City of Elk Grove website for this project it states that at this time the City is unsure if the University would get any state funding. Consider involvement of DTSC if state funding is proposed. Consider the Federal Highway Act of 1956 and 1988 and using the Federal Highway Administration (FHWA) visual quality assessment method which provides a systematic and objective approach to evaluating visual changes that potentially would result from implementation of proposed projects or actions. Consider conducting a visual resources inventory of the project area including regionally and locally important visual or scenic resources, astronomical observation, photography of wildlife and migratory birds, properties specifically oriented to views within the viewshed, and recreation areas and similar facilities (e.g., parks, trails (Stonelake Preserve trail), wildlife and waterfowl refuges). Consider the viewer groups within the study area such as people on local roadways and I-5; residents; commercial viewers; office viewers; park and trail users; and agricultural and industrial workers. In evaluating viewer sensitivity, consider (1) How many people have that view and what types of viewers are they? (2) How long can they see the view? Residents and recreationists generally have long-duration views while bicyclists and motorists typically have short-duration views. (3) What is their likely level of concern about the appearance, aesthetics, and quality of the view? Level of concern is a subjective response. Factors such as the visual character of the surrounding landscape, the activity in which a viewer is engaged, and the viewer's values, expectations, and interests affect a viewer's level of concern. Consider project compliance with the California Public Utilities Code and the Stonelake, West Laguna, and Lakeside CC&Rs Requirements. Consider (1) introduction of new sources of light (streetlights) with the proposed project and impacts to the night sky; (2) aesthetic impact of converting the Stonelake Landing Shopping Center site to a massive Medical University Center, which is inconsistent with the neighborhood, character of the area; (3) aesthetic impacts of overhead power lines and telephone poles. Consider potential air quality impacts. Address Federal Clean Air Act, California Clean Air Act , and local Air Quality Management Districts. Evaluate the following with regard to air quality: (1) conflict with or obstruct implementation of the applicable air quality plan; (2) violate any air quality standard or contribute substantially to an existing or projected air quality violation; (3) result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors); (4) expose sensitive receptors to substantial pollutant concentrations; and (5) create objectionable odors affecting a substantial number of people. Evaluate the impact of ventilation arrangements on airborne particle dissemination outside of the hospital, dorms and parking structures. Address transportation-related air quality impacts consistent with Caltrans policies, guidance, and tools to conduct air quality analyses. Establish conformity with the CAA and compliance with the Amendments to Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks 13296 (68 FR 78, April 18, 2003). Also consider (1) odors from any onsite wastewater associated with any open-air processing, and (2) air quality impacts to local residents during project construction, including the sewer line or other lines during demolition and construction. Evaluate the potential for the project to (1) have a substantial adverse effect, |

| COMMENTER | Application | Project Description | Aesthetics | Agriculture | Air Quality | Biological Resources | Cultural Resources | Geology/Soils | Climate Change/GHGs | Energy | Hazards/Haz Materials | Hydrology/Water Quality | Land Use/Planning | Minerals | Noise | Population/Housing | Public Services | Recreation | Transportation/Traffic | Utilities Service Systems | Cumulative Impacts | Growth Inducement | Alternatives | Other | NOTES |
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| | | | | | | | | | | | | | | | | | | | | | | | | | either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service; (2) have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or US Fish and Wildlife Service; (3) have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means; and (4) interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; (5) conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; and (6) conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. Request that lighting plans for permanent light fixtures go for review to Caltrans/OCTA. Evaluate project compliance with Sections 1600 – 1603, and Section 4150 and 4152 of the California Fish and Game Code, as well as California Wildlife Protection Act of 1990. Identify and evaluate potential impacts to special status species lists on the USFWS ECOS IPaC website and the California Natural Diversity Data Base (CNDDB). Consider impacts to birds that have been observed flying over and roosting at the Stonelake Shopping Center, including but not limited to Swainson's hawk, tricolored blackbird, black-crowned night-heron, double-crested cormorant, great blue heron, great egret, northern harrier, white-tailed kite, yellow warbler, Allen's hummingbird, bats, giant garter snake (see Stonelake Special Status Species of the area at https://www.fws.gov/nwrs/twocolumn.aspx?id=2147505433#). Address the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c) (Bald and Golden eagles have been observed flying over the Stonelake Landing Shopping Center and the adjacent Stonelake NWR). Address the Endangered Species Act (16 USC 1531 et seq.), as amended and the California Endangered Species Act of 1974, as amended. Consider including analysis and continuous plan implementation studies of threatened and endangered species that would be impacted by the proposed project. Address the Migratory Bird Treaty Act (16 USC 703 et seq.). Migratory birds, (many species of raptors, passerines, and swallows), that have been observed frequently nesting in trees and shrubs near the project area where suitable habitat exists (Stone Lakes NWR), include raptors and passerines, and swallows commonly nest underneath bridges and other structures in close proximity to water. Consider including mitigation that includes Caltrans/OCTA perform a nesting survey to avoid nesting birds during the avian breeding season, and if a nesting bird species is found, avoid and minimize impacts on native birds and the nest or eggs of any birds by installing flagging, stakes, and/or construction fencing to demarcate the inside boundary of the buffer between the project activities and the nest. Address (1) Archaeological and Historical Preservation Act (16 USC 469 et seq.), (2) Department of Transportation Act, Section 4(f) [Department of Transportation Act 49 U.S.C.], and (3) National Historic Preservation Act (NHPA) [16 U.S.C. Section 470 et.seq]. Consider that Elk Grove has one of California's largest Native American populations: an estimated 4 percent are descendants of local and other American Indian tribes, including indigenous tribes such as the Valley and Sierra Miwok, Nisenan or Southern Maidu, and River Patwin. Comply with Assembly Bill (AB) 52, 09/2014. Address Executive Order (EO) B-10-11, 09/2011. Evaluate if the project would cause a substantial adverse change in the significance of tribal cultural resources considering the depth, height, helistop, and other features of the project. Consider preparation of a study to address geology and soils. Identify any need for LAFCO involvement in the project due to the magnitude of the application. Address whether Sacramento County Zone 40 would require geotechnical studies and design guidelines to identify and minimize any hazardous geologic changes to the underlying substrata. Identify need for, potential for, and/or plans for management and/or handling of (1) geological and soil survey, (2) sink holes (3) underground garages with ground water table at sea level to 400 feet, (4) |

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| | | | | | | | | | | | | | | | | | | | | | | | | | discovery of Native American relics, (5) collapse of the levee, (6) groundwater saturation due to location, (7) continuing project construction during annual rainy flooding season, and (8) Geotechnical Report for the site that encompasses the magnitude of the project. Identify whether the Elk Grove zoning code requires preparation of a geotechnical report or other appropriate analysis to determine the shrink/swell potential and stability of the soil for public and private construction projects and identification of measures necessary to ensure stable soil conditions. Evaluate if the project would impede or redirect flood flows taking into consideration existing condition and current water flow/drainage systems in place. Address the Sacramento County use of the 1997 Uniform Building Code and compliance with it. Consider adopted policies to minimize geologic impacts associated with new construction in the Safety Element of the Sacramento County General Plan. Evaluate the potential for the project to (1) expose people or structures to major geologic hazards, including unstable slopes (e.g., landslides), ground failure, subsidence, liquefaction, and lateral spreading; (2) result in substantial changes in geologic substructures that could affect human safety or result in substantial soil erosion or the loss of topsoil; (3) cause inundation by mudflow from the adjacent wildland (open range land) that floods annually as described by FEMA. Review Water Resources Flood Depth and Evacuation Maps at http://www.waterresources.saccounty.net/Pages/Maps.aspx. Review appropriate "Flood Hazard Boundary Map (FHBM)." Consider potential for landslides, including debris flows and mudslides. Address seismicity and faults within at least 60 miles of the project site and the seismic severity zone classification of Zone 40. Identify the earthquake risk for Elk Grove and the largest earthquake that has occurred within 30 miles of the City. Evaluate the potential for the proposed project to affect the levee embankment and foundation stability, and include a detailed settlement analysis to assess long-term stability during full flood stage. Identify additional standards for levee construction, including easement conditions, as provided in Title 23, Code of California Regulations, Division 1, Article 8, Section 120, Levees. Assess (1) potential for failure of a levee within the project area to result in the failure of the function of the overall flood protection system even further from the site; (2) the project to result in slope failure or landslides due to adjacent levee disturbance; (3) the project to result in substantial soil erosion or the loss of topsoil on or around the levee; (4) the flood safety easement between the levee and roadways/buildings which are used to access levee features, including the existing, paved service road located on the property. Identify if preparation of an Erosion Control plan that complies with the Sacramento County's Erosion and Sedimentation Control Ordinance would be prepared by the Sacramento County Water Agency for the proposed project. Address the potential for the project to increase soil erosion by wind or water during construction or in the future. Discuss the degree to which erosion would increase due to dormitory residents and visitors, as well as helicopters. Address the potential for the project to cause land subsidence. Identify and discuss any Site Assessments that have been conducted for to assess potential for contamination at the project site due to the nearby land uses (including but not limited to the gas station and businesses within the Stonelake Landing Shopping Center). Identify if a Site Assessment will be performed for the proposed project. Identify the elevation relative to sea level of any underground garages. Address the potential for liquefaction. Evaluate the potential direct and indirect energy-related impacts of the proposed project, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy (see Public Resources Code §21100(b)(3) and Assembly Bill (AB) 1575). Address Executive Order (EO) S-14-08, 11/2008. Senate Bill (SB) 107, 09/2006. Senate Bill (SB) 1078, 09/2002. Address California's Energy Efficiency Standards for Residential and Nonresidential Buildings Title 24, Part 6, of the California Code of Regulations which establishes California's Energy Efficiency Standards for Residential and Nonresidential Buildings. Address California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), commonly referred to as the CALGreen Code. Evaluate the potential for the project to impact shade profiles and solar production on nearby houses with solar panels and identify mitigation consistent with CEQA case law (California, Clean Energy |

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| | | | | | | | | | | | | | | | | | | | | | | | | | Committee v. City of Woodland (2014) 225 Cal.App.4th 173 ("CCEC"). Also address compliance with Energy resources from the Sacramento County General Plan concerning depletion of nonrenewable resources (e.g., oil, natural gas, coal, etc.) and emissions of pollutants during both the construction and long-term operations. Address (1) California's Global Warming Solutions Act of 2006 (California Health and Safety Code §35000 et seq.), (2) Executive Order (EO) B-30-15, 04/2015 (including explaining how the project would meet these targets; evaluating the project's potential to directly increase motor vehicles in the West side of Elk Grove; and identify plans to mitigate health effects, (3) Executive Order (EO) S-13-08, 11/2008 (identify how the California Sea Level Rise Assessment Report and California Climate Adaptation Strategy and evaluate impacts related to sea level rise and climate adaptation); (4) Executive Order (EO) S-1-07, 01/2007 (address how the project would meet the Low Carbon Fuel Standard); (5) Executive Order (EO) S-1-07, 08/2007 (include a climate change analysis in accordance with CEQA and OPR guidelines); and (6) Senate Bill (SB) 1368, 09/2006 (identify how the project would meet the low GHG emissions target. Identify any Hazardous Materials Area Plan based on requirements of Chapter 6.95 of the California H&SC, Title 19 of the CCR and SARA Title III for emergency response to a release or threatened release of a hazardous material within the County. Identify the location of the Operational Area Emergency Operations Center in the City of Elk Grove. Discuss any identified evacuation points and transportation routes, including transportation points identified to collect and transport people without transportation resources to evacuation points. Evaluate the potential impact of the project on the effectiveness of established evaluation routes. Identify any needed amendments to the Sacramento County and City of Elk Grove Emergency Evacuation Plans (Water Resources Flood Depth and Evacuation Maps - http://www.waterresources.saccounty.net/Pages/Maps.aspx). Discuss relevant FAA standards for a helipad. Identify if helicopters would carry hazardous waste. Identify any changes to emergency plans to address what would occur in the event a helicopter loses fuel or crashes into homes or the Stonelake Wildlife National Preserve. Address Federal Aviation Regulations, Notice of Proposed Construction or Alteration including who is responsible for notification and how Responsible Agency approvals would occur including use of the EIR. Identify any active military bases with airports that use airspace above the west side of Elk Grove and if they or DOD would provide input on the acceptability of the proposed project. Address U.S. Department of Defense Air Installations Compatible Use Zone Program – identify what zone the project would be in and discuss proposed helicopter compatibility with the current flight patterns of the Military airspace. Address compliance with California's Hazardous Waste Control Law – identify any plans related to this that would be submitted to the City of Elk Grove and the designated CUPA for the County. Discuss compliance with the California Accidental Release Prevention Program (CalARP) program (Health and Safety Code Section 25531-25543.3) which implements the federal RMP program for the accidental airborne release of substances regulated under Section 112 of the Clean Air Act (42 USC Section 7412(r)). Address the Underground Storage Tank (UST) Act and Title 23 of the California Code of Regulations, and the California H&SC and Title 23 of the CCR – identify any proposed Underground Storage Tanks and/or Aboveground Storage Tanks for hazardous waste and discuss how such storage tanks would be managed and/or inspected. Address the Chemical Accident Prevention Provisions (40 CFR Part 68) which require USEPA to publish regulations and guidance for chemical accident prevention at facilities that use extremely hazardous substances, and identify who would be responsible for compliance. Also identify if the City of Elk Grove or Sacramento County already have one for Universities, hospitals, and helipads developments. Address the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC Section 9601 et seq.), also known as the Superfund program – identify who would monitor for potential accidents involving hazardous waste and who citizens of Elk Grove would contact should they observe a hazardous situation during demolition, construction, and after completion. Address Hazardous Materials Transportation Act (HMTA) – identify who would maintain and how often would the hazardous |

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| | | | | | | | | | | | | | | | | | | | | | | | | | list for the project be updated; if the list would be provided to City of Elk Grove; if who would be responsible for and oversee monitoring and reporting requirements for the University/Hospital. Address Government Code Section 65962.5 which requires Cal/EPA to develop, at least annually, an updated Cortese List. Identify who would provide hazardous-material-release information to the Cortese List and at what stages of the project. Evaluate the potential for the project to (1) result in a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment; (2) emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing school, including CNU; (3) be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment; (4) result in a safety hazard for people residing or working in the project area because the project is within the vicinity of a private helipad; (5) impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan, in particular for the Stonelake Community, Heritage Lakeside Community, and Laguna West community; (6) expose people or structures to a significant risk of loss, injury or death involving wildland (open range land) fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. Address (1) Clean Water Act (33 USC 1251 et seq.), as amended (impaired waterbodies); (2) Porter-Cologne Water Quality Control Act; (3) Federal Compliance with Pollution Control Standards 12088 (43 FR 47707, October 13, 1978) – include a description of our how the project would handle the discharge of waste to prevent it from going to the Stonelake National Wildlife Refuge slough and wetlands, and then ultimately the Sacramento River -- consider requiring a storm water pollution prevention plan be developed and implemented to limit effluent discharge as a result of storm water runoff, and inspections of storm water pollution prevention measures be performed during and after construction; (4) National Pollutant Discharge Elimination System (NPDES)Program – comply with the Regional Water Quality Control Board's (RWQCB) requirements for discharges from general construction activity and trench dewatering in accordance with NPDES requirements. Describe how any point and nonpoint discharge would be managed. Identify water bearing layers, groundwater quality, and other aquifer characteristics in the project site area and discuss the potential for non-point source discharges to affect these resources. Evaluate the potential for the project to create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff. Identify existing storm drainage facilities/hydrology and describe required improvements to accommodate the project. Identify the location for any discharge of trenched/dredged or fill material into Stonelake NWR slough and wetlands or the Sacramento River. Discuss compliance with CWA Section 404 and the Least Environmentally Damaging Practicable Alternative (LEDPA). Evaluate the potential for the project to substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site. Describe how water quality of storm water discharges would be monitored and measured and describe what infrastructure improvements would be required along with any changes to discharge locations. Evaluate the potential for project-related water quality and species impacts in water ways of Stonelake NWR. Evaluate potential project-related impacts to adjacent levee and any water wells. Identify the complete footprint of the proposed project, including features overhanging offsite areas, location of all potential construction operations and staging areas for each phase of the project. Evaluate potential conflicts with any applicable habitat conservation plan or natural community conservation plan. Discuss how land use conditions, such as type of use and/or densities adjacent to the project would influence land use compatibility north, east, south, and west of the project site. Discuss any need for NEPA compliance including due to proximity to the Stone Lakes NWR. |

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| | | | | | | | | | | | | | | | | | | | | | | | | | Consider identifying issues and opportunities for improving the provision of parks, trails, green belts, and open space. Address the Northern Sacramento Valley Planning Area 2012 Triennial Air Quality Attainment Plan (AQAP) and how the project would address this. Discuss Department of the Army Regulation (AR 200-1) if applicable. Discuss how the City would (1) avoid introducing new noise-sensitive land uses in the vicinity of the helipad that would be exposed to significant levels of aircraft noise, taking into account the characteristics of the helipad and the communities surrounding the helipad; (2) minimize the risks associated with potential off-airport aircraft accidents and emergency landings, including providing for the safety of people and property on the ground in the event of an aircraft accident near an airport and enhancing the chances of survival of the occupants of an aircraft involved in an accident beyond the immediate helipad area; (3) avoid the development of land use conditions that, by posing hazards to flight, could increase the risk of an accident occurring, including airspace obstructions, wildlife hazards, particularly bird strikes, and land use characteristics that pose other potential hazards to flight by creating visual or electronic interference with air navigation; (4) avoid, to the extent possible, new land use development that would be disrupted by overflight activity and might lead to annoyance and complaints; (5) notify people about the presence of aircraft overflights near the helipad so they can make informed decisions regarding acquisition or lease of property. Evaluate the effect of overflight disclosure on real estate transactions. Discuss consistency with California Government Code §6586021 which requires zoning to be consistent with the general plan (Sacramento County and City of Elk Grove). Describe how the following existing features would be handled during each phase of demolition and construction: (1) infrastructure, (2) circulation; (3) water system, (4) wastewater system, (5) drainage system, (6) dry utilities, (7) off-site improvements. Describe proposed improvements to the following during each phase of demolition and construction: (1) drainage, (2) water pipelines, (3) sewer pipelines, (4) public parks, (5) private road, (6) public roads, (7) dry utilities including gas, electricity, and telecommunications. Identify any setbacks for project features relative to nearby one/two story residential homes and backyards. Discuss any City of Elk Grove environmental statutes and regulations. Describe how CNU would comply with the Clean Air Act, the Toxic Substances Control Act, the Occupational Safety and Health Act, and the Federal Water Pollution Control Act. Discuss how the Emergency Management Plan would address any chemical leak from the project area into Stonelake NWR waterways. Discuss any liability the City would have if such an incident occurred and if the City could demand clean up by CNU. Describe any plans and their scale for transition and mitigation/buffering for the project. Address proposed change in development density on the site and its effect on the rural character of the area, consistency/compatibility with zoning surrounding the site, and property values. Address impacts to existing community character of the area. Discuss consistency with the Objectives and Policies of the Sacramento County General Plan, particularly concerning density. Discuss the consistency of the project with the land capability analysis for the property. Discuss growth inducing impacts, the potential effect on future development density in the area, and potential for increasing density create hazards to the community. Evaluate the potential for blight to occur if the project site is not developed or only partially developed following demolition activities in one or more phases. Discuss the project's potential to set precedent for altering the General Plan through develop applications and future re-zoning throughout the City of Elk Grove. Discuss the potential need for fencing to limit unauthorized access to adjacent properties. Describe potential for increase in traffic-related noise within a normally quiet wildlife area. Identify whether CNU plans to extract Inferred Concrete Aggregate mineral as identified in Special Report 245 from the site during or after construction and discuss if and how this activity would be permitted. Consider (1) Noise Control Act of 1972, 42 U.S.C. § 4901 to 4918 and compliance with the Sacramento County Noise Ordinance; (2) USEPA, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Safety Margin, 1974; (3) FHWA, Technical Noise Supplement, 1998; (4) California Noise Control Act of 1973; |

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| | | | | | | | | | | | | | | | | | | | | | | | | | and (5) Sections 46000 through 46080 of the California Health and Safety Code, known as the California Noise Control Act. Evaluate potential for the project construction to impact noise- and vibration-sensitive land uses adjacent to the site such as the gas station, restaurants, multi-family residential buildings, single-family residential buildings, and the church. Evaluate the potential for the project to result in (1) exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies; (2) exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels; (3) substantial short-term or periodic increase in ambient noise levels in the project vicinity above existing levels without the project; (4) substantial long-term increase in ambient noise levels in the project vicinity above levels without the project; and (5) vibration exceeding 0.2 in/sec within 75 feet of existing buildings and/or levee. Identify (1) the maximum allowable interior space noise exposure from transportation noise sources at noise sensitive land uses in terms of DBA L (DN) and General Plan (City and County) or applicable standards of other agencies such as US Fish and Wildlife or any other Federal agency; (2) any noise level descriptors in the General Plans (City and County) or applicable standards of other agencies such as US Fish and Wildlife or any other Federal agency. Describe the anticipated additional temporary noise level and any change in future ongoing noise levels with the project. Identify noise emissions reference levels for demolition and construction equipment. Identify planned construction and operations work hours; and disclose if and under what circumstances night work could occur during demolition and construction activities. Describe how noise nuisances would be handled such as sirens, helicopter landings, and hospital alarms when trauma patients arrive. Discuss what level of sound proofing would be provided for the hospital and dormitories. Identify potential noise levels anticipated from garages and surface lot parking. Discuss the anticipated permanent increase in ambient noise levels in the project site vicinity relative to existing noise levels without the project. Discuss the potential for the project to expose people residing or working in the project area to excessive noise levels because of the helistop (private airstrip). Address compliance with Title 24 of the CCR, Part 2, California Noise Insulation Standards, which establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities (hospital), apartment houses, and dwellings other than single-family residences. Evaluate the potential for construction- and operations-related vibration to result in short- and long-term impacts on the adjacent levee and surrounding buildings. Consider whether equipment during building demolition and foundation construction would generate elastic waves in soil that may adversely affect surrounding buildings and the adjacent levee and discuss how adverse impacts to them would be identified and managed. Consider assessing vibration prior to the start of construction and requiring vibration monitoring during building demolition and foundation construction. Evaluate growth inducing impacts of the project. Consider indirect effects such as (1) extension of utility lines, (2) construction of roads, or construction or expansion of water or wastewater facilities through extension of roads or other infrastructure, (3) revisions to land use policies, such as General Plan amendments, annexations, and rezones – request to have on a ballot for the City of Elk Grove citizens to approve; (4) displacement of substantial numbers of small businesses that are revenue generating for city and community. Identify when the last update of the City of Elk Grove Housing Element occurred and discuss how the project would be maintain consistency with the Housing Element as they relate to the west side of Elk Grove: Stonelakes, Laguna West, and Laguna communities. Describe whether the proposed project is identified in current planning and zoning documents as an approvable project (identify consistency with these plans/documents). Identify applicable General Plan policies, including but not limited to: Policy CI-23: Consider the transit needs of senior, disabled, low-income, and transit-dependent persons in making recommendations regarding transit services; and Policy LU-45: Mix affordable housing units with market rate units to the extent feasible, as opposed to building segregated affordable housing developments. Identify the City's plan for maintenance and improvement of existing |

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| | | | | | | | | | | | | | | | | | | | | | | | | | infrastructure and discuss the impact on efficiency and cost-effective public service delivery. Identify who would provide fire protection and life safety services for the project and their ability to handle emergencies for a 12-story building and helipad. Consider the potential for helicopter crashes into homes or businesses and the ability of City staff and emergency plans to handle such events and protect public health and safety. Consider the potential for a helicopter to spark a fire within the Stone Lakes NWR and address how this would be handled. Address project construction- and operations-related impacts on response times and access to address structure fires and medical emergencies in the vicinity taking into consideration roadway congestion, intersection level of service, weather conditions, and demolition/construction traffic along the response route. In the event the hospital requires evaluation due to an emergency, identify how patients would be removed (multiple helicopter landings/take offs, ground transport, etc.). Discuss the need for, process for, and frequency of drilling such situations as well as for conducting fire drills at the hospital and dormitory. Identify "Life Safety Code" and facility specific safety plans to reduce the impact to patients in times of emergencies. Address the potential for fire drills to disturb nearby sensitive receptors in terms of noise and gathering points. Evaluate the potential for accidental on-site fires from such sources as the operation of mechanical equipment, use of flammable construction materials, and from carelessly discarded cigarettes. Address the potential for wildland fires due to the proximity of the project to open space or within close proximity to wildland fuels or designated fire severity zones. Evaluate potential impacts from wildfire hazards caused by project demolition, construction, or operations. Identify who would provide police services to the project site and immediate project vicinity. Address actual and preferred response time, number of officers on the street at any given time, priority for thefts, vandalism, and loitering type calls. Disclose whether background checks and clearances would be provided for workers on the site. Identify the number of anticipated new residents onsite in the dormitory and the proposed number of visitors to the various project facilities. Identify how emergency access to Stone Lake Elementary would be maintained during demolition and construction. Identify if the proposed development would be assessed fees for the local schools (Education Code Section 17620). Evaluate potential impacts of the project on existing library resources. Identify any additional library resources the project would provide. Evaluate the potential for the project to result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services. Identify whether the project would result in the need for additional resources such as (1) maintenance monitoring of the levee and Stonelake Preserve Trail, (2) street and roadways maintenance and cleaning, (3) transit services, (4) pump station monitoring, (5) landfill expansion, (6) waste disposal, (7) water service (discuss SB 610 WSA prepared for the proposed project), and (8) solid waste service (provide adequate solid waste disposal facilities and services for collection, storage and reuse of refuse). Identify whether current residents would have to absorb any utility fee hikes to pay for additional Public Works responsibilities such wastewater pumping stations, added utility maintenance, road maintenance, levee maintenance, hazardous waste, etc. Identify any plans for transport and disposal of hazardous materials and discuss any City involvement in oversite of the plan or coordination with CNU on the plan. Evaluate impacts of the project on existing wastewater pumping, conveyance, treatment, and discharge facilities and identify the need for any improvements or capacity expansions. Identify any demolition and development impact fees CNU would pay for the following public services: (1) public protection, (2) public health, (3) library, (4) sheriff patrol and investigation, (5) general government, (6) animal control, (7) fire protection, (8) traffic, and (9) capital facilities. Evaluate potential for the project to result in increased crime in the area. Evaluate potential project to increase demand on City, County sheriff, and fire services. Discuss the potential for the project to result in impacts to recreation (green space, trails [particularly |

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| | | | | | | | | | | | | | | | | | | | | | | | | | the Stonelake Wildlife Preserve Trail that is adjacent to the project site on the levee that wraps around the perimeter of the Stonelake Community], bikeways, greenways, school parks and facilities, landscape areas). Identify anticipated use of existing greenspace, trails, bikeways, greenways, school parks and facilities, landscape areas by project residents, workers, and visitors. Discuss compliance by the project with General Plan policies related to establishing and maintaining a safe, comprehensive and integrated bikeway and trail system that encourages the use of bikes and walking for commuting, recreational and other trips; and establishing a safe, comfortable, convenient and highly-connected bikeway system that meets the transportation and recreation needs of avid, regular, youth and beginning bike riders, while balancing the needs of other transportation types including automobiles, transit, and pedestrians. Address Senate bill (SB) 375, 09/2008. Identify any plans for addressing traffic and transportation impacts of the proposed project on surrounding streets, intersections and I-5. Disclose any plans for new trucker and commuter lanes on I-5. Evaluate the potential for the project to impact traffic circulation and flows on principal arterials, arterials, collectors, subcollectors, major local streets, local streets, minor local streets, and minor streets in the City. Identify potential impacts of changes in circulation on the environment and resource management. Evaluate the potential for the project to conflict with any applicable Plans (i.e. General), ordinances or policies establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit. Evaluate the potential for the project to conflict with any applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways. Evaluate the potential for the project to conflict with air traffic patterns and result in substantial safety risks. Evaluate potential hazards due to a design feature and/or incompatible use. Evaluate emergency access. Conduct a review study assessing five-years historical collision data, including collision types, of Interstate-5 in the immediate surrounding area, since the proposed project would utilize the I-5 corridor off of Elk Grove Blvd. Discuss how the project would impact the existing safe and efficient system of bicycle routes for commuter, school, and recreational use in the immediate area of the project site. Discuss how the project would address any conflicts with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety within the immediate surroundings of the project site. Evaluate the potential impacts to existing freeway/roadway network, public transportation, bicycle and pedestrian facilities, as well as types of traffic and circulation patterns and the effects to I-5. Address the potential for the project to: (1) substantially increase traffic in relation to existing traffic load and capacity of the roadway system; (2) substantially disrupt the flow and/or travel time of traffic; (3) expose people to significant public safety hazards resulting from construction activities on or near the public road system; (4) reduce supply of parking spaces sufficiently to increase demand above supply; (5) conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit; (6) conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways; (7) result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks; (8) substantially increase hazards due to a design feature (e.g., sharp curves or dangerous |

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| | | | | | | | | | | | | | | | | | | | | | | | | | intersections) or incompatible uses (e.g., farm equipment) – (Farm equipment currently uses the Elk Grove Blvd I-5 overpass to enter the Stonelake National Wildlife Refuge. Cattle is transported in and out of Stonelake National Wildlife Refuge throughout the year.); (9) result in inadequate emergency access (see Sacramento County evacuation plan); (10) conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities. Evaluate the potential for the project to impact transit services and their routes. Consider existing roadway geometries being inadequate to support the development, contributing to an already unsafe condition at Elk Grove Blvd due to high rates of speed and blind curves to getting on and off I-5. Consider that the one-way access location to the project may not be sufficient to support the development. Consider safety at HarborPointe/Elk Grove Blvd and businesses entrances due to the existing roadway configuration. Consider that efforts to widen roadways may require acquisition of private property outside of the existing right-of-way. Consider who is the responsible party for on-site and off-site roadway maintenance. Address required approvals and consider impacts if Stonelake Community roads are proposed for use as project-related emergency access for fire or demolition/construction vehicles. Evaluate potential for the project to result in significant traffic congestion along the roadways and I-5. Consider the potential for the existing dirt trail on the adjacent levee to become a feeder road for the development and the need for adjacent residents to provide right-of-way access. Consider ingress and egress to the levees, businesses, and residences. Consider safety along the roadways and I-5 on and off ramps near the project site. Address compliance with the following: (1) City of Sacramento 2030 General Plan, (2) City of Elk Grove General Plan, (3) Urban Water Management 2010 Plan, (4) CalRecycle's Solid Waste Information System, (5) Sacramento Regional County Sanitation District, (6) Sacramento Groundwater Authority - Groundwater Management 2008 Plan, (7) NPDES, (8) California Department of Water Resources (DWR), (9) State Water Resources Control Board (SWRCB), (9) California Water Code, (10) Senate Bill 610 – Water Supply Assessment, (11) Sustainable Groundwater Management Act of 2014, (12) California Drought Regulations, (13) California Integrated Waste Management Act, (14) California Solid Waste Reuse and Recycling Access Act, and (15) California Green Building Standards Code. Address Public Resources Code (PRC) §21151.9 which requires preparation of a Water Supply Assessment (WSA). Identify how the project would meet water supply needs. Disclose the following: (1) City of Elk Grove water sources and supplies; (2) capacity to supply project demand; (3) City of Elk Grove water rights and entitlements; (4) City's permitted water take; (5) City drought condition and contingency plans; (6) Portion of the City's water supplied by groundwater; (7) how much groundwater pumping would be needed to supplement the project's additional water demand; (8) total available water supply; (9) additional demand the project would place on existing water supply facilities; (10) any need for new water transmission pipes or lines for water; (11) any proposed water supply improvements or extensions required to serve the project; (12) any infrastructure studies proposed for the project; (13) any water supply reliability or water shortage contingency plans; (14) any complicating factors surrounding climate change and water resources; (15) the normal and dry-year water supply reliability; (16) proposed management of groundwater levels and seasonal fluctuations; and (17) how groundwater would be protected. Address the Model Water Efficient Landscape Ordinance (MWELO). Evaluate the potential for the project to (1) exceed wastewater treatment plant requirements of the applicable Regional Water Quality Control Board; (2) require or result in the construction of new water or wastewater treatment pipeline expansion of existing pipelines, the demolition and construction of which could cause significant environmental effects, such as disrupting surrounding residences and businesses; and (3) require a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments. Describe the current sewer collection system and any existing water reclamation facilities. Discuss the impact of the project on water reclamation facility capacity to handle |

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| | | | | | | | | | | | | | | | | | | | | | | | | | project demands on an ongoing basis. Address NPDES Permit for small MS4s. Provision E.12, "Post-Construction Stormwater Management Program." Describe the existing storm drainage system and any measures required by the City or other agencies to control pollutant sources, control runoff volumes, rates, and durations, and to treat runoff before discharge from the site. Evaluate the potential for the project to require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects. Identify plans for solid waste disposal service during demolition and construction. Address health and safety plan for solid waste disposal. Evaluate whether the current landfill has sufficient permitted capacity to accommodate the project's solid waste disposal needs. Describe any extension of service infrastructure below ground and when these would be implemented. Consider the adequacy of existing (SMUD, PG&E, telephone, internet) infrastructure to accommodate 12-story hospital, underground parking, helipad, 5-story medical office building, 5-story dormitory, 4-story parking garage structure. Identify current source of electrical power for the project site. If another substation is required, disclose this and identify where it would be located. Identify any need for new or expanded underground or above-ground distribution lines for any utilities. Identify any potential utility disruptions to residential or businesses during project demolition and construction activities. Consider ability to provide water during drought conditions, including water for fire suppression and water pressure for existing customers. Consider the potential for property owners to be assessed additional property taxes to pay for water to support the project. Address the potential for property owners along the sewer alignment who are currently on septic systems to be forced to connect to the sewer system proposed by the development and the potential for such sewer extension to induce growth off-site. Consider inability of Water District to meet current water needs as evidenced by water rations, restricted allocations and higher rates compared to other neighboring water districts. Consider costs to existing property owners to maintain the new infrastructure required for the project, particularly the proposed sewer line extension. Consider that special water assessments and costs would be distributed to all Water District customers. Consider that surrounding property owners would be required to hook up to the wastewater treatment system. Consider existing poor water pressure for fire suppression. Consider potential for project to decrease property values. Consider economic viability of the project and the potential for the community to be left with an abandoned project and backbone infrastructure. Consider the potential for higher property taxes due to the increase in student enrollment associated with the project. Consider effects on the Stone Lakes National Wildlife Association that established in 1994 to protect and restore the Stone Lakes area from encroachment and development and is managed by the U.S. Fish and Wildlife Service. Recommendations: (1) remove the helipad from the development plans due to potential effects on residents and the surrounding Stonelake National Wildlife Refuge and potential Consumnes River Preserve; (2) do not build around or block the Stonelake Wildlife Preserve trail that is on the levee adjacent to the project site. The trail is currently used for walking, jogging, and cycling, as well as, photography and astronomy by the citizens of Elk Grove; (3) Determine appropriate requirement for maintenance and storage space within the Stonelake Landing Shopping Center to accommodate needs of each phase of the project; (4) consider potential issues concerning water, power, and light pollution with the proposed development; (5) consider aesthetic concerns as there are no trees of sufficient size to mask development; (6) consider that development should be focused elsewhere (near the other hospitals such as Kaiser, Dignity, etc.); consider aesthetic impacts of a proposal for a 12-story hospital, 5-story dorm and 5 story parking garages in a community that is primarily single story to two story construction; (9) consider impacts of proposed construction activities on adjacent levee, other drainage areas (such as the Sacramento River, etc.), (10) avoid and minimize impacts to waters; (11) identify required permits for "Discharge of fill material" and "Land disturbance"; (12) require best management practices to control storm water concentration and downstream erosion. BMPs are also necessary for non-storm water control and infiltration; (13) map |

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| | | | | | | | | | | | | | | | | | | | | | | | | | and delineate wetlands in project area to avoid disturbance from projects operations; and (14) keep the current businesses and only expand the University to the vacant Stonelake Landing Shopping Center. Do not allow applicant to pursue existing businesses and vacate property or allow reporting that could negatively affect existing businesses prior to a project decision. |
| Facebook<br>June 21, 2019 | | • | | | | | | | | | | | | | | | • | | • | | | | | | Request that helipad be designed to support size and weight of an Army UH-60 Medevac-Configured Blackhawk to facilitate a regional emergency plan for mass casualty/mass disaster scenarios. Mather hosts a National Guard Medevac Unit integrated into the State Office of Emergency Services. Currently only one hospital in Sacramento region has this capability (Sutter Hospital – Roseville). Multiple landing sites would be beneficial. |
| Yvette Sack<br>3148 Shelter Cove Lane<br>Elk Grove, CA 95758<br>ysack@comcast.net<br>June 25, 2019 | | • | | | • | • | | | | | • | • | | | | | | | • | | | | | | Evaluate the potential for project to contribute contaminated runoff to and affect water quality and wildlife in Stone Lake NWR (stormwater runoff from parking lots and increased use of gas stations, streets and car washes). Disclose how many additional vehicles would be expected as a result of the project. Evaluate effect of additional vehicles, increased traffic, and longer commutes on air quality. Disclose if more traffic lanes would be needed and how removal of greenbelt areas to accommodate this could be avoided. If not avoided, evaluate effect of removing greenbelt areas on air quality. Evaluate how wildlife in the area would be impacted by construction and operation of the project. Identify what species could be affected and provide mitigation or explain why the impacts could not be avoided. Evaluate the effect of paving on groundwater recharge. Evaluate the potential for chemicals in existing buildings to affect air quality during building demolition and disclose where contaminated waste would be disposed. |
| Melinda Robinson<br>mrobinson@ncsdia.com<br>June 25, 2019 | | | | | • | | | | | | | • | | • | | | | | • | | | | | | Disclose the objectives of the Lakeside master planned community and discuss consistency of proposed Project with those objectives. Evaluate potential noise-related impacts from placement of a level 2 trauma center in a residential community. Use existing noise levels in Lakeside neighborhood and noise levels from a neighborhood adjacent to an existing trauma center (neighborhood adjacent to UC Davis Medical Center) to evaluate the potential change in noise levels. Disclose current acceptable level of noise based on City noise ordinance and current zoning. Consider how rezoning would affect allowable noise levels and the potential effect on nearby residential neighborhoods. Evaluate construction-related effects of noise, dust, ground vibrations, construction traffic, and parking in relation to phasing and schedule on nearby residential neighborhoods and describe what measures would be implemented to minimize any potential impacts. |
| Randy Chinn<br>asiandragon@gmail.com<br>June 25, 2019 | | • | • | | | | | | | | • | | | | | • | • | | | | | | | | Disclose the type, magnitude, and schedule of lighting associated with the project and evaluate the potential impact of project-related lighting on nearby residences, particularly during night-time hours, since the facility would be operational 24/7. Disclose the types of injuries/patients that would be expected to use a level 2 trauma center. Discuss the potential for and expected frequency of "lock-down" orders related to gang violence and describe protocol for the site and surrounding area during a "lock down" given the proximity to residential neighborhoods. Identify where incoming patients, visitors and staff would be routed to during a lock down and the potential for this to impact surrounding neighborhoods. Provide a discussion of changes in crime rates for similar neighborhoods before and after the placement of a trauma center. Disclose the anticipated demographics for the population anticipated to be served by the proposed trauma center (including but not limited to indigent/homeless and drug/alcohol-related emergencies). Consider where homeless would go upon release from the trauma center. Disclose any services that would be available to discharged patients who are at risk for engaging in violent or illegal activities. |
| Randy Chinn<br>asiandragon@gmail.com<br>June 25, 2019 | | | | | | | | | | | | | | | | | | • | | | | | | | CNU has stated that they will be bringing 24,000 jobs and 3,400 parking spaces to the project site and surrounding areas. Request that recreation be addressed in the EIR. Evaluate the potential impacts to neighborhood parks as a result of increased use by project-related employees/visitors before/during/after business hours. |

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| Andrea Klinenberg<br>aklinenberg@comcast.net<br>June 25, 2019 | | • | • | | | • | | | | | • | | | | | | | | • | • | | | | | Describe what measures would be implemented to protect birds travelling along the Pacific Flyway and habitat and wildlife in the Stone Lakes NWR. Disclose potential impacts to wetlands. Evaluate the impact of 24/7 lighting on wildlife and other sensitive receptors (nearby residences). Disclose if the project would serve the homeless population. Describe what measures would be implemented to prevent the homeless from taking up "residence" in the area. Disclose potential impacts of the proposed project on local schools. Disclose if a fee would be charged for parking in the proposed parking structures. Describe any measures that would be implemented to prevent patrons of the project from parking in adjacent neighborhoods. Provide a study addressing the effects of the project on the Elk Grove Blvd off ramps from I-5 and describe measures that would be implemented to reduce potential impacts. Evaluate the potential impacts of providing dormitory housing on existing infrastructure and describe measures that would be implemented to ensure adequate infrastructure capacity. |
| Donna Pertile Soppeland<br>9540 Crystal Bay Lane<br>Elk Grove, CA 95758<br>pertild@comcast.net<br>June 26, 2019 | | | • | | • | • | • | | • | • | | | • | | • | | | | • | | | | | • | Evaluate the heat and glare effects of the building design and materials on bird populations using the Pacific Flyway. Evaluate the effect of the project on views from nearby residences that overlook the lake. Evaluate the potential for project-related traffic to increase emissions of air pollutants. Disclose the potential health effects of project-related air pollutant emissions on surrounding neighborhoods. Describe how the project would comply with air quality standards and greenhouse gas emissions thresholds. Describe what tribes may have inhabited the project area and the potential to encounter cultural and tribal cultural resources during project construction. Describe the energy demands of each phase of the project and what modifications would be required for SMUD and PG&E to serve the project. Evaluate impacts of the project on greenhouse gas emissions and climate change. Disclose the contribution of the Mechanic Yard to greenhouse gas emissions and climate change. Describe how medical waste such as bodily fluids, contaminated needles and laundry, infectious waste materials, and radioactive materials from a Nuclear Medicine Department and/or Oncology Department would be handled. Evaluate the consistency of the proposed project with General Plan policies regarding employment centers serving neighborhoods. Disclose the "District" in which the site is located and define the District goals. Address how a conditional use permit for the project would affect the existing Master Planned community. Describe how Master Planned communities and zoning are related. Describe how the project would preserve/enhance the existing surrounding neighborhoods. Disclose noise levels and evaluate impacts associated with operation of stationary sources of equipment (power generators) and the mechanical yard, and use of the sport courts on the dormitory parking structure. Describe and evaluate potential effects of each construction phase on noise levels, dust emissions, traffic and parking. Consider the effect of the project on rentals in surrounding neighborhoods and home values. |
| Jan Smutny-Jones<br>smutny@gmail.com<br>June 26, 2019 | • | • | • | | • | • | | | • | | • | • | • | | • | | • | | • | • | • | | | • | Project description should include complete drawings for Phase 1 and additional details on Phases 2 and 3. Describe activities that would occur during demolition and construction. Describe what approvals would be needed prior to the start of demolition of existing buildings.<br>NEST COMMENTS: Describe depth of and illustrations of setbacks (landscaping, signage, etc.). Describe required roadway/intersection widening, traffic control features (traffic lights, stop signs), I-5 to Elk Gove Blvd off-ramp improvements, overpass widening to accommodate traffic volume going to and from project. Recommend overpass widening to three lanes and one emergency lane on Elk Grove Blvd in eastbound direction. Provide architectural street-level renderings and oblique (20-25 degrees) aerial illustrations of north, west, south, and east elevations for each phase for entire project area. Provide north, west, south, and east architectural renderings, and preliminary floor plans for each floor, including basement levels, of each proposed structure. Provide illustration of fenced mechanical equipment yard. Prepare independent analysis addressing (1) need for Trauma 2 hospital in Elk Grove, (2) suitability of proposed site location. Describe City building height restrictions. Provide visual renderings of each phase from perspective of adjacent neighborhood locations (Riparian Dr, Elk Gove Blvd, |

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| | | | | | | | | | | | | | | | | | | | | | | | | | Maritime Dr, Waterfowl Dr). Describe building glazing materials. Evaluate impact on West Taron water well. Describe infrastructure upgrades (electrical, water, gas, sewer, surface roads, I-5 south of Elk Gove Blvd, I-5 on/off ramps) and who will pay for them. Evaluate effect of building size/massing on visual character of area and wildlife refuge. Describe how the project will be financed, and contingency plans if abandoned by applicant. Describe whether facility will include Nuclear Medicine Department and explain why or why not. Identify current land use of each parcel. Describe FAR calculation and identify consistency with parking requirements for each phase. Identify the number of CNU students and employees and describe how the number was derived. Discuss and evaluate consistency of proposal with General Plan SA-14. Justify adequacy of 7-ft raise for acute care facility. Describe what elevation the basement will be constructed at relative to 200-yr floodplain. Describe what equipment uses will be at basement level. Describe what elevation the Central Plant will be constructed at relative to the 200-yr floodplain and what equipment will be housed there. Describe what elevation all hazardous substances will be stored/used at relative to the 200-yr floodplain as well as the elevation of infrastructure used to deliver the substances. Describe what elevation the dormitory will be constructed at relative to the 200-yr floodplain. Describe what roadways emergency vehicles will use to access the hospital during a 200-yr flood event. Describe what types of emergency vehicles the fire department, EMT services, and police department have to access sites inundated by 3+ feet deep flood water. Describe how patients will be evacuated during a 200-yr flood event. Describe how utilities (water, sewer, gas, communications, electricity) will serve the site during a 200-yr flood event. Describe the change in traffic load and congestion for W. Taron Dr, Riparian Dr, Waterflow Dr, Stonelake Club Dr, E. Taron Dr, Maritime Dr, and I-5. Describe how increased traffic loads will be accommodated on these roadways and what improvements will be required on each roadway. Describe how project-related traffic will affect surrounding residential neighborhoods. Describe how changes in traffic are consistent with General Plan and climate change goals. Describe how proposed emergency left turn pocket into project site is consistent with California law. Describe adequacy of proposed ingress/egress to the site from adjacent roadways. Describe effect of project on I-5 traffic and on I-5 traffic exiting onto Elk Grove Blvd. Describe how many existing and new parking spaces will be provided in each Phase of construction, and the total at buildout and how these relate to ability of existing roadways to adequately provide access to the site and surrounding neighborhoods. Describe the type, number, and location of charging stations that will be provided in each phase. Describe how parking in adjacent neighborhoods will be affected by the project. Describe the semi-automatic parking structures and whether they will be enclosed or stand-along. Identify the flight patterns for helicopter arriving and departing the site. Evaluate the effect of the helistop on airspace, which is also used by Sac International Airport, Sac Executive Airport, and US Air Force bases in the vicinity. Evaluate the impact of noise related to helistop construction and operations on the community and wildlife. Evaluate the impact of project-related helicopter activity on waterfowl associated with nearby wildlife areas (NWR, Bufferlands, Pacific Flyway) and describe the potential hazards this presents to the helicopters, the public, and wildlife. Describe planned security for the trauma center. Describe how law enforcement service requirements serving the Stonelake Community will be affected by the trauma center. Describe who will provide law enforcement services/personnel for the area in and around the project site. Describe any plans to prevent/respond to terrorist threats/acts in and around the project site and how the surrounding community will be protected during any such events. Evaluate the impacts of noise generated by emergency vehicles associated with the project on adjacent residential neighborhoods. Describe what measures will be used to reduce noise impacts. Describe plans for fire drills and emergency evacuation of the project site, including where evacuees will go. Evaluate the potential for the hospital building height, glazing, and lighting to affect birds. Describe how any wildlife easements associated with the project site will be affected. Describe how lighting and glare effects will be mitigated to prevent bird strikes, particularly during migration seasons, but also |

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| | | | | | | | | | | | | | | | | | | | | | | | | | for resident birds. Describe what hazardous materials/substances will be stored onsite and where they will be stored as well as what type of containment will be provided. Describe how hazardous materials will be delivered to and from the site and how spills, accidents, etc. will be handled. Describe where liquid waste generated onsite will be treated or discharged to the Sacramento County Sewer District. Describe how air quality at hazardous materials storage facilities will be monitored. Evaluate the air quality impacts of parking structure, hospital, and dorm ventilation. Identify what City environmental ordinances/regulations are applicable to the project. Describe how the project will comply with the Clean Air Act, Toxic Substances Control Act, Federal Water Pollution Control Act, and Occupational Safety and Health Act. Describe the project's consistency with the balanced mixed use of West Elk Grove neighborhoods. Describe the setback for the dormitory from the adjacent neighborhood. Describe the impact of the project on adjacent neighborhood access to sunlight for solar energy generation. Describe the cumulative effect of the project in combination with the Dignity Hospital project 3 miles east on Elk Grove Blvd. |
| Gary and Deborah Sibner<br>gsib@frontiernet.net<br>June 27, 2019 | | • | • | | | | | | | | | | | | | | | | | | | | • | | Provide the justification for the height of the hospital since it would be 3 times taller than what is typically approved, twice as tall as Dignity Health, and across I-5 from the 1400-ac Stone Lakes NWR. Identify what approvals would be required and when demolition of each building could begin. Identify when the project would be referred to the Planning Commission for review. Identify who is responsible for reviewing and verifying the applicant's financial ability to build and operate the hospital at a profit considering CNU's lack of experience in building and operating a hospital of any size. Discuss the need for the proposed project taking into consideration the status and location of the Dignity Health project. Identify the schedule for the next public meeting. |
| **ORGANIZATIONS** | | | | | | | | | | | | | | | | | | | | | | | | | |
| NEST<br>Jan Smutny-Jones, Planning and Environmental Committee Chair<br>May 13, 2019 | • | • | • | | • | • | | | • | | • | • | • | | • | | • | | • | • | • | | | • | Describe depth of and illustrations of setbacks (landscaping, signage, etc.). Describe required roadway/intersection widening, traffic control features (traffic lights, stop signs), I-5 to Elk Gove Blvd off-ramp improvements, overpass widening to accommodate traffic volume going to and from project. Recommend overpass widening to three lanes and one emergency lane on Elk Grove Blvd in eastbound direction. Provide architectural street-level renderings and oblique (20-25 degrees) aerial illustrations of north, west, south, and east elevations for each phase for entire project area. Provide north, west, south, and east architectural renderings, and preliminary floor plans for each floor, including basement levels, of each proposed structure. Provide illustration of fenced mechanical equipment yard. Prepare independent analysis addressing (1) need for Trauma 2 hospital in Elk Grove, (2) suitability of proposed site location. Describe City building height restrictions. Provide visual renderings of each phase from perspective of adjacent neighborhood locations (Riparian Dr, Elk Gove Blvd, Maritime Dr, Waterfowl Dr). Describe building glazing materials. Evaluate impact on West Taron water well. Describe infrastructure upgrades (electrical, water, gas, sewer, surface roads, I-5 south of Elk Gove Blvd, I-5 on/off ramps) and who will pay for them. Evaluate effect of building size/massing on visual character of area and wildlife refuge. Describe how the project will be financed, and contingency plans if abandoned by applicant. Describe whether facility will include Nuclear Medicine Department and explain why or why not. Identify current land use of each parcel. Describe FAR calculation and identify consistency with parking requirements for each phase. Identify the number of CNU students and employees and describe how the number was derived. Discuss and evaluate consistency of proposal with General Plan SA-14. Justify adequacy of 7-ft raise for acute care facility. Describe what elevation the basement will be constructed at relative to 200-yr floodplain. Describe what equipment uses will be at basement level. Describe what elevation the Central Plant will be constructed at relative to the 200-yr floodplain and what equipment will be housed there. Describe what elevation all hazardous substances will be stored/used at relative to the 200-yr floodplain as well as the elevation of infrastructure used to deliver the substances. |

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| | | | | | | | | | | | | | | | | | | | | | | | | | Describe what elevation the dormitory will be constructed at relative to the 200-yr floodplain. Describe what roadways emergency vehicles will use to access the hospital during a 200-yr flood event. Describe what types of emergency vehicles the fire department, EMT services, and police department have to access sites inundated by 3+ feet deep flood water. Describe how patients will be evacuated during a 200-yr flood event. Describe how utilities (water, sewer, gas, communications, electricity) will serve the site during a 200-yr flood event. Describe the change in traffic load and congestion for W. Taron Dr, Riparian Dr, Waterflow Dr, Stonelake Club Dr, E. Taron Dr, Maritime Dr, and I-5. Describe how increased traffic loads will be accommodated on these roadways and what improvements will be required on each roadway. Describe how project-related traffic will affect surrounding residential neighborhoods. Describe how changes in traffic are consistent with General Plan and climate change goals. Describe how proposed emergency left turn pocket into project site is consistent with California law. Describe adequacy of proposed ingress/egress to the site from adjacent roadways. Describe effect of project on I-5 traffic and on I-5 traffic exiting onto Elk Grove Blvd. Describe how many existing and new parking spaces will be provided in each Phase of construction, and the total at buildout and how these relate to ability of existing roadways to adequately provide access to the site and surrounding neighborhoods. Describe the type, number, and location of charging stations that will be provided in each phase. Describe how parking in adjacent neighborhoods will be affected by the project. Describe the semi-automatic parking structures and whether they will be enclosed or stand-along. Identify the flight patterns for helicopter arriving and departing the site. Evaluate the effect of the helistop on airspace, which is also used by Sac International Airport, Sac Executive Airport, and US Air Force bases in the vicinity. Evaluate the impact of noise related to helistop construction and operations on the community and wildlife. Evaluate the impact of project-related helicopter activity on waterfowl associated with nearby wildlife areas (NWR, Bufferlands, Pacific Flyway) and describe the potential hazards this presents to the helicopters, the public, and wildlife. Describe planned security for the trauma center. Describe how law enforcement service requirements serving the Stonelake Community will be affected by the trauma center. Describe who will provide law enforcement services/personnel for the area in and around the project site. Describe any plans to prevent/respond to terrorist threats/acts in and around the project site and how the surrounding community will be protected during any such events. Evaluate the impacts of noise generated by emergency vehicles associated with the project on adjacent residential neighborhoods. Describe what measures will be used to reduce noise impacts. Describe plans for fire drills and emergency evacuation of the project site, including where evacuees will go. Evaluate the potential for the hospital building height, glazing, and lighting to affect birds. Describe how any wildlife easements associated with the project site will be affected. Describe how lighting and glare effects will be mitigated to prevent bird strikes, particularly during migration seasons, but also for resident birds. Describe what hazardous materials/substances will be stored onsite and where they will be stored as well as what type of containment will be provided. Describe how hazardous materials will be delivered to and from the site and how spills, accidents, etc. will be handled. Describe where liquid waste generated onsite will be treated or discharged to the Sacramento County Sewer District. Describe how air quality at hazardous materials storage facilities will be monitored. Evaluate the air quality impacts of parking structure, hospital, and dorm ventilation. Identify what City environmental ordinances/regulations are applicable to the project. Describe how the project will comply with the Clean Air Act, Toxic Substances Control Act, Federal Water Pollution Control Act, and Occupational Safety and Health Act. Describe the project's consistency with the balanced mixed use of West Elk Grove neighborhoods. Describe the setback for the dormitory from the adjacent neighborhood. Describe the impact of the project on adjacent neighborhood access to sunlight for solar energy generation. Describe the cumulative effect of the project in combination with the Dignity Hospital project 3 miles east on Elk Grove Blvd. |

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| Friends of Stone Lakes National Wildlife Refuge/Environmental Council of Sacramento/Habitat 2020<br>Chris Tooker, President, Friends of Stone Lakes NWR<br>Ralph Propper, President, ECOS<br>Sean Wirth, Co-Chair Habitat 2020<br>PO Box 1526<br>Sacramento, CA 95812-1526<br>June 27, 2019 | • | • | | | • | • | | | • | | • | • | • | | • | • | | | • | | • | • | • | • | Evaluate potential impacts to birds associated with proximity of 12-story building to Stone Lakes wetlands and foraging sites, in particular North Stone Lake. Identify waterfowl and passerine utilization of refuge sites in proximity to the proposed building(s). Evaluate the relationship between roosting sites and foraging areas and the extent to which building location would interfere with bird movement between the two. Consult with specialists to estimate bird mortality resulting from bird strikes to proposed buildings. The analysis should distinguish between passerine species, migratory waterfowl and specifically sandhill cranes. Estimate the number of helicopter flights based on full build-out of the project and discuss diurnal and seasonal variation. Evaluate how restricted air space in the vicinity of Stone Lakes NWR would impact helicopter approach angles. Evaluate the potential for the project to increase noise impacts over residential areas as a result of restrictions on approaches and flight angles for arriving and departing helicopters due to restrictions imposed by Federal law on aircraft flight elevations over national wildlife refuges. Consult with avian specialists to evaluate (1) the potential for helicopter flights associated with the project to increase bird mortality due to collisions (2) the potential for bird collisions involving cranes, geese and other waterfowl to increase the likelihood of a helicopter crash; (3) the frequency of disturbance to roosting and foraging waterfowl due to aircraft noise, and the associated impacts of the disturbances, with particular attention to disturbance to geese; and (4) evaluate the potential cumulative impact of repeated noise stressors on bird health. Identify the intensity and glare of lighting associated with the project. Consult with avian specialists to evaluate the potential for project-related light and glare to impact migrating and non-migrating birds in the Stone Lakes NWR, and discuss measures to reduce or avoid these impacts. Disclose that the location of the hospital campus is in Zone X of the FEMA rate map and is subject to the provisions of SB5 Chapter 364 requiring 200-yr flood protection. Identify the elevation of each building relative to the 200-yr flood elevation. Describe hydrology of south Sacramento County region with regard to flooding and discuss how it is exacerbated by backup flow from the Mokelumne/Cosumnes River complex to the south. Evaluate the project for compliance with the requirements of SB5, Chapter 364. Identify the most likely source(s) of inundation for a 200-year flood event. Identify the depth and duration of a 200-year flood event within the floodplain surrounding the hospital building site. Identify the depth and duration of a 200-year flood event under mid-to-worst-case sea level rise scenarios during a period of extreme tidal variation. Discuss the safety impacts associated with access to a level 2 trauma center during various 200-year flood event scenarios. Evaluate flood mitigation options and their effectiveness under different flooding scenarios. Quantify potential increases in surface water runoff associated with full project build-out, identify the downstream course of flow, assess runoff water quality and identify the potential to adversely impact North Stone Lake. Require a surface water retention and treatment plan as part of the project and evaluate its ability to mitigate adverse impacts. Model, in coordination with SACOG and the Sacramento Metropolitan Air Quality Management District, the cumulative impact of the proposed project on VMT. Assess the cumulative impact of the project's VMT contribution in terms of consistency with the Sustainable Communities Strategy and adopted air quality plans. Identify characteristics of the project, e.g. primary employment and its multiplier effect, which would lead to increased demand for housing and commercial services. Evaluate the stimulus effect of the project on demand for additional development in areas currently not planned for growth. Evaluate the project's impact on raw land values and the resulting impact on implementation of the South Sacramento HCP. Identify and evaluate the impacts of at least one alternative site in the region that would better provide patient access to trauma level emergency health care for east Sacramento County and west El Dorado County residents. Identify at least one alternative site on vacant land within Elk Grove City or South County that would be outside of the floodplain, have less impact on wildlife and have less growth inducing impact. |

| COMMENTER | Application | Project Description | Aesthetics | Agriculture | Air Quality | Biological Resources | Cultural Resources | Geology/Soils | Climate Change/GHGs | Energy | Hazards/Haz Materials | Hydrology/Water Quality | Land Use/Planning | Minerals | Noise | Population/Housing | Public Services | Recreation | Transportation/Traffic | Utilities Service Systems | Cumulative Impacts | Growth Inducement | Alternatives | Other | NOTES |
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| Soluri Meserve<br>on behalf of<br>Stonelake Masters<br>Homeowners<br>Association<br>510 8th Street<br>Sacramento, CA<br>95814<br>June 27, 2019 | | • | • | | • | • | | | | • | • | | | | • | | | | • | • | • | | | • | Disclose CNU plans for all activities that would occur at or near the medical campus. Fully disclose all proposed types of lab activities CNU intends to conduct on the project site, and any other type of activities that could involve dangerous chemicals or hazardous waste. Disclose whether there are reasonably foreseeable future projects that would include a wet chemistry lab or a bio-tech district. Provide an approximate timeline for each phase of development. Evaluate the distinct impacts of each phase of the project. Identify the height and reflective materials of the hospital and evaluate the risk of bird strikes from birds in and nearby Stone Lakes NWR, including Fully Protected Species such as the Greater sandhill crane. Evaluate the risk of glare and heat on nearby residents, drivers, and those on the campus. Identify expected changes in traffic conditions. Evaluate noise impacts related to regular traffic and emergency vehicles traveling to and from the hospital on nearby sensitive receptors. Evaluate the potential impact of helicopters to birds in and near the NWR. Evaluate project impacts to air quality and potential health effects of sensitive receptors and wildlife. Evaluate all potential impacts to the natural and human environment. Provide sufficient information and analysis of the planned demolition of existing buildings and address the potential waste of resources caused by demolishing existing structures. Disclose and analyze the project's energy consumption, as well as new infrastructure or improvements that would be required. |
| **FEDERAL AGENCIES** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stone Lakes<br>National Wildlife<br>Refuge<br>Bart McDermott,<br>Manager<br>1624 Hood-<br>Franklin Road<br>Elk Grove, CA<br>95757<br>May 22, 2019 | | | | | | • | | | | | | | | | | | | | • | | | | | | Project site is within the 18,000-acre Refuge Project Boundary. USFWS manages 6,500 acres. Refuge attracts 50,000 migratory birds, including ducks, geese, and Sandhill cranes that also use surrounding farmlands and protected areas. Evaluate collision threat to birds of the 12+ story building complex, including proximity, height, design, and reflective glass. Evaluate effect of artificial lighting on roosting birds and disruption to nighttime behavior. Evaluate effect of low flying helicopters on risk of collisions caused by disturbance and flushing of waterfowl. Describe FAA regs and other Code of Federal Regulations (50CFR 27.34) limits on aircraft use and altitude over NWRs. |
| Stone Lakes<br>National Wildlife<br>Refuge<br>Bart McDermott,<br>Manager<br>1624 Hood-<br>Franklin Road<br>Elk Grove, CA<br>95757<br>June 21, 2019 | | | | | | • | | | | | • | | | | | | | | • | | | | | | In addition to the issues raised in their May 22, 2019 letter, the EIR should evaluate project-related traffic and health and safety impacts associated with use of Elk Grove Blvd to access several management units of the Stone Lakes NWR. |
| **STATE AGENCIES** | | | | | | | | | | | | | | | | | | | | | | | | | |
| California<br>Department of Fish<br>and Wildlife<br>Dylan Wood, | | • | | | | • | | | | | | | | | | | | | | | | | | | Include a site map that identifies the number and species of all trees to be removed from all potential disturbance areas, including staging and access routes. Evaluate the effect of the height of the buildings and reflective nature of the windows on bird collisions given the proximity to the Sacramento River and Stone Lakes NWR. Include relevant data from window manufacturer or designer regarding reduction of bird collisions. |

| COMMENTER | Application | Project Description | Aesthetics | Agriculture | Air Quality | Biological Resources | Cultural Resources | Geology/Soils | Climate Change/GHGs | Energy | Hazards/Haz Materials | Hydrology/Water Quality | Land Use/Planning | Minerals | Noise | Population/Housing | Public Services | Recreation | Transportation/Traffic | Utilities Service Systems | Cumulative Impacts | Growth Inducement | Alternatives | Other | NOTES |
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| Environmental Scientist, Sacramento County Dylan.A.Wood@wildlife.ca.gov June 4, 2019 | | | | | | | | | | | | | | | | | | | | | | | | | |
| Central Valley Regional Water Quality Control Board Jordan Hensley, Environmental Scientist (916) 464-4812 Jordan.Hensley@waterboards.ca.gov June 13, 2019 | | | | | | | | | | | | • | | | | | | | | | | | | | Consider the applicability of the following to the proposed project and discuss in the Regulatory Setting as appropriate: (1) Water Quality Control Plan for the Sacramento and San Joaquin River Basins (http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/); (2) Antidegradation Policy (https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201 805.pdf); (3) Construction Storm Water General Permit (http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml); (4) Phase I and II Municipal Separate Storm Sewer System (MS4) Permits (http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml); (5) Industrial Storm Water General Permit (http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml); (6) Clean Water Act Section 404 Permit (contact Regulatory Division of the Sacramento District of USAGE at (916) 557-5250); (7) Clean Water Act Section 401 Permit - Water Quality Certification (https://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/); (8) Waste Discharge Requirements - Discharges to Waters of the State (https://www.waterboards.ca.gov/centralvalley/water_issues/waste_to_surface_water/); (9) Dewater Permit http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf); (10) Regulatory Compliance for Commercially Irrigated Agriculture (https://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/regulatory_information/for_growers/coalition_groups/ or contact water board staff at (916) 464-4611 or via email at IrrLands@waterboards.ca.gov); (11) Limited Threat General NPDES Permit (https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/rS-2016-0076-01.pdf); (12) NPDES Permit (https://www.waterboards.ca.gov/centralvalley/help/permit/) |
| Caltrans Alex Fong, Branch Chief District 3 Planning Division 703B Street, MS-4130 Marysville, CA 95901 *Douglas Adams, Intergovernmental* | • | | | | | | | | | | | • | • | | | | | | • | | | | | • | Caltrans reviews proposed projects for impacts to the State Highway System consistent with their mission, vision, and goals for sustainability/livability/economy and safety/health. Project design should include bus stops and ride-share designated zones to comply with the multi-modal transportation plan. Conduct a Transportation Impact Study (TIS) to project's impacts on the I-5 transportation corridor. The TIS should include the following: (1) existing traffic conditions for the I-5/Elk Grove Blvd interchange with and without the project, (2) transportation impacts in the future with the project, (3) LOS analysis for the following intersections: (a) I-5/Elk Grove Blvd interchange, (b) I-5/Hood-Franklin Rd interchange, (c) SR99/Elk Grove Blvd interchange, and (d) SR 99/Laguna Blvd Interchange, (3) analysis of freeway mainlines, ramps, and ramp terminal intersections, (4) merge/diverge analysis for freeway and ramp junctions, (5) analysis based on AM and PM peak hour volumes, (6) individual (not average) LOS and traffic volumes applicable to all intersection road approaches and turn movements. Evaluate consistency of the "emergency traffic only" left-turn pocket with Section 504.8, "Access Control" of the Highway Design Manual and describe how non-emergency traffic would be prohibited from accessing the turn pocket. |

| COMMENTER | Application | Project Description | Aesthetics | Agriculture | Air Quality | Biological Resources | Cultural Resources | Geology/Soils | Climate Change/GHGs | Energy | Hazards/Haz Materials | Hydrology/Water Quality | Land Use/Planning | Minerals | Noise | Population/Housing | Public Services | Recreation | Transportation/Traffic | Utilities Service Systems | Cumulative Impacts | Growth Inducement | Alternatives | Other | NOTES |
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| *Review Coordinator* Douglas.adams@dot.ca.gov June 27, 2019 | | | | | | | | | | | | | | | | | | | | | | | | | Regulatory Signs must be consistent with the latest version of the California Manual on Uniform Traffic Control Devices. Identify any increases in permeable surfaces and evaluate the potential for the project to increase peak surface water runoff. Evaluate peak runoff discharge for the 10 and 100-year storm events to the State's Right of Way and Caltrans drainage facilities and identify stormwater BMPs (i.e., detention/retention ponds or basins, sub-surface galleries, on-site storage and/or infiltration ditches, etc.) that would be implemented to achieve peak runoff at or below pre-construction levels and how they would be maintained. Identify stormwater BMPs that would be implemented to control runoff water quality from the proposed project so that project-related runoff entering the State's Right of Way and/or Caltrans drainage facilities would meet regional water quality control board water quality standards prior to entering the State's Right of Way or Caltrans drainage facilities, and describe how these BMPs would be maintained. Describe consistency of all work proposed and performed within the State's right of way with Caltrans' standards. A Caltrans Encroachment Permit would be required prior to commencing construction. The Encroachment Permit application should include drainage plans and calculations for the pre and post 10 and 100-yr peak run-off (quantities and velocities) and water quality treatment for all discharge to the State's Right of Way and to Caltrans' drainage facilities and be submitted with environmental documentation and five sets of plans clearly indicating State Right of Way to Hikmat Bsaibess at California Department of Transportation District 3, Office of Permits, 703 B Street, Marysville, CA 95901. Submit copies of further actions and any project changes for Caltrans review and comment. |
| **REGIONAL/LOCAL AGENCIES** | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sacramento Metropolitan Air Quality Management District Joanne Chan, Air Quality Planner/Analyst 777 12th Street, 3rd Floor Sacramento, CA 95814-1908 JChan@airquality.org 916-874-6267 June 21, 2019 | | • | | | • | | | • | | | | • | | | | | | • | | | | | | • | Evaluate the project's consistency with existing plans, especially those that reduce criteria air pollutants and greenhouse gases: (i) the current Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS); (ii) the Elk Grove General Plan and Climate Action Plan – 2019 Updates; (iii) the Elk Grove Bicycle, Pedestrian and Trails Master Plan; (iv) and the Sacramento Tree Foundation's Regional Greenprint Initiative. Consider good connections for all modes of transportation to minimize direct and indirect emissions of air contaminants. Ensure that the project implements a balanced transportation system using a layered network approach for all mobility users and promotes context-sensitive pedestrian and bicycle movement via direct, safe and pleasant routes that connect to destinations inside and outside the project area, consistent with General Plan Policies MOB-3-1 and MOB-4-1. Encourage demand management strategies that seek to reduce single-occupant vehicle use consistent with General Plan Policy NR-4-5 (example: robust Transportation Demand Management (TDM) Program that includes emergency ride home, transit passes and ride matching assistance. Analyze and disclose both construction and operational emissions; including nitrogen oxides, reactive organic gases, exhaust and fugitive dust particulate matter (PM10 and PM2.5), GHG emissions, toxic air contaminants and odors. Recommend analyzing possible onsite and offsite mitigation measures to reduce construction emissions. Recommend preparing an Air Quality Mitigation Plan (AQMP) that reduces emissions by at least 15 percent as referenced in the City of Elk Grove's General Plan Policy NR-4-1 and the Sac Metro Air District's CEQA Guide. Request the AQMP be reviewed by SMAQMD staff for technical adequacy prior to the release of the DEIR, and recommend AQMP be included as a mitigation measure in the DEIR. SMAQMD staff are available to work with the City and project applicant to provide emissions reductions verification of the AQMP. Emission sources such as equipment that emits air pollutants and requires a permit to operate, including but not limited to, boilers, back-up generators and medical waste incinerators, should specifically be included and analyzed in the DEIR. Laboratory hoods do not require a permit through SMAQMD. Recommend analyzing the feasibility of using zero-emission emergency power options for the medical center buildings. Analyze project features that contribute to increases in the urban heat island effect, as well as the feasibility of deploying measures, such as cool roofs and cool pavements, to reduce |

| COMMENTER | Application | Project Description | Aesthetics | Agriculture | Air Quality | Biological Resources | Cultural Resources | Geology/Soils | Climate Change/GHGs | Energy | Hazards/Haz Materials | Hydrology/Water Quality | Land Use/Planning | Minerals | Noise | Population/Housing | Public Services | Recreation | Transportation/Traffic | Utilities Service Systems | Cumulative Impacts | Growth Inducement | Alternatives | Other | NOTES |
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| | | | | | | | | | | | | | | | | | | | | | | | | | the urban heat island effect. Due to proximity to I-5, consider reducing air pollutant exposure for the roof-top sports facility patrons by planting a roof-top vegetative barrier and including lower VOC-emitting tree species throughout the project site (see Sacramento Tree Foundation's website: http://www.sactree.com/assets/ShadyEightySTFweb.pdf). Review SMAQMD most current Guide to Air Quality Assessment in Sacramento County and thresholds of significance (available at www.airquality.org). Send environmental documents, including the air quality analyses to ProjectReview@airquality.org. |
| Sacramento Municipal Utility District<br>Nicole Goi<br>Regional & Local Government Affairs<br>6301 S Street, Mail Stop A313<br>Sacramento, CA 95817<br>*Ashlen McGinnis, Environmental Management Specialist*<br>*Ashlen.mcginnis@smud.org*<br>June 25, 2019 | | | | | | | | | | • | | | | | | | | | | • | • | | | | Acknowledge Project impacts related to: (1) overhead and/or underground transmission and distribution line easements (for more information regarding transmission encroachment, view https://www.smud.org/en/Business-Solutions-and-Rebates/Design-and-Construction-Services and https://www.smud.org/en/Corporate/Do-Business-with-SMUD/Land-Use/Transmission-Right-of-Way; (2) Utility line routing; (3) Electrical load needs/requirements; (4) Energy Efficiency; (5) Climate Change; (6) Cumulative impacts related to the need for increased electrical delivery; and (7) The potential need to relocate and or remove any SMUD infrastructure that may be affected in or around the project area. Disclose that SMUD has existing and proposed underground 12kV facilities on the project parcel(s), along W. Taron Drive, Elk Grove Boulevard, and Harbour Point Drive that will need to remain or be replaced with an equivalent electrical system. SMUD offers to be involved in discussions of potential issues. |
| Sacramento County Department of Health Services Emergency Medical Services Agency<br>David M Magnino, EMS Administrator<br>7001A East Parkway, Ste 1000<br>Sacramento, CA 95823<br>magninod@saccounty.net<br>916-875-9708 | • | • | | | | | | | | | | | | | | • | | • | | | | • | | | Comment expresses support for a proposed ambulance path that provides two points of ingress and egress ("Ambulance Path with Caltrans Penetration"). |

## Sarah Kirchgessner

**From:** Kristyn Laurence
**Sent:** Monday, June 24, 2019 12:33 PM
**To:** Darren Wilson; Antonio Ablog; Sarah Kirchgessner
**Cc:** Kara Reddig
**Subject:** FW: FB question

See note that came in on Facebook about the hospital project.

**Kristyn Laurence | City Manager's Office**
*Public Affairs Manager*

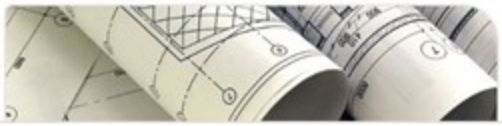
**City of Elk Grove**
8401 Laguna Palms Way, Elk Grove, CA 95758
t 916.478.2206 | f 916.627.4200
TTY/TDD 888.435.6092
elkgrovecity.org

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**From:** Jordan Haynes
**Sent:** Friday, June 21, 2019 10:08 AM
**To:** Kristyn Laurence <klaurence@elkgrovecity.org>
**Cc:** Lupe Murrietta <lmurrietta@elkgrovecity.org>
**Subject:** FB question

Should we let him know we will pass this along if he is not able to attend?

I don't know if I can attend. I would like the city to engage CNU to see if the proposed helipad would be able to support the size and weight of an Army UH-60 Medevac Configured Blackhawk. I think this is important because I believe the only hospital in the Sacramento area that can support a helicopter of this size on their helipad is Sutter in Roseville. Having this capability would be useful in any regional emergency plan for mass casualty / mass disaster scenarios. A CA National Guard Medevac unit exists at Mather Airport and is already integrated into the State Office of Emergency Services. Having more than one hospital to land at in this are would be very beneficial to the region.



City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

Ms. Sarah Kirchgessner, Project Planner

SUBJECT: Notice of Preparation for the Draft Environmental Impact Report for the California Northstate University Medical Center Project.

The draft environmental impact report needs to include the following:

1. Please indicate which type of EIR is being prepared, and the process for which the EIR consultant has been selected.

2. Please provide the date that the Project application was deemed complete.

3. Please describe the hospital approval/permitting process, including any mandatory State agency approvals (i.e. State Architect, etc.) that may be required (including upgrading to trauma).

4. The NOP states that the first floor of the hospital will be elevated above the 200-year floodplain. Please explain whether emergency access/parking for the hospital will also be raised above the 200-year floodplain, and if not, cite the authority that permits such a scenario.

5. Please describe the Text Amendments to General Plan Policy ER 2-3 and EGMC Section 23.42.040 related to development within the 200-year flood plain the Project is requesting.

6. The EIR should analyze the anticipated increase in water consumption and impact on water supply resulting from the Project buildout as compared to the existing baseline condition.

7. The EIR should include commitment letters from all responsible agencies that will be providing utilities and services to the Project.

8. The EIR should analyze the cumulative impacts of the Project with the established baseline environmental impacts of the area. The cumulative analysis needs to describe the current baseline impacts that required Findings of Overriding Consideration, and an analysis how the Project is/is not consistent with those previous findings.

Thank you for the opportunity to submit comments.

Lynn Wheat
Wheat91@yahoo.com

13 May 2019

Sarah Kirchgessner, Senior Planner

City of Elk Grove

8401 Laguna Palms Way

Elk Grove, California, 95758

Re: Application of CNU- NEST Comments/Question (Set 1)

Dear Ms. Kirchgessner:

Please find attached, initial comments/questions regarding the Application of the California Northstate University, to construct a hospital complex in the Stonelake community. These are being submitted by NEST. The purpose of these comments is to inform the City/public on issues relevant to 1) an Environmental Impact Report (EIR), 2) any amendment to the Elk Grove General Plan and, 3) any specific zoning changes related to the three-phase project.

The Application is incomplete and requires significantly more detail. Specifically, it only contains incomplete drawings (Only 3 levels of a 12-story building) for Phase 1. More comments/questions will arise as the developers completes the Application.

We appreciate your consideration.

Sincerely,

Jan Smutny-Jones

NEST Planning and Environmental Committee Chair

# NEST (Neighbors Ensuring Sincere Transparency) 1st Draft Comments
# CNU Proposed Hospital Documents Dated 4/22/19

## Incomplete Application Submittal Comments

The submission package dated April 15, 2019 does not provide an adequate level of information for a thorough analysis of the multi-structure, multi-phase project that will put NEST in a position of commenting on the project.

**Site Plan:**

No depth of setbacks and a description and illustration of what will be put in the setbacks (landscaping, signage, etc.)

**Roadway and Traffic Control Improvement Plans:**

The submission package did not include any roadway and traffic control improvement plans that address how the applicant will make improvements to handle a high volume of traffic going to and coming from the proposed project.

The plans should describe items including but not limited to:

- Widening of roadways and intersections to handle a high volume of traffic going to and coming from the proposed project.
- Addition of traffic control features including new traffic lights and stop signs to handle a high volume of traffic going to and coming from the proposed project.
- Improvements to the existing Interstate 5 to Elk Grove Boulevard eastbound off-ramp to handle a high volume of traffic going to and coming from the proposed project. The potential need for a ¼ cloverleaf off-ramp based on traffic studies.
- Widening of overpass to provide for three vehicle lanes and one emergency lane leading to Elk Grove Boulevard in an eastbound direction to handle a high volume of traffic going to and coming from the proposed project.

**Street Level Illustrations:**

- The submission package should include architectural renderings of the north, west, south and east elevations of the entire project area.
- The architectural renderings should be prepared for each of the three phases so that stakeholders can evaluate the impact that building scale and massing will have on the neighborhood over a 10 to 20 year construction cycle.

**Oblique Aerial Illustrations:**

- There should be aerial illustrations of the north, west, south and east views of the project from a 20 – 25 degree aerial perspective.
- The aerial illustrations should be prepared for each of the three phases so that stakeholders can evaluate the impact that building scale and massing will have on the neighborhood over a 10 to 20 year construction cycle.

**Phase I Structures:**

12 story 700,000 square foot hospital tower with an additional double / triple story (14 -15 stories high) mechanical penthouse for mechanical equipment and rooftop helicopter landing pad.

- Need north, west, south and east architectural renderings to evaluate and comment.
- Need preliminary plans for each floor including basement to evaluate and comment. Submission only included the first three floors.

2 story 29,300 square foot central plant building with 15,000 square foot exterior mechanical equipment yard.

- Need north, west, south and east elevations and architectural renderings of each side of the building to evaluate and comment.
- Need preliminary plans for each floor including basement to evaluate and comment.
- Need an illustration of the fenced in mechanical equipment yard.

**Phase II Structures:**

4 story plus basement 257,000 square foot concrete parking structure facing West Taron.

- Need north, west, south and east elevations and architectural renderings of each side of the building to evaluate and comment.
- Need preliminary plans for each floor including basement to evaluate and comment.

11 story high rise 136,500 square foot hospital tower (7 stories on top of a 4 story building).

- Need north, west, south and east elevations and architectural renderings of each side of the building to evaluate and comment.
- Need preliminary plans for each floor to evaluate and comment.

4 story 125,000 square foot Medical Outpatient building.

- Need north, west, south and east elevations and architectural renderings of each side of the building to evaluate and comment.
- Need preliminary plans for each floor including basement to evaluate and comment.

5 story 123,000 square foot office building.

- Need north, west, south and east elevations and architectural renderings of each side of the building to evaluate and comment.
- Need preliminary plans for each floor to evaluate and comment.

Existing 2 story 109,800 square foot CNU school building.

- Need north, west, south and east elevations and architectural renderings for any and all changes to each side of the building to evaluate and comment.

**Phase III Structures:**

4 story plus basement 207,000 square foot concrete parking structure facing West Taron.

- Need north, west, south and east elevations and architectural renderings of each side of the building to evaluate and comment.
- Need preliminary plans for each floor to evaluate and comment.

5 story 172,500 square foot dormitory facing Ruddy Duck

- Need north, west, south and east elevations and architectural renderings of each side of the building to evaluate and comment.
- Need preliminary plans for each floor to evaluate and comment.

1 story plus basement 67,000 square foot concrete parking structure with a illuminated roof top basketball, tennis and volleyball courts facing West Taron.

- Need north, west, south and east elevations and architectural renderings of each side of the building to evaluate and comment.
- Need preliminary plans for each floor including basement to evaluate and comment.

**General Comments/Questions**

- Given the scope and impact of this major development, the City of Elk Grove should conduct an independent analysis addressing: 1) the need for a Trauma II hospital in Elk Grove; 2) the suitability of the specific location being considered. The City's disclaimer that this is a private property decision, ignores the fact that an existing shopping center is demolished and replace with a huge "essential health care facility" in a 200-year flood plain. The City authorizing this project would be imprudent at best and potentially catastrophic.
- Presuming the need for a Trauma II center, the Application is devoid of any explanation of why this specific location is needed for a hospital. It is on the far western end of the City of Elk Grove accessed by Elk Grove Blvd. There are no population centers to the west, which has a wildlife preserve, wetlands and agriculture uses. It is approximately 7 miles to the north before you hit a population center (Pocket Road) which is currently being served by Kaiser South Trauma Center. It is 33 miles to the south (Highway 12), before you hit a population center. There is no explanation in the Application why this site is appropriate for a large hospital complex.
- Main hospital building is 271 feet in height. What is the current City of Elk Grove height restrictions for buildings adjacent to residential neighborhoods?
- There is a need for artist renderings of scale and scope of hospital complex ( all 3 Phases) from Riparian Drive, Elk Grove Blvd Maritime Dr. and Waterfowl Dr. to assess visual impact on existing neighborhoods
- Need detail on building(s) glazing. Reflective glazing is responsible for bird kills. CNU complex is adjacent to a major wildlife preserve used by migratory bird on the Pacific Flyway
- Is the West Taron water well impacted by the project?
- What infrastructure (electrical, water, gas, sewer, surface roads, widening of I-5 south of Elk Grove Blvd, on-ramp/off-ramp improvements, etc.) upgrades are expected to take place? Who will be responsible for paying for such infrastructure upgrades?
- Has the negative impact on the esthetic value of a 12-story hospital complex been considered? There is no building even close to 12 stories north to downtown Sacramento or south of Elk Grove until you reach Stockton. There are no such buildings east or west of this area as we are located within wildlife, ranching and farm lands. More importantly, this project borders on a federally protect wildlife area.
- How will this project be financed? What plans are in place in the event a partially built hospital is abandoned? Will CNU be responsible for making the area whole again?
- The Vision Statement states that new development plans are grounded in community needs and market demand. According to reports by other **well established** healthcare systems in the Sacramento area their bed occupancy rates run at 60%. We may need a hospital, but this is not location or the size to meet the needs of **all** of Elk Grove.
- The proposed Conditional Use permit will allow for this project to change the character and alter the neighborhood having a very negative impact on all of the surrounding neighborhoods.
- It is interesting to note that their plans do not include a Laboratory or a Nuclear Medicine Department. It is very strange for any hospital of this size not to have these very vital departments not included in their plans.
- The current land use of the property with CNU and All Data is NOT Employment Center but Light Industrial.
- The purpose of a FAR calculation is to ensure against building size that is too large for the parcel of land it is to occupy. This project far exceeds what is allowed.
- The number of CNU Students and Employees does not match what we have been told in the past. Where does this number come from?

**200 Year Floodplain (3 feet + water above existing grade)**

- The Proposed Medical Center is in the 200-year flood hazard zone. How is this consistent with Elk Grove General Plan SA-14 : "The City shall locate and encourage other agencies to locate new essential government

services facilities and **essential health care facilities** outside of the 100- year and 200-year flood hazard zones , except in cases where such locations would compromise facility functioning" ?

- Plans indicate that the hospital site will be elevated 7 feet higher than current grade to address 200-year flood plain concerns. Is this enough for an acute care hospital?
- Will the basement still be in the 200-year flood plain? What critical equipment will be housed there?
- The Central Plant will also be raised to address 200-year flood plain level. What critical equipment will be housed there?
- Will all hazardous substances and infrastructure delivering them be elevated above the 200-year flood plain?
- Will the Dormitory (Phase 3) be elevated above the 200-year flood plain?
- While the hospital may be raised above the 200-year flood plain the roads accessing the hospital (West Taron, Elk Grove Blvd., Maritime and I -5 appear to be flooded in a 200-year event. How will the hospital be accessed by emergency vehicles?
- Does Cosumnes Fire Dept have ambulances and fire equipment that operate in 3ft + of water?
- Does Elk Grove Police Dept. have equipment that operate at 3ft + water depth?
- Does Sacramento County Sheriff have equipment to operate in 3 ft+ water depth?
- What is the plan to evacuate patients from the site in case of a 200-year flood?
- Are utility services serving the hospital complex, water, sewer, gas, communications and electricity secure in a 200-year flood event?

**Traffic and Access**

- The only access providing ingress and egress for the hospital complex/trauma center is W. Taron Drive, a street that currently serves as a primary access street into the Stonelake Community. It was not designed to accommodate the level of traffic likely attracted to the hospital complex. What modifications will be necessary to address this significant traffic impact while preserving access into the residential neighborhood?
- How will the location of the hospital affect the ability of Stonelake residents and Elliot Ranch Elementary School to exit in case of an emergency?
- What is the traffic load assumed for Riparian Drive providing egress from the hospital complex?
- What is the traffic load assumed for Waterfowl Drive providing egress for the hospital complex? This road provides right turn only on to eastbound Elk Grove Blvd.
- What is traffic load on Stonelake Club Dr. providing egress and ingress for the hospital complex? Stonelake Club Dr. is the first traffic light which would provide egress for westbound traffic (left turn) to access I-5.
- What is the traffic load assumed for East Taron Dr. providing ingress/egress serving the hospital complex? East Taron has the only other traffic light allowing for westbound egress from the hospital complex.
- How will hospital related traffic be kept out of residential neighborhoods?
- How does increased vehicle activity in the Stonelake Community fit within the current general plan and climate change goals?
- Are there anticipated changes to the roads in and around West Taron and Riparian?
- What is the added traffic load assumed for Elk Grove Blvd?
- What is the added traffic load assumed for Maritime Drive?
- The Elk Grove Blvd. westbound ambulance entrance, a left turn into cross traffic, appears to be very close to the I-5 Southbound exit. Is this consistent with current California law?
- Access to hospital complex site from eastbound Elk Grove Blvd is limited to right hand turn into the complex. This access is one-way into the complex. Is this enough for a complex of the size being considered?
- What is the impact of the hospital complex on southbound I-5 exiting traffic onto Elk Grove Blvd?
- What will be the impact of the hospital complex on I-5 which already experiences congestion?

**Parking**

- The plan is unclear as to describing the total amount of parking through all three phases. Phase 1 states there will be 1554. "Phase 2 planned total of 2744 parking spots (last bullet page 2). Phase 3 "Planned total of 3,390". Is this cumulative or separate? If separate, the 3 Phases combined require a total of 7688 parking

spaces. Either result approach, far surpasses the number of vehicles currently utilizing the limited roads serving the Stonelake Community.

- Will the parking structure have charging stations for electric vehicles? If so, how many?
- How will hospital complex related parking be kept out of residential neighborhoods?
- Will the semi-automatic parking structure be enclosed or a stand-alone version?

**Helicopters**

- Plan lacks any information on the Helicopter facility serving the hospital
- What will be fight patterns?
- Airspace over Stonelake Community serves Sacramento International Airport, Sacramento Executive Airport and U.S. Airforce Travis Field. What effect does the Helistop on the use(s) of this airspace?
- What will be the helicopter noise impact on the community and wildlife?
- The hospital complex has the Stonelake Wildlife Preserve on its southern and western approaches. To the north are the Sacramento County Bufferlands which also serve as bird habitat. Large waterfowl are prevalent in the area and fly at altitudes could present a danger for helicopters. How will the issue be addressed?

**Trauma Center**

- What are the security measures planned for the trauma center?
- Will the existence of the trauma center require an additional law enforcement presence in the Stonelake Community?
- Will the hospital employ its own law enforcement personnel or will Elk Grove Police Department be the agency responsible for daily security in and around CNU? Are there plans included to prevent and/or respond to terrorist threats and acts in and around the hospital? How will the community of Stonelake and other surrounding communities be protected?
- What are the impacts of emergency vehicle noise and hospital alarms in the adjacent residential neighborhood? Will the hospital be sound proofed?
- Access and egress are critical in an emergency, such as fire. Is there a plan for fire drills and emergency evacuation of the complex? Where will people evacuate to?

**Wildlife Areas**

- The hospital complex is in proximity of the Stonelake Wildlife refuge and the Bufferlands which are active habitat on the Pacific Flyway. At 271 feet, the hospital complex height is within the altitudes utilized by large birds. Glazing and lighting utilized on the structure are a potential hazard to flying birds. How will this be addressed?
- Property contained within the Stonelake Wildlife Refuge has wildlife easements. Will these be affected by the development of the hospital complex?
- How will the reflective exterior of a 12-story building be mitigated to prevent the incredible number of birds that fly from the flyway on the west side of I-5 to our grazing fields just south of Stonelake on a daily basis - especially during migration seasons - from flying into the building and killing large numbers of these birds?
- How will the reflective exterior of a 12-story building be mitigated to prevent the birds that live year-round in our neighborhoods and the flyway, from flying into the building and killing large numbers of our resident birds?

**Hazardous Substances/Waste**

- Where will hazardous materials be stored? Will they be in containment areas?
- Will hazardous waste be trucked out and if so, are there plans I place to handle spills, accidents, etc.?
- Will liquid waste from sinks and other equipment be treated on site or will there be a dual discharge system to Sacramento County Sanitations?
- Will there be any hazardous gases stored on site? Will the air at the storage facility be continuously monitored?

- What is the air quality impact of the ventilation of air borne particle dissemination outside of the parking structures, hospital and dorms
- What specific City of Elk Grove environment al ordinances and/or regulation are applicable to the medical complex?
- How does CNU intend to comply with the Clean Air Act?
- How does CNU intend to comply with the Toxic Substances Control Act?
- How does CNU intend on complying with the Federal Water Pollution Control Act?
- How does CNU intend on complying with the Occupational Safety and Health Act?

**Neighborhood Impacts**

- West Elk Grove neighborhoods are balanced mix use. How is the medical complex consistent with this balanced mix use?
- What will be the setbacks for the 5-story dormitory abutting the 1 or 2 story residential homes on Ruddy Duck Way?
- Is the West Taron water well impacted by the project?
- How will buildings in the medical complex assure solar access to neighboring properties?
- The creation of an Employment Center should serve the neighborhood by providing services desired by the Districts population. We do not desire CNU to build a hospital which will have a tremendous impact on our quality of life. For example: increased traffic, all the years of construction, noise, pollution, and having to look at cranes for **years** as the background to our lake view when sitting on our patios.

**Cumulative Hospital Impacts (Dignity?)**

The approved Dignity Hospital, 3 miles east on Elk Grove Blvd., will soon begin construction. Are there cumulative environmental or economic impacts of having two hospitals in proximity?

# United States Department of the Interior
## FISH AND WILDLIFE SERVICE

Stone Lakes National Wildlife Refuge
1624 Hood-Franklin Road
Elk Grove, California 95757
(916) 775-4421

May 22, 2019

Sarah Kirchgessner, Project Manager
Planning Department, City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 96758

RE: California Northstate University Medical Center, PLNG 18-110

Ms. Kirchgessner:

Thank you for the opportunity to provide some initial comments concerning the proposed California Northstate University Medical Center (CNU) hospital and medical center. These comments reflect our concerns that were raised during our meeting on May 16, 2019 at the Refuge office with you and the City's planning department. I anticipate providing additional and more detailed comments as the environmental review process continues, and appreciate the opportunity to provide an overview of concerns at this time.

The CNU site is within the 18,000 acre Refuge Project Boundary and surrounded by land that is managed for wildlife and threatened and endangered species. In 1994, the U.S. Fish & Wildlife Service (Service) began land protection efforts and habitat enhancement on private and public lands. The Service currently manages approximately 6,500 acres. Over the past twenty five years, private, state and federal funds have been invested to acquire and restore wetlands, grasslands and riparian habitats that attract over 50,000 migratory birds that include ducks, geese and sandhill cranes. These birds migrate to the Refuge, private farmlands and surrounding protected areas (Bufferlands, Cosumnes River Preserve, Yolo Basin) because they provide essential wintering habitat and stop over areas.

Our concerns regarding the proposed construction of a 12+ story building complex adjacent to the Refuge include: 1) the proximity, height and design of buildings with reflective glass that pose a collision threat to migratory birds; 2) artificial lighting which causes disturbance to roosting birds and disruptions to night time behavior; and 3) low flying helicopters which can cause disturbance and flush waterfowl which may increase the risk of collisions. I encourage you to review Federal Aviation Administration regulations and other Code of Federal

Regulations (50 CFR 27.34) that limit aircraft use and altitude over national wildlife refuges.

Please include these concerns in your project scoping efforts. I look forward to providing you with additional information.

Respectfully,

Bart McDermott
Stone Lakes National Wildlife Refuge Manager

Cc: Don Nottoli, Sacramento County Supervisor
Congressman John Garamendi

## Sarah Kirchgessner

**From:** Lisashores <lisashores@icloud.com>
**Sent:** Wednesday, May 29, 2019 12:01 PM
**To:** Sarah Kirchgessner
**Subject:** Re: Notice of Preparation - California Northstate University Medical Center Project PLNG18-110

Hi Sarah,

Can you please explain to me why the dormitory is not considered housing? It is housing to the students is it not?!?

Lisa

On May 29, 2019 at 10:17 AM, <Sarah Kirchgessner> wrote:

Good morning,
In accordance with the California Environmental Quality Act (CEQA) Guidelines, the City of Elk Grove has released a Notice of Preparation (NOP) of a Draft Environmental Impact Report for the California Northstate University Medical Center Project (PLNG18-110). A NOP is used to describe a project and identify its potential environmental effects. The City is encouraging public input during the NOP's 30-day review period ending on June 27, 2019. The Notice of Preparation is attached.
A scoping meeting for the Project will be held on **Monday, June 24, 2019** from 5:30 to 7:30 p.m. at the City Council Chambers (8400 Laguna Palms Way).
Regards,
Sarah

CITY OF ELK GROVE

**Sarah Kirchgessner | Development Services - Planning**
*Senior Planner*
**City of Elk Grove**
8401 Laguna Palms Way, Elk Grove, CA 95758
t 916.478.2245
TTY/TDD 888.435.6092
elkgrovecity.org

## Sarah Kirchgessner

**From:** DeAna <deana.spiess@sbcglobal.net>
**Sent:** Thursday, May 30, 2019 1:58 PM
**To:** Sarah Kirchgessner
**Cc:** David Melilli; DeAna Melilli
**Subject:** NOP EIR for the California Northstate University Hospital
**Attachments:** FAA Advisory Circular 150-5390-2C Helistop-pad.pdf

Hi Sarah, just checking that for the NOP EIR for the California Northstate University Hospital: Project Update: California Northstate University Medical Center Project Information located at http://cityofelkgrove.hosted.civiclive.com/cms/One.aspx?pageId=144965&portalId=109669&objectId.15286=15690786&contextId.15286=144966&parentId.15286=15690750

The FAA notification requirements are meet.

FAA Advisory Circular 150/5390-2C provides guidance for Heliport Design including notification requirements were done, see attached. Located at https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.information/documentnumber/150_5390-2c

**Chapter 1: Penalty for failure to provide notice (To FAA).** Persons who fail to give notice are subject to civil penalty under Title 49 United States Code 46301, Civil Penalties, of not more than $25,000 (or $1,100 if the person is an individual or small business concern).

Want to make sure the City is not liable…

Please include this in the NOP EIR as a public comment.

Sincerely,

**DeAna and David Melilli**
**916-549-4915 or 916-997-4841**

## Sarah Kirchgessner

**From:** Wood, Dylan@Wildlife <Dylan.A.Wood@wildlife.ca.gov>
**Sent:** Tuesday, June 4, 2019 10:40 AM
**To:** Sarah Kirchgessner
**Cc:** Wildlife R2 CEQA
**Subject:** Comments on the Notice of Preparation for the California Northstate University Medical Center SCH: 2019050019

Ms. Kirchgessner,

The California Department of Fish and Wildlife (CDFW) has received and reviewed the **Notice of Preparation** for the **California Northstate University Medical Center** (Project) in Sacramento County. CDFW offers the comments and recommendations below to assist the Lead Agency in adequately identifying and, where appropriate, mitigating the Project's significant or potentially significant, direct and indirect impacts on fish and wildlife resources.

CDFW has identified several potential impacts relating to nesting and migrating birds. CDFW recommends that the draft Environmental Impact Report discuss the following impacts:

- ➔ Bird nests on the project site: Please include a site map that includes the number and species of trees to be removed for the Project. This should characterize areas designated for construction and any areas used for Project staging/storage that are not within the construction footprint.
- ➔ Bird collisions: An analysis should be included that discusses the height of the building and reflective nature of the windows. CDFW recommends the City choose a window treatment that reduces potential for bird collisions. Any relevant data from the window manufacturer or designer for the proposed window treatments is useful in reducing impacts to a less than significant level.

CDFW recognizes the urban setting of the project; however given the proximity of the Sacramento River and Stone Lakes National Wildlife Refuge, impacts of constructing taller buildings may have the potential to be significant for wildlife.

I am available for consultation regarding biological resources and strategies to minimize and/or mitigate impacts, please call me at 916-358-2384 or email at dylan.a.wood@wildlife.ca.gov. Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife.

Sincerely,

**Dylan Wood**
California Department of Fish and Wildlife
Environmental Scientist, Sacramento County
(916) 358-2384

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SECRETARY FOR
ENVIRONMENTAL PROTECTION

Central Valley Regional Water Quality Control Board

13 June 2019

Sarah Kirchgessner
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

**CERTIFIED MAIL**
7017 2620 0001 1359 0635

**COMMENTS TO REQUEST FOR REVIEW FOR THE NOTICE OF PREPARATION FOR THE DRAFT ENVIRONMENTAL IMPACT REPORT, CALIFORNIA NORTHSTATE UNIVERSITY MEDICAL CENTER PROJECT, SCH#2019050019, SACRAMENTO COUNTY**

Pursuant to the State Clearinghouse's 29 May 2019 request, the Central Valley Regional Water Quality Control Board (Central Valley Water Board) has reviewed the *Request for Review for the Notice of Preparation for the Draft Environmental Impact Report* for the California Northstate University Medical Center Project, located in Sacramento County.

Our agency is delegated with the responsibility of protecting the quality of surface and groundwaters of the state; therefore our comments will address concerns surrounding those issues.

## I. Regulatory Setting

### Basin Plan

The Central Valley Water Board is required to formulate and adopt Basin Plans for all areas within the Central Valley region under Section 13240 of the Porter-Cologne Water Quality Control Act. Each Basin Plan must contain water quality objectives to ensure the reasonable protection of beneficial uses, as well as a program of implementation for achieving water quality objectives with the Basin Plans. Federal regulations require each state to adopt water quality standards to protect the public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act. In California, the beneficial uses, water quality objectives, and the Antidegradation Policy are the State's water quality standards. Water quality standards are also contained in the National Toxics Rule, 40 CFR Section 131.36, and the California Toxics Rule, 40 CFR Section 131.38.

The Basin Plan is subject to modification as necessary, considering applicable laws, policies, technologies, water quality conditions and priorities. The original

Basin Plans were adopted in 1975, and have been updated and revised periodically as required, using Basin Plan amendments. Once the Central Valley Water Board has adopted a Basin Plan amendment in noticed public hearings, it must be approved by the State Water Resources Control Board (State Water Board), Office of Administrative Law (OAL) and in some cases, the United States Environmental Protection Agency (USEPA). Basin Plan amendments only become effective after they have been approved by the OAL and in some cases, the USEPA. Every three (3) years, a review of the Basin Plan is completed that assesses the appropriateness of existing standards and evaluates and prioritizes Basin Planning issues.

For more information on the *Water Quality Control Plan for the Sacramento and San Joaquin River Basins*, please visit our website:
http://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/

**Antidegradation Considerations**
All wastewater discharges must comply with the Antidegradation Policy (State Water Board Resolution 68-16) and the Antidegradation Implementation Policy contained in the Basin Plan. The Antidegradation Implementation Policy is available on page 74 at:
https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf

In part it states:

> *Any discharge of waste to high quality waters must apply best practicable treatment or control not only to prevent a condition of pollution or nuisance from occurring, but also to maintain the highest water quality possible consistent with the maximum benefit to the people of the State.*
>
> *This information must be presented as an analysis of the impacts and potential impacts of the discharge on water quality, as measured by background concentrations and applicable water quality objectives.*

The antidegradation analysis is a mandatory element in the National Pollutant Discharge Elimination System and land discharge Waste Discharge Requirements (WDRs) permitting processes. The environmental review document should evaluate potential impacts to both surface and groundwater quality.

## II. Permitting Requirements

**Construction Storm Water General Permit**
Dischargers whose project disturb one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one or more acres, are required to obtain coverage under the

General Permit for Storm Water Discharges Associated with Construction Activities (Construction General Permit), Construction General Permit Order No. 2009-009-DWQ. Construction activity subject to this permit includes clearing, grading, grubbing, disturbances to the ground, such as stockpiling, or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility. The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP).

For more information on the Construction General Permit, visit the State Water Resources Control Board website at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/constpermits.shtml

**Phase I and II Municipal Separate Storm Sewer System (MS4) Permits[1]**
The Phase I and II MS4 permits require the Permittees reduce pollutants and runoff flows from new development and redevelopment using Best Management Practices (BMPs) to the maximum extent practicable (MEP). MS4 Permittees have their own development standards, also known as Low Impact Development (LID)/post-construction standards that include a hydromodification component. The MS4 permits also require specific design concepts for LID/post-construction BMPs in the early stages of a project during the entitlement and CEQA process and the development plan review process.

For more information on which Phase I MS4 Permit this project applies to, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/municipal_permits/

For more information on the Phase II MS4 permit and who it applies to, visit the State Water Resources Control Board at:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/phase_ii_municipal.shtml

**Industrial Storm Water General Permit**
Storm water discharges associated with industrial sites must comply with the regulations contained in the Industrial Storm Water General Permit Order No. 2014-0057-DWQ.

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[1] Municipal Permits = The Phase I Municipal Separate Storm Water System (MS4) Permit covers medium sized Municipalities (serving between 100,000 and 250,000 people) and large sized municipalities (serving over 250,000 people). The Phase II MS4 provides coverage for small municipalities, including non-traditional Small MS4s, which include military bases, public campuses, prisons and hospitals.

For more information on the Industrial Storm Water General Permit, visit the Central Valley Water Board website at:
http://www.waterboards.ca.gov/centralvalley/water_issues/storm_water/industrial_general_permits/index.shtml

**Clean Water Act Section 404 Permit**

If the project will involve the discharge of dredged or fill material in navigable waters or wetlands, a permit pursuant to Section 404 of the Clean Water Act may be needed from the United States Army Corps of Engineers (USACE). If a Section 404 permit is required by the USACE, the Central Valley Water Board will review the permit application to ensure that discharge will not violate water quality standards. If the project requires surface water drainage realignment, the applicant is advised to contact the Department of Fish and Game for information on Streambed Alteration Permit requirements.

If you have any questions regarding the Clean Water Act Section 404 permits, please contact the Regulatory Division of the Sacramento District of USACE at (916) 557-5250.

**Clean Water Act Section 401 Permit – Water Quality Certification**

If an USACE permit (e.g., Non-Reporting Nationwide Permit, Nationwide Permit, Letter of Permission, Individual Permit, Regional General Permit, Programmatic General Permit), or any other federal permit (e.g., Section 10 of the Rivers and Harbors Act or Section 9 from the United States Coast Guard), is required for this project due to the disturbance of waters of the United States (such as streams and wetlands), then a Water Quality Certification must be obtained from the Central Valley Water Board prior to initiation of project activities. There are no waivers for 401 Water Quality Certifications.

For more information on the Water Quality Certification, visit the Central Valley Water Board website at:
https://www.waterboards.ca.gov/centralvalley/water_issues/water_quality_certification/

**Waste Discharge Requirements – Discharges to Waters of the State**

If USACE determines that only non-jurisdictional waters of the State (i.e., "non-federal" waters of the State) are present in the proposed project area, the proposed project may require a Waste Discharge Requirement (WDR) permit to be issued by Central Valley Water Board. Under the California Porter-Cologne Water Quality Control Act, discharges to all waters of the State, including all wetlands and other waters of the State including, but not limited to, isolated wetlands, are subject to State regulation.

For more information on the Waste Discharges to Surface Water NPDES Program and WDR processes, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/water_issues/waste_to_surface_water/

**Dewatering Permit**

If the proposed project includes construction or groundwater dewatering to be discharged to land, the proponent may apply for coverage under State Water Board General Water Quality Order (Low Risk General Order) 2003-0003 or the Central Valley Water Board's Waiver of Report of Waste Discharge and Waste Discharge Requirements (Low Risk Waiver) R5-2013-0145. Small temporary construction dewatering projects are projects that discharge groundwater to land from excavation activities or dewatering of underground utility vaults. Dischargers seeking coverage under the General Order or Waiver must file a Notice of Intent with the Central Valley Water Board prior to beginning discharge.

For more information regarding the Low Risk General Order and the application process, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0003.pdf

For more information regarding the Low Risk Waiver and the application process, visit the Central Valley Water Board website at: http://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/waivers/r5-2013-0145_res.pdf

**Regulatory Compliance for Commercially Irrigated Agriculture**

If the property will be used for commercial irrigated agricultural, the discharger will be required to obtain regulatory coverage under the Irrigated Lands Regulatory Program.
There are two options to comply:

1. **Obtain Coverage Under a Coalition Group.** Join the local Coalition Group that supports land owners with the implementation of the Irrigated Lands Regulatory Program. The Coalition Group conducts water quality monitoring and reporting to the Central Valley Water Board on behalf of its growers. The Coalition Groups charge an annual membership fee, which varies by Coalition Group. To find the Coalition Group in your area, visit the Central Valley Water Board's website at: https://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/regulatory_information/for_growers/coalition_groups/ or contact water board staff at (916) 464-4611 or via email at IrrLands@waterboards.ca.gov.

2. **Obtain Coverage Under the General Waste Discharge Requirements for Individual Growers, General Order R5-2013-0100**. Dischargers not participating in a third-party group (Coalition) are regulated individually. Depending on the specific site conditions, growers may be required to monitor runoff from their property, install monitoring wells, and submit a notice of intent, farm plan, and other action plans regarding their actions to comply with their General Order. Yearly costs would include State administrative fees (for example, annual fees for farm sizes from 11-100 acres are currently $1,277 + $8.53/Acre); the cost to prepare annual monitoring reports; and water quality monitoring costs. To enroll as an Individual Discharger under the Irrigated Lands Regulatory Program, call the Central Valley Water Board phone line at (916) 464-4611 or e-mail board staff at IrrLands@waterboards.ca.gov.

**Limited Threat General NPDES Permit**

If the proposed project includes construction dewatering and it is necessary to discharge the groundwater to waters of the United States, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. Dewatering discharges are typically considered a low or limited threat to water quality and may be covered under the General Order for *Limited Threat Discharges to Surface Water* (Limited Threat General Order). A complete Notice of Intent must be submitted to the Central Valley Water Board to obtain coverage under the Limited Threat General Order.

For more information regarding the Limited Threat General Order and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/general_orders/r5-2016-0076-01.pdf

**NPDES Permit**

If the proposed project discharges waste that could affect the quality of surface waters of the State, other than into a community sewer system, the proposed project will require coverage under a National Pollutant Discharge Elimination System (NPDES) permit. A complete Report of Waste Discharge must be submitted with the Central Valley Water Board to obtain a NPDES Permit.

For more information regarding the NPDES Permit and the application process, visit the Central Valley Water Board website at: https://www.waterboards.ca.gov/centralvalley/help/permit/

If you have questions regarding these comments, please contact me at (916) 464-4812 or Jordan.Hensley@waterboards.ca.gov.

Jordan Hensley
Environmental Scientist

cc: State Clearinghouse unit, Governor's Office of Planning and Research, Sacramento

## Sarah Kirchgessner

**From:** Ed Klinenberg <eklinenberg@comcast.net>
**Sent:** Monday, June 17, 2019 9:11 PM
**To:** Sarah Kirchgessner
**Cc:** Clifford Loveland; Klinenberg, Andrea
**Subject:** Re: Notice of Preparation - California Northstate University Medical Center Project PLNG18-110

[EXTERNAL EMAIL]

Hi Sarah,

I would recommend this CEQA report include a section on homelessness . As a Level II Trauma center, the CNU hospital will probably attract people of all income levels including the homeless. If true, it will be important to understand the environmental impact an increased homeless population may have on the surrounding community including trash, sharps, hazardous waste, and fires.

Regards,

Ed

---

**From:** Sarah Kirchgessner [mailto:skirchgessner@elkgrovecity.org]
**Sent:** Wednesday, May 29, 2019 10:18 AM
**To:** Sarah Kirchgessner <skirchgessner@elkgrovecity.org>
**Subject:** Notice of Preparation - California Northstate University Medical Center Project PLNG18-110

Good morning,

In accordance with the California Environmental Quality Act (CEQA) Guidelines, the City of Elk Grove has released a Notice of Preparation (NOP) of a Draft Environmental Impact Report for the California Northstate University Medical Center Project (PLNG18-110). A NOP is used to describe a project and identify its potential environmental effects.

The City is encouraging public input during the NOP's 30-day review period ending on June 27, 2019. The Notice of Preparation is attached.

A scoping meeting for the Project will be held on **Monday, June 24, 2019** from 5:30 to 7:30 p.m. at the City Council Chambers (8400 Laguna Palms Way).

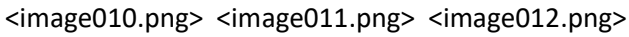
Regards,

Sarah

**<image009.png>**

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# California Northstate University (CNU) Medical Center Project
# Development Plans Scoping Meeting June 24, 2019
# Resources Consideration NOP Public Response (6/20/19)

As a homeowner stakeholder in the City of Elk Grove Stonelake/Laguna community, of course, am very concerned about the development. My household is very distressed at the demolition and development of an overall magnitude of the project, 12-story hospital, underground parking, helipad, 5-story medical office building, 5-story dormitory, 4-story parking garage structure and in a crowded footprint.

The purpose of our environmental analysis request of each EIR category addresses many of our concerns and is not only to inform decision-makers and the public of a general plan's potential adverse environmental impacts, but also to allow environmental considerations to influence the design of the plan itself.

The scoping for the CNU proposed project EIR three phases request is to consider and evaluate the impact to the following factors associated with respect to public health and safety concerns and **legislative and General Plans (City of Elk Grove and Sacramento County) compliance** as described below in each of the EIR categories. This is also a request to identify to what extent the proposed CNU project **will be in compliance to each piece of legislation and General Plans (City of Elk Grove and Sacramento County)** mentioned in this document. Considering the proposed CNU project will have a basement and trench (possibly dredge and excavation) deep into the ground after the demolishment of the current structures and foundations. Our initial questions for each category.

- Does the CNU proposed project have the potential to….
  - degrade the quality of the environment,
  - substantially reduce the habitat of a wildlife species,
  - cause a wildlife population to drop below self-sustaining levels in the area,
  - threaten to eliminate a plant (by pollutants) or animal community (wildlife preserve),
  - substantially reduce the number or restrict the range of a rare or endangered plant or animal
  - eliminate important examples of the major periods of California history or prehistory due to magnitude of the project in depth and height primarily but limited to?

- Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

- Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?

Currently, this proposed CNU project violates the City of Elk Grove general plan. Should not the City of Elk Grove general plan get updated prior to approving on a decision of CNU proposal? Should the to scoping process be broken out two separate scopes before CNU proposal is considered: 1.) general plan analysis and related land use/feasibilty/demand study 2.) A second scope for re-zoning the site, site plan approval. I recommend since there is a lot of opposition to the site CNU proposed for their project University/Medical Facility for a City of Elk Grove general plan amendment to go on a ballot (measure) for the City citizen to approve the City of Elk Grove general plan changes required for the development approval? Does the City of Elk Grove, Mayor/Council

really want to change our general plan after having spent five years updating it? The elements of the City of Elk Grove general plans seem to get amended a lot without stability for a complete long-term general plan. Is there an expected solid long-term General Plan.

Does this proposed CNU project violate the Sacramento general plan? Are there any amendments that the Sacramento County will need to make based on the proposed CNU project?

How will this project effect Sacramento County emergency evacuation plan in their general plan, see attached map? The attached map shows where the level is most likely to breach the levee.

Sacramento County Emergency evacuation plans, is the general plan for Elk Grove, Laguna West, and Laguna using Interstate-5 from Elk Grove Blvd and Laguna Blvd in an emergency. Will there be a new or amended emergency evacuation general plan from Sacramento County?

Our response is in consideration of the four following pieces of legislation below in respect to the California Northstate University (CNU) Medical Center Project Development Plans proposed to the City of Elk Grove, California.

**Resources Code §§ 21100.1, 21000(a)** ("maintenance of a quality environment for the people of this state now and in the future is a matter of statewide concern")

**California Environmental Quality Act (California Public Resource Code, Div. 13 21100)**, as amended – The CEQA was enacted by the California Legislature in 1970 and, like NEPA, requires public agencies to consider the environmental effects of their actions.

**County (Contra Costa, Sacramento, Solano, and Yolo) General Plans –** The California Public Resources Code Section 65302a mandates that a general plan's land use element designates "…the proposed general distribution and general location and extent of the uses of the land for housing, business, industry, open space, including agriculture, natural resources, recreation, and enjoyment of scenic beauty, education, public buildings and grounds, solid and liquid waste disposal facilities, and other categories of public and private uses of land." The California Public Resources Code Section 65583 requires that a general plan's housing element consist of "…an identification and analysis of existing and projected housing needs and a statement of goals, policies, quantified objectives and scheduled programs for the preservation, improvement and development of housing." These plans guide local zoning, which is a regulatory control. Does the Proposed CNU Project comply with all applicable Sacramento County General Plans? What are the approvals required to implement the proposed CNU project and by whom? Will there be a matrix of project approvals and permits? Will there be list of past, present, and reasonable anticipated future projects in the project area in considering cumulative impacts?

**Environmental Justice EO 12898 (February 11, 1994)** to Address **Environmental Justice** in Minority Populations and Low-Income Populations currently in the City of Elk Grove. And also the consideration to the affordable housing project going in on Maritime Dr. and Harbor Pointe Dr. off of Elk Grove Blvd and Interstate-5 per the Sacramento Business Journal and the Developer, which they plan to use this EIR inconsideration of their plans if allowable by the City of Elk Grove, CA. Therefore, what is the intended uses of the final EIR?

**California Education Code (CEC) Section 17210 et seq.**
The CEC establishes the law for California public education. The CEC requires that DTSC be involved in the environmental review process for the proposed acquisition and/or <u>construction of school properties</u> that will use <u>state funding</u>. The CEC requires that a Phase I Environmental Site Assessment be completed prior to acquiring a school site or engaging in a construction project. Depending on the outcome of the Phase I Environmental Site Assessment, a Preliminary Endangerment Assessment (PEA), including the collection and submittal of samples for analysis,

may be warranted. Depending upon the results of the PEA, remediation may be necessary. Per the City of Elk Grove website for this project it states that at this time the City is unsure if the University will get any state funding incentives of monetary nature. I believe this would preclude the University from receiving any state funding unless they are involved in the proposed CNU project now.

## Aesthetics *(natural beauty)*

*Project Setting and Viewshed*

**Federal Highway Act of 1956 and 1988**
The Federal Highway Administration agency (FHWA) visual quality assessment method provides a systematic and objective approach to evaluating visual changes that potentially would result from implementation of proposed projects or actions. The FHWA is an agency within the U.S. Department of Transportation that supports State and local governments in the design, construction, and maintenance of the Nation's highway system (Federal Aid Highway Program) and various federally and tribal owned lands (Federal Lands Highway Program). Therefore, the following factors is requested consideration related to the proposed project:

- The overall visual and aesthetic quality of the area. Will the proposed project site and its surroundings degrade the existing visual character or quality?
- The visual and aesthetic experience and expectations of viewers (including residents, users of parks and other public spaces, pedestrians, and motorists) looking at transportation corridors.
- The scale and contrast between existing and proposed elements in the area.
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

**Would the project:**

**Visual Resources**
Effects on visual resources study is requested of the area are inventoried prior to assessing impacts. The inventory includes elements such as regionally and locally important visual or scenic resources, astronomical observation, photography of wildlife and migratory birds, properties specifically oriented to views within the viewshed, and recreation areas and similar facilities (e.g., parks, trails (Stonelake Preserve trail), wildlife and waterfowl refuges). Residents are considered highly sensitive viewers with a relatively high degree of awareness to changes in existing visual resources.

**Viewer Groups and Their Relative Sensitivities**
(Relationship to the height of the proposed buildings and lighting, but not limited to.)
Effects on viewer groups study is requested of the area are inventoried prior to assessing impacts. Viewer groups within the study area represent such people as roadway and Interstate; residents; commercial viewers; office viewers; park and trail users; and agricultural and industrial workers. The response of viewers to a specific object or view produces the visual experience of that view.

Sensitivity varies among viewer types. Sensitivity to views affects the response. Viewer sensitivity (or level of concern) is a combination of the following factors for a specific view:

- How many people have that view and what types of viewers are they?
- How long can they see the view? Residents and recreationists generally have long-duration views while bicyclists and motorists typically have short-duration views.
- What is their likely level of concern about the appearance, aesthetics, and quality of the view? Level of concern is a subjective response. Factors such as the visual character of the surrounding landscape, the activity in which a viewer is engaged, and the viewer's values, expectations, and interests affect a viewer's level of concern.

Viewer sensitivity or level of concern is a neutral term that is an important parameter in assessing visual quality, as well as, future visual conditions with the project.

**Visual Landscape Quality**

The project compliance with the California Public Utilities Code.
The project compliance with the Stonelake, West Laguna, and Lakeside CC&Rs Requirements.

Impact concerns:

- ✓ Concerns with the introduction of new sources of light (streetlights) with the proposed project and impacts to the night sky.
- ✓ Concerns with the aesthetic impact of converting the Stonelake Landing Shopping Center site to a massive Medical University Center, which is inconsistent with the neighborhood, character of the area.
- ✓ Concerns regarding the development including overhead power lines and telephone poles.

# Air Quality

This is a request to have the Sacramento Metropolitan Air Quality Management District (SMAQMD) give their advice on the construction emissions related to this project due to its magnitude and location and an air quality analysis study performed. Result in a cumulatively considerable net increase of any criteria pollutant for which the proposed project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?

**Assembly Bill 617 (C. Garcia, Chapter 136, Statutes of 2017)**
AB 617 requires the California Air Resources Board (CARB), with input from air districts including Sac Metro Air District, to identify the communities throughout the state with the highest air pollution burden in which to deploy new community air monitoring. Community air monitoring is intended to measure localized community exposure to criteria air pollutants and toxic air contaminants.

State of California, 2018 *California Environmental Quality Act (CEQA) Statutes and Guidelines*
http://resources.ca.gov/ceqa/docs/2018_CEQA_Statutes_and_Guidelines.pdf

The potential air quality impacts of the proposed CNU project should have significant consideration. The approval of this project can effect children, outdoor athletes, pregnant women, outdoor workers, older adults, the elderly, and people who have heart or lung disease are most affected by air pollution, but even healthy adults can feel its effects. The following federal, state, and local government agencies air quality management requested for consideration in compliance of their air quality standards associated to this proposed project.

The Federal Clean Air Act (CAA) is administered by the U.S. Environmental Protection Agency (USEPA). The California Clean Air Act (CCAA) is administered by the California Air Resources Board (CARB). Local Air Quality Management Districts are responsible for monitoring the attainment and maintenance of federal and state air quality standards.

*Federal Air Quality Management*. Air quality in the United States is governed by the CAA, which has adopted federal air pollutant standards, known as National Ambient Air Quality Standards (NAAQS). These standards apply to the following criteria air pollutants: carbon monoxide (CO), ozone ($O_3$), sulfur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), lead (Pb), particulate matter less than 10 microns in diameter ($PM_{10}$), and fine particulate matter ($PM_{2.5}$). Under existing regulations, *de minimis* emission thresholds are listed for each criteria air pollutant.

*State Air Quality Management*. Air quality in California is also governed by the CCAA. The California criteria air pollutant standards are known as the California Ambient Air Quality Standards (CAAQS) and are generally more stringent than NAAQS.

Under the CCAA, designation of attainment or non-attainment is based on pollutant levels and whether they are below or in excess of the current standards. “Attainment” status for a pollutant means that the Air District meets the standards set by the USEPA. Will the air quality have continuous air monitoring ensures that these standards are met and maintained?

*Local Air Quality Management*. The proposed Project Area is within Sacramento County, which forms part of the federal Ozone attainment area. Sacramento County is currently in attainment for all criteria air pollutants (EPA 2018) and thus input and consideration for this project requested.

**Air Quality Significance Criteria Questions**

**Would the project:**

- Conflict with or obstruct implementation of the applicable air quality plan?
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors).
- Expose sensitive receptors to substantial pollutant concentrations.
- Create objectionable odors affecting a substantial number of people.
- What is the impact of ventilation arrangements on airborne particle dissemination outside of the hospital, dorms and parking structures?

**The Federal Clean Air Act** (e.g. Transportation Conformity), the California Clean Air Act, the National Environmental Policy Act (NEPA), and the California Environmental Quality Act (CEQA) require transportation planning and project development to consider air quality as a part of the environment review process. Caltrans coordinates with Federal, State, and regional transportation planning agencies and local air districts to address transportation-related air quality issues. The Department develops policies, guidance, and tools to conduct air quality analyses (therefore, this is a request to have the analysis done as part of the EIR for compliance of these legislation) in compliance with Federal and State regulations. Caltrans also initiates and participates in air quality researches and studies to advance its scientific knowledge and state-of-practice on the subject.

**Clean Air Act (42 USC 7401 et seq.)**, as amended – The Clean Air Act (CAA) of 1955 and as amended in 1970 established the structure of the clean air program as it exists today. Major amendments enacted in 1977 and 1990 made significant changes to the program but continued to build on the program as designed in 1970. The primary objective of the CAA is to establish federal standards for air pollutants from stationary and mobile sources and to work with states to regulate polluting emissions. The CAA is designed to improve air quality in areas of the country that do not meet federal standards and to prevent significant deterioration in areas where air quality exceeds those standards. The Proposed Project must establish conformity with the CAA and assure compliance with the Amendments to Executive Order 13045, **Protection of Children from Environmental Health Risks and Safety Risks 13296 (68 FR 78, April 18, 2003)**

**Other impact concerns**:

- ✓ Concerns of odors from any onsite wastewater associated with any open air processing.
- ✓ Concerns of air quality impacts to local residents during project construction, including the sewer line or other lines during demolition and construction.

## Biological Resources

In considering the location of the proposed CNU project this is a request to address the following Federal, State, and local legislation and compliance thereof.

**Would the project:**

Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?

Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, etc.) through direct removal, filling, hydrological interruption, or other means?

Interfere substantially with the movement of any native resident or migratory wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites? Request to have the lighting plans for permanent light fixtures to go for review by Caltrans/OCTA.

Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

**Fish and Wildlife Coordination Act and California Fish and Game Code**
**• Sections 1600 – 1603 of the California Fish and Game Code**
**• Section 4150 and 4152 of the California Fish and Game Code**
**• California Wildlife Protection Act of 1990**

**To what extent will the proposed CNU project be in compliance?**

Special status species include both state and federal proposed, candidate, threatened, or endangered species and their designated critical habitats. It also includes migratory birds protected under the Migratory Bird Protection Act and raptors protected under the Bald and Golden Eagle Protection Act.

Special status species lists are located at the USFWS ECOS IPaC website and the California Natural Diversity Data Base (CNDDB) (USFWS September 18, 2018, CNDDB August 24, 2018). This is a request to include the special status species in the EIR and a study of the potential impact the proposed CNU project.

**Birds observed flying over and roosting at the Stonelake Shopping Center (proposed CNU project)**
The Swainson's hawk (SWHA) is state-listed as threatened.
The tricolored blackbird is designated as a state candidate for listing as endangered (SCE).

Other special-status animal species identified on a regular basis, but not limited to:
- Black-crowned night-heron
- Double-crested cormorant

- Great blue heron
- Great egret
- Northern harrier
- White-tailed kite
- Yellow warbler
- Allen's hummingbird
- Bats
- Giant Garter Snake
- Stonelake Special Status Species of the area - https://www.fws.gov/nwrs/twocolumn.aspx?id=2147505433#

**Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c),** enacted in 1940, and amended 1962 Prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald or golden eagles, including their parts*, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle ... [or any golden eagle], alive or dead, or any part*, nest, or egg thereof." The Act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Stonelake National Wildlife Preserve has Bald and Golden Eagles that fly, roust, etc., annually in the area.

"Disturb" means: "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available:

1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habits, and causes injury, death or nest abandonment. There are photos and sighting of both Bald and Golden eagles flying over the Stonelake Landing Shopping Center and the adjacent Stonelake Wildlife Preserve.

A violation of the Act can result in a fine of $100,000 ($200,000 for organizations), imprisonment for one year, or both, for a first offense. Penalties increase substantially for additional offenses, and a second violation of this Act is a felony.

**Endangered Species Act (16 USC 1531 et seq.),** as amended – The federal ESA protects threatened and endangered species and their designated critical habitat from unauthorized take. Section 9 of the ESA defines take as to harm, harass, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Take incidental to otherwise lawful activities can be authorized under Section 7 of the ESA when there is federal involvement and under Section 10 when there is no federal involvement. USFWS and NMFS share responsibilities for administering the ESA.

**California Endangered Species Act of 1974,** as amended – Like the federal ESA, the California Endangered Species Act (CESA) provides for the protection of CDFG-recognized rare, threatened, and endangered plants and animals, and prohibits take of such species without CDFG authorization under Section 2081 of the Fish and Game Code. Request analysis and continuous plan implementation studies of threatened and endangered species impacted by the proposed project.

**Migratory Bird Treaty Act (16 USC 703 et seq.)** – The Migratory Bird Treaty Act (MBTA), as amended, provides for the protection of migratory birds by making it illegal to possess, pursue, hunt, take, or kill any migratory bird species, unless specifically authorized by the Secretary of the Interior (i.e., designated seasonal hunting). The MBTA also applies to removing nests occupied by migratory birds during the breeding season.

Migratory birds include many species of raptors, passerines, and swallows. Raptors and passerines frequently nest in trees and shrubs near the Proposed Project Area (where suitable habitat exists, Stonelake Wildlife Preserve). Swallows commonly nest underneath bridges and other structures in close proximity to water. Migratory birds are protected from disturbance during the nesting season (typically February 1st through September 30th), by the Migratory Bird Treaty Act (MBTA).

Request for Caltrans/OCTA to perform a nesting survey as legally described. To determine that avoidance of the avian breeding season…. If a nesting bird species is found, Caltrans/OCTA will do the following to avoid and minimize impacts on native birds and the nest or eggs of any birds: • Flagging, stakes, and/or construction fencing will be used to demarcate the inside boundary of the buffer between the project activities and the nest.

## Archaeological, Historical, and Tribal Cultural Resources

**Archaeological and Historical Preservation Act (16 USC 469 et seq.) –** Also known as the Archeological Recovery Act and the Moss-Bennett bill, the Archaeological and Historical Preservation Act (AHPA) requires federal agencies to preserve "historical and archeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed as the result of any alteration of the terrain.

**Department of Transportation Act, Section 4(f) [Department of Transportation Act 49 U.S.C.]**
The Department of Transportation Act became law on October 15, 1966. It is aimed to preserve the natural beauty of the countryside, public park and recreation lands, wildlife and waterfowl refuges, and historic sites.

**National Historic Preservation Act (NHPA) [16 U.S.C. Section 470 et.seq.]**
The NHPA establishes the federal government policy on historical preservation. Under the NHPA, significant cultural resources, referred to as historical properties, include any prehistoric or historic district, site, building, structure or object included in, or eligible for inclusion in, the National Register of Historic Places (NHRP). Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties. Potential adverse effects include change in the physical features within the property's setting that contribute to its historical significance and introduction of visual elements that diminish the integrity of the property's significant historical features. The Section 106 implementing regulations are codified in 36 CFR 800, which describe the procedures that federal agencies follow to consult with the State Historic Preservation Office (SHPO), the Advisory Council on Historic Preservation, Native American tribes, and interested parties.

#### Tribal Cultural Resources

**Elk Grove** has one of **California**'s largest Native American populations: an estimated 4 percent are descendants of local and other American **Indian tribes**. Indigenous **tribes:** Valley and Sierra Miwok, Nisenan or Southern Maidu, and River Patwin.

**Assembly Bill (AB) 52, 09/2014.** The California Legislature passed Assembly Bill (AB) 52, which added provisions to the Public Resources Code regarding the evaluation of impacts on tribal cultural

resources under CEQA, and consultation requirements with California Native American tribes. In particular, AB 52 requires lead agencies to analyze project impacts on "tribal cultural resources," separately from archaeological resources (PRC § 21074; 21083.09). The Bill defines "tribal cultural resources" in a new section of the PRC Section 21074. AB 52 also requires lead agencies to engage in additional consultation procedures with respect to California Native American tribes (PRC § 21080.3.1, 21080.3.2, 21082.3).

**Executive Order (EO) B-10-11, 09/2011.** Directs state agencies to encourage effective cooperation, collaboration, communication, and consultation with tribes concerning the development of legislation, regulations, rules, and policies on matters that may affect Tribes in California. In November 2012 the Natural Resources Agency adopted a Final Tribal Consultation Policy that implemented the Executive Order, including but not limited to: recognition of tribal sovereignty over their territories and members, acknowledgment that tribes and tribal communities possess distinct cultural, spiritual, environmental, economic and public health interests, and unique traditional cultural knowledge about California resources, recognition of tribal interests, and defining effective consultation as open, inclusive, regular, collaborative and implemented in a respectful manner, sharing responsibility, and providing free exchange of information concerning Natural Resources Agency regulations, rules, policies, programs, projects, plans, property decisions, and activities.

Question is mostly due to the depth, height and helipad in relationship to each of the phases of the proposed CNU project specified, but not limited to… Would the proposed CNU project cause a substantial adverse change in the significance of tribal cultural resources? Defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe. That is of significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1 to a California Native American tribe.

## Geology and Soils

Will there be a Geology and Soil study done for the proposed CNU project (demolition and construction) of this magnitude?

Does LAFCO (Sacramento or California) need to get involved in the proposed CNU project due to the magnitude of the application?

**Changes in Geologic Structures**
Does the development and planning of proposed CNU project (12-story hospital, underground parking, helipad, 5-story medical office building, 5-story dormitory, 4-story parking garage structure) in Sacramento County Zone 40 require geotechnical studies and design guidelines, to identify and minimize any hazardous geologic changes to the underlying substrata?

Major concerns over health and safety for the following regarding demolition and construction disturbance on the ground, soil, and adjacent levee. What is the managing and handling plan for each situation?

- Geological and Soil Survey
- Sink hole possibility
- Underground garages with ground water table at sea level to 400 feet
- Indians relics found
- Collapse of the levee possibility
- Groundwater saturation due to location?
- Will the project continue during rainy flooding season, which occurs each year?

- Is there a current Geotechnical Report for the site that encompasses the magnitude of this projects scope in size and unearthing?

Does Elk Grove zoning code require that a geotechnical report or other appropriate analysis be conducted to determine the shrink/swell potential and stability of the soil for public and private construction projects and identifies measures necessary to ensure stable soil conditions? Would the proposed CNU project impede or redirect flood flows from the current water flow/drainage systems in place?

**Sacramento County**
Geologic resources and geotechnical hazards are primarily governed by local jurisdictions. Sacramento County uses the 1997 Uniform Building Code to assess the adequacy of facility design. Will the proposed CNU project following the same standards or less? In addition, as part of the Safety Element of the General Plan (1993), the County has adopted polices to minimize geologic impacts associated with new construction. These policies are outlined on page 2 of the Safety Element, and the General Plan is hereby incorporated by reference. A copy of the General Plan can be reviewed at the Sacramento County Department of Environmental Review and Assessment, 827 7th Street, Room 220, Sacramento, California 95814.

**THRESHOLDS OF SIGNIFICANCE**
Based on the State CEQA Guidelines, a project would have a significant impact on geology or soils if it would:

- expose people or structures to major geologic hazards, including unstable slopes (e.g., landslides), ground failure, subsidence, liquefaction, and lateral spreading;
- result in substantial changes in geologic substructures that could affect human safety; or
- result in substantial soil erosion or the loss of topsoil.
- Inundation by mudflow from the adjacent wildland (open range land) that floods annually as described by FEMA. **Therefore, mudflow should be considered in the EIR**.

Water Resources Flood Depth and Evacuation Maps -
http://www.waterresources.saccounty.net/Pages/Maps.aspx

**MUDFLOW - should be considered in the EIR**

**FEMA definition:**
Mudslides (i.e., mudflows) which are proximately caused by flooding and are akin to a river of liquid and flowing mud on the surfaces of normally dry land areas, as when earth is carried by a current of water and deposited along the path of the current.

"Flood Hazard Boundary Map (FHBM)" means an official map of a community where the boundaries of the flood, mudslide (i.e., mudflow) related erosion areas, the other side of the levee. (i.e. Stonelake Wildlife Preserve Zone AE and Stonelake, Laguna West, and Laguna Zone X and Lakes are Zone A)

Geologists classify landslides into several different types that reflect differences in the type of material and type of movement. The four most common types of landslides are translational, rotational, earth flow, and rock fall. Debris flows are another common type of landslide similar to earth flows, except that the soil and rock particles are coarser. Mudslide is a term that appears in nontechnical literature to describe a variety of shallow, rapidly moving earth flows. Although the primary cause of landslides is gravity, other factors, including erosion, saturation of slope, and earthquakes, can also contribute to landslide occurrences.

**Seismicity and Faults**
The San Andreas fault system is located to the west, with the closest active branches of this fault being the Antioch (56 miles southwest) and the Green Valley and Concord faults (59 miles southwest). The Midland fault, also historically known to be active, is located approximately 22 miles west of the City of

Sacramento. The Sacramento County General Plan classifies Zone 40 as seismic severity zone I, which is a low-intensity ground-shaking zone (Sacramento County 1993a).

Elk Grove, CA has a high earthquake risk, with a total of 26 earthquakes since 1931. The USGS database shows that there is a 45.61% chance of a major earthquake within 50km of Elk Grove, CA within the next 50 years. The largest earthquake within 30 miles of Elk Grove, CA was a 3.7 Magnitude in 2002.

Stockton, CA has a high earthquake risk, with a total of 190 earthquakes since 1931. The USGS database shows that there is a 79.95% chance of a major earthquake within 50km of Stockton, CA within the next 50 years. The largest earthquake within 30 miles of Stockton, CA was a 5.6 Magnitude in 1980.

**Damage or the collapse of the levee possibility -**

Levees constructed, reconstructed, raised, enlarged or modified within a floodway must be designed and constructed in accordance with the USACE manual, "Design and Construction of Levees" (EM 1110-2-1913). Evaluation of levee embankment and foundation stability and a detailed settlement analysis must be conducted to ensure long-term stability during full flood stage. Additional standards for levee construction, including easement conditions, are provided in **Title 23, Code of California Regulations, Division 1, Article 8, Section 120, Levees**.

LEVEE Concern –

- **Failure** of a **levee** at any location could result in the **failure** of the function of the overall flood protection system even further from the site.
- Possible landslide from adjacent levee disturbance.
- Result in substantial soil erosion or the loss of topsoil or around the levee.
- Levee features are also accessible from the existing, paved service road located on the property. What will be the flood safety easement between the levee and roadways/buildings?

Sacramento County Water Agency (SCWA) generally prepares a project-by-project basis an Erosion Control plan that complies with the **Sacramento County's Erosion and Sedimentation Control Ordinance (1993)**. Will they prepare a report for the proposed CNU project?

**Erosion**

Erosion naturally occurs on the surface of the earth as surface material (i.e., rock, soil, debris, etc.) is loosened, dissolved, or worn away, and transported from one place to another by gravity. Three common types of soil erosion include wind erosion (high winds 15 mph or higher), water erosion and worn away by traffic.

Will the proposed CNU project increased soil erosion by wind or water during construction or in the future? By how much or degree based on the increased residence (dormitory) and visitors as well as helicopters?

**Subsidence**

Land subsidence is the gradual, local settling or sinking of the earth's surface with little or no horizontal motion. Land subsidence occurs in Sacramento County and is generally attributed to five causes of land subsidence: (1) compaction of unconsolidated soils from earthquakes; (2) compaction by heavy structures; (3) erosion of peat soils; (4) peat oxidation; and (5) groundwater withdrawal (Sacramento County 1992). This type of ground failure can be aggravated by ground shaking, and by the withdrawal of large volumes of fluid. Other causes of subsidence include sinking tectonics, oil and gas extraction, and deficient alluvial deposits. Subsidence from any cause accelerates maintenance problems on roads, levees, and underground utilities, and contributes to drainage and flood problems. Seismic activities also aggravate subsidence areas.

Concentrations of contaminants in soil and groundwater, as well as the lateral and vertical extent of the areas of impacted soil and groundwater, can change substantially over time based on the nature of the

contaminants identified and the local geology, hydrology, and soil characteristics associated with a particular impacted site.

Has Sacramento County ever done a Site Assessment for any contamination for this site due to the nearby gas station and businesses with the Stonelake Landing Shopping Center? Will the Sacramento County or City of Elk Grove perform a site assessment due to magnitude of the proposed CNU project and depth the project with dredging/trenching into the ground?

**Sacramento County general plan –**

Elevations range from sea level in the southwest (Stonelake, Laguna West, and Laguna) to approximately 400 feet above mean sea level (msl) in the eastern areas of the county (SCS 1993). The low floodplains not protected by levees or upstream dams are frequently inundated (SCS 1993). Will the proposed CNU project go below sea level with the underground garage?

**Liquefaction**
Liquefaction is the loss of soil strength due to seismic forces acting on water-saturated granular soils that leads to a "quicksand" condition generating various types of ground failure, especially in areas where the groundwater table is less than 50 feet deep. The Stonelake, Laguna West, and Laguna area groundwater table is less than 50 feet deep.

## Energy

The potential energy direct and indirect impacts of the proposed CNU project, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy (see **Public Resources Code §21100(b)(3) and Assembly Bill (AB) 1575**). Energy conservation implies that a project's cost effectiveness be reviewed not only in dollars, but also in terms of energy requirements.

**Executive Order (EO) S-14-08, 11/2008. Senate Bill (SB) 107, 09/2006. Senate Bill (SB) 1078, 09/2002.** Establishment of renewable energy mandates and goals as a percentage of total energy supplied in the State. Reduction of GHG emissions from purchased electrical power.

**California's Energy Efficiency Standards for Residential and Nonresidential Buildings Title 24, Part 6, of the California Code of Regulations establishes California's Energy Efficiency Standards for Residential and Nonresidential Buildings.**
The standards were updated in 2005 and set a goal of reducing growth in electricity use by 478 gigawatt-hours per year (GWh/y) and growth in natural gas use by 8.8 million therms per year (therms/y). The savings attributable to new nonresidential buildings are 163.2 GWh/y of electricity savings and 0.5 million therms/y. For nonresidential buildings, the standards establish minimum energy efficiency requirements related to building envelope, mechanical systems (e.g., HVAC and water heating systems), indoor and outdoor lighting, and illuminated signs.

**California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), commonly referred to as the CALGreen Code**
The most recent update to the CALGreen Code was adopted in 2016 and went into effect January 1, 2017.

**CEQA litigation:**
**In California, Clean Energy Committee v. City of Woodland (2014) 225 Cal.App.4th 173 ("CCEC")**

How will houses who have solar panels get mitigated by the structures, which could be shaded by the proposed structures?

How does the proposed CNU project comply with Energy resources from the Sacramento County General Plan concerning depletion of nonrenewable resources (e.g., oil, natural gas, coal, etc.) and emissions of pollutants during both the construction and long-term operations?

## Greenhouse Gas Emissions and Climate Change

In **California's Global Warming Solutions Act of 2006** (California Health and Safety Code § 35000 et seq.), the California Legislature recognized California's vulnerability to weather events triggered by global warming. The Legislature found that global warming would "have detrimental effects on some of California's largest industries." Assembly Bill 32 mandates that emissions of GHGs be reduced to 1990 levels by 2020.

**Executive Order (EO) B-30-15, 04/2015.** The order established a new interim greenhouse gas (GHG) reduction target to reduce GHGs to 40% below 1990 levels by 2030 in order to meet the target of reducing GHGs to 80% below 1990 levels by 2050. How will the CNU project meet the low GHG target?

The term "greenhouse gas" refers to a gas that traps heat in the atmosphere and contribute to global climate change. The primary GHGs of concern include carbon dioxide ($CO_2$), methane ($CH_4$), nitrous oxide ($N_2O$) and fluorinated compounds (Sacramento County 2030). The United States is the 2nd largest contributor to worldwide $CO_2$ emissions resulting from fossil fuel combustion (USEIA 2017)—additionally, according to State-level $CO_2$ emissions, California is the 2nd largest emitter of energy-related $CO_2$ in the United States (USEIA 2017). Transportation is the largest source of ozone and GHG production in the region and a reduction in vehicle emissions is necessary to achieve significant GHG reduction.

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to GHG emissions, particularly those generated from the production and use of fossil fuels.

The proposed CNU project will directly increase motor vehicles in the West side of Elk Grove as mentioned in each of the three phases. What is the plan to keep a healthy environment as it is now for all human beings and animals?

**Executive Order (EO) S-13-08, 11/2008.** Directs the Resource Agency to work with the National Academy of Sciences to produce a California Sea Level Rise Assessment Report, and directs the Climate Action Team to develop a California Climate Adaptation Strategy. Information in the reports would provide information for climate change adaptation analysis. Does California Sea Level Rise Assessment Report affect the sea level for this project site and the climate change adaptation analysis?

**Executive Order (EO) S-1-07, 01/2007.** Establishment of Low Carbon Fuel Standard. Reduction of GHG emissions from transportation activities. How will the CNU project meet the Low Carbon Fuel Standard?

**Executive Order (EO) S-1-07, 08/2007.** Directs Office of Planning and Research (OPR) to develop guideline amendments for the analysis of climate change in CEQA documents. Requires climate change analysis in all CEQA documents. Will a climate change analysis study be done for the EIR?

**Senate Bill (SB) 1368, 09/2006.** Establishment of GHG emission performance standards for base load electrical power generation. Reduction of GHG emissions from purchased electrical power. How will the CNU project meet the low GHG emissions target?

# Hazards and Hazardous Materials

**The Emergency Planning and Community Right to Know Act (EPCRA)** was enacted in 1986 in response to concerns regarding the environmental and safety hazards posed by the storage and handling of toxic chemicals.

Emergency response plans include elements to maintain continuity of government, emergency functions of governmental agencies, mobilization and application of resources, mutual aid, and public information. Emergency response plans are maintained at the federal, state, and local levels for all types of disasters, human-made and natural. It is the responsibility of government to undertake an ongoing comprehensive approach to emergency management in order to avoid or minimize the effects of hazardous events. Local governments have the primary responsibility for preparedness and response activities.

Hazardous materials and wastes regulated in the United States by federal, state, and local regulations, including those administered by the U.S. Environmental Protection Agency (USEPA), the California Environmental Protection Agency (Cal/EPA) the U.S. Occupational Safety and Health Administration, the U.S. Department of Transportation (USDOT), the U.S. Nuclear Regulatory Commission, and others. The California Health and Safety Code (H&SC), in Section 25501.

Is there a Hazardous Materials Area Plan based on requirements of Chapter 6.95 of the California H&SC, Title 19 of the CCR and SARA Title III for emergency response to a release or threatened release of a hazardous material within the County?

If an evacuation is required, local jurisdictions work with the Operational Area Emergency Operations Center, law enforcement officials, Caltrans, the California Highway Patrol, County Public Works, and other applicable agencies/departments to identify evacuation points and transportation routes. In addition, transportation points will be identified to collect and transport people without transportation resources to evacuation points. Where is the Operational Area Emergency Operations Center in the City of Elk Grove? Is it identified on the City of Elk Grove website?

Sacramento County has identified in their general plan that Emergency Plan as the primary transportation routes for an evacuation is Interstate-5 for the West side of Elk Grove and South West side of Sacramento. What effect will this have on the effectiveness of evacuation? Will both the Sacramento County and City of Elk Grove amend their Emergency evacuation plans?

Water Resources Flood Depth and Evacuation Maps -
http://www.waterresources.saccounty.net/Pages/Maps.aspx

**Helipad Safety**

**Federal Aviation Administration Functions**
The Federal Aviation Administration (FAA) has primary responsibility for the safety of civil aviation. The
FAA‘s major functions related to hazards include:

- Developing and operating a common system of air traffic control and navigation for both civilian and military aircraft;
- Developing and implementing programs to control aircraft noise and other environmental effects of civil aviation;
- Regulating U.S. commercial space transportation; and
- Conducting reviews to determine that the safety of persons and property on the ground are protected.

See attached FAA standards for a helipad provided to the City of Elk Grove on May 30, 2019 by me.

Will helicopters carry any hazardous waste? In the Sacramento County and city of Elk Grove general plan emergency plan will there be a section if the helicopter loses fuel or crashes into homes or the Stonelake Wildlife National Preserve?

***Federal Aviation Regulations, Notice of Proposed Construction or Alteration***

The FAA imposes height restrictions in order to prevent obstructions to navigable airspace to protect flights and surrounding structures. In certain cases, the FAA should be notified of proposed development pursuant to Section 77.11 of Federal Aviation Regulations. The notification of proposed development provides a basis for:

- Evaluating the effect of the construction or alteration on operational procedures and proposed operational procedures;
- Determinations of the possible hazardous effect of the proposed construction or alteration of air navigation;
- Recommendations for identifying the construction or alteration in accordance with current FAA Advisory Circular AC 70/7460-1K dated August 1, 2000, Obstruction Marking and Lighting;
- Determining other measures to be applied for continued safety of air navigation; and
- Charting and other notification to airmen of the construction or alteration.

I understand this is CNU responsibility, as told by City employees, but how can the City of Elk Grove approve a project where permits of development, structures and operations that are approved by Federal and State agencies ONLY?

Does the active military bases with airports use the airspace above West side of Elk Grove? If so is this project acceptable by the U.S. Department of Defense (DOD)?

***U.S. Department of Defense Air Installations Compatible Use Zone Program***

Safety compatibility criteria for U.S. military air bases are set forth through the Air Installations Compatible Use Zone (AICUZ) Program administered by the U.S. Department of Defense (DOD). The objective of this program is to encourage compatible uses of public and private lands in the vicinity of military air installations through the local communities' comprehensive planning process. DOD creates AICUZ plans for all major military air installations. The plans recommend land uses that may be compatible with air installations noise levels, and accident potential and flight clearance requirements associated with military airfield operations. AICUZ plans generally contain three safety zones: Clear Zones and two Accident Potential Zones (APsZ) is an area at military airfields that is beyond the Clear Zone. What zone or interference will a helipad pose? Is the helicopter compatible with the current flight patterns of the Military airspace?

**Storage**

California's own hazardous waste laws are collectively known as the **Hazardous Waste Control Law**. Will this project be incompliance with this law? Will they submit a plan to the City of Elk Grove and the designated CUPA for the County?

The California Accidental Release Prevention Program (CalARP) program (Health and Safety Code Section 25531-25543.3) implements the federal RMP program for the accidental airborne release of substances regulated under Section 112 of the Clean Air Act (42 USC Section 7412(r)), with certain additions specific to California. Who will monitor and verify the proposed CNU project complies?

Will there be Underground Storage Tanks and/or Aboveground Storage Tanks of hazardous waste? If so, how will the storage tanks get managed and/or inspected?

- **Underground Storage Tank (UST) Act and Title 23 of the California Code of Regulations**
- **California H&SC and Title 23 of the CCR**

**Chemical Accident Prevention Provisions (40 CFR Part 68)** require USEPA to publish regulations and guidance for chemical accident prevention at facilities that use extremely hazardous substances. Who

will be responsible for its development for this proposed CNU project? Does the City of Elk Grove or the Sacramento County already have one for Universities, hospitals, and helipads developments?

**The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC Section 9601 et seq.),** also known as the Superfund program, established a program to clean up uncontrolled or abandoned hazardous waste sites as well as accidents, spills, and other emergency releases of pollutants and contaminants into the environment. Who shall monitor for a potential accidents of hazardous waste. Who does the citizens of Elk Grove contact should they observe a hazardous situation during demolition, construction and after as an emergency preparedness plan?

**The Hazardous Materials Transportation Act (HMTA)** regulates the transportation of hazardous materials under the authority of the Secretary of Transportation. A hazardous material, as defined by the Secretary of Transportation is, any "particular quantity or form" of a material that "may pose an unreasonable risk to **health and safety or property" (USEPA 2014b)**. Will there be maintained a hazardous list by CNU? If so how often? Will the list get provided to the City of Elk Grove? Will the City of Elk Grove have any liability for monitoring and reporting requirements for the University/hospital, especially, since it is a teaching school where accidents during the learning process can and does occur?

**Government Code Section 65962.5** requires Cal/EPA to develop, at least annually, an updated Cortese List. DTSC is responsible for a portion of the information contained in the Cortese List. Other state and local government agencies are required to provide additional hazardous-material-release information for the Cortese List. Will the City of Elk Grove provide a list at the beginning of demolition, during construction, and continuously afterwards?

**Would the project:**

Is there a potiental of a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or the proposed CNU project itself as a Universtiy school?

Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

For a project within the vicinity of a private helipad, would the project result in a safety hazard for people residing or working in the project area?

Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan? Such as Stonelake Community, Heritage Lakeside Community Laguna West community.

Expose people or structures to a significant risk of loss, injury or death involving wildland (open range land) fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

## Hydrology and Water Quality

**Clean Water Act (33 USC 1251 et seq.),** as amended (impaired waterbodies) – The CWA established the federal structure for regulating surface water quality standards and discharges of pollutants into waters of the United States. The basis of the CWA was enacted in 1948 and was

called the Federal Water Pollution Control Act, which was significantly reorganized and expanded in 1972.

**Porter-Cologne Water Quality Control Act.** The Porter-Cologne Water Quality Control Act of 1970 established the SWRCB and nine RWQCBs within California. These groups are the primary State agencies responsible for protecting California water quality to meet present and future beneficial uses, and regulating appropriative surface rights allocations. The Act requires a person who discharges waste into the waters of the state in violation of waste discharge requirements or other order or prohibition issued by a California regional water quality control board or the State Water Resources Control Board.

**Federal Compliance with Pollution Control Standards 12088 (43 FR 47707, October 13, 1978)**

How will the proposed CNU project handle the discharge of waste to prevent it from going to the Stonelake National Wildlife Preserve slough and wetlands, and then ultimately the Sacramento River?

Prior to construction, will the City of Elk Grove develop and implement a storm water pollution prevention plan to limit effluent discharge as a result of storm water runoff and performance of inspections of storm water pollution prevention measures during and after construction?

Sacramento County Zone 40 projects should comply with the Regional Water Quality Control Board's (RWQCB) requirements for discharges from general construction activity and trench dewatering in accordance with National Pollutant Discharge Elimination System (NPDES) requirements. These requirements call for the implementation of a Storm Water Pollution Prevention Program (SWPPP) identifying Best Management Practices (BMPs) to be employed during and following project construction to control soil erosion and waste discharges into waterways. BMPs may include, but would not be limited to, construction of berms and runoff diversion ditches, construction of temporary cofferdams to dewater work areas, hydroseeding, use of sediment detention devices, and similar measures. The SWPPP also specify measure for removing sediment from water pumped for trench dewatering before it is released to waterways.

**National Pollutant Discharge Elimination System – (**NPDES) program
Will the City of Elk Grove consider in the EIR the SWRCB statewide General Permit for California that applies to all construction-related storm water discharges, except for those on tribal lands, in the Lake Tahoe Hydrologic Unit, and under the control of the California Department of Transportation (Caltrans)? Construction activity subject to this General Permit includes any clearing, grading, stockpiling, or excavation that results in soil disturbances of at least one acre of total land area. Construction activities disturbing less than one acre are still subject to this permit if the activity is part of a large common plan of development or if significant water quality impairment will result from the activity. The overall magnitude of the project, 12-story hospital, underground parking, helipad, 5-story medical office building, 5-story dormitory, 4-story parking garage structure.

How will point and non-point source pollutants get managed?

**Point and Non-Point Source Pollutants Concern defined:**
The issue of pollution in storm water and urban runoff has been recognized by both federal and state agencies, and there has been a growing concern regarding activities that discharge water affecting California's surface water, coastal waters, and groundwater. Discharges of water are classified as either point source or non-point source discharges. A point source discharge usually refers to waste emanating from a single, identifiable point. Regulated point sources include municipal wastewater, oil field wastewater, winery discharges, solid waste sites, and other industrial discharges. Point source discharge, I believe, must be actively managed to protect the state's waters. A non-point source discharge usually is a waste emanating from diffused locations. As a result, specific sources of

non-point source pollution may be difficult to identify, treat, or regulate. The goal is to reduce the adverse impact of non-point source discharges on water resources through better management of these activities. Non-point sources include drainage and percolation from a variety of activities such as agriculture, forestry, recreation, and storm runoff.

What are the water bearing layers, groundwater quality, and other aquifer characteristics in the project site area besides the obvious?

**Would the project:**

Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

Considering the proposed CNU project will have a basement and trench (possibly dredge) deep into the ground after the demolishment of the current structures and foundations. Will there be any discharge of trenched/dredged or fill material into Stonelake Wildlife Preserve sough and wetlands or the Sacramento River? The United States is regulated under Section 404 of the CWA. Does this project construction/development plans fall into these guidelines? If so will the discharge comply with the **Least Environmentally Damaging Practicable Alternative** (LEDPA).

Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

**Surface Waters**

What methods will be used to assess the quality of storm water provide a method of measuring impairment? For instance, high volume construction equipment and automobile traffic makes available a number of potential pollutants (such as lead and hydrocarbons).

The City area storm drains discharge/flow into Stonelake National Wildlife Preserve wetlands and slough which then into the Sacramento River. Will coverts and drains, pumping stations need to get enlarged to handle the additional water flow and possibly discharge/flow elsewhere?

**Impact Concerns:**

- ✓ Concerns related to water quality and species impacts water ways of Stonelake National Wildlife Preserve.
- ✓ Concerns of negative effects to adjacent levee and any water wells.

## Land Use and Planning

**California Environmental Quality Act (California Public Resource Code, Div. 13 21100),** as amended – The CEQA was enacted by the California Legislature in 1970 and, like NEPA, requires public agencies to consider the environmental effects of their actions. Under CEQA, the state lead agency completes an EIR for projects that may have the potential to significantly affect the environment. The purpose of an EIR is comparable to that of an EIS. Because the Proposed Project will need other state approvals, it must comply with CEQA. Due to the significant amount of time that has passed since the initial EIR was completed, the Port is completing this SEIS/SEIR to re-analyze the potential effects of the Proposed Project pursuant to CEQA.

**National Environmental Policy Act [42 U.S.C. Section 4321 et seq.]**
National Environmental Policy Act (42 USC 4321 et seq.: 40 CFR 1500.1), as amended – NEPA was enacted by Congress in 1969 to ensure evaluation of the probable environmental consequences of

proposals before decisions are made by federal agencies. When a federal agency determines that a proposed action could result in significant environmental effects, an EIS is prepared. An EIS informs decision-makers and the public of reasonable alternatives that avoid or minimize significant impacts to, or enhance the quality of, the environment while accomplishing the purpose and need of the proposal.

NEPA requires the consideration of potential environmental effects, including potential aesthetic and visual effects, in the evaluation of any proposed federal agency action. NEPA also obligates federal agencies to consider the project and program environmental consequences and costs as part of the planning process. General NEPA procedures appear in the Council on Environmental Quality (CEQ) regulations 23 Code of Federal Regulations (CFR) 771.

Will the physical features of the proposed CNU project remain within the existing footprint? Alternatively, will there be parts of the building or structures hanging over the Interstate - 5 or homes? Where will the staging areas be located? Where will the operations and maintenance for the project be located for each of the three phases?

Does this project have any conflict with any applicable habitat conservation plan or natural community conservation plan? Currently, the land is use is compatible with its surroundings. How will the proposed CNU project have consistency with relevant plans and programs that have jurisdiction within the project area and compatibility with surrounding land uses? How will the land use conditions, such as type of use and/or densities adjacent to the project influence land use compatibility (North, East, South, and West of the project site)?

Has the Environmental Council of the States (ECOS) determine an EIS is required due to the proximity of the proposed CNU project site to Federally Protected Land, Stonelake National Wildlife Preserve?

Does the City of Elk Grove plan to identify the issues and opportunities for improving the provision of parks, trails, green belts, and open space?

**Northern Sacramento Valley Planning Area 2012 Triennial Air Quality Attainment Plan (AQAP)** identifies those portions of the NSVPA designated as "non-attainment" for the State ambient air quality standards. The AQAP identifies the air pollution problems which are to be cooperatively addressed on as many fronts as possible in order to make the region a healthier place to live now and in the future. How will this be addresses with the proposed CNU project?

**Department of the Army Regulation (AR 200-1)** – Army Regulation 200-1, Environmental Protection and Enhancement, establishes policies, procedures, and responsibilities for protecting the environment. These include material substitution, process/equipment modification, waste stream segregation, improved procurement practices and inventory control, good housekeeping or best management practices (BMPs), proper storage, and employee training.

What is the City of Elk Grove and CNU planning for each of the below factors summarized below:

**Noise:** Avoid introducing new noise-sensitive land uses in the vicinity of the helipad that would be exposed to significant levels of aircraft noise, taking into account the characteristics of the helipad and the communities surrounding the helipad.

**Safety:** Minimize the risks associated with potential off-airport aircraft accidents and emergency landings. This objective has two components:

- *Safety on the Ground*: Provide for the safety of people and property on the ground in the event of an aircraft accident near an airport.

- *Safety of Aircraft Occupants*: Enhance the chances of survival of the occupants of an aircraft involved in an accident beyond the immediate helipad area.

**Airspace Protection:** Avoid the development of land use conditions that, by posing hazards to flight, can increase the risk of an accident occurring. The particular hazards of concern are:

- Airspace obstructions;
- Wildlife hazards, particularly bird strikes; and
- Land use characteristics that pose other potential hazards to flight by creating visual or electronic interference with air navigation.

**Overflight:** Avoid, to the extent possible, new land use development that would be disrupted by overflight activity and might lead to annoyance and complaints; notify people about the presence of aircraft overflights near the helipad so they can make informed decisions regarding acquisition or lease of property. This would need to get disclosed in restate transaction if the proposed CNU project is approved. There is a slight possibility this could also deter new homebuyers from buying homes in the area. This could cause possible foreclosures in the area, if home cannot sell.

**California Government Code §6586021** requires zoning to be consistent with the general plan (Sacramento County and City of Elk Grove).

What is the Land Use Plan for the following areas during the demolition and construction phases?

- Project Infrastructure
- Project Circulation
- Project Water System
- Project Wastewater System
- Project Drainage System
- Project Dry Utilities
- Off-Site Improvements

During the demolition and construction phases, involving facilities development will the following be included:

- Drainage improvements
- Water pipelines improvements
- Sewer pipelines improvements
- Public park improvements
- Private road improvements
- Public road improvements
- Dry utilities including gas, electricity, and telecommunications improvements

**Other Impact concerns**:

- ✓ What would be the setbacks due to the large massive structure proposed against one/two story residential homes and backyards?
- ✓ What is the City of Elk Grove environmental statutes and regulations? How does CNU plan to comply with Clean Air Act, the Toxic Substances Control Act, the Occupational Safety and Health Act, and the Federal Water Pollution Control Act? If there is a chemical leak into the Wildlife National Stonelake Preserve waterways this, proposed CNU project would be adjacent to be handled as part of their emergency plan? Government agencies that enforce the contamination and pollution laws may be able to demand clean-up costs directly from CNU for the clean-up bill. Would this cause the University/hospital to go bankrupt? What is their liability insurance requirements by the City of Elk Grove due to this location?
- ✓ What is the planned scale to use transition and mitigation/buffering for this project?
- ✓ Concerns that a higher density development will change the rural character of the area and is not consistent or compatible with the existing zoning surrounding the site. Project would result in a diminution of property values.

- ✓ Concerns that the project will negatively impact the community current character of the area.
- ✓ Concerns that the project is inconsistent with the Objectives and Policies of the Sacramento County General Plan, particularly concerning density. How is the project consistent with the land capability analysis for the property?
- ✓ Concerns that the project's growth inducing impacts will set precedence for increasing density in the area. The increase in density will create greater hazards to the community.
- ✓ Concerns that potential blight would occur if the subdivision is left undeveloped or with a significant number of unfinished lots.
- ✓ The project would set a precedent for future re-zoning throughout the City of Elk Grove, indicating the General Plan can quickly get altered by application.
- ✓ Concerns that without fences, unauthorized access will occur on adjacent properties.
- ✓ Increase in traffic-related noise within a normally quiet wildlife area.

## Mineral Resources – should be considered in the EIR

**CA Department of Conservation**
Special Report 245: Mineral Land Classification: Concrete Aggregate in the Greater Sacramento Area Production-Consumption Region (2018)

Considering the project will have a basement garage parking and trench deep into the ground after the demolishment of the current structures and foundations. The mineral consideration is for Inferred Concrete Aggregate mineral resource, which identified in MRZ3 zone.

Does CNU plan to abstract Inferred Concrete Aggregate mineral from the site during or after construction as identified in Special Report 245? Is it permit able to abstract Inferred Concrete Aggregate mineral?

## Noise and Vibration

**Noise Control Act of 1972, 42 U.S.C. § 4901 to 4918.** This Act establishes a national policy to promote an environment for all Americans free from noise that jeopardizes their health and welfare. Compliance with this Act is being addressed though compliance with the Sacramento County Noise Ordinance.

**USEPA, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Safety Margin, 1974**

**FHWA, Technical Noise Supplement, 1998**

**California Noise Control Act of 1973**
**Sections 46000 through 46080 of the California Health and Safety Code, known as the California Noise Control Act**

**Sensitive Receptors**
Noise- and vibration-sensitive land uses are locations where people reside or where the presence of unwanted sound could adversely affect the use of the land. Residences, schools, guest lodging, and some passive recreation areas (Stonelake Preserve Trail, bike paths, etc..) would each be considered noise- and vibration-sensitive and may warrant unique measures for protection from intruding noise and vibration that are adjacent and near the site for demolition and construction such as.

- Gas Station
- Restaurants

- Multi-family residential buildings
- Single-family residential buildings
- Church

Would adverse effects of noise and/or vibration be considered significant, if an alternative would result in any of the following?

• Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

• Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

• Substantial short-term or periodic increase in ambient noise levels in the project vicinity above existing levels without the project.

• Substantial long-term increase in ambient noise levels in the project vicinity above levels without the project.

• Vibration exceeding 0.2 in/sec within 75 feet of existing buildings and/or levee.

**Would the project:**

**Noise**

Noise is commonly defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities. What is the maximum allowable interior space noise exposure from transportation noise sources at noise sensitive land uses. DBA L (DN) and General Plan (City and County) or applicable standards of other agencies such as US Fish and Wildlife or any other Federal agency? What noise level descriptor is there in the General Plans (City and County) or applicable standards of other agencies such as US Fish and Wildlife or any other Federal agency? Our household understands that some noise is a perception while others are not. What will the additional noise both on a temporary level and future ongoing level anticipated, besides potential health issue resulting from the proposed CNU project?

**Federal Highway Administration 2017**
**California Department of Transportation 2013**

- What is the noise emissions reference levels for demolition and construction equipment?

- Regarding demolition and construction, will there be night work? What is the planned hours of work? Since such activities can generate loud noises and disturb persons, occupying sleeping quarters in any adjacent dwelling, hotel, businesses or other place of residence.

What is the future plan for noise nuisance such as sirens, helicopter landings, and hospital alarms when trauma patients arrive? Will the hospital and dormitory be sound proofed? What is the anticipated ongoing parking noise from garages and lot parking? Currently, the lot parking is buffered by distance to residences and landscaping. What is the anticipated substantial permanent increase in ambient noise levels in the project site vicinity above levels existing without the project?

For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels? By the addition of and helipad?

**Dormitory – requirement compliance**

**California Code**
Title 24 of the CCR, Part 2, California Noise Insulation Standards, establishes minimum noise insulation standards to protect persons within new hotels, motels, dormitories, long-term care facilities (hospital), apartment houses, and dwellings other than single-family residences. Under this regulation, interior noise levels attributable to exterior noise sources cannot exceed 45 Ldn in any habitable room.

**Vibration**

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration can be a serious concern, causing buildings to shake, levee soil disturbance, and rumbling sounds heard. Some common sources of vibration are semi-trucks, construction and demolition activities such as blasting, pile driving, and heavy earth-moving equipment. High levels of vibration may cause physical personal injury or damage to buildings and levees. In addition, high levels of ground-borne vibration may damage fragile buildings, levees, or interfere with equipment that is highly sensitive to ground-borne vibration (e.g., electron microscopes). What is the protection plan for the adjacent levee and surrounding buildings for short-term and long-term effects?

How will the equipment generate elastic waves in soil that may adversely affect surrounding buildings and the adjacent levee be managed to identify an adverse impact during demolishment of current buildings and foundations and construction of new development?

Will there be monitoring construction vibrations prior to the beginning of demolishment and construction works at a site and then continued during demolishment and construction to provide the safety and serviceability of sound and vulnerable structures?

## Population and Housing - SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

A growth-inducing impact is defined by the CEQA Guidelines as:

*"[T]he ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment. Included in this are projects which would remove obstacles to population growth. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment"*.

A project can have direct and/or indirect growth-inducement potential. Direct growth-inducement would result if a project actually induced or required that additional actions or projects be implemented. For instance, a new housing project could require construction of new electric transmission lines to serve the new population (5-story dormitory). A project can also have indirect growth inducement potential if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises) or if it would involve a substantial construction effort that would indirectly stimulate the need for additional housing and services to support the new employment demand.

The environmental impacts associated with a growth-inducing action are secondary, or indirect, physical effects of growth. Secondary effects of growth-inducing action typically include, but are not limited to, increased traffic, degradation of air quality, loss of biological resources and habitats, increased demand on public services, and changes in land use.

**Growth-Inducing Impacts - Pub. Resources Code § 21100(b)(5)**
The construction of additional housing (5-story dormitory), along with the proposed 12-story hospital, 5-story medical office building, 4-story parking garage structure and underground basement

parking garage, either directly or indirectly, in the surrounding environment will have growth-inducing impacts of the following:

- Extension of utility lines, construction of roads, or construction or expansion of water or wastewater facilities - through extension of roads or other infrastructure
- Revisions to land use policies, such as General Plan amendments, annexations, and rezones – Request to have on a ballot for the City of Elk Grove citizens to approve.
- Displace substantial numbers of small businesses that are revenue generating for city and community.

**Housing Element Law (California Government Code Article 10.6).** State law requires each city and county to prepare and maintain a current housing element as part of the community's General Plan to attain a statewide goal of providing "decent housing and a suitable living environment for every California family." Under state law, housing elements must be updated every eight years and reviewed by the State Department of Housing and Community Development. When was the last update done by the City of Elk Grove. How will this proposed CNU project maintain a current housing element of the West side of Elk Grove: Stonelakes, Laguna West, and Laguna communities?

**California Planning and Zoning Law**
The legal framework in which California cities and counties exercise local planning and land use functions is provided in the **California Planning and Zoning Law (Sections 65000 through 66499.58 of the California Government Code)**. Under state planning law, each city and county must adopt a comprehensive, long-term general plan. State law fundamental requirements include seven mandatory elements described in the California Government Code. Each of the elements must contain text and descriptions setting forth objectives, principles, standards, policies, and plan proposals; diagrams and maps that incorporate data and analysis; and implementation measures. Currently, the City of Elk Grove and Sacramento County general plans do not reflect the proposed CNU project in planning or zoning as an approvable project; therefore, this project request is in violation to parts of the current general plans.

**Sacramento County 2030 General Plan**
The *Sacramento County 2030 General Plan* (Sacramento County General Plan) (Sacramento County 2011) includes goals, objectives, and policies related to socioeconomics and environmental justice. Applicable policies include the following:

- **Policy CI-23:** Consider the transit needs of senior, disabled, low-income, and transit-dependent persons in making recommendations regarding transit services.
- **Policy LU-45:** Mix affordable housing units with market rate units to the extent feasible, as opposed to building segregated affordable housing developments.

## Public Services (and Fiscal Impact)

Public services include fire protection, law enforcement, parks, public infrastructure such as roads and utilities, and other governmental services including schools, libraries, and other public service systems. What is the City of Elk Grove plan for maintenance and improvement of existing infrastructure? How will the existing infrastructure stay efficient and with cost-effective public service delivery as they are now?

**FIRE PROTECTION SERVICES**
Who would provide fire protection and life safety services for the project? Can the City handle a fire at a 12 story high building and helipad? What if a helicopter crashes into a home or business how would it get handled? Can the City's current staffing and emergency plans handle the impacts to protect the citizens and businesses of Elk Grove? What if the helicopter goes down or sparks a fire in

the Stonelake National Wildlife Preserve how will it get handled? For instance, structure fires and medical emergencies during and after demolition and construction. What is the response distance and access considering roadway congestion, intersection level of service, weather conditions, and demolition/construction traffic along the response route?

- During a fire and other emergency scenarios, it may become necessary to relocate or evacuate patients, often in reduced visibility. How will these trauma patients get removed from the hospital, is it through multiple helicopter landings, which would have to be fire drilled? What is the "Life Safety Code" and facility specific safety plans to reduce the impact to patients in times of emergencies?
- Emergency access and egress are critical during an emergency situation such as a fire. During a fire, timing and quick response are essential to save lives and property. Unobstructed emergency egress ensures that building occupants can exit a building to safety. How often does the plan include fire drills to evacuate the hospital, dorms, and to where? How loud will the fire drill alarms be and what time of the day? Many neighbors sleep during the day, since they work night shifts?

Will the proposed CNU project have the potential for accidental on-site fires from such sources as the operation of mechanical equipment, use of flammable construction materials, and from carelessly discarded cigarettes?

A wildland-urban interface is an area where urban development is located in proximity to open space or "wildland" areas. The potential for wildland fires represents a hazard where development is adjacent to open space or within close proximity to wildland fuels or designated fire severity zones. Fires that occur in wildland-urban interface areas may affect natural resources as well as life and property.

Potential wildland fire hazards impacts that may result from demolition and construction and/or operation of the proposed CNU project. What is the plan for health and safety measures for possible hazard conditions of the project site and surroundings, with consideration applicable goals and policies, identification and analyzes of the potential environmental impacts?

**LAW ENFORCEMENT PROTECTION SERVICES**

**City of Elk Grove Police**
**California Highway Patrol**
**Jail / Detention Facilities**

Who would provide police services to the project site and immediate project vicinity? What will be the response time to a call? How many officers are on the street at a time? What is the existing preferred response time for emergency calls? What is the priority for thefts, vandalism, and loitering type calls requesting police assistance? What background checks and clearances will be done for the workers on the site, such sex offenders and felony criminals etc..?

How many new residents would the project introduce to the project site in the dormitory? How many visitors would the project introduce to the project site in the hospital and proposed shops?

**School Services**
What is the health and safety plan in access to the Stone Lake Elementary school during demolition and construction of the proposed CNU project?

- **California Fire Code**
- **California Health and Safety Code**

**Education Code Section 17620** allows school districts to assess fees on new residential and commercial construction within their respective boundaries. These fees can be collected without special city or county approval, to fund the construction of new school facilities necessitated by the impact of residential and commercial development activity. In addition, these fees can also be used to fund the reconstruction of school facilities or reopening of schools to accommodate development-related enrollment growth. **Fees are collected immediately prior to the time of the issuance of a building permit by the city or county**.

Will the proposed CNU project get assessed fees for the local schools?

**Library Services**
Would the proposed CNU project require additional library resources? Can the City of Elk Grove provide enough library resources to serve current residents and the additional CNU students? Will CNU provide additional library resources to the community?

**PUBLIC WORKS DEPARTMENT**
Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services. Due to the magnitude of the proposed CNU project, will there be a need for the additional **services?**

- Maintenance monitoring of the levee and Stonelake Preserve Trail.
- Street and Roadways maintenance and cleaning
- Transit services
- Pump station monitoring
- Landfill expansion
- Waste disposal
- Water service (Will an SB 610 WSA be prepared for the proposed CNU project?)
- Solid waste service (provide adequate solid waste disposal facilities and services for collection, storage and reuse of refuse)

Will the current residence have to absorb any utility fee hikes to pay for additional Public Works responsibilities such wastewater pumping stations, added utility maintenance, road maintenance, levee maintenance, hazardous waste, etc..?

Does CNU have a proposed plan for Transport and Disposal of Hazardous Materials? Will the Department of Public Works oversee the plan or be in coordination with CNU?

Due to the magnitude of the proposed CNU project, will there be a need for the following:

- Pump Station Improvement requiring an EIR
- Sewer Improvements requiring an EIR

Sanitary sewer service is an essential public service needed to support developments. The Wastewater Treatment Plant (WWTP) provides sufficient wastewater capacity with the current Stonelake Landing shopping Center and serve other local residents and businesses. Can the WWTP keep the current level of effluent quality to satisfy more waste discharge from the proposed CNU project and maintain future wastewater service demands from residents and businesses?

**FISCAL IMPACTS**
Will the proposed CNU project pay any demolition and development impact fees for the following public services?

- Public Protection
- Public Health
- Library
- Sheriff Patrol and Investigation
- General Government
- Animal Control
- Fire Protection
- Traffic
- Capital Facilities Impact Fee

Other Impact concerns:

- ✓ Concerns that crime will increase in the area since the dormitory residence can be living in the dorms for two to five years depending on medical school degree/residency obtaining.
- ✓ Increased demand on already constrained City, County sheriff and fire services.

## Recreation – Should be considered in the EIR

**City of Elk Grove General Plan, Pedestrian/Bicycle, and Trail System Plans**

The new housing is a 5-story dormitory of resident students was not a growth inducing planned development in the city of Elk Grove general plan, which will affect the recreational settings in Elk Grove. A dormitory is a building, as at a college/university, containing a number of private or semiprivate residential quarters for a large number of people.

Our greenspace development in the City of Elk Grove is a very valuable investment for a city. Citizens take great pride and make much use of every type of greenspace within the City. The various greenspaces available to the public with no access restrictions listed below. The added dormitory housing will affect an impact on these spaces and therefore discussed in the EIR.

Trails and greenways create healthy recreation and transportation opportunities by providing people of all ages with attractive, safe, accessible and low- or no-cost places to cycle, walk, hike, jog or skate. Trails help people of all ages incorporate exercise into their daily routines by connecting them with places they want or need to go. Communities that encourage physical activity by making use of the linear corridors can see a significant effect on public health and wellness. Both residents and visitors to the proposed CNU project will use the City of Elk Grove Landscape, greenways, bikeways and trails in the City, especially those close to the project site.

**Neighborhood/School Park**
School park areas are facilities developed on or adjacent to school land and available for joint City and school use. Which the City of Elk Grove has throughout the City. There are no restrictions on their use of any Elk Grove residents.

**Landscape Areas**
Landscape areas are generally defined as linear public corridors (i.e., roadway landscaping and corridors, and other landscape frontages) that provide visual relief along major roadways and are important connections within the City between parks, schools, neighborhoods, businesses, and shopping areas. Typical components are usually sidewalks, trees, turf, shrubs, and ground covers designed by using berms and slopes. Landscape areas may also include benches, street furnishings, walls/fencing, city boundary markers, monuments, lighting, and signs. Which the City of Elk Grove has throughout the City. There are no restrictions on their use of any Elk Grove residents.

**Greenways**
Greenways are defined as wide, usually linear, landscape corridors. They usually consist of simple landscaping features, such as turf, trees, shrubs, or no landscaping at all, and usually include sidewalks,

and/or bike and pedestrian trails. They typically link streets together to provide passive recreation opportunities, such as walking or biking, and they may be an important component of a Class I bike path system. Which the City of Elk Grove has throughout the City. There are no restrictions on their use of any Elk Grove residents.

**Bikeways**
Bikeways are defined as specific routes and classes that meet minimum design standards for bicycle or multi-use purposes. Which the City of Elk Grove has throughout the City. There are no restrictions on their use of any Elk Grove residents.

**Trails**
Trails are defined as an existing recreational trail paved or unpaved trail for walking, jogging, biking, and multiple use, which are open to the public, such as the Stonelake Wildlife Preserve Trail that is adjacent to this proposed CNU project site on the levee that wraps around the perimeter of the Stonelake Community.

Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated? Stonelake Wildlife Preserve Trail on the levee, park, and tennis courts

The City of Elk Grove general plan 1) Encourages preservation of natural areas within and outside the Planning Area as Regional parks or nature preserves; 2) Creates and maintains a system of trails serving both recreational and emergency access needs on the Stonelake Wildlife Preserve Trail on the levee. The system currently accommodates walking, hiking, jogging, and bicycle use. The public photographers and astronomers currently uses the Stonelake Wildlife Preserve Trail, which is adjacent to the proposed CNU project. How will the proposed CNU development comply with the general plan?

- Establish and maintain a safe, comprehensive and integrated bikeway and trail system that encourage the use of bikes and walking for commuting, recreational and other trips.

- Establish a safe, comfortable, convenient and highly-connected bikeway system that meets the transportation and recreation needs of avid, regular, youth and beginning bike riders, while balancing the needs of other transportation types including automobiles, transit, and pedestrians.

## Transportation and Traffic

**Senate bill (SB) 375, 09/2008.** Requires metropolitan planning organizations to included sustainable community strategies in their transportation plans. Reduction of GHG emissions associated with housing and transportation.

What is the plan for addressing the traffic and transportation impacts with the proposed CNU project on surrounding streets, intersections and Interstate – 5 (I-5).

Is there a plan for new trucker and commuter lanes to I-5? I-5 is the second busiest interstate in California per the U.S. Department of Transportation, which the trucking industry is a major sector of our economy.

**The National Network (Source: U.S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, 2008.)**
The National Network was authorized by the Surface Transportation Assistance Act of 1982 (P.L. 97-424) and specified in the U.S. Code of Federal Regulations (23 CFR 658) to require states to allow conventional combinations on "the Interstate System and those portions of the Federal-aid Primary System ... serving to link principal cities and densely developed portions of the States ... [on] high volume route[s] utilized extensively by large vehicles for interstate commerce ... [which do] not have any unusual

characteristics causing current or anticipated safety problems." Conventional combinations are tractors with one semitrailer up to 48 feet in length or with one 28-foot semitrailer and one 28-foot trailer, and can be up to 102 inches wide.

The National Network differs in extent and purpose from the National Highway System (NHS), which was created more than a decade later by the National Highway System Designation Act of 1995 (P.L. 104-59). Both are about the same length, roughly 200,000 miles, but the National Network includes approximately 65,000 miles of highways beyond the NHS, and the NHS includes about 50,000 miles of highways that are not on the National Network. The National Network supports interstate commerce by regulating the size of trucks, while the NHS supports interstate commerce by focusing federal investments.

The Sacramento County general plan plans for the future circulation network of streets, highways and interstates within the County. What is the impact of this proposed CNU project to the following traffic circulation flows? What is the impact of this proposed CNU project to the City of Elk Grove general plans traffic circulations? What is the planned traffic and circulation effects on the environment and management for this resource?

- **Principal Arterial**. A principal arterial provides regional, statewide, and national transportation connections. All principal arterials are under Federal jurisdiction and include Federal highways as well as interstate highways.
- **Arterial**. Arterials provide connections between links in the highway network and connects major destinations with the highway network.
- **Collector**. Accommodates traffic between principal arterial, arterial streets and/or activity centers.
- **Subcollector**. This roadway classification serves between 300 and 700 potential residences. Usually, direct access from adjoining parcels is permitting.
- **Major Local Street**. Provides access for 50 to 300 potential residences.
- **Local Street**. Provides access for 25 to 50 potential residences.
- **Minor Local Street**. Provides access for up to 25 potential residences.
- **Minor Street**. Other types of streets that carry very low volumes of traffic.

How will conflict with any applicable Plans (i.e. General), ordinances or policies establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?

How will conflict with any applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?

What is the management plan for any conflicting results in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

**Safety Performance**

Will there be an offsite pedestrian, bicycle, and motorized vehicle safety review? There is a potential increase hazards due to a design feature shown on the current mapping of the proposed CNU project (e.g., sharp curves or dangerous intersections) and/or incompatible uses (e.g., farm equipment)? The design reflects a potential result in inadequate emergency access.

Will there be a study done reviewing at five-years historical collision data of Interstate-5 in the immediate surrounding area, since the proposed CNU project would utilize the I-5 corridor off of Elk Grove Blvd, including collision types?

**Bikeway and Bicycle Transportation Plan**
What is the plan for the proposed CNU project in providing a safe and efficient system of bicycle routes for commuter, school, and recreational use in the immediate area of the project site that currently exist?

What is the plan for addressing the conflicts with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety within and in immediate surroundings of the project site?

**California Streets and Highway Code (Section 890.4)**
The existing freeway/roadway network, public transportation, bicycle and pedestrian facilities, as well as types of traffic and circulation patterns and the effects to I-5 issues get addressed. An action would be considered to have a significant effect on transportation if it would result in any of the following:

- Substantially increase traffic in relation to existing traffic load and capacity of the roadway system.
- Substantially disrupt the flow and/or travel time of traffic.
- Expose people to significant public safety hazards resulting from construction activities on or near the public road system.
- Reduce supply of parking spaces sufficiently to increase demand above supply.
- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.
- Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways.
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment). Farm equipment currently uses the Elk Grove Blvd I-5 overpass to enter the Stonelake National Wildlife Preserve. Cattle is transported in and out of Stonelake National Wildlife Preserve throughout the year.
- Result in inadequate emergency access, see Sacramento County evacuation plan.
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

What effect will the proposed CNU project have on the transit services and their routes?

**Impact concerns:**

- ✓ Concerns regarding existing roadway geometries being inadequate to support the development, contributing to an already unsafe condition at Elk Grove Blvd due to high rates of speed and blind curves to getting on and off Interstate - 5.
- ✓ Concerns of a one-way access location to the project may not be sufficient to support the development.
- ✓ Safety concerns at HarborPointe/Elk Grove Blvd and businesses entrances due to the existing roadway configuration.
- ✓ Concerns that efforts to widen roadways may require acquisition of private property outside of the existing right-of-way.
- ✓ Concerns of who is the responsible parties for on-site and off-site roadway maintenance.
- ✓ Concerns regarding Stonelake Community roads being used as the emergency access road for fire or demolition/construction vehicles. The roadway is a private road, which cannot handle the

increased traffic. Residents located along Stonelake Community roads have not given permission for the road to be used for the purpose of emergency access or demolition/construction vehicles.

- ✓ Concerns regarding significant traffic congestion along the roadways and Interstate – 5 near the project site.
- ✓ Concerns that dirt trail on the adjacent levee that exist today will become feeder roads for the development and adjacent residents will have to provide right-of-way access.
- ✓ Concerns over ingress and egress to the levees, businesses, and residences.
- ✓ Concerns with safety along the roadways near the project site.
- ✓ Concerns with safety for the Interstate – 5 on and off ramps near the project site.

## Utilities and Service Systems

The following concerns for proposed CNU project's potential impacts on certain utilities and services: water, wastewater, storm water, and solid waste. Back to the initial request on the first page of this letter (document) how complaint with this project with the following governing Plans, legislation, and Agencies.

**City of Sacramento 2030 General Plan**
**City of Elk Grove General Plan**
**Urban Water Management 2010 Plan**
**CalRecycle's Solid Waste Information System**
**Sacramento Regional County Sanitation District**
**Sacramento Groundwater Authority - Groundwater Management 2008 Plan**
**CWA requires National Pollutant Discharge Elimination System (NPDES)**
**California Department of Water Resources (DWR)**
**State Water Resources Control Board (SWRCB)**
**California Water Code**
**Senate Bill 610 – Water Supply Assessment**
**Sustainable Groundwater Management Act of 2014**
**California Drought Regulations**
**California Integrated Waste Management Act**
**California Solid Waste Reuse and Recycling Access Act**
**California Green Building Standards Code**
**Are there any relevant Infrastructure Study**

**Water Supply Assessment**

**Public Resources Code (PRC) §21151.9** requires that a Water Supply Assessment (WSA) be prepared for proposed projects as defined in the statute to ensure that long term water supplies are sufficient to meet the project's demands in normal, single dry and multiple dry years for a period of 20 years. Preparation of a WSA is required if a proposed action meets the statutory definition of a "project," which includes at least one of the following (**Water Code § 20912(a)**):

- A proposed residential development of more than 500 dwelling units;
- A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space;
- A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space;
- A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than
- 650,000 square feet of floor area
- A mixed use project that includes one or more of the projects specified in the above bullets.

Completion of a WSA requires collection of proposed water supply data and information relevant to the project in question, an evaluation of existing/current use, a projection of anticipated demand sufficient to

serve the project for a period of at least 20 years, delineation of proposed water supply sources, and an evaluation of water supply sufficiency under single year and multiple year drought conditions.

If the proposed CNU project requires rezoning as mentioned then the land use will change service activities larger than neighborhood for water demand. How will this proposed CNU project get enough water supply?

**Senate Bill (SB) 221- Written Verification of Water Supply**

Government Code Section 66473.7(a)(1) requires an affirmative written verification of sufficient water supply. SB 221 is intended to ensure that collaboration on finding the needed water supplies to serve a new large subdivision or commercial project occurs early in the planning process. This verification must also include documentation of historical water deliveries for the previous 20 years, as well as a description of reasonably foreseeable impacts of the proposed subdivision on the availability of water resources of the region. Government Code section 66473.7 (b)(1) states:

> The legislative body of a city or county or the advisory agency, to the extent that it is authorized by local ordinance to approve, conditionally approve, or disapprove the tentative map, shall include as a condition in any tentative map that includes a subdivision a requirement that a sufficient water supply shall be available. Proof of the availability of a sufficient water supply shall be requested by the subdivision or commercial applicant or local agency, at the discretion of the local agency, and shall be based on written verification from the applicable public water system within 90 days of a request.

Thus, following project certification, additional water supply verification is required to be completed at the Tentative Map stage, prior to adoption of the Final Map, for certain tentative maps. Pursuant to Government Code §66473.7(i), additional water supply verification is *not* required for:

Any residential project proposed for a site that is within an urbanized area and has been previously developed for urban uses, or where the immediate contiguous properties surrounding the residential project site are, or previously have been, developed for urban uses, or housing projects that are exclusively for very low and low income households.

Additional questions besides the initial compliance questions at the beginning of this document relavent to the proposed CNU project:

- What are the City of Elk Grove water sources and supplies?
- Do they have the capacity for the proposed CNU project of demand?
- What is the City of Elk Grove water rights and entitlements?
- What is the Cities permitted water take?
- What is the drought condition and contingencies plan?
- Does any groundwater make of the supply of the Cities water?
- Will there be any groundwater pumping to supplement the additional water demand?
- What is the total available water supply?
- What additional demand will the proposed CNU project have on water supply facilities?
- Will there be a need for new water transmission pipes or lines for water?
- Have the necessary water supply improvements and any extensions that would be necessary been proposed to the City of Elk Grove and any other relevant agencies?
- Is there going to be an infrastructure study for the proposed CNU project?
- Is there a water supply reliability and a water shortage contingency plan?
- Are there any complicating factors surrounding climate change and water resource?
- What is the normal and Dry-Year supply reliability?
- What will the management of groundwater levels seasonal fluctuations?
- How will the groundwater stay protected?

**Assembly Bill (AB) 1881, the Water Conservation in Landscaping Act of 2006**
**Model Water Efficient Landscape Ordinance**

Pursuant to CCR Title 23, Division 2, Chapter 2.7, the California Department of Water Resources (DWR) approved the Model Water Efficient Landscape Ordinance. Local agencies, including the City of Sacramento, were required to adopt the ordinance or a local water efficient landscape ordinance by January 1, 2010, and notify DWR of the adoption by January 31, 2010. In accordance with these requirements, the City's Model Water Efficient Landscape Ordinance (MWELO) became effective on January 1, 2010. (California Code of Regulations Title 23, Division 2, Chapter 2.7 as amended). Key objectives of the MWELO are:

- Promote the values and benefits of landscapes while recognizing the need to invest water and other resources as efficiently as possible;
- Establish a structure for planning, designing, installing, maintaining and managing water efficient landscapes in new construction and rehabilitated projects;
- Establish provisions for water management practices and water waste prevention for existing landscapes;
- Use water efficiently without waste by setting a Maximum Applied Water Allowance (MAWA) as an upper limit for water use and reduce water use to the lowest practical amount;
- Promote the benefits of consistent landscape ordinances with neighboring local and regional agencies;
- Encourage local agencies and water purveyors to use economic incentives that promote the efficient use of water, such as implementing a tiered-rate structure; and
- Encourage local agencies to designate the necessary authority that implements and enforces the provisions of the MWELO or its local landscape ordinance.

The MWELO applies to public and private projects that would include a landscaped area of at least 2,500 square feet and require a building or landscape permit, plan check, or design review.

## Water Delivery Infrastructure

**Urban Water Management Planning Act (Water Code Sections 10610 – 10656)**
**California Integrated Waste Management Act - Assembly Bill 939**
**Senate Bill 1016**

### WASTEWATER SERVICE

Will the proposed CNU project require exceed wastewater treatment plant requirements of the applicable Regional Water Quality Control Board?

Will the proposed CNU project require or result in the construction of new water or wastewater treatment pipeline expansion of existing pipelines, the demolition and construction of which could cause significant environmental effects, such as disrupting surrounding residences and businesses?

Will the proposed CNU project require in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

- What is the current sewer collection system consists of?
- Is there a water reclamation facility? If so, does it have enough capacity to handle the magnitude demand the proposed CNU project will demand on an ongoing basis.

### STORMWATER AND DRAINAGE

What does the municipal storm drainage system consists of?
What is the management plan for storm water pollution prevention measures for new development projects, such as bio-swales, detention ponds, erosion, and sedimentation control, are incorporated in the

planning, design, construction, and operation of projects with the potential to create pollutants in storm water runoff?

**National Pollutant Discharge Elimination System (NPDES) Permit for small MS4s. Provision E.12, "Post-**
**Construction Stormwater Management Program,"** mandates municipalities to require specified features and facilities—to control pollutant sources, control runoff volumes, rates, and durations, and to treat runoff before discharge from the site—be included in development plans of projects that create or replace 5,000 square feet or more impervious surface as conditions of issuing approvals and permits. The new requirements continue a progression of increasingly stringent requirements since 1989.

Polluted storm water runoff is commonly transported through municipal separate storm sewer systems (MS4s - conveyance or system of conveyances), and then often discharged, untreated, into local water bodies.

To prevent harmful pollutants from being washed or dumped into MS4s, certain operators are required to obtain NPDES permits and develop storm water management programs (SWMPs). The SWMP describes the storm water control practices that will be implemented consistent with permit requirements to minimize the discharge of pollutants from the sewer system.

Will the proposed CNU project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

**SOLID WASTE**

**Solid waste collection** provides residential and commercial garbage service, debris box service and recycling to residents, and yard waste. Will the proposed CNU project have their own solid waste disposal plan or will they expect the City to provide this service during demolition and construction? What will be the health and safety plan for solid waste disposal? In addition, considering landfill material, hazardous waste material, and dirt and soil removal will CNU provide the City and/or County with a health and safety plan?

Does the current landfill have sufficient permitted capacity to accommodate the project's solid waste disposal needs?

## Gas and Electricity Infrastructure

Would the extension of service infrastructure occur below ground and be implemented concurrent with project implementation? Is there enough infrastructure to accommodate 12-story hospital, underground parking, helipad, 5-story medical office building, 5-story dormitory, 4-story parking garage structure?

- ✓ SMUD
- ✓ PG&E
- ✓ Telephone
- ✓ Internet

- What currently powers the electric system for the project site area?
- Will the proposed CNU project require another substation? If so, where will an additional substation get located?
- Will there be a need for new or expanded distribution pipelines for utilities?

- Is there a potential of residence and businesses to be without Utilities for any duration of the demolition and construction of the proposed CNU project?

**Other Impact concerns:**

- ✓ Inability to provide water during drought conditions, including inadequate water for fire suppression and poor water pressure for existing customers.
- ✓ Concerns that property owners be assessed additional property taxes to pay for water to support the project.
- ✓ Concerns that property owners along the sewer alignment who are currently on septic systems will be forced to connect to the sewer system proposed by the development. Inducing off-site growth due to the extension of the proposed sewer line.
- ✓ Water District cannot meet current water needs. Existing occurrences of water rations, restricted allocations and higher rates compared to other neighboring water districts.
- ✓ Concerns over costs to existing property owners to maintain the new infrastructure required of the project, particularly the proposed sewer line extension.
- ✓ Concerns that special water assessments and costs will be distributed to all Water District customers.
- ✓ Concerns that surrounding property owners will be required to hook up another wastewater treatment system.
- ✓ Concerns regarding poor water pressure for fire suppression.
- ✓

**Other Concerns and Comments**

- ✓ Decrease in property values.
- ✓ Concerns that the project will not be economically viable and the community will be left with an abandon project and backbone infrastructure.
- ✓ Higher property taxes due to the increase in student enrollment associated with the project.
- ✓ Concerns about the effects on the **Stone Lakes National Wildlife** Association that established in 1994 to **protect** and **restore the Stone Lakes area** from encroachment and development. Managed by the U.S. **Fish** and **Wildlife Service.**

My household as a stakeholder encourage those making the development decisions and recommendation to consider the need for a well rounded community and not just a huge magnitude medical center.

***Suggestions:***

Removal of the helipad from the development plans effects residents and the surrounding Stonelake National Wildlife Preserve and potential Consumnes River Preserve impacts.

Requests no building around or blocking of the Stonelake Wildlife Preserve trail that is on the levee adjacent to the project site. The trail current use for walking, jogging, and cycling, as well as, photography and astronomy by the citizens of Elk Grove.

Determine appropriate requirement for maintenance and storage space within the Stonelake Landing Shopping Center (proposed CNU project) to accommodate needs of each phase of the project.

Requests consideration regarding potential issues concerning water, power, and light pollution with the proposed development. Expresses aesthetical concerns as there are no trees of sufficient size to mask development. Finally, concerned that development should be focused elsewhere (Near the other hospitals such as Kaiser, Dignity, etc).

Concern over the aesthetics of a proposal for a 12-story hospital, 5-story dorm and 5 story parking garages in a community that is primarily single story to two story construction.

Proposed construction activities appear to impact adjacent levee, other drainage areas (such as the Sacramento River, etc.) The project must avoid and minimize impacts to waters. Possible required permits may be: “Discharge of fill material” and “Land disturbance”. Does this apply? Best management practices required to control storm water concentration and downstream erosion. BMPs are also necessary for non-storm water control and infiltration. Request to have wetlands mapped and delineated for non-disturbance from projects operations.

Suggest keeping the current business and only expand the University to the vacant Stonelake Landing Shopping Center (Center) and not continual pursue businesses as is the current situation, such as the new Sushi restaurant. Nor negatively affect current Center businesses by publically indicating this project is a go without due process, such as the Sacramento Business Journal is reporting. Presently, locals and visitors use the Center daily. The number of people enjoying the businesses in the Center has often amazed me.

In conclusion and to reiterate this request to have in the proposed CNU project EIR consideration and evaluation the impact on the factors associated with respect to public health and safety concerns and legislative compliance as described to each of the EIR categories. As a part of this request to identify <u>to what extent, the proposed CNU project will be in compliance to each piece of legislation</u> mentioned in this document.

Sincerely,

DeAna Melilli

3013 Granite Park Lane
Elk Grove, CA 95758

Heritage Lakeside Community

SACRAMENTO METROPOLITAN
AIR QUALITY
MANAGEMENT DISTRICT

June 21, 2019

**SENT VIA EMAIL**

Ms. Sarah Kirchgessner, Senior Planner
Development Services – Planning
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

**RE: Notice of Preparation of a Draft Environmental Impact Report for the California Northstate University Medical Center Project**

Dear Ms. Kirchgessner:

Thank you for providing an opportunity for the Sacramento Metropolitan Air Quality Management District (Sac Metro Air District) to review and comment on the Notice of Preparation (NOP) of a Draft Environmental Impact Report (DEIR) for the **California Northstate University (CNU) Medical Center** project. The project is located adjacent to Interstate 5 at the southwest intersection of Elk Grove Boulevard and West Taron Drive. The project involves building a 700,000-square foot (SF), 12-story, 400-bed teaching hospital; a central plant that would house support equipment for the hospital; two parking structures that include ground-floor commercial space; a 123,000-SF, five-story medical office building; a 125,000-SF, four-story outpatient clinic; and a 172,500-SF, five-story, 150-unit dormitory to house 300 students.

The Sac Metro Air District, in our role as the agency with the "…primary responsibility for the development, implementation, monitoring, and enforcement of air pollution control strategies…" in Sacramento County,[1] review and provide comments through the lead agency planning, environmental and entitlement processes with the goal of reducing adverse air quality impacts and ensuring compliance with the California Environmental Quality Act (CEQA). We offer the following comments to ensure air quality impacts are adequately analyzed, disclosed and mitigated.

## 1. Consistency with Existing Plans

Evaluate the project's consistency with existing plans, especially those that reduce criteria air pollutants and greenhouse gases. Such plans include, but are not limited to: (i) the current Metropolitan Transportation Plan/Sustainable Communities Strategy (MTP/SCS); (ii) the Elk Grove General Plan and Climate Action Plan – 2019 Updates; (iii) the Elk Grove Bicycle, Pedestrian and Trails Master Plan; (iv) and the Sacramento Tree Foundation's Regional Greenprint Initiative.

Good connections for all modes of transportation to this project should be considered and analyzed in order to minimize direct and indirect emissions of air contaminants. Several Elk Grove General Plan policies that support multi-modal transportation and emissions reductions are highlighted below.

[1] California Health and Safety Code §40961

- Ensuring that this project implements a balanced transportation system using a layered network approach for all mobility users and promotes context-sensitive pedestrian and bicycle movement via direct, safe and pleasant routes that connect to destinations inside and outside the project area, would be in line with General Plan Policies MOB-3-1 and MOB-4-1.

- Additionally, General Plan Policy NR-4-5 encourages demand management strategies that seek to reduce single-occupant vehicle use. One example is a robust Transportation Demand Management (TDM) Program that includes emergency ride home, transit passes and ride matching assistance. TDM programs have successfully reduced vehicle miles traveled in many local and regional projects, which in turn have reduced greenhouse gas emissions and criteria air pollution.

**2. Emissions of Criteria Air Pollutants and Greenhouse Gases**
Analyze and disclose both construction and operational emissions; including nitrogen oxides, reactive organic gases, exhaust and fugitive dust particulate matter (PM10 and PM2.5), GHG emissions, toxic air contaminants and odors.

**a. Short-term Construction Emissions of Criteria Air Pollutants and Precursors**
This project may exceed the Sac Metro Air District thresholds of significance for construction criteria air pollutants. We recommend analyzing possible onsite and offsite mitigation measures to reduce construction emissions from this project.

**b. Long-term Operational Emissions of Criteria Air Pollutants and Precursors**
In order to ensure operational air quality impacts are mitigated for the project, Sac Metro Air District recommends preparation of an Air Quality Mitigation Plan (AQMP) that reduces emissions by at least 15 percent as referenced in the City of Elk Grove's General Plan Policy NR-4-1[2] and the Sac Metro Air District's CEQA Guide.[3]

We request the AQMP be reviewed by Sac Metro Air District staff for technical adequacy prior to the release of the DEIR. The AQMP should be included as a mitigation measure in the DEIR. Sac Metro Air District staff are available to work with the City and project applicant to provide emissions reductions verification of the AQMP.

**c. Authority to Construct and Permit to Operate**
All projects are subject to Sac Metro Air District rules in effect at the time of construction. The Sac Metro Air District's Rules & Regulations Statement is attached for your reference. Medical centers often include equipment that emits air pollutants and requires a permit to operate from the Sac Metro Air District. Examples include, but are not limited to, boilers, back-up generators and medical waste incinerators. **These emission sources should specifically be included and analyzed in the environmental document.** Permits to operate from the Sac Metro Air District are in

[2] City of Elk Grove *General Plan*. Community and Resource Protection Chapter. Policy NR-4-1. Pages 7-34. Adopted February 27, 2019.

[3] Sacramento Metropolitan Air Quality Management District *CEQA Guide to Air Quality Assessment in Sacramento County.* Chapter 4 Operational Criteria Air Pollutant and Precursor Emissions. Adopted December 2009. Reflects Amendments through August 2016.

addition to any entitlements required by the City. Please note that laboratory hoods do not require a permit through our agency.

**d. Zero-Emission Emergency Power Options**
Sac Metro Air District recommends analyzing the feasibility of using zero-emission emergency power options for the medical center buildings.

**3. Urban Heat Island Effect**
Analyze the proposed project's features that contribute to increases in the urban heat island effect, as well as the feasibility of deploying measures, such as cool roofs and cool pavements, to reduce the urban heat island effect. The urban heat island effect contributes to increased air pollution by accelerating ozone formation and increasing the use of air-conditioning for cooling. The widespread use of cool roofs, tree shading, cool pavements, and other strategies can help to lower building energy use, cool ambient air temperatures, and protect public health. For example, shaded parking spaces help reduce emissions of volatile organic compounds (VOC), an ozone precursor, from conventional internal combustion engine vehicles.

**4. Exposure Reduction Measures**
Due to this project's proximity to Interstate 5, the project should consider reducing air pollutant exposure for the roof-top sports facility patrons by planting a roof-top vegetative barrier. Additionally, SMAQMD recommends the inclusion of lower VOC emitting tree species throughout the project site. A list of low emitting trees can be found on the Sacramento Tree Foundation's website: http://www.sactree.com/assets/ShadyEightySTFweb.pdf.

**5. General Comments**
Sac Metro Air District's most current *Guide to Air Quality Assessment in Sacramento County* and thresholds of significance are available at www.airquality.org to assist with air quality analysis and significance determinations.

Please send environmental documents, including the air quality analyses to ProjectReview@airquality.org. If you have any questions, please contact me at 916-874-6267 or JChan@airquality.org.

Regards,



Joanne Chan
Air Quality Planner/Analyst

c:
Paul Philley, Program Supervisor – CEQA & Land Use Section, Sac Metro Air District
Karen Huss, Air Quality Planner/Analyst – CEQA & Land Use Section, Sac Metro Air District
Brian Krebs, Program Supervisor – Stationary Source Division, Sac Metro Air District

Attachment:
Sac Metro Air District Rules & Regulations Statement

## Sac Metro Air District Rules & Regulations Statement (revised 6/2018)

*The following statement is recommended as standard condition of approval or construction document language for **all** development projects within the Sacramento Metropolitan Air Quality Management District (Sac Metro Air District):*

All projects are subject to Sac Metro Air District rules in effect at the time of construction. A complete listing of current rules is available at www.airquality.org or by calling 916-874-4800. Specific rules that may relate to construction activities or building design may include, but are not limited to:

**Rule 201: General Permit Requirements.** Any project that includes the use of equipment capable of releasing emissions to the atmosphere may require permit(s) from Sac Metro Air District prior to equipment operation. The applicant, developer, or operator of a project that includes an emergency generator, boiler, or heater should contact the Sac Metro Air District early to determine if a permit is required, and to begin the permit application process. Other general types of uses that require a permit include, but are not limited to, dry cleaners, gasoline stations, spray booths, and operations that generate airborne particulate emissions. Portable construction equipment (e.g. generators, compressors, pile drivers, lighting equipment, etc.) with an internal combustion engine over 50 horsepower is required to have a Sac Metro Air District permit or a California Air Resources Board portable equipment registration (PERP) (see Other Regulations below).

**Rule 402: Nuisance.** The developer or contractor is required to prevent dust or any emissions from onsite activities from causing injury, nuisance, or annoyance to the public.

**Rule 403: Fugitive Dust.** The developer or contractor is required to control dust emissions from earth moving activities, storage or any other construction activity to prevent airborne dust from leaving the project site.

**Rule 414: Water Heaters, Boilers and Process Heaters Rated Less Than 1,000,000 BTU PER Hour.** The developer or contractor is required to install water heaters (including residence water heaters), boilers or process heaters that comply with the emission limits specified in the rule.

**Rule 417: Wood Burning Appliances**. This rule prohibits the installation of any new, permanently installed, indoor or outdoor, uncontrolled fireplaces in new or existing developments.

**Rule 442: Architectural Coatings.** The developer or contractor is required to use coatings that comply with the volatile organic compound content limits specified in the rule.

**Rule 453: Cutback and Emulsified Asphalt Paving Materials.** This rule prohibits the use of certain types of cut back or emulsified asphalt for paving, road construction or road maintenance activities.

**Rule 460: Adhesives and Sealants.** The developer or contractor is required to use adhesives and sealants that comply with the volatile organic compound content limits specified in the rule.

**Rule 902: Asbestos.** The developer or contractor is required to notify the Sac Metro Air District of any regulated renovation or demolition activity. Rule 902 contains specific requirements for surveying, notification, removal, and disposal of asbestos containing material.

**Other Regulations (California Code of Regulations (CCR))**

**17 CCR, Division 3, Chapter 1, Subchapter 7.5, §93105 Naturally Occurring Asbestos:** The developer or contractor is required to notify the Sac Metro Air District of earth moving projects, greater than 1 acre in size in areas "Moderately Likely to Contain Asbestos" within eastern Sacramento County. The developer or contractor is required to comply with specific requirements for surveying, notification, and handling soil that contains naturally occurring asbestos.

**13 CCR, Division 3, Chapter 9, Article 5, Portable Equipment Registration Program:** The developer or contractor is required to comply with all registration and operational requirements of the portable equipment registration program such as recordkeeping and notification.

**13 CCR, Division 3, Chapter 9, Article 4.8, §2449(d)(2) and 13 CCR, Division 3, Chapter 10, Article 1, §2485 regarding Anti-Idling:** Minimize idling time either by shutting equipment off when not in use or reducing the time of idling to 5 minutes. These apply to diesel powered off-road equipment and on-road vehicles, respectively.

# United States Department of the Interior
## FISH AND WILDLIFE SERVICE

Stone Lakes National Wildlife Refuge
1624 Hood-Franklin Road
Elk Grove, California 95757
(916) 775-4421

June 21, 2019

Sarah Kirchgessner,
Development Services Department, City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 96758

RE: California Northstate University Medical Center, NOP EIR

Ms. Kirchgessner:

Thank you for the opportunity to provide some additional comments concerning the proposed California Northstate University Medical Center (CNU) hospital and medical center. These comments were initially raised during our meeting on May 16, 2019 at the Refuge office with you and the City's planning department and in a follow up letter I submitted to your department on May 22, 2019.

The CNU site is within the 18,000 acre Refuge Project Boundary and surrounded by land that is managed for wildlife and threatened and endangered species. In 1994, the U.S. Fish & Wildlife Service (Service) began land protection efforts and habitat enhancement on private and public lands. The Service currently manages approximately 6,500 acres. Over the past twenty five years, private, state and federal funds have been invested to acquire and restore wetlands, grasslands and riparian habitats that attract over 50,000 migratory birds that include ducks, geese and sandhill cranes. These birds migrate to the Refuge, private farmlands and surrounding protected areas (Bufferlands, Cosumnes River Preserve, Yolo Basin) because they provide essential wintering habitat and stop over areas.

Our concerns regarding the proposed construction of a 12+ story building complex adjacent to the Refuge include: 1) the proximity, height and design of buildings with reflective glass that pose a collision threat to migratory birds; 2) artificial lighting which causes disturbance to roosting birds and disruptions to night time behavior; 3) low flying helicopters which can cause disturbance and flush waterfowl which may increase the risk of collisions. I encourage you to review Federal Aviation Administration regulations and other Code of Federal Regulations (50 CFR 27.34) that limit aircraft use and altitude over national wildlife refuges.

Another concern we have is regarding the amount of traffic this complex would generate. Refuge staff use Elk Grove Boulevard to access several management units. The existing level of traffic during rush-hour is challenging for staff to safely cross to access and egress our Refuge units. Additional traffic would increase the time it would take to access our units and put staff, volunteers and cooperators at a greater risk of auto accidents.

Please include these concerns in your project scoping efforts. I look forward to providing you with additional information.

Respectfully,



Bart McDermott
Stone Lakes National Wildlife Refuge Manager

## Sarah Kirchgessner

**From:** Andrea <aklinenberg@comcast.net>
**Sent:** Tuesday, June 25, 2019 9:34 PM
**To:** Sarah Kirchgessner
**Subject:** CNU Questions for EIR

[EXTERNAL EMAIL]

Hi Sarah,

As requested, here are the questions we asked last night.

1. What is being done to protect the wildlife that travels up and down the North American Flyway? What will be done to protect Stone Lake Wildlife Refuge? Aren't these birds important to agriculture up and down the Pacific coast? Will any wetlands be impacted?

2. Hospitals are lit 24 hours a day (light pollution). What is the impact to wild life and homes in close proximity?

3. If serving the homeless population, what measures will be put in place to ensure they do not take up residency in our area? What impact will this have on Merry Hill school or Elliot Ranch Elementary School?

4. Will parking be free in the structures? If not, what is the impact to the residential streets surrounding the hospital?

5. CalTrans study of Elk Grove Blvd off ramp from 5 South

6. What is the addition of high density housing (dorms) on the existing infrastructure?

Thank you,
Andrea Klinenberg

## Sarah Kirchgessner

**From:** asiandragon8 <asiandragon8@gmail.com>
**Sent:** Tuesday, June 25, 2019 3:37 PM
**To:** Sarah Kirchgessner
**Subject:** Add back to Scope of Work - Recreation

[EXTERNAL EMAIL]

Hi Sarah,

I am writing to state that that Recreation should not be scoped out of the draft Environmental Impact Report.

I am requesting that Recreation be included in the scope of the draft Environmental Impact Report.

California Northstate University has stated on numerous occasions that they will be bringing 24,000 jobs to the project site and surrounding areas.

> " ***24,000+*** *new jobs (direct and indirect, region-wide)* "
>
> https://www.cnuhealth.com/

They are proposing approximately 3,400 on-site parking spaces which means that there could be over 10,000 people that will be going in and out of the project area on a daily basis. A portion of those employed on the project site may decide to use neighborhood parks for outdoor activities before, during and after work hours.

The employees of the project and visitors to the project could overtax the public parks within the Stonelake subdivision. It is for that reason that I feel that the scope of the draft Environmental Impact Report include an evaluation of Recreation resources and mitigation measures within the project area.

Thank you,

Randy Chinn
Elk Grove, CA 95757

## Sarah Kirchgessner

**From:** asiandragon8 <asiandragon8@gmail.com>
**Sent:** Tuesday, June 25, 2019 3:20 PM
**To:** Sarah Kirchgessner
**Cc:** Asian Singer
**Subject:** Scoping Comments - California Northstate University Medical Center Environmental Impact Report
**Attachments:** NEST - Comments 1st Draft May 13, 2019 to Sarah 6 25 2019.pdf

[EXTERNAL EMAIL]

Hi Sarah;

The attached document was sent to you on May 13, 2019 by Jan Smutney-Jones NEST Planning and Environmental Committee Chair and served as comments regarding the initial application package submitted by California Northstate University.

- I am sending these comments as a concerned citizen and not as a representative of NEST. I am in agreement with the questions and issues raised by NEST.

Please enter the attached document into formal record as my comments on the scope of the Environmental Impact Report.

I am requesting that all of the questions and issues raised in the attached document should be made part of the scope of the draft Environmental Impact Report.

Thank you,

Randy Chinn
Elk Grove, CA 95757

## Sarah Kirchgessner

**From:** Melinda Robinson <mrobinson@ncsdia.com>
**Sent:** Tuesday, June 25, 2019 11:25 AM
**To:** Sarah Kirchgessner
**Subject:** CNU

[EXTERNAL EMAIL]

Good Morning,

I am writing to express my opposition to the CNU project currently planned for west Elk Grove.

I have been a resident in the Lakeside community since 2005. We specifically chose this section of Elk Grove for its quiet and safe environment. My community is a master planned community and was designed to remain zoned for residential and small business. The rezoning of the proposed CNU project location is a direct contradiction of what this master planned community was intended to be.

I have numerous concerns over the impact this project will have including but not limited to:

-Placement of a level 2 trauma center in a residential community will bring a significant increase in noise to our community. The sound of sirens and helicopters form emergency responders will impact our peace and quiet. Will the EIR make a comparison of our neighborhood as is presently stands to the sounds and noises of neighborhoods that have a trauma center adjacent to it? What is the difference in noise level? UC Davis would be a fair comparison as they are located in (what was once) a quiet area. What is the current acceptable level of noise (per city ordinance) for a residential neighborhood? Will the placement of this hospital violate this ordinance? If CNU were to be successful in having the location rezoned, thereby allowing a higher level of noise for that location, the residents that are directly across the street from this proposed site are still considered residential, are zoned as such, and would be impacted by an increased noise level.

It is anticipated the construction of this project will take place over several phases which translates into years of construction until completion. This will be a significant issue for the surrounding neighborhoods: Noise, dust, ground vibrations, construction traffic, parking. What steps will be taken to minimize the impact of the construction? Will the EIR take into consideration the fact that all of the proposed construction will be occurring in a residential area? And what negative impact does this present for the surrounding community?

CNU's proposed trauma center is a 24-hour facility. It is anticipated the building location will be illuminated with necessary lighting. As the building site is directly across the street from neighboring homes, how will this impact the surrounding neighbors? It would be expected that a building of this size and magnitude will have considerable lighting on campus for the safety of their staff, students, patients and visitors. What will be done to protect the nearby residents from the bright lights of this property during the night or when most nearby residents would need to sleep?

-Increase in crime. A level 2 trauma center will likely (and is expected) to treat significant injuries including gunshots, stabbings (i.e. gang related violence). I have heard from a number of personnel in the medical field who have explained that there are often "lock downs" that will take place in a trauma facility due to treatment for gang related violence. What is the protocol for a "lock down" in a trauma center that is across the street from homes? In the event of a full lock down, where will incoming patients, visitors and staff be routed? Will they be re-routed to the surrounding neighborhoods?

Will the EIR include an analysis of the crime rates of similar neighborhoods both before and after the placement of a trauma center?

-Decrease in community safety. Including the above scenario, the services of a trauma center will also include treatment to a wide range of public demographics. This may include the indigent or homeless, as well as drug or alcohol related medical emergencies. Upon completion of treatment and discharge, where are those who are homeless going to go? What services will be available to at discharged patients who are at risk for engaging in violent or illegal activities? These individuals will be discharged into our neighborhoods; not simply the city streets, but into the streets where we live, where are homes are, the neighborhoods where our children play or walk to school, not to mention the parks that were designed to provide recreation to the those that live in what was intended to be our master planned community.

The proposed location for CNU to build their facility and the potentially negative impact on our safety and security would be within 3 miles of the following schools:

Stone Lake Elementary
Joseph Sims Elementary
Elliot Ranch Elementary
Merryhill Preschool
River City Learning Center (preschool)
Horizon Charter School
Helen Carr Castello Elementary School
Marion Mix Elementary School
Franklin Elementary School
Franklin High School
Elk Grove Charter School
John Ehrhardt Elementary School
Toby Johnson Middle School
Laguna Creek High School
Arlene Hein Elementary School
Laguna KinderCare
Carroll Elementary School
St. Elizabeth Ann Seton Elementary School
Harrier Eddy Middle School
Laguna Montessori School
Zehnder Ranch Elementary School
Elitha Donner Elementary School
Delta Elementary School
Clarksburg Middle School
Rio Valley Charter School
Delta High School
Cosumnes Oaks High School
Barbara Comstock Morse Elementary School
Valley High School
Elizabeth Pinkerton Middle School
Irene B. West Elementary School

-Police support. Will Elk Grove Police Department have the manpower to safely protect and respond to the projected increase in calls created by this trauam center? Will the EIR complete an analysis comparing the number of incoming calls and reponses similar police departments have received both before and after the placement of a trauam center in their community?

-Traffic. Currently there a 2 major roads for the public to cross from the west to the east side of Elk Grove: Elk Grove Blvd and Laguna Blvd. During peak commute times, traveling the 5 miles across town can take up to 20 minutes. CNU estimates their project will provide for up to 1400 new jobs. Can the city of Elk Grove absorb the impact of the increased number of commuters? Concerns include damage to existing road conditions, increase smog and air pollution from the increase in traffic, waiting in traffic, not to mention the patients and visitors to the facility. How will this impact the quality of our air? How will this impact greenhouse gas emisions? Will the EIR complete an analysis of similar neighborhoods that have an employment center of this size and the changes to their air pollution both before and after the completion of said buisness?

With the proximity of this trauma center to Hwy 5, how will the increase in traffic affect the already congested on/off ramps for Elk Grove Blvd at Hwy 5? As our state capital, downdown Sacramento is the location for a majority of jobs in this region. The only 2 highways to access downtown from the Elk Grove area are highways 5 and 99. There is already a significant increase in trafiic during commute time for those traveling to/from the Elk Grove area. What typically is a 15 minute drive between downtown Sacramento and Elk Grove can currently take up to 45 minutes during a normal commute. With the estimated 1400 jobs CNU has projected, what steps will be taken to ensure the commute is not more severaly impacted? Will highway lanes be widened? When? Will HOV lanes be installed? When? Will any changes to impove increased traffic take place before completion of the project to mitigate the impact? Or will it take place after completion, thereby forcing the local residents to endure the increased traffic issues until a solution is provided?

Will the city of Elk Grove increase public transportation options to mitigate the increased number of vehicles/driviers on our local roads?

-Impact on wildlife. The tallest building in the west Elk Grove area is approximately 4 stories. The buisness was capped at 4 stories so as to avoid any impact on the wildlife refuge across the highway from its location. How is it feasabile to allow a 12 story building across the street from the aforementioned 4 story building? The location of CNU's facility is in the path of the Pacifc Flyway for bird migration. If the 4 story hotel across the street from CNU had to be under 40 feet to protect the wildlife, under what possible justification can a 12 story glass building be erected right next door? This would create a severly negative impact on the migration of the wildlife including bird strikes, increased pollution and noise thereby disrupting the natural habitat of the wildlife refuge. Will the EIR provide an analysis of the impact CNU's proposed project will have on the life cycle, life span, nesting, migration, safety and effect to the natural habitat for each of the species that live in the refuge? Will such an analysis include these affects during both the periods of construction as well as the impact duirng normal business hours? (i.e. sirens from emergency response at CNU, helicopters arriving/departing). What will be the flight path for the helistop? Will it be over the refuge? Over the freeway? Over the adjacent neighborhoods?

-Elk Grove currently has access to medical care, including trauma care at both Methodist and South Sacramento Kaiser. Further, Dignity Healthcare is already approved for a trauma center (with a possible helistop) aproximatley 2 miles from CNU's proposed location, towards central Elk Grove. With that, is CNU's faciility needed in its current proposed site?

The current location for CNU's trauam center is on the western most edge of Elk Grove. Hwy 99 is the central artery into and out of Elk Grove. There is a large population on the east side of Elk Grove, extending out to Grantline and the Sheldon/Wilton area that currently do not have immediate access to emergency medical care. The eastern area is also less incorporated than west Elk Grove, which could provide numerous options for a trauma center of this size to be built that would better serve the Elk Grove community as a whole. Were CNU to build on the eastern side of Elk Grove, there would be less negative impact on neighboring communites and local wildlife. This would be a "win-win" for all. CNU would be able to build their medical complex and bio-district, it would be in an area that is not residential and would not impact neighboring homes and it would not be adjacent to a national wildlife refuge. Elk Grove would get another hospital (after Dignity) and CNU would get their bio district.

With regards to the mention of a bio district: CNU intends on building adjacent businesses including a wet lab. The size and scope of the current medical center project is not limited to just the medical center. It is their intention to expand beyond this to create a bio district or medical city. Knowing this, does the EIR take into consideration future expansion

that is intended by the busniess owner? Shouldn't the full scope of the business owners plans be revealed and factored into the EIR analysis so that the full impact on the community can be properly evaluated?

Lastly, it is my understanding that CNU did not utilize any of the EIR consultants currently available through the city of Elk Grove, but rather selected their own analyst. During the scoping meeting, it was asked if CNU's EIR analyst had experience with a project of this magnititde in a propsed site such as this (in between a homes and a wildlife refuge). While the analyst responded that they have experience with similar projects, he admitted that he has not completed an analysis involving all these specific components. With all due respect, I would ask that the EIR be completed by an analyst, or completed in conjunction with an analyst with demonstrated experience completing an EIR with similar if not equal to circumstances as this project. This will ensure that all areas of concern are adequatley addressed with proven experience and thereby avoiding any incorrect results.

Thank you!

Melinda J. Robinson

## Sarah Kirchgessner

**From:** Yvette Sack <ysack@comcast.net>
**Sent:** Tuesday, June 25, 2019 8:05 PM
**To:** Sarah Kirchgessner
**Subject:** Environmental Impact Report for the CNU hospital project

[EXTERNAL EMAIL]

Dear Ms. Kirchgessner,

I have lived in Elk Grove since 1991. I have lived in the Lakeside Community since 2003. I recently retired from Elk Grove Unified School District. My last sixteen years of teaching were in the Lakeside area at Stone Lake Elementary.

I have several concerns/questions about the proposed CNU hospital project and how it may negatively impact the environment, and as a result also negatively impact the lives of those individuals that call this area home.

Here are some of the questions I have;

1. How will Stone Lake Refuge be affected by tainted water runoff going into the refuge (additional parked cars with chemical runoff from the rain, additional use of gas stations, street runoff, and car wash usage)?

2. How many additional cars are expected to be on the streets causing air pollution? We already have an increase in juvenile asthma and spare the air days.

3. How will our air quality be affected with more traffic and longer commutes?

4 How will the increased need for more traffic lanes be met without removing our greenbelt areas which will directly affect our air quality?

5. How will wildlife living in the area be affected? What wildlife will be impacted and how will that be mitigated, or can it?

6. Most of this area was some form of wetlands or fields providing much needed ground water storage when it rained. How will the ground water be affected by additional paving?

7. How will the removal of the existing buildings (all the materials have chemicals in them) affect the air quality? Where will this contaminated waste be disposed of?

It is my belief that this project will negatively affect the environment and the quality of life that we all enjoy here.

Regards,

Yvette Sack

3148 Shelter Cove Lane

Elk Grove, CA 95758

916 230-4156

SMUD®

***Sent Via E-Mail***

June 25, 2019

Sarah Kirchgessner
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

Subject: **California Northstate University Medical Center / NOP**

Dear Sarah Kirchgessner;

The Sacramento Municipal Utility District (SMUD) appreciates the opportunity to provide comments on the Notice of Preparation (NOP) for the California Northstate University Medical Center Project. SMUD is the primary energy provider for Sacramento County and the proposed Project area. SMUD's vision is to empower our customers with solutions and options that increase energy efficiency, protect the environment, reduce global warming, and lower the cost to serve our region. As a Responsible Agency, SMUD aims to ensure that the proposed Project limits the potential for significant environmental effects on SMUD facilities, employees, and customers.

It is our desire that the Project NOP will acknowledge any Project impacts related to the following:

- Overhead and or underground transmission and distribution line easements. Please view the following links on smud.org for more information regarding transmission encroachment:
  - https://www.smud.org/en/Business-Solutions-and-Rebates/Design-and-Construction-Services
  - https://www.smud.org/en/Corporate/Do-Business-with-SMUD/Land-Use/Transmission-Right-of-Way
- Utility line routing
- Electrical load needs/requirements
- Energy Efficiency
- Climate Change
- Cumulative impacts related to the need for increased electrical delivery
- The potential need to relocate and or remove any SMUD infrastructure that may be affected in or around the project area

More specifically, SMUD would like to have the following details related to the electrical infrastructure incorporated into the project description:

1. SMUD has existing and proposed underground 12kV facilities on the project parcel(s), along W. Taron Drive, Elk Grove Boulevard, and Harbour Point Drive that will need to remain or be replaced with an equivalent electrical system.

SMUD would like to be involved with discussing the above areas of interest as well as discussing any other potential issues. We aim to be partners in the efficient and sustainable delivery of the proposed Project. Please ensure that the information included in this response is conveyed to the Project planners and the appropriate Project proponents.

Environmental leadership is a core value of SMUD and we look forward to collaborating with you on this Project. Again, we appreciate the opportunity to provide input on this NOP. If you have any questions regarding this letter, please contact SMUD's Environmental Management Specialist, Ashlen McGinnis, at ashlen.mcginnis@smud.org or 916.732.6775.

Sincerely,



Nicole Goi
Regional & Local Government Affairs
Sacramento Municipal Utility District
6301 S Street, Mail Stop A313
Sacramento, CA 95817
nicole.goi@smud.org

Cc: Ashlen McGinnis

**Department of Health Services**
Peter Beilenson, MD, MPH, Director

RECEIVED
JUL 01 2019
CITY OF ELK GROVE
DEVELOPMENT SERVICES

**Divisions**
Behavioral Health Services
Primary Health
Public Health
Departmental Administration

**County of Sacramento**

June 26, 2019

City of Elk Grove
Development Services Department
C/O Sarah Kirchgessner
8401 Laguna Palms Way
Elk Grove, CA 95758

Dear Ms. Kirchgessner,

In response to the Environmental Impact Report for the California Northstate University Medical Center (CNUMC) Project, please see the attached letter of support for the future site of CNUMC. The letter provides CNUMC with support from the Sacramento County Emergency Medical Services Agency for a revision to the proposed paths for ambulance ingress and egress onto the north end of the medical center property.

As requested, the Emergency Medical Services (EMS) Agency staff reviewed both proposed pathways for the ambulance traffic. The Sacramento County EMS Agency supports the 'Ambulance Path with Caltrans Penetration' document for the following reasons:

1) This proposed path will allow the best ambulance traffic flow into the ambulance bay outside of the emergency department.
2) It provides two points to ingress and egress, which allows ambulance traffic to continue into the property if one point is closed due to an incident.
3) The west entrance closest to Interstate 5 is the shortest route and easier to enter the property from Interstate 5. It allows for both eastbound and westbound ambulance traffic to enter the property without interfering or being delayed by having to use only one entrance from Elk Grove Blvd.

Should you have any questions, please do not hesitate to contact me at magninod@saccounty.net or (916) 875-9708.

Sincerely,

David M. Magnino, B.S. / EMT-P
EMS Administrator
Sacramento County EMS Agency

Attachment

**Department of Health Services**
Peter Beilenson, MD, MPH, Director

**Divisions**
Behavioral Health Services
Primary Health
Public Health
Departmental Administration

**County of Sacramento**

June 5, 2019

Alvin Cheung, PharmD, MHSA
President / Chief Executive Officer
C/O California Northstate University
9700 West Taron Drive
Elk Grove, CA 95757

Dear Dr. Cheung,

Thank you for providing the site plan and supporting documents of the future site of California Northtate University Medical Center. The documents included the two proposed paths for ambulance ingress and egress onto the north end of the medical center property.

As you requested, the Emergency Medical Services (EMS) Agency staff reviewed both proposed pathways for the ambulance traffic. The Sacramento County EMS Agency supports the 'Ambulance Path with Caltrans Penetration' document for the following reasons:

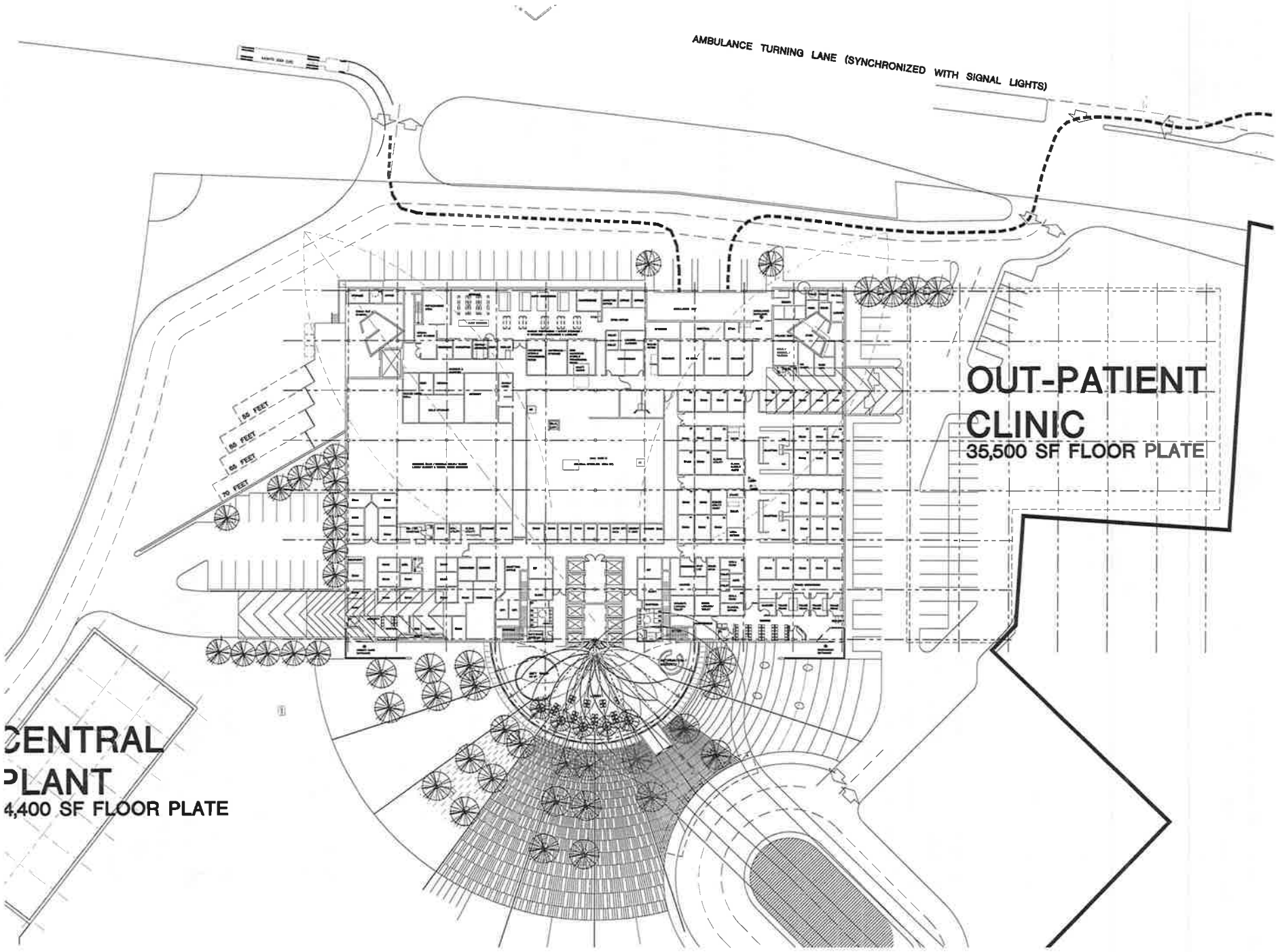
1) This proposed path will allow the best ambulance traffic flow into the ambulance bay outside of the emergency department.
2) It provides two points to ingress and egress, which allows ambulance traffic to continue into the property if one point is closed due to an incident.
3) The west entrance closest to Interstate 5 is the shortest route and easier to enter the property from Interstate 5. It allows for both eastbound and westbound ambulance traffic to enter the property without interfering or being delayed by having to use only one entrance from Elk Grove Blvd.

Should you have any questions, please do not hesitate to contact me at magninod@saccounty.net or (916) 875-9708.

Sincerely,

David M. Magnino, B.S. / EMT-P
EMS Administrator
Sacramento County EMS Agency

cc: Hernando Garzon, M.D.: EMS Agency Medical Director
Ben Merin: EMS Coordinator




# AMBULANCE PATH WITH CALTRANS PENETRATION

NOT TO SCALE

DATE: APRIL 26 2019

## Sarah Kirchgessner

**From:** Donna Pertile <pertild@comcast.net>
**Sent:** Wednesday, June 26, 2019 11:25 AM
**To:** Sarah Kirchgessner
**Subject:** California Northstate University Medical Center Project Environmental Impact Report-Scoping Comments

[EXTERNAL EMAIL]

Name: Donna Pertile Soppeland
9540 Crystal Bay Lane
Elk Grove, CA 95758
pertild@comcast.net

**COMMENTS:**

**Aesthetics-**The design of this hospital is out of character not just by design with the amount of glass but also by height. The glare and heat of all this glass will affect the bird population in the Pacific Flyway. It will forever have a direct impact on our outlook and dominate our views from our home and patio forever which overlook the lake.

**Air Quality-**The air quality will be jeopardized just by the increased emissions from the increased traffic. This is not healthy for the surrounding neighborhoods and may not comply with air quality standards and climate control issues.

**Archaeological, Historical, and Tribal Cultural Resources-**Four Indian tribes inhabited the Elk Grove Area. Significant artifacts could be found when digging down for basements and/or parking structures.

**Energy-**It is questionable that SMUD and PG&E are currently equipped to handle the energy demands of such a large hospital and the projected buildings in all phases of the development.

**Greenhouse Gases and Climate Change-**What impacts will this project have concerning these both of these issues? Will the Mechanical Yard emit any Gases or contribute to Climate Change?

**Hazards and Hazardous Materials**-Hospitals have inherent issues with medical waste such as all bodily fluids, contaminated needles and laundry, infectious waste materials, and **radioactive materials from a Nuclear Medicine Department and/or Oncology Department**.

**Land Use and Planning-**Changing the current zoning from the General Plan, and amending the General Plan which was just completed sets a precedence for future ease of change. A policy in the General Plan states that the creation of an Employment Center should serve the neighborhood by providing services desired by Districts population. Is this the case? Define District? Additionally, a Conditional Use Permit will materially alter the Master Planned neighborhoods. Our home purchases in Master Planned Communities were based on confidence and trust in the zoning. This change will not have a positive impact on our neighborhoods. Changes should preserve and enhance our neighborhoods. What do these changes do to preserve and enhance our neighborhoods?

**Noise and Vibration-**How loud will the power generators be? How frequently will they be tested? Construction noise, traffic, dust, and parking are some of the issues we would have to live with for indeterminate time as no timeline has been established for all 3 phases of the project. Sport courts on top of a parking structure will surely be a

a noise issue with shouting, screaming, basketball, tennis and volleyball courts. How noisy will the external mechanical yard be?

**Population and Housing-**There are already issues in neighborhoods from student rentals. This project would further increase investor rentals which would house many students and devalue our property.

Thank you.

26 June 2019

Sarah Kirchgessner, Senior Planner

City of Elk Grove

8401 Laguna Palms Way

Elk Grove, California, 95758

RECEIVED
JUN 27 2019
By

Re: Notice of EIR Preparation-CNU

Dear Ms. Kirchgessner:

Please find attached, initial comments/questions regarding the Draft Environmental Impact Report for the California Northstate University (CNU), Hospital Complex/ Level II Trauma Center in the Stonelake Community. These comments are being submitted by NEST and myself. The purpose of these comments is to inform the City/public on issues relevant to an Environmental Impact Report (EIR); and the use of the EIR in any amendment to the Elk Grove General Plan, any specific zoning changes or other entitlement related to the three-phase CNU project.

The Application is woefully incomplete and requires significantly more detail for any meaningful analysis. Specifically, it only contains incomplete drawings (3 levels of a 12-story building) for Phase 1. It only has very general information of Phases 2 and 3. Moreover, it contains no detail on demolition/construction related activities. These significant deficiencies are on the developer who controls the completeness and timing of the pertinent information. We reserve the right to submit additional EIR related questions/comments as more information is submitted by the developer to complete the Application.

Finally, it is our understanding, based City staff response to questions at the NOP meeting, that no demolition of existing building/small businesses is allowed on the site, if at all, until the Final EIR is adopted. Please confirm that our understanding is correct.

We appreciate your consideration.

Sincerely,

Jan Smutny-Jones

916.296.8584

smutny@gmail.com

RECEIVED
JUN 27 2019
By A. Arceo

**NEST COMMENTS OF NOTICE OF PREPARATION FOR THE NORTHSTATE UNIVERSITY MEDICAL CENTER.**

**27 MAY 2019- SUBMITTED BY NEST/JAN SMUTNY-JONES**

**General Comments/Questions**

Given the scope and impact of this major development, the City of Elk Grove needs to conduct an independent analysis addressing: 1) the need for a Trauma II hospital in Elk Grove; 2) the suitability of the specific location being considered; 3) the cumulative impact of the already City approved Dignity Hospital approximately 3 miles apart on Elk grove Boulevard.

The City's disclaimer that this is a private property decision, ignores the fact that an existing shopping center, with small businesses (which the City actively encouraged) which are used by the community, is being demolished and replaced with a huge "essential health care facility", on a 200-year flood plain. The City authorizing this project would be imprudent at best and potentially catastrophic without an independent need's analysis.

Even presuming the need for a Trauma II center, the CNU Application is devoid of any explanation of why this specific location is needed for a hospital. It is on the far western end of the City of Elk Grove accessed by Elk Grove Blvd. There are no population centers to the west, which has a wildlife preserve, wetlands and agriculture uses. It is approximately 7 miles to the north before encountering a population center (Pocket Road) an area currently being served by Kaiser South Trauma Center. It is 33 miles to the south (Highway 12), before encountering a population center. There is no explanation in the Application why this isolated site is appropriate for a large hospital/trauma complex which are normally centrally located in population centers.

The main hospital building is 271 feet in height. What is the current City of Elk Grove height restrictions for buildings adjacent to residential neighborhoods?

Is there height restriction placed on the Dignity Hospital? If so, what are they and why?

There is a need for artist renderings of scale and scope of hospital complex (all 3 Phases) from Riparian Drive, Elk Grove Blvd, Maritime Dr. and Waterfowl Dr. to assess visual impact on existing neighborhoods

There is a need for detail on building(s) glazing. Reflective glazing is responsible for bird kills. CNU complex is adjacent to a major wildlife preserve used by migratory bird on the Pacific Flyway.

Building glazing and other materials may have heat or other micro-climate impacts on the site and adjacent property. How will CNU address these impacts?

Aesthetics- The limited artist rendering of the proposed architecture appears to be out of character with the general character of the commercial and residential aesthetics of Western Elk Grove.

As an infill development, is the trauma center complementary with the surrounding area and neighborhood?

The hospital is immediately adjacent to an existing gas station. What are the regulations or potential impacts/hazards associated with siting a hospital next to a gas station?

There are no specific descriptions or plans on the Mechanical Penthouse. What equipment and hazardous materials will be located there?

Are the other 9 floors that have not been made available for review in the application of the hospital be identical?

Do these 9 floors only contain hospital beds or are there additional labs, wet labs, operating rooms or other medical services on them?

What are the impacts of traffic, released patients and emergency vehicles related to the hospital complex on Elliot Ranch Elementary School and the Don Nottoli Park?

Is the hospital complex consistent with a Master Planned Community?

**200 Year Floodplain (3 feet + water above existing grade)**

The Proposed Medical Center is in the 200-year flood hazard zone. How is this consistent with Elk Grove General Plan SA-14 : "The City shall locate and encourage other agencies to locate new essential government services facilities and **essential health care facilities** outside of the 100- year and 200-year flood hazard zones , except in cases where such locations would compromise facility functioning" ?

Does the proposed site have an urban level of flood protection?

Plans indicate that the hospital site will be elevated 7 feet higher than current grade to address 200-year flood plain concerns. Is this enough for an acute care hospital?

Will the basement still be in the 200-year flood plain? What critical equipment will be housed there?

The Central Plant will also be raised to address 200-year flood plain level. What critical equipment will be housed there?

Will all hazardous substances and infrastructure delivering them be elevated above the 200-year flood plain?

Will the Dormitory (Phase 3) be elevated above the 200-year flood plain?

While the hospital may be raised above the 200-year flood plain the roads accessing the hospital (West Taron, Elk Grove Blvd., Maritime and I -5 appear to be flooded in a 200-year event. How will the hospital be accessed by emergency vehicles?

Does Cosumnes Fire Dept have ambulances and fire equipment that operate in 3ft + of water?

Does Elk Grove Police Dept. have vehicles that operate at 3ft + water depth?

Does Sacramento County Sheriff have vehicles that operate in 3 ft+ water depth?

What is the plan to evacuate patients from the site in case of a 200-year flood?

Are utility services serving the hospital complex, water, sewer, gas, communications and electricity secure in a 200-year flood event?

How will the 200-year flood plain be affected by sea level rise and corresponding tidal impact on the levee system and potential depths of flooding?

**Traffic and Access**

The only access providing ingress and egress for the hospital complex/trauma center is W. Taron Drive, a street that currently serves as a primary access street into the residential Stonelake Community. It was not designed to accommodate the level of traffic likely attracted to the hospital complex. What modifications will be necessary to address this significant traffic impact while preserving access into the residential neighborhood?

What is the traffic load assumed for Riparian Drive providing ingress/egress to the hospital complex?

What is the traffic load assumed for Waterfowl Drive providing ingress/egress to the hospital complex? This road provides right turn only on to eastbound Elk Grove Blvd.

What is traffic load on Stonelake Club Dr. providing egress and ingress for the hospital complex? Stonelake Club Dr. is the first traffic light which would provide egress for westbound traffic (left turn) to access I-5.

What is the traffic load assumed for East Taron Dr. providing ingress/egress serving the hospital complex? East Taron has the only other traffic light allowing for westbound egress from the hospital complex.

How will hospital related traffic be kept out of residential neighborhoods?

How does increased vehicle activity in the Stonelake Community fit within the current general plan and climate change goals?

What is the added traffic load assumed for Elk Grove Blvd?

What is the added traffic load assumed for Maritime Drive?

The Elk Grove Blvd. westbound ambulance entrance, a left turn into cross traffic, appears to be very close to the I-5 Southbound exit. Is this consistent with current California law?

Access to hospital complex site from eastbound Elk Grove Blvd is limited to right hand turn into the complex. This access is one-way into the complex. Is this enough for a complex of the size being considered?

What is the impact of the hospital complex on southbound I-5 exiting traffic onto Elk Grove Blvd?

What will be the impact of the hospital complex on I-5 which already experiences congestion?

What are the transportation plans, other than automobiles, for accessing the hospital complex?

What is the effect of the Trauma Hospital on the Transportation element of the General Plan?

**Parking**

Planned parking for all 3 phases is a planned total of 3,390. What is the projected daily traffic flow into the completed project?

What are the impacts on parking during different phases of developing the complex?

Will the parking structure have charging stations for electric vehicles? If so, how many?

How will hospital complex related parking be kept out of residential neighborhoods?

What is the height of the parking structures?

**Helicopters**

The Application lacks any information, including detail rendering/plans of the Helicopter facility serving the hospital. We reserve the right to further comment when the developer completes the Application.

What will be fight patterns?

Airspace over Stonelake Community serves Sacramento International Airport, Sacramento Executive Airport and U.S. Airforce Travis Field. What effect does the Helistop on the use(s) of this airspace?

What will be the helicopter noise impact on the community?

What impacts will the operation of helicopters have on wildlife in the immediate adjacent wildlife areas?

The hospital complex has the Stonelake Wildlife Preserve on its southern and western approaches. To the north are the Sacramento County Bufferlands which also serve as bird habitat. Large waterfowl are prevalent in the area and fly at altitudes that could present a danger for helicopters. How will the issue be addressed?

**Trauma Center**

What are the security measures planned for the trauma center?

Will the existence of the trauma center require an additional law enforcement presence in the Stonelake Community?

Does Cosumnes Fire Department have appropriate equipment to address fire or other emergency conditions in a 12 story (plus) structure?

What are the impacts of emergency vehicle noise and hospital alarms in the adjacent residential neighborhood?

Will the hospital be sound proofed?

Access and egress are critical in an emergency, such as, fire. Is there a plan for fire drills and emergency evacuation of the complex? Where will people evacuate to?

**Wildlife Areas**

The hospital complex is in proximity of the Stonelake Wildlife refuge and the Bufferlands which are active habitat on the Pacific Flyway. At 271 feet, the hospital complex height is within the altitudes utilized by large birds. Glazing and lighting utilized on the structure are a potential hazard to flying birds. How will this be addressed?

Property contained within the Stonelake Wildlife Refuge has wildlife easements. Will these be affected by the development of the hospital complex.

The Stonelake area is on the Pacific Flyway, subject to the international migratory bird treaty. How is a 12-story building, in an area active with migratory birds consistent with good planning?

**Hazardous Substances/Waste**

Where will hazardous materials be stored? Will they be in containment areas, if so where?

What is the access point for trucks carrying hazardous material to and from the hospital site?

Will liquid waste from sinks and other equipment be treated on site or will there be a dual discharge system to Sacramento County Sanitations?

Will there be any hazardous gases stored on site? Will the air at the storage facility be continuously monitored?

What is the air quality impact of the ventilation of air borne particle dissemination outside of the parking structures, hospital and dormitory?

**Environmental Regulatory Requirements**

The proposed project will significantly increase vehicle traffic in Western Elk Grove.

- What will be the increase in criteria air pollutants?
- What will be the increase in transportation related greenhouse gas emissions?
- Is the increase GHG emissions consistent with the General Plan?
- What effect does this project have on the City's Vehicle Miles Travelled goals?

What specific City of Elk Grove environment al ordinances and/or regulation are applicable to the medical complex?

How does CNU intend to comply with the Clean Air Act?

How does CNU intend to comply with the Toxic Substances Control Act?

How does CNU intend on complying with the Federal Water Pollution Control Act?

How does CNU intend on complying with the Occupational Safety and Health Act?

**Energy and Water Use**

What is the electricity load related to the 3 phased Hospital/Trauma Center and any other related cumulative development?

Is the existing SMUD distribution infrastructure designed to handle this additional load?

What level of energy efficiency will the developer utilize in the construction of the complex?

What is the projected natural gas usage associated with the 3 phased Hospital /Trauma Center and other related cumulative developments?

Is the existing PG&E natural gas distribution system designed to meet this need?

How much water will the 3 phased Hospital /Trauma Center and related cumulative development use on a daily basis?

Will the facility utilize recycled water?

**Neighborhood Impacts**

West Elk Grove neighborhoods are balanced mix use. How is the medical complex consistent with this balanced mix use?

What will be the setbacks for the 5-story dormitory abutting the 1 or 2 story residential homes on Ruddy Duck Way?

Is the West Taron water well impacted by the project?

How will buildings in the medical complex assure solar access to neighboring properties?

What impact will 300 additional students living in the dorms have on recreation, traffic and parking?

**Cumulative Hospital Impacts (Dignity?)**

The approved Dignity Hospital, 3 miles east on Elk Grove Blvd., will soon begin construction. What are there cumulative environmental or economic impacts of having two hospitals in proximity to one another?

The Developer/West Taron recently purchased additional land just north of Elk Grove Blvd. Is this land planned for expansion of the hospital complex? What will be the cumulative impact of further expansion north of the hospital facility?

Public records search has identified a program called "Project Medi". What are the cumulative impacts of this project as it relates to the hospital complex?

**Construction Related Impacts**

The Application and NOP have no details on construction related activities. These will be significant. It is not possible to offer specific concerns in the absence of further detailed information. We reserve the right to further comment as the Developer completes the Application.

General Obvious Concerns:

Demolition

Noise

Dust

Fumes

Heavy vehicle traffic in and around neighborhood.

Construction schedules

Is there a laydown yard? If so where?

Will the construction be covered by a Project Labor Agreement (PLA)?

**END OF COMMENTS TO THE NOP BASED UPON THE INCOMPLETE APPLICATION OF THE CNU APPLICANT. WE RESERVE THE RIGHT TO FURTHER COMMENT ON SPECIFIC DETAILS AS THE APPLICANT COMPLETES THE APPLICATION.**

**DEPARTMENT OF TRANSPORTATION**
DISTRICT 3
PLANNING DIVISION
703 B Street, MS-4130
Marysville CA 95901
PHONE (530) 634-7616
www.dot.ca.gov
TTY 711
www.dot.ca.gov

*Making Conservation a California Way of Life.*

June 27, 2019

GTS# 03-SAC-2019-00466
EG-18-097

Ms. Sarah Kirchgessner
Project Planner
Development Services - Planning
City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 95758

**California Northstate University Medical Center – Notice of Preparation of Environmental Impact Report**

Dear Ms. Kirchgessner,

Thank you for including the California Department of Transportation (Caltrans) in the review process for the project referenced above. Caltrans' new mission, vision, and goals signal a modernization of our approach to California's transportation system. We review this local development for impacts to the State Highway System (SHS) in keeping with our mission, vision, and goals for sustainability/livability/economy, and safety/health. We provide these comments consistent with the State's smart mobility goals that support a vibrant economy, and build communities, not sprawl.

The project is located at the southwest corner of the intersection of Elk Grove Boulevard and West Taren Drive in the City of Elk Grove, southeast of the Interstate 5 (I-5) and Elk Grove Boulevard interchange. The project proposes a teaching hospital and associated central plant building, several parking structures, ground-floor commercial space, a roof-top sports court, a medical office building, an outpatient clinic, and a student dormitory. The project would be completed in three phases, and the completed project would entail 400 patient beds and 150 housing units for 300 students. The following comments are based on the information received.

***Forecasting/Traffic Operations***

Given the number of beds, parking spaces, and expected employees in the full build out of the project, Caltrans anticipates that peak hour and daily trip generations would increase significantly from existing levels. The project should provide bus stops and ride share designated zones to comply with the multi-model transportation plan.

Since the project is located next to the I-5 Elk Grove Boulevard interchange, we anticipate it to have significant transportation impacts to the I-5 corridor. Caltrans requires a Transportation Impact Study (TIS) to identify the project's transportation impacts and mitigation. The existing

traffic conditions for the I-5/Elk Grove Boulevard interchange with and without the project will need to be included in the TIS, as well as future transportation impacts with the new structure. The TIS should provide a Level of Service (LOS) analysis for the following locations:

- I-5 / Elk Grove Boulevard Interchange
- I-5 / Hood Franklin Road Interchange
- SR 99 / Elk Grove Boulevard Interchange
- SR 99 / Laguna Boulevard Interchange

The TIS should include analysis for freeway mainlines, ramps, and ramp terminal intersections. A merge/diverge analysis should be performed for freeway and ramp junctions. Length of queue analysis should be included for all off-ramps. All analysis should be based on AM and PM peak hour volumes. The analysis should include the individual, not averaged, LOS and traffic volumes applicable to all intersection road approaches and turn movements. If there are any questions regarding the scope for the TIS, Caltrans is open to scheduling a scoping meeting.

The proposed "Emergency Traffic Only" left-turn pocket would violate Section 504.8, "Access Control," of the Highway Design Manual because it could not prohibit non-emergency traffic to access the left-turn pocket. Caltrans may consider the feasibility of this left-turn pocket if it could prevent non-emergency traffic from using it. Additionally, Caltrans will only accept Regulatory Signs approved in the latest version of the California Manual on Uniform Traffic Control Devices.

**Hydraulics**

The development of this site will potentially result in an increase in peak surface water runoff due to construction of buildings and parking and an increase in impermeable surface area. Peak runoff discharge for the 10 and 100-year storm events to the State's Right of Way and to Caltrans' drainage facilities must be reduced to at or below the pre-construction levels. This may be accomplished through the implementation of storm water management Best Management Practices (i.e., detention/retention ponds or basins, sub-surface galleries, on-site storage and/or infiltration ditches, etc.). Once installed, the property owner must properly maintain these systems. The proponent/developer may be held liable for future damages due to impacts for which adequate mitigation was not undertaken or sustained. In addition, runoff from the proposed project that will enter the State's Right of Way and/or Caltrans drainage facilities must meet all regional water quality control board water quality standards prior to entering the State's Right of Way or Caltrans drainage facilities. Appropriate storm water quality Best Management Practices may be applied to ensure that runoff from the site meets these standards (i.e., is free of oils, greases, metals, sands, sediment, etc.). Once installed, the property owner must properly maintain these systems in perpetuity.

All work proposed and performed within the State's right of way must be in accordance with Caltrans' standards and require a Caltrans Encroachment Permit prior to commencing construction.

For the encroachment permit application, provide drainage plans and calculations for the pre and post 10 and 100 peak run-off (quantities and velocities) and water quality treatment for all discharge to the State's Right of Way and to Caltrans' drainage facilities.

**Encroachment Permit**

An encroachment permit will be required from Caltrans for any work performed on the State Right of Way if not previously obtained. To apply, a completed encroachment permit application, environmental documentation, and five sets of plans clearly indicating State Right of Way must be submitted to:

Hikmat Bsaibess
California Department of Transportation
District 3, Office of Permits
703 B Street
Marysville, CA 95901

Please provide our office with copies of any further actions regarding this project. We would appreciate the opportunity to review and comment on any changes related to this development.

If you have any questions regarding these comments or require additional information, please contact Douglas Adams, Intergovernmental Review Coordinator, at (530) 741-4543 or by email at: douglas.adams@dot.ca.gov.

Sincerely,

Alex Fong, Branch Chief
Office of Transportation Planning
Regional Planning Branch -South

PO Box 1526, Sacramento, CA 95812-1526
office@ecosacramento.net; (916) 444-0022

June 27, 2019

Sarah Kirchgessner, Project Manager
Planning Department, City of Elk Grove
8401 Laguna Palms Way
Elk Grove, CA 96758
skirchgessner@elkgrovecity.org

**RE: Comments on Notice of Preparation of EIR for Northstate University Medical Center, PLNG 18-110**

Dear Ms. Kirchgessner

The Friends of Stone Lakes National Wildlife Refuge, Environmental Council of Sacramento and Habitat 2020 herewith submit our comments in response to a Notice of Preparation of an Environmental Impact Report for the California Northstate University Medical Center Project, dated May 29, 2019.

## A. Increase in Bird Collisions

Construction of a 12-story hospital with reflective glass will likely significantly increase avian mortality due to collision with the building. Significant numbers of large waterfowl, including sandhill cranes and geese, frequent the refuge at certain times of the year. Sandhill cranes are a fully protected species under California law and no take is permitted.

The EIR must:

- Evaluate proximity of building to Stone Lakes wetlands and foraging sites, in particular North Stone Lake
- Identify waterfowl and passerine utilization of refuge sites in proximity to the proposed building(s)

- Evaluate the relationship between roosting sites and foraging areas and the extent to which building location will interfere with bird movement between the two

- Consult with specialists to estimate bird mortality resulting from bird strikes. The analysis should distinguish between passerine species, migratory waterfowl and specifically sandhill cranes.

## B. Helicopter Flight Impacts

The presence of a heliport atop the structure will impact migratory birds in surrounding roosting and foraging habitat. Helicopter flights will likely increase bird mortality due to collisions. The potential for bird collisions increases the likelihood of a helicopter crash with potentially fatal consequences. Helicopter noise will disturb roosting and foraging birds, causing them to take flight. Geese are particularly sensitive to helicopter noise.

Please note that Federal law restricts aircraft flight elevations over national wildlife refuges. Restrictions on approaches and flight angles for arriving and departing helicopters may increase noise impacts over residential areas.

The EIR must:

- Estimate the number of flights based on full build-out of project and evaluate diurnal and seasonal variation

- Evaluate how restricted air space in the vicinity of Stone Lakes NWR will impact helicopter approach angles

- Consult with avian specialists to estimate the increase in bird mortality due to aircraft collision

- Consult with aviation specialists to assess the probability of a helicopter crash involving collision with cranes, geese and other waterfowl

- Consult with avian specialists to assess the frequency of disturbance to roosting and foraging waterfowl due to aircraft noise, and the associated impacts of the disturbances, with particular attention to disturbance to geese. The analysis should consider the cumulative impact of repeated noise stressors on bird health

- Discuss how federal restrictions on aircraft may alter noise impacts on surrounding residential neighborhoods.

## C. Lighting Impacts

The hospital and possibly other buildings on the site will have 24 hour lighting. Night lighting and glare not only adds to light pollution from the urban area, but can potentially impact the behavior of migrating birds.

The EIR must:

- Require sufficient detail on the hospital design to identify the intensity and glare of lighting.

- Consult with avian experts to assess the potential to impact migrating and non-migrating birds in the Stone Lakes NWR, and how impacts can be mitigated.

## D. Flooding

The hospital campus is proposed to be located within a 200 year flood plain. The hospital campus is in Zone X of the FEMA rate map and is subject to the provisions of SB5 Chapter 364 requiring 200 year flood protection. The main hospital building is proposed to be located on a pad that raises the structure above the 200-year flood elevation. Other buildings, including a proposed residential dormitory, and roads providing access to the hospital, will not be elevated above the 200-year flood elevation.

Major flooding events in south Sacramento County are exacerbated by backup flow from the Mokelumne/Cosumnes River complex to the south which may not be mitigated by levees, dams or other conventional means. Climate change induced sea level rise will impact the Delta and potentially exacerbate future floods. Flood impacts will be further exacerbated if flooding occurs during a period of extreme tidal variation.

The EIR must:

- Evaluate the project for compliance with the requirements of SB5, Chapter 364

- Identify the most likely source(s) of inundation for a 200 year flood event.

- Identify the depth and duration of a 200 year flood event within the floodplain surrounding the hospital building site

- Identify the depth and duration of a 200 year flood event under mid-to-worst case sea level rise scenarios during a period of extreme tidal variation

- Discuss the safety impacts associated with access to a level 2 trauma center during various 200 year flood event scenarios

- Evaluate flood mitigation options and their effectiveness under different flooding scenarios.

## E. Surface Runoff

The project will potentially increase surface runoff from structures, parking and other impervious surfaces. The project's proximity to North Stone Lake within the Stone Lakes NWR raises concerns about potential impacts on North Stone Lake. A surface water retention and treatment plan should be incorporated as part of the project and not be deferred as a mitigation measure.

The EIR must:

- Quantify potential increases in surface water runoff associated with full project build-out, identify the downstream course of flow, assess runoff water quality and identify the potential to adversely impact North Stone Lake.

- Require a surface water retention and treatment plan as part of the project and evaluate its ability to mitigate adverse impacts.

## F. Cumulative Impacts and MTP Sustainable Communities Strategy

The Sacramento Area Council of Governments (SACOG) is required by law to adopt and update a regional Sustainable Communities Strategy (SCS) sufficient to meet carbon and air quality conformity requirements. The Project represents a major trip generator at the edge of the Sacramento urban area. It cannot be assumed that the project at build-out will have an insignificant impact on trip-making behavior and VMT, and that that impact can be accommodated cumulatively in SACOG's SCS.

The EIR must:

- Model, in coordination with SACOG and the Sacramento Metropolitan Air Quality Management District, the cumulative impact of the proposed project on VMT

- Assess the cumulative impact of the project's VMT contribution in terms of consistency with the SCS and a adopted air quality plans.

## G. Growth Inducement

The project location is at the southwest corner of the urban area with land currently identified as permanent agriculture on the Sacramento County General Plan south of Hood Franklin Road, two miles to the south. The Elk Grove General Plan identifies growth study areas for the area south of the current sphere of influence and east of Franklin Road. The General Plan does not however designate them for urbanization. The same area is identified as important habitat for mitigation of Swainson's hawk, sandhill cranes and other listed species in the South Sacramento HCP, with a target of acquiring 1000 acres of habitat easements specifically in the area south of Elk Grove.

The EIR must:

- Identify characteristics of the project, eg primary employment and its multiplier effect, which would lead to increased demand for housing and commercial services

- Evaluate the stimulus effect of the project on demand for additional development in areas currently not planned for growth

- Evaluate the project's impact on raw land values and the resulting impact on implementation of the SSHCP.

## H. Project Alternatives

The Project proposes a large hospital at the southwest corner of the Sacramento urban area, with a limited service area population to the west and south of the site. The project proposes a third level two or greater trauma center in the south Sacramento area. The only other similar trauma center in the metro area is located in Roseville.

The EIR must:

- Identify and evaluate the impacts of at least one alternative site in the region that would better provide patient access to trauma level emergency health care for east Sacramento County and west El Dorado County residents.

- Identify at least one alternative site on vacant land within Elk Grove City or South County that would be outside of the floodplain, have less impact on wildlife and have less growth inducing impact.

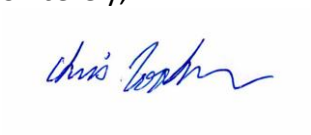
Thank you for the opportunity to comment on the scope and depth of the environmental document for this major Elk Grove project. We hope you will embrace their constructive intent and endeavor to include them in a thorough and thoughtful environmental document.

Our three organizations have a long history of advocating for good planning that protects habitat in south Sacramento County.

The Friends are a nonprofit organization dedicated to preserving and protecting the Stone Lakes National Wildlife Refuge  The Stone Lakes NWR is the single largest complex of natural wetlands, lakes and riparian areas remaining in the Sacramento-San Joaquin Delta, and provides critical habitat for waterfowl and other migratory birds of international concern, as well as endangered plant and animal species. Location at the south end of a large urban area increases the Refuge's importance as a stop on the Pacific Flyway migratory route.  Stone Lakes NWR and its surrounding agricultural areas are home to several special status species, including the tri-colored blackbird, greater sandhill crane, white-face ibis, long-billed curlew, Swainson's hawk, burrowing owl, giant garter snake and valley elderberry longhorn beetle.

The Environmental Council of Sacramento (ECOS), a 501c3 organization, and Habitat 2020 are partner coalitions dedicated to protecting the natural resources of the greater Sacramento region. ECOS-Habitat 2020 member organizations include: 350 Sacramento, Breathe California of Sacramento-Emigrant Trails, International Dark-Sky Association, Los Rios College Federation of Teachers, Mutual Housing California, Physicians for Social Responsibility Sacramento Chapter, Preservation Sacramento, Resources for Independent Living, Sacramento Housing Alliance, Sacramento Natural Foods Co-op, Sacramento Vegetarian Society, SEIU Local 1000, Sierra Club Sacramento Group, The Green Democratic Club of Sacramento, and the Wellstone Progressive Democrats of Sacramento, Sacramento Audubon Society, California Native Plant Society, Friends of the Swainson's Hawk, Save the American River Association, Save Our Sandhill Cranes, Sierra Club Sacramento Group, Friends of Stone Lakes National Wildlife Refuge, and the Sacramento Area Creeks Council.

Sincerely,



Chris Tooker, President
Friends of Stone Lakes NWR



Sean Wirth, Co-Chair
Habitat 2020



Ralph Propper, President
Environmental Council of Sacramento

June 27, 2019

Sarah Kirchgessner
Elk Grove Development Services Department
8401 Laguna Palms Way
Elk Grove, CA 95758

Dear Ms. Kirchgessner,

We are submitting the following comments/questions in response to the information provided by the City Planning Manager and the EIR project manager during the June 24th NOP scoping meeting for the draft environmental impact report for the California Northstate University Level II trauma center/hospital to be built on the site of the Stonelake Landing shopping center. Some are specific to the EIR and others specific to the planning process in general.

According to the information at the scoping meeting, the phase I hospital is projected to be 12 stories high. The maximum building height in Elk Grove is 4 stories but can be exceeded with justification. The proposed Dignity Health hospital, again according the information at the meeting, was approved at 6 stories with justification. What would justify a building in Elk Grove that would be 3 times taller than what is typically approved and twice as tall as Dignity Health? The height of this building across Interstate 5 from the Stonelakes National Wildlife Refuge with migratory birds flying across the freeway to the 1400 acres directly adjacent to and south of the Stonelakes community should not be justified.

We have heard anecdotally, that CNU is pressuring or offering some or all the businesses in the buildings slated to be demolished in Phase I, to move to another location, perhaps even to a location not slated to be demolished until Phase III. We are concerned that CNU may be under the impression that they could begin demolishing buildings prior to the final approval of the project – all three phases. Why would they be doing this without some belief they would be able to do that? We would like confirmation that no buildings could be demolished, or any construction started without first receiving final approval from the City for ALL THREE PHASES. Must CNU wait for other approvals, such as State of CA, Sacramento County or federal approvals before they could pull a permit and begin demolition?

If the EIR is completed and certified in the Spring 2020, what is the earliest the Planning Department could complete its review, assuming all the applicant's documentation is in order (which is currently woefully incomplete). What is the earliest it would be referred to the Planning Commission for review?

What agency is responsible to review the applicant's financial ability to build and operate this hospital at a profit? What consideration is given to the possible failure of the hospital given CNU's lack of experience in building and operating a hospital of any size given that Dignity Health has built/operates approximately 673 hospitals, clinics and health care centers and CNU none.

What consideration in the Planning Department or EIS study will be given to the fact that Dignity Health has already pulled permits and expects to construct a 100-bed hospital within just a few miles of CNU's project? The fact that they would offer the same services, for at least five years before CNU could contemplate a Level II trauma designation seems unnecessary considering all the other neighborhood, business and environmental concerns.

At what point would be the next public meeting on the project be scheduled?

We would appreciate the City's response to our comments and questions.

Respectfully

Gary and Deborah Sibner
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June 27, 2019

**SENT VIA EMAIL (skirchgessner@elkgrovecity.org)**

City of Elk Grove
Development Services Department
c/o Sarah Kirchgessner, Project Planner
8401 Laguna Palms Way
Elk Grove, CA 95758

**RE: Comments on the Notice of Preparation of a Draft Environmental Impact Report for the California Northstate University Medical Center Project**

Dear Ms. Kirchgessner:

These comments on the Notice of Preparation ("NOP") for the California Northstate University ("CNU") Medical Center Project ("project") are submitted on behalf of the Stonelake Masters Homeowners Association ("Association") and its members. The Association, incorporated in March 2000, is made up of 1,467 single family homes neighboring the project. The Association was formed to manage a common interest development and to provide for the administration, maintenance, preservation and architectural control of the residential lots and Common Area within the Stonelake Master Association Community. The Association's members are those residents that would be adversely affected by the project and its significant impacts on the environment.

The overriding and primary goal of the California Environmental Quality Act (Pub. Resources Code, §§ 21000–21189.3 ["CEQA"]; see §§ 21000–21002) is the protection of the environment. It is the policy of the state to "[t]ake all action necessary" to provide citizens with "clean air and water," "freedom from excessive noise," "[p]revent the elimination of fish or wildlife species due to [anthropogenic] activities" and "[e]nsure that the long-term protection of the environment, consistent with the provision of a decent home and suitable living environment for every Californian, shall be the guiding criterion in public decisions." (Pub. Resources Code, § 21001, subd. (b)-(d).) The purpose of an environmental impact report ("EIR") is to provide the public with detailed information about the effect which a proposed project is likely to have on the environment; to list ways in which the significant effects of such a project might be minimized; and to indicate alternatives to such a project. (Pub. Resources Code, §§

21061, 21002.1, subd. (a).) The City of Elk Grove's ("City") EIR for the project must disclose and fully analyze all of the project's potentially significant impacts.

At this time, the Association seeks clarification of specific project elements that are not described in the NOP or the project application documents. The Association has also sought to obtain documents regarding the project through the California Public Records Act process, but the City has stated the records will not be provided until after the due date for comments on the NOP.

To facilitate the public process, the City should, at a minimum, make project application materials submitted by CNU available to the public. Currently, the only materials available on the City's website are a brief project description, and incomplete project blueprints.[1] According to the City, CNU has failed to provide a complete application. Without a complete project application, clear comments on the scope of environmental review are impaired.

As the City acknowledges on its frequently asked questions ("FAQ") page for the project, the public has significant concerns over the scope of CNU's plans for the project site.[2] A recent Sacramento Bee article detailed email exchanges between the City and CNU officials that centered on the development of a "bio wet lab" on or near the CNU campus. (Yoon-Hendricks, *Private medical school asked Elk Grove to provide financing for $750M hospital, emails show*, Sacramento Bee (April 5, 2019).) While the City's website expressly denies the creation of a bio-tech district, it does not mention a laboratory of any type. CNU's project plans are unclear as to all of the possible activities that would occur at or near the medical campus. The type of lab activities CNU intends to conduct on the project site, and any other type of activities that could involve dangerous chemicals or hazardous waste, must be fully disclosed for complete review to be conducted. Further, the City should disclose whether there are reasonably foreseeable future projects that would include a wet chemistry lab or a bio-tech district.

The project will purportedly be developed in three phases. However, CNU's project description, as well as the NOP, fails to provide a timeline of the project's proposed phased development. The only relevant information provided is on the FAQ

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1 http://www.elkgrovecity.org/city_hall/departments_divisions/planning/current_development_projects/california_northstate_university_hospital/documents__visuals

2 http://www.elkgrovecity.org/city_hall/departments_divisions/planning/current_development_projects/california_northstate_university_hospital/frequently_asked_questions

page, which states construction would begin in 2020, and the hospital would open in 2022. The City should provide an approximate timeline for each phase of development so that the public can better understand the associated environmental impacts of each phase. The EIR should also provide detailed analysis of each phase's distinct impacts.

The Association and other members of the public have concerns about the project's impacts on the greater Elk Grove area and Stone Lakes National Wildlife Refuge ("the Refuge"). The design of the project would cause potentially significant effects. The height and reflective materials of the hospital would create a risk of bird strikes from birds in and nearby the Refuge, including Fully Protected Species such as the Greater sandhill crane. (Fish & G. Code, § 3511.) Additionally, as noted by one commenter at the June 25, 2019 scoping meeting, the reflective nature of the hospital could create a glare and heat risk for nearby residents, drivers, and those on the campus.

The project includes the addition of 3,390 parking spots, and would presumably cause a staggering increase in traffic. Along with regular traffic, emergency vehicles traveling to and from the hospital, such as helicopters, ambulances, fire trucks, and police vehicles, would create noise impacts for nearby sensitive receptors. Helicopters would additionally pose a threat to birds in and near the Refuge. All of the vehicle traffic generated by the project would cause impacts to air quality, potentially harming sensitive receptors and Refuge wildlife. The City must be cognizant of and analyze all of the project's potential impacts on natural and human environment.

Additionally, both CNU's and the NOP's descriptions do not provide adequate detail of the demolition activities required to build the project. The EIR must include sufficient information and analysis of the planned demolition of existing buildings and address the potential waste of resources caused by demolishing existing structures.

Last, the project would undoubtedly require a significant amount of energy and utility resources. CNU's and the NOP's project descriptions make no mention of the project's energy consumption nor any other infrastructure changes that may be necessary. The EIR must disclose and analyze the project's energy consumption, as well as any infrastructure activities that would be required.

The Association hopes that the City will take these concerns seriously, and be forthright in its environmental review of the project. Thank you for considering these comments and please feel free to contact my office with any questions.

Very truly yours,

**SOLURI MESERVE**
A Law Corporation

By: 
Osha R. Meserve

ORM/NS:mre

**U.S. Department of Transportation**

Federal Aviation Administration

# Advisory Circular

| Subject: Heliport Design | Date: 4/24/2012 | AC No: 150/5390-2C |
|---|---|---|
| | Initiated by: AAS-100 | Change: |

**1. Purpose.** This advisory circular (AC) provides standards for the design of heliports serving helicopters with single rotors. Apply basic concepts to facilities serving helicopters with tandem (front and rear) or dual (side by side) rotors, however many standards will not apply.

**2. Cancellation.** This AC cancels AC 150/5390-2B, Heliport Design, dated September 30, 2004.

**3. Application.** The Federal Aviation Administration (FAA) recommends the guidelines and specifications in this AC for materials and methods used in the construction of heliports. In general, use of this AC is not mandatory. However, use of this AC is mandatory for all projects funded with federal grant monies through the Airport Improvement Program (AIP) and with revenue from the Passenger Facility Charge (PFC). See Grant Assurance No. 34, Policies, Standards, and Specifications, and PFC Assurance No. 9, Standards and Specifications. For information about grant assurances, see http://www.faa.gov/airports/aip/grant_assurances/. The use of terms implying strict compliance applies only to those projects. Other federal agencies, states, or other authorities having jurisdiction over the construction of other heliports decide the extent to which these standards apply.

**4. Principal changes.**

**a.** Changed the term for the helicopter overall length (OL) to 'D' or 'D-value.'

**b.** Added definitions for design loads for static and dynamic load-bearing areas (LBA).

**c.** Added guidance for pavement or structure larger than the touchdown and liftoff area (TLOF), but less than the size of the final approach and take off (FATO).

**d.** Added guidance for turbulence effects.

**e.** Added guidance to provide adequate clearance between parking areas and taxi routes and within parking areas.

**f.** Added guidance for minimum dimensions of curved approach/departure airspace.

**g.** Added guidance for Touchdown/Positioning Circle (TDPC) Marking.

**h.** Added guidance for Flight Path Alignment Guidance markings and lights.

**i.** Added an appendix providing guidance for Emergency Helicopter Landing Facility Requirements (EHLF).

**j.** Added FATO to FATO separation distance for simultaneous operations.

**k.** Revised standards for size of "H" for general aviation heliports.

**l.** Added increased TLOF size when the FATO of a hospital heliport is not load bearing.

**n.** Combined chapter 6, Non-Precision Instrument Operations and Chapter 7, Precision Approach Operations into chapter 6, Instrument Operations. Reference FAA Order 8620 series.

**o.** To improve the legibility of the AC, changed the format to a single column and nested the tables in the text.

**p.** Deleted requirements for load bearing capacity of a FATO at general aviation and hospital heliports when the TLOF is marked.

**q.** Changed color of landing direction lights from yellow to green.

**r.** Added references to Engineering Brief 87, Heliport Lights for Visual Meteorological Conditions (VMC).

**5. Use of metrics.** This AC includes both English and metric dimensions. The metric conversions may not be exact equivalents, and the English dimensions govern.

**6. Copies of this AC.** This and other advisory circulars published by the Office of Airport Safety and Standards are available on the FAA Office of Airports web page at www.faa.gov/airports.



MICHAEL J. O'DONNELL

Director of Airport Safety and Standards

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# Chapter 1. Introduction

**101. Background.** Section 103 of the Federal Aviation Act of 1958 states in part, "In the exercise and performance of his power and duties under this Act, the Secretary of Transportation shall consider the following, among other things, as being in the public interest: (a) The regulation of air commerce in such manner as to best promote its development and safety and fulfill the requirements of defense; (b) The promotion, encouragement, and development of civil aeronautics . . ." This public charge, in effect, requires the development and maintenance of a national system of safe heliports. Using the standards and recommendations contained in this publication in the design of heliports supports this public charge. These standards and recommendations, however, do not limit or regulate the operations of aircraft. When it is not feasible to meet all the standards and recommendations in this AC, consult with the appropriate offices of the Federal Aviation Administration (FAA) Office of Airports and Flight Standards Service to identify any adjustments to operational procedures necessary to accommodate operations to the maximum extent.

**102. General.** This chapter provides an explanation of terms used in this AC, describes the notification responsibilities of heliport proponents to FAA, provides general siting guidance, and identifies sources of technical information relating to heliport planning and design of a civil heliport.

**103. Facilities.** While heliports can be large and elaborate, most are not. The basic elements of a heliport are clear approach/departure paths, a clear area for ground maneuvers, final approach and takeoff area (FATO), touchdown and liftoff area (TLOF), safety area, and a wind cone. This minimal facility may be adequate as a private use prior permission required (PPR) heliport, and may even suffice as the initial phase in the development of a public use heliport capable of serving the general aviation segment of the helicopter community.

**104. Planning.** While the heliport itself may be simple, the planning and organization required to properly put one into place can be intimidating. Consider the physical, technical, and public interest matters described in this document in the planning and establishment of a heliport. While this AC is a technical document intended to help engineers, architects, and city planners design, locate, and build the most effective heliport, anyone considering the construction of a heliport can use it. Figures in this document are general representations and are not to scale.

**105. Existing heliports.** When a change to an existing heliport requires the submission of FAA Form 7460-1, Notice of Proposed Construction or Alteration, or FAA Form 7480-1, Notice of Landing Area Proposal, bring the heliport up to current standards. It may not, however, be feasible to meet all current standards at existing heliports. In those cases, consult with the appropriate offices of the FAA Office of Airports and Flight Standards Service to identify any adjustments to operational procedures necessary to accommodate operations to the maximum extent.

**106. Location.** The optimum location for a heliport is near the desired origination and/or destination of the potential users. Industrial, commercial, and business operations in urban locations are demand generators for helicopter services, even though they often compete for the limited ground space available. Heliport sites may be adjacent to a river or a lake, a railroad, a freeway, or a highway, all of which offer the potential for multi-functional land usage. These locations also have the advantage of relatively unobstructed airspace, which can be further protected from unwanted encroachment by properly enacted zoning. As vertical flight transportation becomes more prevalent, requirements for scheduled "airline type" passenger services may necessitate the development of an instrument procedure to permit "all-weather" service.

**107. AC organization.** This AC is structured to provide communities and persons intending to develop a heliport, or become involved in regulating helicopter facilities, with general guidance on heliport requirements. The AC covers general aviation heliports (including PPR), transport heliports, hospital heliports, and emergency landing facilities. It is important for a heliport proponent to be familiar with the terminology used in this specialized field. This chapter defines terms used in the industry and identifies actions common to developing a heliport.

**a. General aviation heliports**. The term "general aviation" is technically defined as "flights conducted by operators other than Title 14 of the Code of Federal Regulations (CFR) Part 121 or Part 135 certificate holders."[1] However, for the purposes of this AC, "general aviation" refers to all helicopter operations other than scheduled passenger service. Hospital heliports and emergency landing facilities fall under general aviation, but are treated separately in the AC due to their unique requirements. General aviation heliports are normally privately owned although they can be publicly owned. Find design standards for general aviation heliports in Chapter 2.

**b. Transport heliports.** Transport heliports will provide the community with a full range of vertical flight services including scheduled service by air carriers (airlines) using helicopters. These operations will require a more extensive airside and landside infrastructure with the potential capability to operate in instrument meteorological conditions. Find design standards for transport heliports in Chapter 3.

**c. Hospital heliports.** Hospital heliports are general aviation heliports that provide a unique public service. They are normally located close to the hospital emergency room or a medical facility. Find design standards for hospital heliports in Chapter 4.

**d. Helicopter facilities on airports.** When there are a significant number of helicopter operations on an airport, consider developing separate facilities specifically for helicopter use. Chapter 5 addresses helicopter facilities on airports.

**e. Instrument operations.** With the introduction of the global positioning system (GPS), it is now practical for heliports to have instrument approach procedures. Good planning suggests that heliport proponents plan for the eventual development of instrument approaches to their heliports. Consider the recommendations in Chapter 6 in contemplating future instrument operations at a heliport. It is wise to consider these issues during site selection and design.

**f. Heliport gradients and pavement design.** Chapter 7 addresses heliport gradients and pavement design issues.

**g.** The appendices provide information about emergency helicopter landing facilities, helicopter dimensional data, form and proportions of certain heliport markings, and a list of publications and resources referenced in this AC.

**108. Explanation of terms.** The Pilot/Controller Glossary of the Aeronautical Information Manual (AIM) defines terms used in the Air Traffic System. Copies of the AIM are available from the FAA web site http://www.faa.gov/atpubs. Other terms used in this publication follow:

**a. Air taxi.** Used both to refer to on-demand air carriers and as a synonym for "hover taxi." See hover taxi.

**b. Approach/departure path.** The flight track helicopters follow when landing at or departing from a heliport. The approach/departure paths may be straight or curved.

[1]Plane Sense General Aviation Information, U.S. Department of Transportation FAA-H-8083-19A, http://www.faa.gov/library/manuals/aviation/media/faa-h-8083-19A.pdf

**c. Design helicopter.** A single or composite helicopter that reflects the maximum weight, maximum contact load/minimum contact area, overall length (D), rotor diameter (RD), tail rotor arc radius, undercarriage dimensions, and pilot's eye height of all helicopters expected to operate at the heliport.

**d. D (Formerly "OL").** The overall length of the helicopter, which is the dimension from the tip of the main or forward rotor to the tip of the tail rotor, fin, or other rear-most point of the helicopter. This value is with the rotors at their maximum extension. See Figure B–1. If only the value of the rotor diameter (RD) is known, estimate the value for D using the relationship D = 1.2 RD (or conversely, RD = 0.83 D).

**e. Design loads.** Design and construct the TLOF and any load-bearing surfaces to support the loads imposed by the design helicopter and any ground support vehicles and equipment.

**(1) Static load.** For design purposes, the design static load is equal to the helicopter's maximum takeoff weight applied through the total contact area of the wheels or skids. See paragraph 707.

**(2) Dynamic load.** For design purposes, assume the dynamic load at 150 percent of the maximum takeoff weight of the design helicopter applied through the main undercarriage on a wheel-equipped helicopter or aft contact areas of skid-equipped helicopter. See paragraph 707.

**f. Elevated heliport.** A heliport located on a rooftop or other elevated structure where the TLOF is at least 30 inches (76 cm) above the surrounding surface (a ground level heliport with the TLOF on a mound is not an elevated heliport).

**g. Emergency helicopter landing facility (EHLF).** A clear area at ground level or on the roof of a building capable of accommodating helicopters engaged in fire fighting and/or emergency evacuation operations. An EHLF meets the definition of a heliport in this AC and under Title 14 CFR Part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports.

**h. Final approach and takeoff area (FATO).** A defined area over which the pilot completes the final phase of the approach to a hover or a landing and from which the pilot initiates takeoff. The FATO elevation is the lowest elevation of the edge of the TLOF. See Figure 7–3.

**i. Final approach reference area (FARA).** An obstacle-free area with its center aligned on the final approach course. It is located at the end of a precision instrument FATO.

**j. Flush lights**. Where the term "flush lights" is specified in this AC, interpret it as including semi-flush lights.

**k. Frangible/frangibly mounted.** While there is no accepted standard for frangibility in regard to helicopter operations, remove all objects from a FATO or safety area except those of the lowest mass practicable and frangibly mounted to the extent practicable.

**l. General aviation heliport.** A heliport intended to accommodate individuals, corporations, helicopter air taxi operators, and public safety agencies. For the purposes of this AC, "general aviation" refers to all helicopter operations other than scheduled passenger service. Hospital heliports and emergency landing facilities fall under general aviation, but are treated separately in the AC due to their unique requirements.

**m. Ground taxi.** The surface movement of a wheeled helicopter under its own power with wheels touching the ground.

**n. Hazard to air navigation.** Any object having a substantial adverse effect upon the safe and efficient use of the navigable airspace by aircraft, upon the operation of air navigation facilities, or upon existing or planned airport/heliport capacity as determined by the FAA.

**o. Heliport.** The area of land, water, or a structure used or intended to be used for the landing and takeoff of helicopters, together with appurtenant buildings and facilities.

**p. Heliport elevation.** The highest point of the TLOF expressed as the distance above mean sea level.

**q. Heliport imaginary surfaces.** The imaginary planes defined in Title 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace, centered about the FATO and the approach/departure paths, which are used to identify the objects where notice to and evaluation by the FAA is required. Recommendations may include realignment of approach/departure paths or removal, lowering, marking and lighting of objects.

**r. Heliport layout plan.** The plan of a heliport showing the layout of existing and proposed heliport facilities including the approach/departure paths.

**s. Heliport protection zone (HPZ).** An area off the end of the FATO and under the approach/departure path intended to enhance the protection of people and property on the ground.

**t. Heliport reference point (HRP).** The geographic position of the heliport expressed as the latitude and longitude at:

**(1)** The center of the FATO, or the centroid of multiple FATOs, for heliports having visual and non-precision instrument approach procedures; or

**(2)** The center of the FARA when the heliport has a precision instrument procedure.

**u. Helistop.** A term sometimes used to describe a minimally developed heliport for boarding and discharging passengers or cargo. This AC does not use this term, as the design standards and recommendations this AC apply to all heliports.

**v. Hospital heliport.** A heliport limited to serving helicopters engaged in air ambulance, or other hospital related functions. A designated helicopter landing area located at a hospital or medical facility is a heliport and not a medical emergency site.

**w. Hover taxi (also called air taxi).** The movement of a wheeled or skid-equipped helicopter above the surface. Generally, this takes place at a wheel/skid height of 1 to 5 feet (0.3 to 1.5 m) and at a ground speed of less than 20 knots (37 km/h). For facility design purposes, assume a skid-equipped helicopter to hover-taxi.

**x. Landing position.** An area, normally located in the center of an elongated TLOF, on which the helicopter lands.

**y. Large helicopter.** A helicopter with a maximum takeoff weight of more than 12,500 lbs.

**z. Load-bearing area (LBA).** The portion of the FATO capable of supporting the dynamic load of the design helicopter.

**aa. Medical emergency site.** An unprepared site at or near the scene of an accident or similar medical emergency on which a helicopter may land to pick up a patient in order to provide emergency medical transport. A medical emergency site is not a heliport as defined in this AC.

**bb. Medium helicopter.** A helicopter with a maximum takeoff weight of 7,001 to 12,500 lbs.

**cc. Obstruction to air navigation.** Any fixed or mobile object, including a parked helicopter, of greater height than any of the heights or surfaces presented in subpart C of part 77 (see also paragraph 111 in this AC).

**dd. Overall length (D).** See D, paragraph 108.d.

**ee. Parking pad.** The paved center portion of a parking position.

**ff. Prior permission required (PPR) heliport.** A heliport developed for exclusive use of the owner and persons authorized by the owner and about which the owner and operator ensure all authorized pilots are thoroughly knowledgeable. These features include but are not limited to: approach/departure path characteristics, preferred heading, facility limitations, lighting, obstacles in the area, and size and weight capacity of the facility.

**gg. Public use heliport.** A heliport available for use by the general public without a requirement for prior approval of the owner or operator.

**hh. RD.** Rotor Diameter. The length of the main rotor, from tip to tip.

**ii. Rotor downwash.** The downward movement of air caused by the action of the rotating main rotor blades. When this air strikes the ground or some other surface, it causes a turbulent outflow of air from beneath the helicopter.

**jj. Safety area.** A defined area on a heliport surrounding the FATO intended to reduce the risk of damage to helicopters accidentally diverging from the FATO.

**kk. Shielded obstruction.** A proposed or existing obstruction that does not need to be marked or lighted due to its close proximity to another obstruction whose highest point is at the same or higher elevation.

**ll. Shoulder line.** A marking line perpendicular to a helicopter parking position centerline that is intended to provide the pilot with a visual cue to assist in parking.

**mm. Small helicopter.** A helicopter with a maximum takeoff weight of 7,000 lbs or less.

**nn. Tail rotor arc radius.** The distance from the hub of the main rotor to the outermost tip of the tail rotor or the rear-most point of the helicopter tail, whichever is farther.

**oo. Takeoff position.** An area, normally located on the centerline and at the ends of an elongated TLOF, from which the helicopter takes off. Typically, there are two such positions on an elongated TLOF, one at each end.

**pp. Taxi route.** An obstruction-free corridor established for the movement of helicopters from one part of a heliport/airport to another. A taxi route includes the taxiway plus the appropriate clearances on both sides.

**qq. Taxiway.** A marked route between the TLOF and other areas on the heliport. This AC defines two types of helicopter taxiways:

**(1) Ground taxiway.** A taxiway intended to permit the surface movement of a wheeled helicopter under its own power with wheels on the ground. The minimum dimensions defined for a ground taxiway may not be adequate for hover taxi.

**(2) Hover taxiway.** A taxiway intended to permit the hover taxiing of a helicopter.

**rr. Touchdown and liftoff area (TLOF).** A load-bearing, generally paved area, normally centered in the FATO, on which the helicopter lands and/or takes off.

**ss. Transport heliport.** A heliport intended to accommodate air carrier operators providing scheduled service.

**tt. Touchdown/positioning circle (TDPC) marking.** A circular marking located in the center of a TLOF or a parking position. When the pilot's seat is over the TDPC, the whole of the helicopter undercarriage will be within the TLOF or parking position and all parts of the helicopter rotor system will be clear of any obstacle by a safe margin.

**uu. Unshielded obstruction.** A proposed or existing obstruction that may need to be marked or lighted since it is not near another marked and lighted obstruction whose highest point is at the same or higher elevation.

**109. Selection of approach/departure paths.** Design heliports to the extent practicable for two approach/departure paths. Consider items such as the following in selecting the approach/departure paths:

**a. Wind.** Well-designed approach/departure paths permit pilots to avoid downwind conditions and minimize crosswind operations. Align the preferred flight approach/departure path, to the extent feasible, with the predominant wind direction. Base other approach/departure paths on the assessment of the prevailing winds or, when this information is not available, separate such flight paths and the preferred flight path by at least 135 degrees. If it is not feasible to provide complete coverage of wind through multiple approach/departure paths, operational limitations may be necessary under certain wind conditions. See paragraph 101.

**b. Obstructions.** In determining approach/departure paths, take into account the obstructions in the vicinity of the heliport and, in particular, those likely to be a hazard to air navigation. See paragraph 111.

**c. Environmental impacts.** In environmentally sensitive areas, select the final approach/departure path(s) to minimize any environmental impact, providing it does not decrease flight safety. See paragraph 113.

**110. Notification requirements.** Part 157 sets requirements for persons proposing to construct, activate, deactivate, or alter a heliport to give advance notice of their intent to the FAA. This includes changing the size or number of FATOs; adding, deleting, or changing an approach or departure route; or changing heliport status. An example of a heliport status change would be a change from private to public use or vice versa. When notification is required, file Form 7480-1 (see Figure 1–1) with the appropriate FAA Airports Regional or District Office at least 90 days before construction, alteration, deactivation, or change in use. See the FAA Airports web site at http://www.faa.gov/airports/ for contact information.

**a.** Draw the heliport layout plan to scale showing key dimensions, such as the heliport elevation, TLOF size, FATO size, safety area size, distance from safety area perimeter to property edges, and approach/departure paths showing locations of buildings, trees, fences, power lines, obstructions (including elevations), schools, churches, hospitals, residential communities, waste disposal sites, and other significant features as specified on Form 7480-1 and as suggested in Figure 1–2.

**b.** The preferred type of location map is the 7.5-minute U.S. Geological Survey Quadrangle Map, available from the US Geological Survey at nationalmap.gov. Web-based maps are also acceptable. Show the location of the heliport site and the approach/departure paths on the map. Point out the heliport site on this map with an arrow. Indicate the latitude and longitude of the proposed heliport in North American Datum of 1983 (NAD-83) coordinates. See Figure 1–3.

**c. The FAA role.** The FAA will conduct an aeronautical study of the proposed heliport under part 157. Title 14 CFR Part 157.7, FAA determinations, states: “The FAA will conduct an aeronautical study of an airport proposal and, after consultations with interested persons, as appropriate, issue a determination to the proponent and advise those concerned of the FAA determination. The FAA will consider matters such as the effects the proposed action would have on existing or contemplated traffic patterns of neighboring airports; the effects the proposed action would have on the existing airspace structure and projected programs of the FAA; and the effects that existing or proposed manmade objects (on file with the FAA) and natural objects within the affected area would have on the airport proposal. While determinations consider the effects of the proposed action on the safe and efficient use of airspace by aircraft and the safety of persons and property on the ground, the determinations are only advisory. Except for an objectionable determination, each determination will contain a determination-void date to

facilitate efficient planning of the use of the navigable airspace. A determination does not relieve the proponent of responsibility for compliance with any local law, ordinance or regulation, or state or other federal regulation. Aeronautical studies and determinations will not consider environmental or land use compatibility impacts."

Form approved OMB No. 2120-0036

U.S. Department of Transportation
Federal Aviation Administration

## NOTICE OF LANDING AREA PROPOSAL

| Name of Proponent, Individual , or Organization | Address of Proponent, Individual , or Organization (No., Street, City, State, Zip Code) |
|---|---|
| ☐ Check if the property owner's name and address are different than above, and list property owner's name and address on the reverse. | |

☐ Establishment or Activation ☐ Deactivation or Abandonment ☐ Alteration ☐ Change of Status } OF ☐ Airport ☐ Ultraflight Flightpark ☐ Vertiport ☐ Heliport ☐ Seaplane Base ☐ Other (Specify)

**A. Location of Landing Area**

| 1. Associated City/State | 2. County/State (Physical Location of Airport) | | | 3. Distance and Direction From Associated City or Town | |
|---|---|---|---|---|---|
| 4. Name of Landing Area | 5. Latitude ° ' " | 6. Longitude ° ' " | 7. Elevation | Miles | Direction |

**B. Purpose**

| Type Use | If Change of Status or Alteration, Describe Change | ☐ | Construction Dates | |
|---|---|---|---|---|
| ☐ Public<br>☐ Private<br>☐ Private Use of Public Land/Waters | | Establishment or change to traffic pattern (Describe on reverse) | To Begin/Began | Est. Completion |

| C. Other Landing Areas | Ref. A5 above: Direction From Landing Area | Ref. A5 above: Distance From Landing Area |
|---|---|---|
| | | |

| D. Landing Area Data | Existing (if any) Rwy #1 | Existing (if any) Rwy #2 | Existing (if any) Rwy #3 | Proposed Rwy | Proposed Rwy | Proposed Rwy |
|---|---|---|---|---|---|---|
| 1. Airport, Seaplane Base, or Flightpark | | | | | | |
| Magnetic Bearing of Runway (s) or Sealane | | | | | | |
| Length of Runway (s) or Sealane (s) in Feet | | | | | | |
| Width of Runway (s) or Sealane (s) in Feet | | | | | | |
| Type of Runway Surface (Concrete, Asphalt, Turf, Etc.) | | | | | | |
| 2. Heliport | | | | | | |
| Dimensions of Final Approach and Take off Area (FATO) in Feet | | | | | | |
| Dimensions of Touchdown and Lift-Off Area (TLOF) in Feet | | | | | | |
| Magnetic Direction of Ingress/Egress Routes | | | | | | |
| Type of Surface (Turf, concrete, rooftop, etc.) | | | | | | |

| E. Obstructions Type | Height Above Landing Area | Direction From Landing Area | Distance From Landing Area |
|---|---|---|---|
| | | | |

| 3. All Landing Areas | Description of Lighting (If any) | Direction of Prevailing Wind |
|---|---|---|
| | | |

**F. Operational Data**

1. Estimated or Actual Number Based Aircraft

| Airport, Flightpark, Seaplane base | Present (If est. indicate by letter "E") | Anticipated 5 Years Hence | Heliport | Present (If est. indicate by letter "E") | Anticipated 5 Years Hence |
|---|---|---|---|---|---|
| Multi-engine | | | Under 3500 lbs. MGW | | |
| Single-engine | | | Over 3500 lbs. MGW | | |
| Glider | | | | | |

| G. Other Considerations Identification | Direction From Landing Area | Distance From Landing Area |
|---|---|---|
| | | |

2. Average Number Monthly Landings

| | Present (If est. indicate by letter "E") | Anticipated 5 Years Hence | | Present (If est. indicate by letter "E") | Anticipated 5 Years Hence |
|---|---|---|---|---|---|
| Jet | | | Helicopter | | |
| Turboprop | | | Ultralight | | |
| Prop | | | Glider | | |

3. Are IFR Procedures For The Airport Anticipated ☐ No ☐ Yes Within _____ Years Type Navaid:

**H. Application for Airport Licensing**

☐ Has Been Made ☐ Will Be Made ☐ Not Required ☐ State ☐ County ☐ Municipal Authority

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

| Name, title (and address if different than above) of person filing this notice -- type or print | Signature (in ink) | |
|---|---|---|
| | Date of Signature | Telephone No. (Precede with area code) |

FAA Form 7480-1 (1-93) Supersedes Previous Edition Central Region Electronic Revision per ACE-625 (1-97)

**Figure 1–1. Form 7480-1, Notice of Landing Area Proposal**

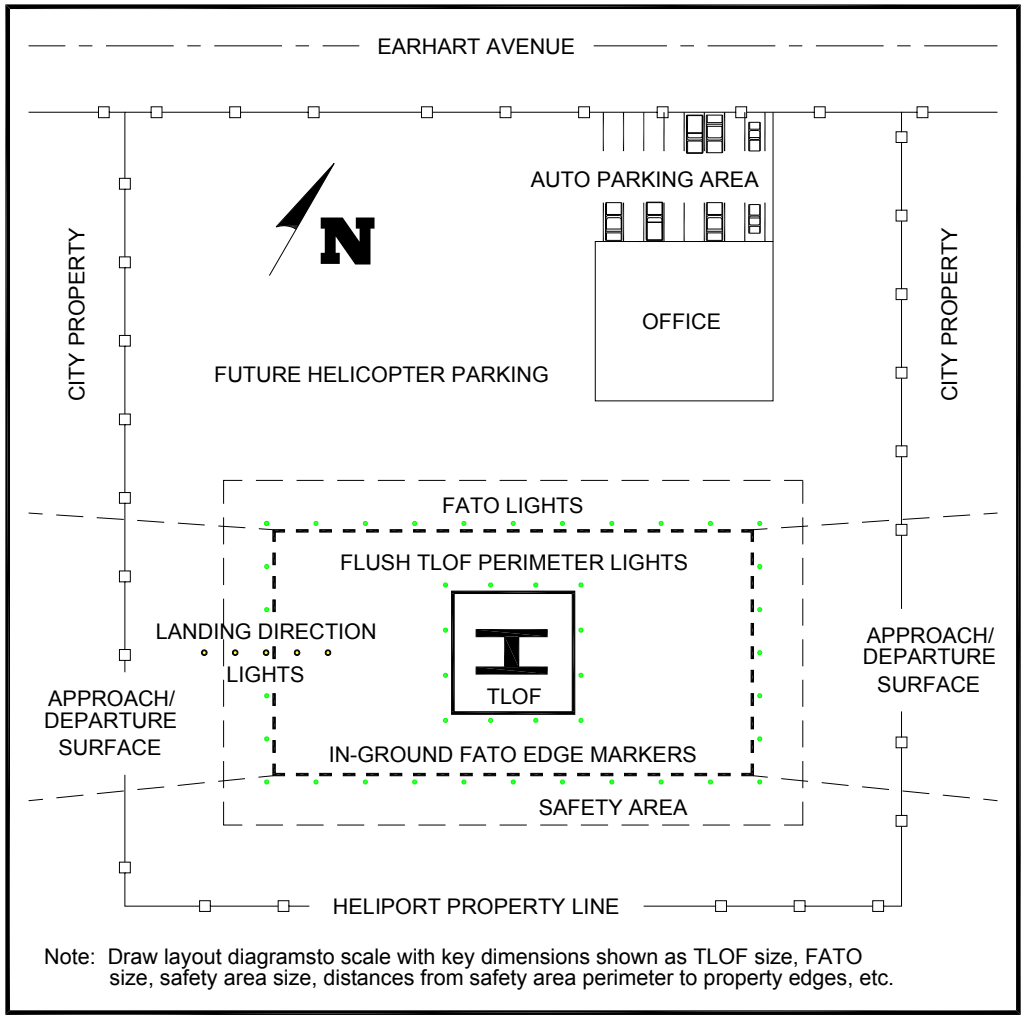



**Figure 1–2. Example of a Heliport Layout Plan**

**d. Penalty for failure to provide notice.** Persons who fail to give notice are subject to civil penalty under Title 49 United States Code 46301, Civil Penalties, of not more than $25,000 (or $1,100 if the person is an individual or small business concern).

**e. Notice exemptions.** Paragraph 157.1, Applicability, of part 157 exempts sites meeting one of the conditions below from the requirement to submit notice. These exemptions do not negate a notice or formal approval requirement prescribed by state law or local ordinance. For the purposes of applying the part 157 exemption criteria cited in (2) and (3) below, a landing and associated takeoff is considered to be one operation. Part 157.1 projects are:

**(1)** [A heliport] subject to conditions of a federal agreement that requires an approved current heliport layout plan to be on file with the FAA, or

**(2)** [A heliport] at which flight operations will be conducted under visual flight rules (VFR) and which is used or intended to be used for a period of less than 30 consecutive days with no more than 10 operations per day.

**(3)** The intermittent use of a site that is not an established airport, that is used or intended to be used for less than 1 year, and at which flight operations will be conducted only under VFR. For the purpose of this part, "intermittent use of a site" means:

**(a)** the site is used or is intended to be used for no more than 3 days in any one week and

**(b)** no more than 10 operations will be conducted in any one day at that site.

**111. Hazards to air navigation.** Part 77 establishes requirements for notification to the FAA of objects that may affect navigable airspace. It sets standards for determining obstructions to navigable airspace and provides for aeronautical studies of such obstructions to determine their effect on the safe and efficient use of airspace. Part 77 applies only to public airports and heliports, airports operated by a federal agency or the Department of Defense, and private airports and heliports with at least one FAA-approved instrument approach procedure. See Figure 1–4.

**a. FAA studies.**

**(1) Part 77.** Part 77 defines objects that are obstructions to surfaces. Presume these objects to be hazards unless an FAA study determines otherwise. The FAA conducts aeronautical studies to determine the physical and electromagnetic effect on the use of navigable airspace, air navigational facilities, public airports and heliports, and private airports and heliports with at least one FAA-approved instrument approach procedure. The FAA encourages public agencies to enact zoning ordinances to prevent man-made features from becoming hazards to navigation.

**(2) Part 157.** While the FAA performs aeronautical studies under part 157 (see paragraph 110.c), such studies do not identify hazards to private facilities that do not have an FAA-approved instrument approach.

**b. Mitigation of hazards.** You may mitigate the adverse effect of an object presumed or determined to be a hazard by:

**(1)** Removing the object.

**(2)** Altering the object, for example, reducing its height.

**(3)** Marking and/or lighting the object, provided an FAA aeronautical study has determined that the object would not be a hazard to air navigation if it were marked and/or lighted. Find guidance on marking and lighting objects in AC 70/7460-1, Obstruction Marking and Lighting.

**c. Notification requirements.** Part 77 requires persons proposing certain construction or alteration to give 45-day notice to the FAA of their intent. Use FAA Form 7460-1, Notice of Proposed Construction or Alteration to provide notification. See https://oeaaa.faa.gov for more information and to download the form.

**d. Heliport development plans.** Future public heliport development plans and feasibility studies on file with the FAA may influence the determinations resulting from part 77 studies. Owners of public heliports and owners of private heliports with FAA-approved instrument approach procedures can ensure full consideration of future heliport development in part 77 studies only when they file plans with the FAA. Include in heliport plan data the coordinates and elevations of planned FATO(s), approach/departure paths including their azimuths, and types of approaches for any new FATO or modification of an existing FATO.

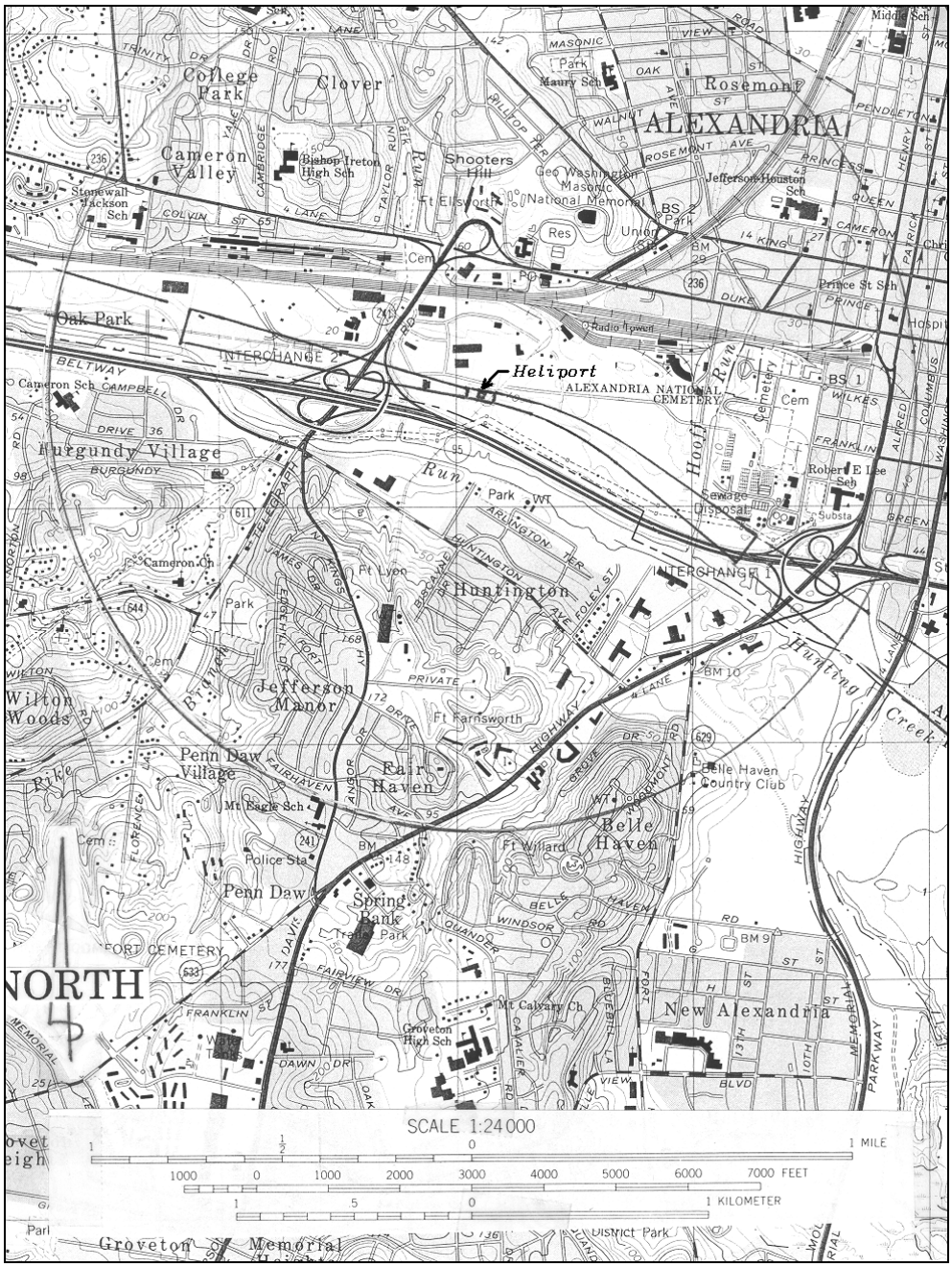



**Figure 1–3. Example of a Heliport Location Map**

**112. Federal assistance.** The FAA administers a grant program that provides financial assistance to eligible sponsors to develop a public use heliport. Information on federal aid program eligibility requirements is available from FAA Airports Regional and District Offices and on the FAA Airports web site, www.faa.gov/airports.

**113. Environmental impact analyses.** The National Environmental Policy Act of 1969 requires the FAA to consider potential environmental impacts prior to agency decision making, including, for example, the decision to fund or approve a project, plan, license, permit, certification, rulemaking, or operations specification, unless these actions are within an existing categorical exclusion and no

extraordinary circumstances exist. Actions that may require an environmental assessment are normally associated with federal grants or heliport layout plan approvals leading to the construction of a new heliport or significant expansion of an existing heliport.

**a. Assessment items.** An environmental assessment addresses noise, historic and cultural resources, wildlife, energy conservation, land usage, air quality, water quality, pollution prevention, light emissions and other visual effects, electromagnetic fields, other public health and safety issues, the "no action" alternative and a reasonable range of feasible alternatives, including mitigation not integrated into the alternative initially. It also describes the action taken to ensure public involvement in the planning process. An opportunity for a public hearing may be required for the federally funded development of, or significant improvement to, an existing heliport.

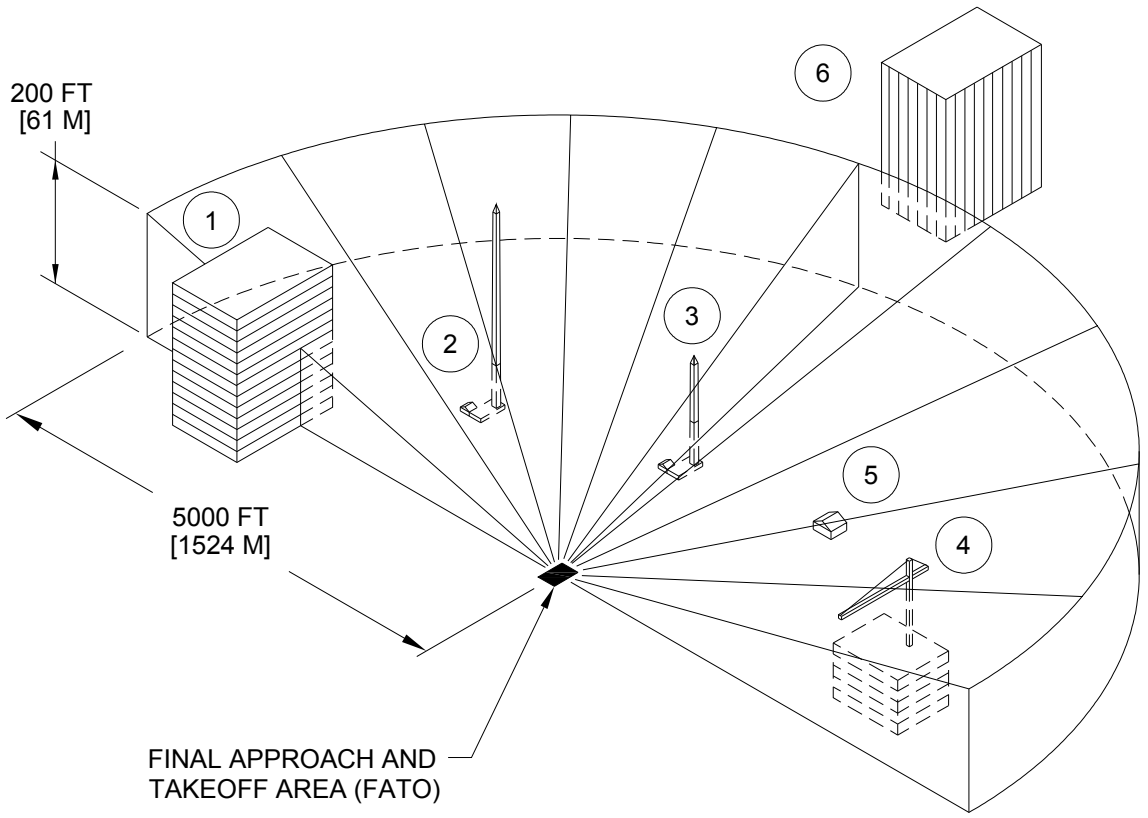
**b. Guidance.** FAA Order 5050.4, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects, and FAA Order 1050.1, Polices and Procedures for Considering Environmental Impacts, and other supplemental guidance from FAA Air Traffic and Flight Standards provide guidance on environmental impact analysis. Contact state and local governments, including metropolitan planning organizations and local transit agencies, directly as they may also require an environmental report. The procedures in AC 150/5020-1, Noise Control and Compatibility Planning for Airports, describe a means of assessing the noise impact. Contact the appropriate FAA Airports Regional or District Office for current information related to assessing noise impact of heliports. Proponents of non-federally assisted heliports work with local governmental authorities concerning environmental issues.

**114. Access to heliports by individuals with disabilities.** Congress has passed various laws concerning access to airports. Since heliports are a type of airport, these laws are similarly applicable. Find guidance in AC 150/5360-14, Access to Airports by Individuals with Disabilities.

**115. State role.** Many state departments of transportation, aeronautical commissions, or similar authorities require prior approval and, in some instances, a license for the establishment and operation of a heliport. Several states administer a financial assistance program similar to the federal program and are staffed to provide technical advice. Contact your respective state aeronautics commissions or departments for particulars on licensing and assistance programs. Contact information for state aviation agencies is available at http://www.faa.gov/airports/resources/state_aviation.

**116. Local role.** Some communities have enacted zoning laws, building codes, fire regulations, etc. that can affect heliport establishment and operation. Some have or are in the process of developing codes or ordinances regulating environmental issues such as noise and air pollution. A few localities have enacted specific rules governing the establishment of a heliport. Therefore, make early contact with officials or agencies representing the local zoning board, the fire, police, or sheriff's department, and the elected person(s) who represent the area where the heliport is to be located.

**117. Related referenced material.** Find a list of related and referenced publications in Appendix D.




Notes:

1. Building is less than 200 ft [61 m] in height, but top will penetrate the 25:1 surface (notice is required by 14 CFR part 77.9).
2. Antenna is over 200 ft [61 m] in height (notice is required by 14 CFR part 77.9 (a)).
3. Antenna is less than 200 ft [61 m] in height, and penetrates the 25:1 surface (notice is required by 14 CFR part 77.9 (b)(3)).
4. Construction crane penetrates 25:1 surface (notice is required by 14 CFR part 77.9 (b)(3)).
5. Building is less than 200 ft [61 m] in height and does not penetrate the 25:1 surface (notice is not required).
6. Building is more than 5,000 ft [1,525 m] from heliport (notice is required if building will be 200 ft [61 m] or more in height).

Note: Notice under 14 CFR part 77 required for all public-use heliports or a private use heliport with at least one FAA-approved instrument approach procedure.

**Figure 1–4. Offsite Development Requiring Notice to the FAA**

# Chapter 2. General Aviation Heliports

**201. General.** A general aviation heliport accommodates helicopters used by individuals, corporations, and helicopter air taxi services. While general aviation heliports may be publicly owned, this is not required. Most general aviation heliports are privately owned.

**202. Applicability.** The standards in this chapter apply to projects funded under the Airport Improvement Program (AIP) or the Passenger Facility Charge (PFC) program. For other projects/heliports, these standards are the FAA's recommendations for designing all general aviation heliports. The design standards in this chapter assume that there will never be more than one helicopter within the final approach and takeoff area (FATO) and the associated safety area. If there is a need for more than one touchdown and liftoff area (TLOF) at a heliport, locate each TLOF within its own FATO and within its own safety area. Figure 2–1 illustrates the essential features of a general aviation heliport.

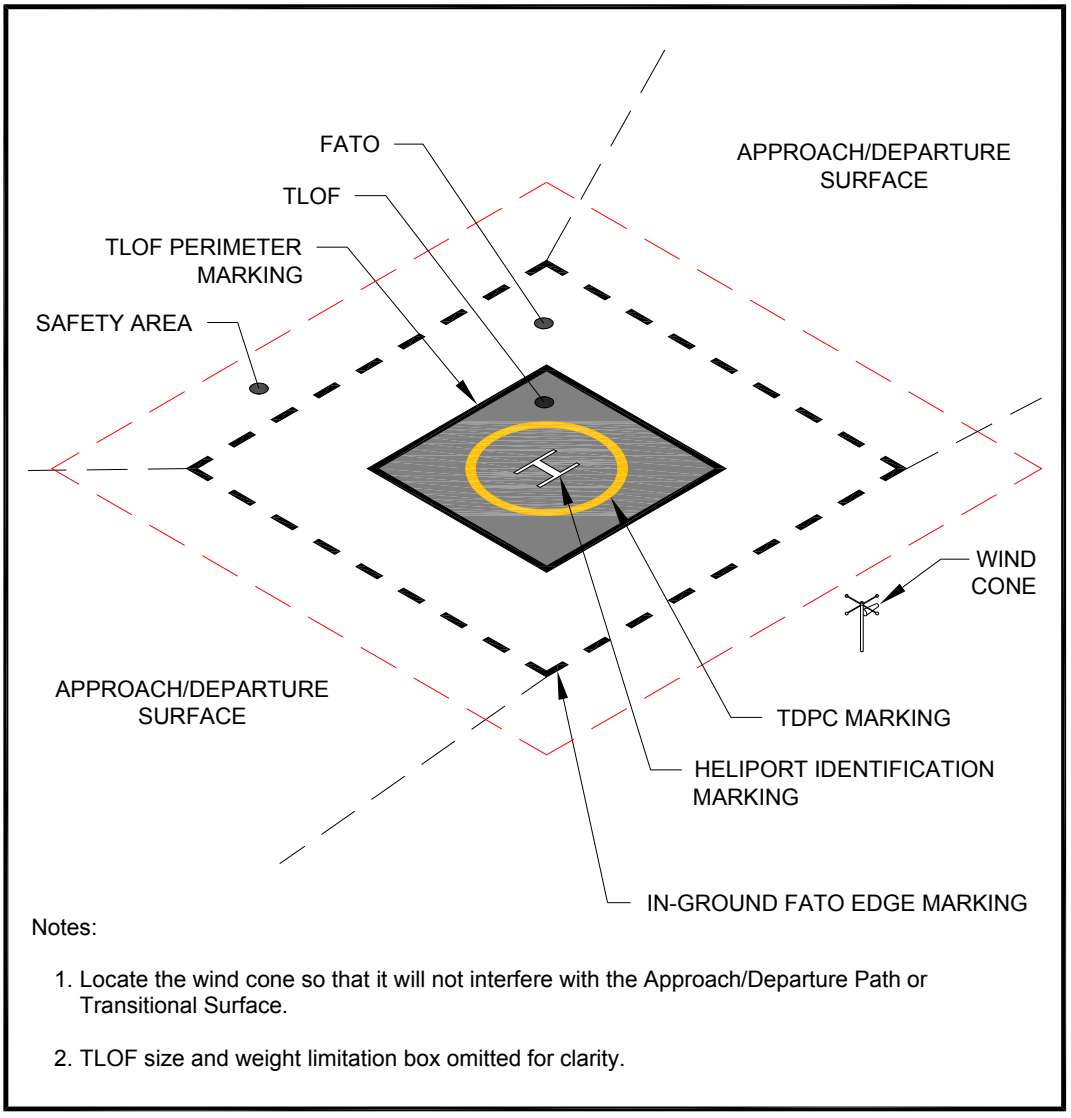



**Figure 2–1. Essential Features of a Heliport: General Aviation**

**203. Prior permission required (PPR) facilities.** The standards in this AC are recommended for all heliports. As PPR heliports are never eligible for federal financial assistance, do not interpret any recommendation in this AC that is not required by federal law or regulation as mandatory for PPR heliports. Recommendations for PPR heliports are provided in recognition of the unique nature of facilities where the operator ensures pilots are thoroughly familiar with the heliport, its procedures, and any facility limitations.

**204. Access by individuals with disabilities.** Various laws require heliports operated by public entities and those receiving federal financial assistance to meet accessibility requirements. See paragraph 114.

**205. Heliport site selection.**

**a. Long term planning.** The FAA encourages public agencies and others planning to develop a general aviation heliport to consider the possible future need for instrument operations and expansion.

**b. Property requirements.** The property needed for a general aviation heliport depends upon the volume and types of users, size of helicopters, and the scope of amenities provided. Property needs for helicopter operators and for passenger amenities frequently exceed those for "airside" purposes.

**c. Turbulence.** Air flowing around and over buildings, stands of trees, terrain irregularities, etc. can create turbulence on ground-level and roof-top heliports that may affect helicopter operations. Where the FATO is located near the edge and top of a building or structure, or within the influence of turbulent wakes from other buildings or structures, assess the turbulence and airflow characteristics in the vicinity of, and across the surface of the FATO to determine if an air-gap between the roof, roof parapet or supporting structure, and/or some other turbulence mitigating design measure is necessary. FAA Technical Report FAA/RD-84/25, Evaluating Wind Flow around Buildings on Heliport Placement, addresses the wind's effect on helicopter operations. Take the following actions in selecting a site to minimize the effects of turbulence.

**(1) Ground-level heliports.** Features such buildings, trees, and other large objects can cause air turbulence and affect helicopter operations from sites immediately adjacent to them. Therefore, locate the landing and takeoff area away from such objects in order to minimize air turbulence in the vicinity of the FATO and the approach/departure paths.

**(2) Elevated heliports.** Establishing a 6 foot (1.8 m) or more air gap on all sides above the level of the roof will generally minimize the turbulent effect of air flowing over the roof edge. Keep air gaps free at all times of objects that would obstruct the airflow. If it is not practical to include an air gap or some other turbulence mitigating design measure where there is turbulence, operational limitations may be necessary under certain wind conditions. See paragraph 101.

**d. Electromagnetic effects.** Nearby electromagnetic devices, such as a large ventilator motor, elevator motor or other devices that consume large amounts of electricity may cause temporary aberrations in the helicopter magnetic compass and interfere with other onboard navigational equipment.

**206. Basic layout.** A basic heliport consists of a TLOF contained within a FATO. A safety area surrounds the FATO. Table 2-1 shows how the standards for safety area width vary as a function of heliport markings. The relationship of the TLOF to the FATO and the safety area is shown in Figure 2–2. A FATO contains only one TLOF. Provide appropriate approach/departure airspace to allow safe approaches to and departures from landing sites. To the extent feasible, align the preferred approach/departure path with the predominant winds. See paragraph 210.

**Table 2-1. Minimum VFR Safety Area Width as a Function of General Aviation and PPR Heliport Markings**

| | | | | |
|---|---|---|---|---|
| **General aviation heliports** | 1/3 RD but not less than 20 ft (6 m)** | 1/3 RD but not less than 30 ft (9 m)** | ½D but not less than 20 ft (6 m) | ½ D but not less than 30 ft (9 m) |
| **PPR heliports** | 1/3 RD but not less than 10 ft (3 m) ** | 1/3 RD but not less than 20 ft (6 m)** | ½ D but not less than 20 ft (6 m) | ½ D but not less than 30 ft (9 m) |
| **TLOF perimeter marked** | Yes | Yes | No | No |
| **FATO perimeter marked** | Yes | Yes | Yes | Yes |
| **Standard "H" marking** | Yes | No | Yes | No |

D: Overall length of the design helicopter
RD: Rotor diameter of the design helicopter
** Also applies when the FATO is not marked. Do not mark the FATO if (a) the FATO (or part of the FATO) is a non-load bearing surface and/or (b) the TLOF is elevated above the level of a surrounding load-bearing area.

## 207. Touchdown and liftoff area (TLOF).

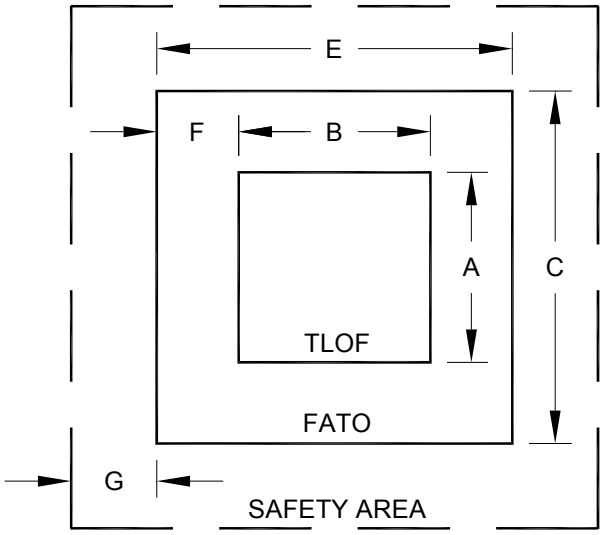
**a. TLOF location.** TLOFs of general aviation heliports are at ground level, on elevated structures, and at rooftop level. Center the TLOF within the FATO. At a PPR rooftop or other PPR elevated facility, where the entire FATO is not load-bearing, locating the TLOF in a load-bearing area (LBA) that is as large as possible may provide some operational advantages. In this case, locate the TLOF in the center of the LBA.

**b. TLOF size.** Design the TLOF so the minimum dimension (length, width, or diameter) is at least equal to the RD of the design helicopter (except as noted in (2) below). Design the TLOF to be rectangular or circular. Each has its advantages. A square or rectangular shape provides the pilot with better alignment cues than a circular shape, but a circular TLOF may be more recognizable in an urban environment. Increasing the LBA centered on the TLOF may provide some safety and operational advantages. At PPR facilities, if only a portion of the TLOF is paved, design the TLOF so the minimum length and width of this paved portion is not less than two times the maximum dimension (length or width) of the undercarriage of the design helicopter. Locate the center of the TLOF in the center of this paved portion. To avoid the risk of catching a skid and the potential for a dynamic rollover, make sure there is no difference in elevation between the paved and unpaved portions of the TLOF.

**(1) Elevated public general aviation heliport.** If the FATO outside the TLOF is not load-bearing, increase the minimum width, length or diameter of the TLOF to the overall length (D) of the design helicopter. See paragraph 207.b(3).

**(2) Elevated PPR heliports.** At PPR rooftop or elevated facilities where the height of the TLOF surface above the adjacent ground or structure is no greater than 30 inches (76 cm), and there is a solid adjacent ground or structure equal to the rotor diameter (RD) able to support 20 lbs/sq ft (98 kg/sq m) live load, design the minimum dimension of the TLOF to be at least the smaller of the RD and two times the maximum dimension (length or width) of the undercarriage of the design helicopter. Locate the center of the LBA of the TLOF in the center of the FATO.

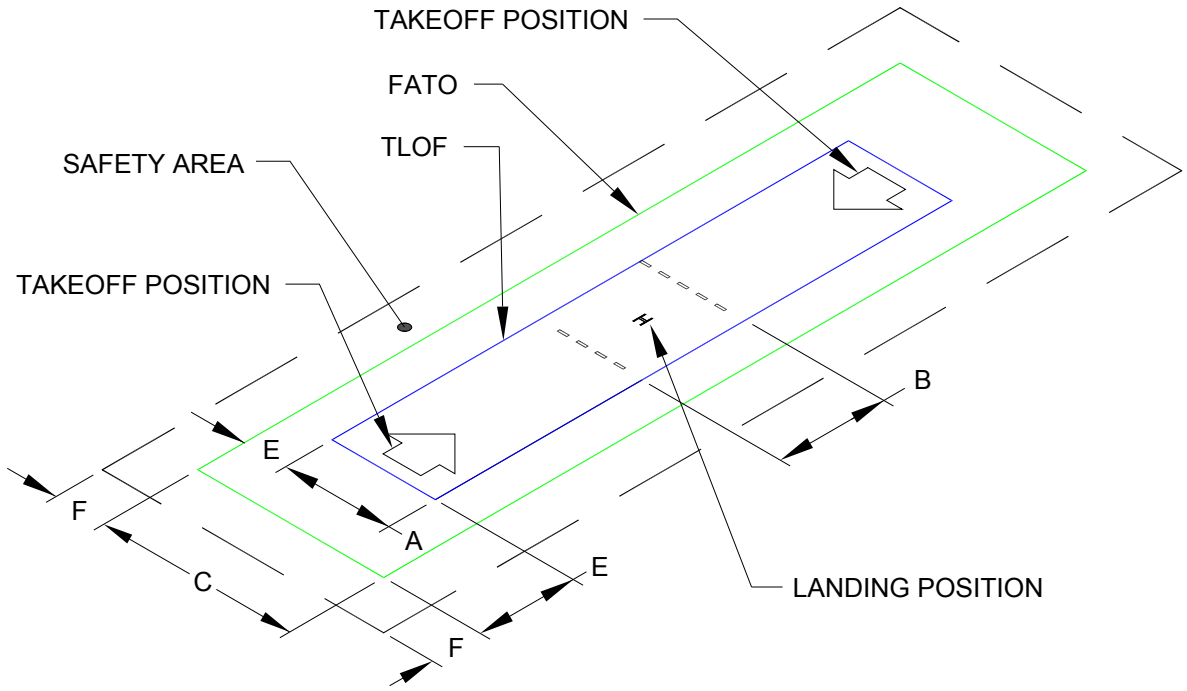
**(3) Elongated TLOF.** An elongated TLOF can provide an increased safety margin and greater operational flexibility. As an option, design an elongated TLOF with a landing position in the center and two takeoff positions, one at either end. Design the landing position to have a minimum length equal to the RD of the design helicopter. If the TLOF is elongated, also provide an elongated FATO. Figure 2–3 shows an elongated TLOF and an elongated FATO.




| DIM | ITEM | VALUE | NOTES |
|---|---|---|---|
| A | Minimum TLOF Length | 1 RD | |
| B | Minimum TLOF Width | 1 RD | |
| C | Minimum FATO Length | 1 ½ D | See Paragraph 207.a.(1) and Figure 2-5 for adjustments of elevations above 1000' |
| E | Minimum FATO Width | 1 ½ D | |
| F | Minimum Separation Between the Perimeters of the TLOF and FATO | ¾ D - ½ RD | |
| G | Minimum Safety Area Width | See Table 2-1 | |

Note: For a circular TLOF and FATO, dimensions A, B, C and E refer to diameters.

**Figure 2–2. TLOF/FATO Safety Area Relationships and Minimum Dimensions: General Aviation**




| DIM | ITEM | VALUE | NOTES |
|---|---|---|---|
| A | Minimum TLOF Width | 1 RD | |
| B | Minimum TLOF/Landing Position Length | 1 RD | |
| C | Minimum FATO Width | 1 ½ D | |
| E | Minimum Separation Between the Perimeters of the TLOF and FATO | ¾ D - ½ RD | |
| F | Minimum Safety Area Width | See Table 2-1 | |

Note: For a circular TLOF and FATO, dimensions A, B, C and E refer to diameters.

**Figure 2–3. Elongated FATO with Two Takeoff Positions: General Aviation**

**c. Ground-level TLOF surface characteristics.**

**(1) Design loads.** Design the TLOF and any supporting TLOF structure to be capable of supporting the dynamic loads of the design helicopter.

**(2) Paving.** Provide either a paved or aggregate-turf surface for the TLOF (see AC 150/5370-10, Standards for Specifying Construction of Airports items P-217, Aggregate-Turf Pavement and P-501, Portland Cement Concrete Pavement). Use portland cement concrete (PCC) when feasible for ground-level facilities. An asphalt surface is less desirable for heliports as it may rut under the wheels or skids of

a parked helicopter. This has been a factor in some rollover accidents. Use a broomed or roughened pavement finish to provide a skid-resistant surface for helicopters and non-slippery footing for people. For PPR heliports where only a portion of the TLOF is paved, design the paved portion to dynamic load-bearing. Design the adjacent ground or structure of the TLOF for the static loads of the design helicopter.

**d. Rooftop and other elevated TLOFs.**

**(1) Design loads.** Design elevated TLOFs and any TLOF supporting structure to capable of supporting the dynamic loads of the design helicopter described in paragraph 707.b. An elevated heliport is illustrated in Figure 2–4.

**(2) Elevation.** Elevate the TLOF above the level of any obstacle in the FATO and safety area that cannot be removed.

**(3) Obstructions.** Elevator penthouses, cooling towers, exhaust vents, fresh-air vents, and other raised features can affect heliport operations. Establish control mechanisms to ensure obstruction hazards are not installed after the heliport is operational.

**(4) Air quality.** Helicopter exhaust can affect building air quality if the heliport is too close to fresh air vents. When designing a building intended to support a helipad, locate fresh air vents accordingly. When adding a heliport to an existing building, relocate fresh air vents if necessary or, if that is not practical, installing charcoal filters or a fresh air intake bypass louver system for HVAC systems may be adequate.

**(5) TLOF surface characteristics.** Construct rooftop and other elevated heliport TLOFs of metal or concrete (or other materials subject to local building codes). Use a finish for TLOF surfaces that provides a skid-resistant surface for helicopters and non-slippery footing for people.

**(6) Safety net.** If the platform is elevated 4 feet (1.2 m) or more above its surroundings, Title 29 CFR Part 1910.23, Guarding Floor and Wall Openings and Holes, requires the provision of fall protection. The FAA recommends such protection for all platforms elevated 30 inches (76 cm) or more. However, do not use permanent railings or fences since they would be safety hazards during helicopter operations. As an option, install a safety net meeting state and local regulations but not less than 5 feet (1.5 m) wide. Design the safety net to have a load carrying capability of 25 lbs/sq ft (122 kg/sq m). Make sure the net, as illustrated in Figure 2–28, does not project above the level of the TLOF. Fasten both the inside and outside edges of the safety net to a solid structure. Construct nets of materials that are resistant to environmental effects.

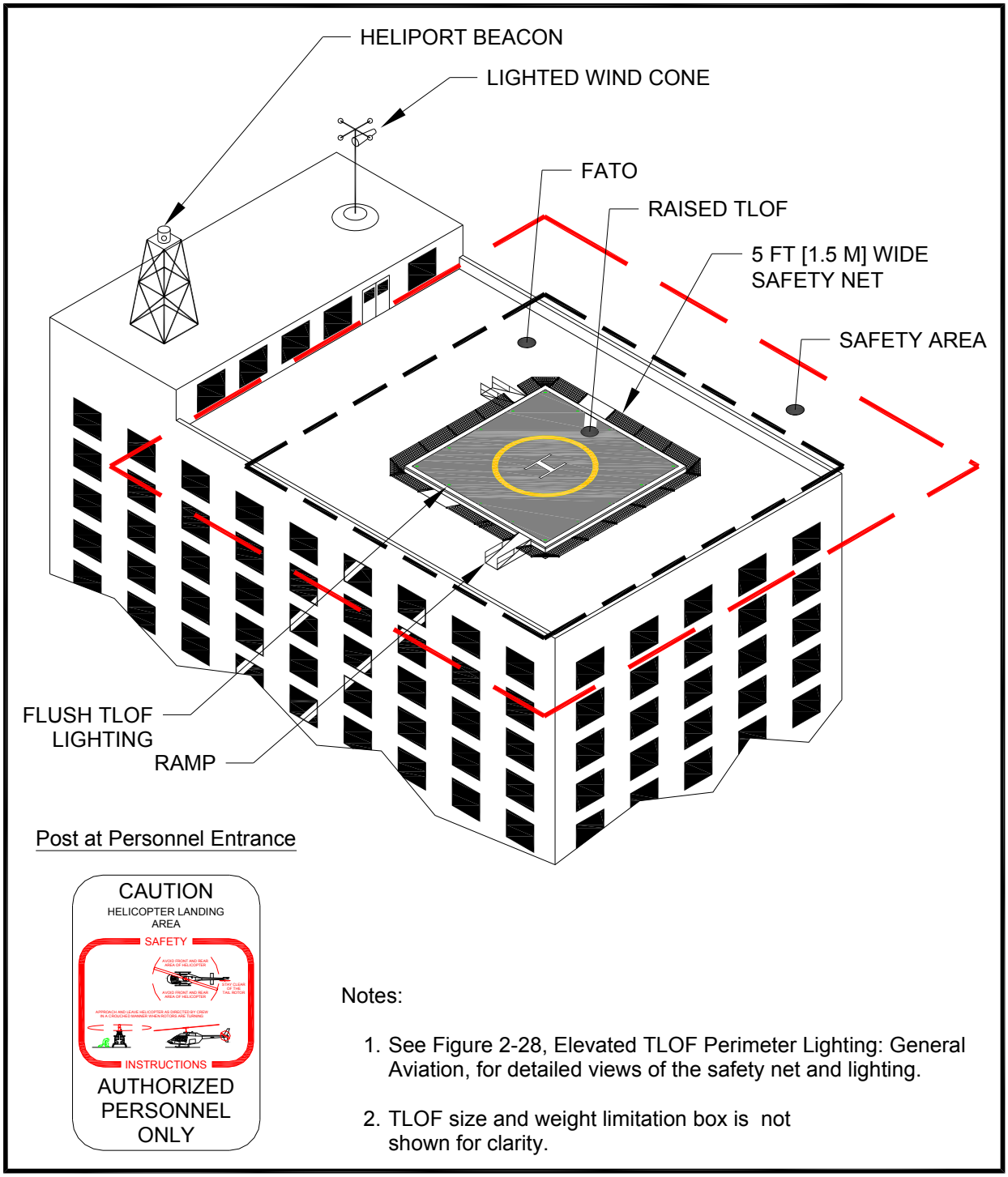



**Figure 2–4. Elevated Heliport: General Aviation**

**(7) Access to elevated TLOFs.** Title 29 CFR Part 1926.34, Means of Egress, requires two separate access points for an elevated structure such as one supporting an elevated TLOF. Title 29 CFR Part 1910.24, Fixed Industrial Stairs applies to stairs. Design handrails required by this regulation to fold down or be removable to below the level of the TLOF so they will not be hazards during helicopter operations.

**e. TLOF gradients.** See paragraph 702 for TLOF gradient standards.

**208. Final approach and takeoff area (FATO).** A general aviation heliport has at least one FATO. The FATO contains a TLOF within its borders at which arriving helicopters terminate their approach and from which departing helicopters take off.

**a. FATO size.**

**(1)** Design the minimum width, length, or diameter of a FATO to be at least 1.5 times the overall length (D) of the design helicopter. Design the FATO to be circular or rectangular, regardless of the shape of the TLOF. At elevations above 1,000 feet MSL, include a longer, rectangular FATO to provide an increased safety margin and greater operational flexibility. Use the additional FATO length depicted in Figure 2–5. Where the operator of a PPR heliport chooses not to provide additional FATO length, the operator makes sure that all pilots using the facility are thoroughly knowledgeable with this and any other facility limitations.

**(2)** Design the minimum distance between the TLOF perimeter and the FATO perimeter to be not less than the distance (¾ D - ½ RD) where D is the overall length and RD is the rotor diameter of the design helicopter. Note that if the TLOF and FATO are not of similar shape, this applies at all points of the TLOF perimeter. The relationship of the TLOF to the FATO and the safety area is shown in Figure 2–2.

**b. FATO surface characteristics.** If the heliport operator marks the TLOF, the FATO outside the TLOF need not load-bearing.

**(1) Ground level public general aviation heliports.** If the heliport operator does not mark the TLOF (see paragraph 215.a), and/or intends that the helicopter be able to land anywhere within the FATO, design the FATO outside the TLOF and any FATO supporting structure, like the TLOF, to be capable of supporting the dynamic loads of the design helicopter, as described in paragraph 707.b.

**(2) Ground level PPR heliports.** If the heliport operator does not mark the TLOF, and/or intends for the helicopter to be able to land anywhere within the FATO, design the FATO outside the TLOF and any FATO supporting structure, like the TLOF, to be capable of supporting the dynamic loads of the design helicopter, as described in paragraph 707.b.

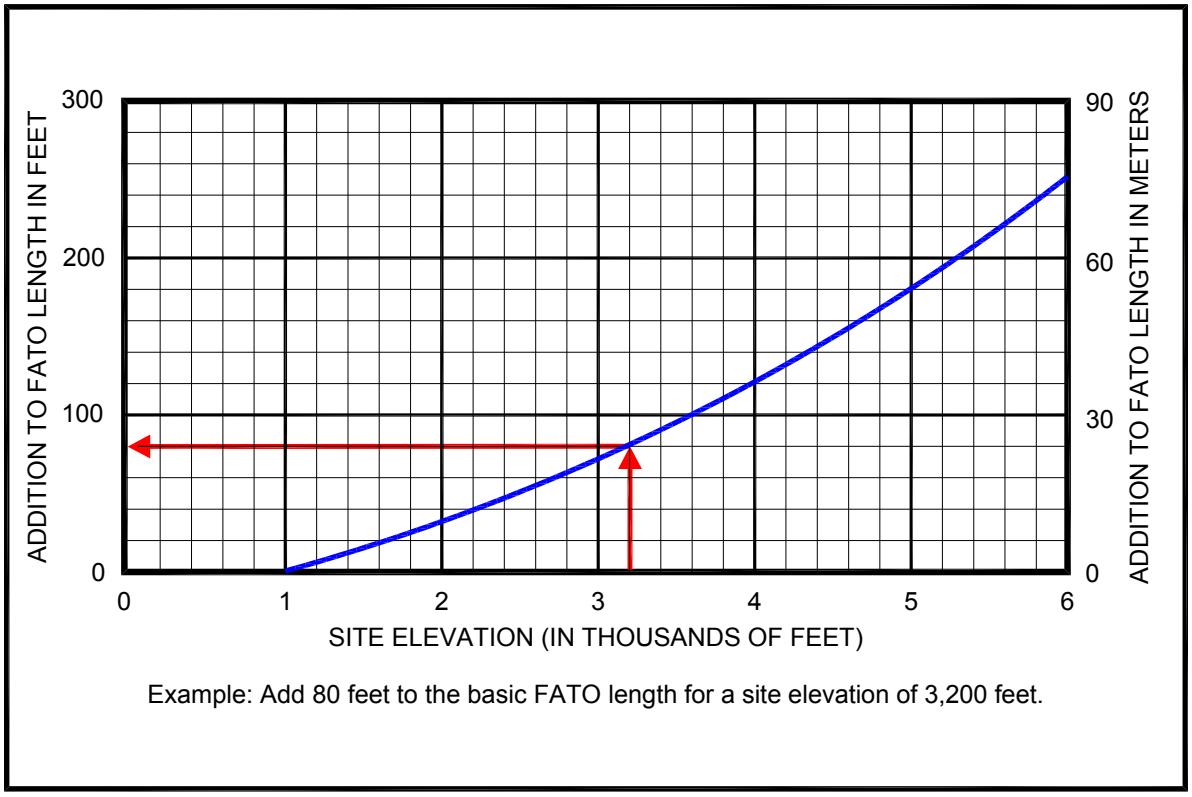



**Figure 2–5. Additional FATO Length for Heliports at Higher Elevations: General Aviation**

**(3) Elevated heliports.** As an option, design the FATO outside the TLOF to extend into clear airspace. However, there are some helicopter performance benefits and increased operational flexibility if the FATO outside the TLOF is load bearing. Design the FATO outside of the TLOF to be load-bearing, or increase the minimum width and length or diameter of TLOF to the overall length of the design helicopter.

**(4) Elevated PPR heliports.** For elevated PPR heliports, if the heliport operator intends to mark the TLOF, as an option design the FATO outside the TLOF and the safety area to extend into the clear airspace (see Figure 2–4). If the heliport operator does not mark the TLOF, and/or intends that the helicopter be able to land anywhere within the FATO, design the FATO outside the TLOF and any FATO supporting structure, like the TLOF, to support the dynamic loads of the design helicopter. As an option, increase the length and width or diameter of the LBA without a corresponding increase in the size of the FATO.

**(5)** If the FATO is load-bearing, design the portion abutting the TLOF to be contiguous with the TLOF, with the adjoining edges at the same elevation.

**(6)** If the FATO is unpaved, treat the FATO to prevent loose stones and any other flying debris caused by rotor downwash.

**(7)** When the FATO or the LBA in which it is located is elevated 4 feet (1.2 m) or more above its surroundings, part 1910.23 requires the provision of fall protection. The FAA recommends such protection for all platforms elevated 30 inches (76 cm) or more. However, do not use permanent railings or fences since they would be safety hazards during helicopter operations. As an option, install a safety net meeting state and local regulations but not less than 5 feet (1.5 m) wide. Design the safety net to have a load carrying capability of 25 lbs/sq ft (122 kg/sq m). Make sure the net, as illustrated in Figure 2–28,

does not project above the level of the TLOF. Fasten both the inside and outside edges of the safety net to a solid structure. Construct nets of materials that are resistant to environmental effects.

**c. Mobile objects within the FATO.** The FATO design standards of this AC assume the TLOF and FATO are closed to other aircraft if a helicopter or other mobile object is within the FATO or the safety area.

**d. Fixed objects within the FATO.** Remove all fixed objects projecting above the FATO elevation except for lighting fixtures, which may project a maximum of 2 inches (5 cm). See Figure 7–3. For ground level heliports, remove all above-ground objects to the extent practicable.

**e. FATO/FATO separation.** If a heliport has more than one FATO, separate the perimeters of the two FATOs so the respective safety areas do not overlap. This separation assumes simultaneous approach/departure operations will not take place. If the heliport operator intends for the facility to support simultaneous operations, provide a minimum 200 foot (61 m) separation.

**f. FATO gradients.** See paragraph 703 for FATO gradient standards.

**209. Safety area.** A safety area surrounds a FATO.

**a. Safety area width.** The standards for the width of the safety area are shown in Table 2-1. The value is the same on all sides. The provision or absence of standard heliport markings affects the width standards. As an option, design the safety area to extend into clear airspace.

**b. Mobile objects within the safety area.** The safety area design standards of this AC assume the TLOF and FATO are closed to other aircraft if a helicopter or other mobile object is within the FATO or the safety area.

**c. Fixed objects within a safety area.** Remove all fixed objects within a safety area projecting above the FATO elevation except for lighting fixtures, which may project a maximum of 2 inches (5 cm). See Figure 7–3. For ground level heliports, remove all above-ground objects to the extent practicable.

**d. Safety area surface.** The safety area need not be load bearing. Figure 2–6 depicts a safety area extending over water. If possible, design the portion of the safety area abutting the FATO to be contiguous with the FATO with the adjoining edges at the same elevation. This is needed to avoid the risk of catching a helicopter skid or wheel. Clear the safety area of flammable materials and treat the area to prevent loose stones and any other flying debris caused by rotor wash.

**e. Safety area gradients.** Find safety area gradient standards in Chapter 7.

**210. VFR approach/departure paths.** The purpose of approach/departure airspace, shown in Figure 2–7 and Figure 2–8 is to provide sufficient airspace clear of hazards to allow safe approaches to and departures from the TLOF.

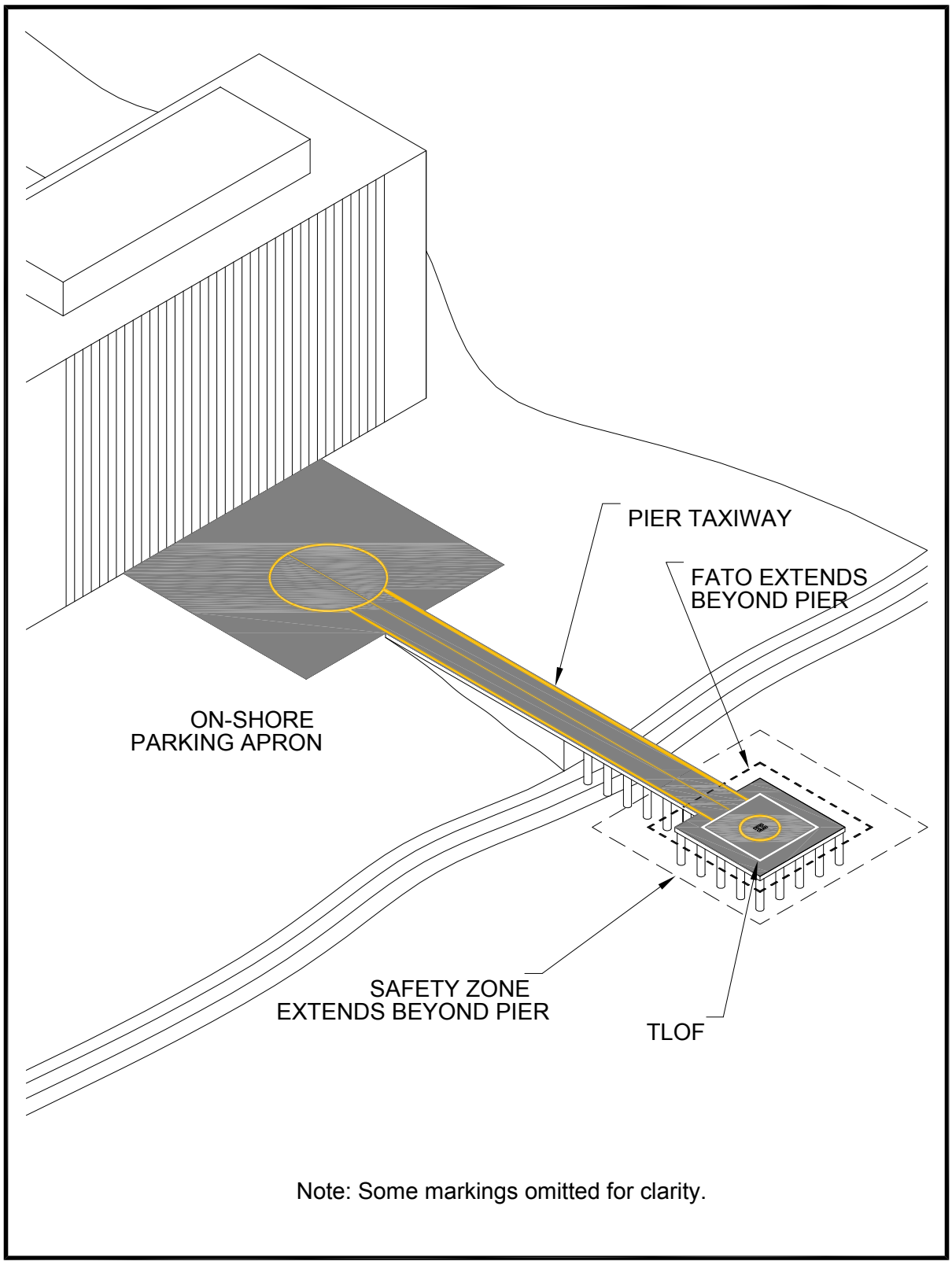



**Figure 2–6. Non-load-bearing FATO and Safety Area: General Aviation**

**a. Number of approach/departure paths.** Align preferred approach/departure paths with the predominant wind direction to avoid downwind operations and minimize crosswind operations. To accomplish this, design the heliport with more than one approach/departure path. Base other approach/departure paths on the assessment of the prevailing winds or, when this information is not available, separate such flight paths and the preferred flight path by at least 135 degrees. See Figure 2–7, Figure 2–8, and Figure 2–9. At a PPR heliport that has only one approach/departure path, the operator makes sure all pilots using the facility are thoroughly knowledgeable with this and any other facility limitations. A second flight path provides additional safety margin and operational flexibility. If it is not feasible to provide complete coverage of wind through multiple approach/departure paths, operational limitations maybe necessary under certain wind conditions. See paragraph 101.

**b. VFR approach/departure and transitional surfaces.** Figure 2–7 illustrates the approach/departure and transitional surfaces.

**(1)** An approach/departure surface is centered on each approach/departure path. The approach/departure path starts at the edge of the FATO and slopes upward at 8:1 (8 units horizontal in 1 unit vertical) for a distance of 4,000 feet (1,219 m) where the width is 500 feet (152 m) at a height of 500 feet (152 m) above the heliport elevation.

**(2)** The transitional surfaces start from the edges of the FATO parallel to the flight path center line, and from the outer edges of the 8:1 approach/departure surface, and extend outwards at a slope of 2:1 (2 units horizontal in 1 unit vertical) for a distance of 250 feet (76 m) from the centerline. The transitional surface does not apply to the FATO edge opposite the approach/departure surface.

**(3)** Make sure the approach/departure and transitional surfaces are free of penetrations unless an FAA aeronautical study determines such penetrations not to be hazards. The FAA conducts such aeronautical studies only at public heliports, heliports operated by a federal agency or the Department of Defense, and private airports with FAA-approved approach procedures. Paragraph 111 provides additional information on hazards to air navigation.

**(4)** At PPR facilities, an alternative to considering transitional surfaces is to increase the size of the 8:1 approach/departure surface for a distance of 2,000 feet (610 m) as shown in Figure 2–9 and Figure 2–11. The lateral extensions on each side of the 8:1 approach/departure surface start at the width of the FATO and are increased so at a distance of 2,000 feet (610 m) from the FATO they are 100 feet (30 m) wide. Make sure obstacles do not penetrate into both Area A and Area B. Make sure obstacles do not penetrate into Area A or Area B unless the FAA determines that the penetration is not a hazard. Mark or light all such penetrations. See paragraph 111 for more information on hazard determinations.

**c. Curved VFR approach/departure paths.** As an option, include one curve in VFR approach/departure paths. As an option, design these paths to use the airspace above public lands, such as freeways or rivers. When including a curved portion in the approach/departure path, make sure the sum of the radius of the arc defining the center line and the length of the straight portion originating at the FATO is not less than 1,886 feet (575 m). Design the approach/departure path so the minimum radius of the curve is 886 feet (270 m) and the curve follows a 1,000 feet (305 m) straight section. Design the approach/departure path so the combined length of the center line of the curved portion and the straight portion is 4,000 feet (1,219 m). See Figure 2–8. Figure 2–10 shows a curved approach/departure path for an 8:1 approach/departure surface.

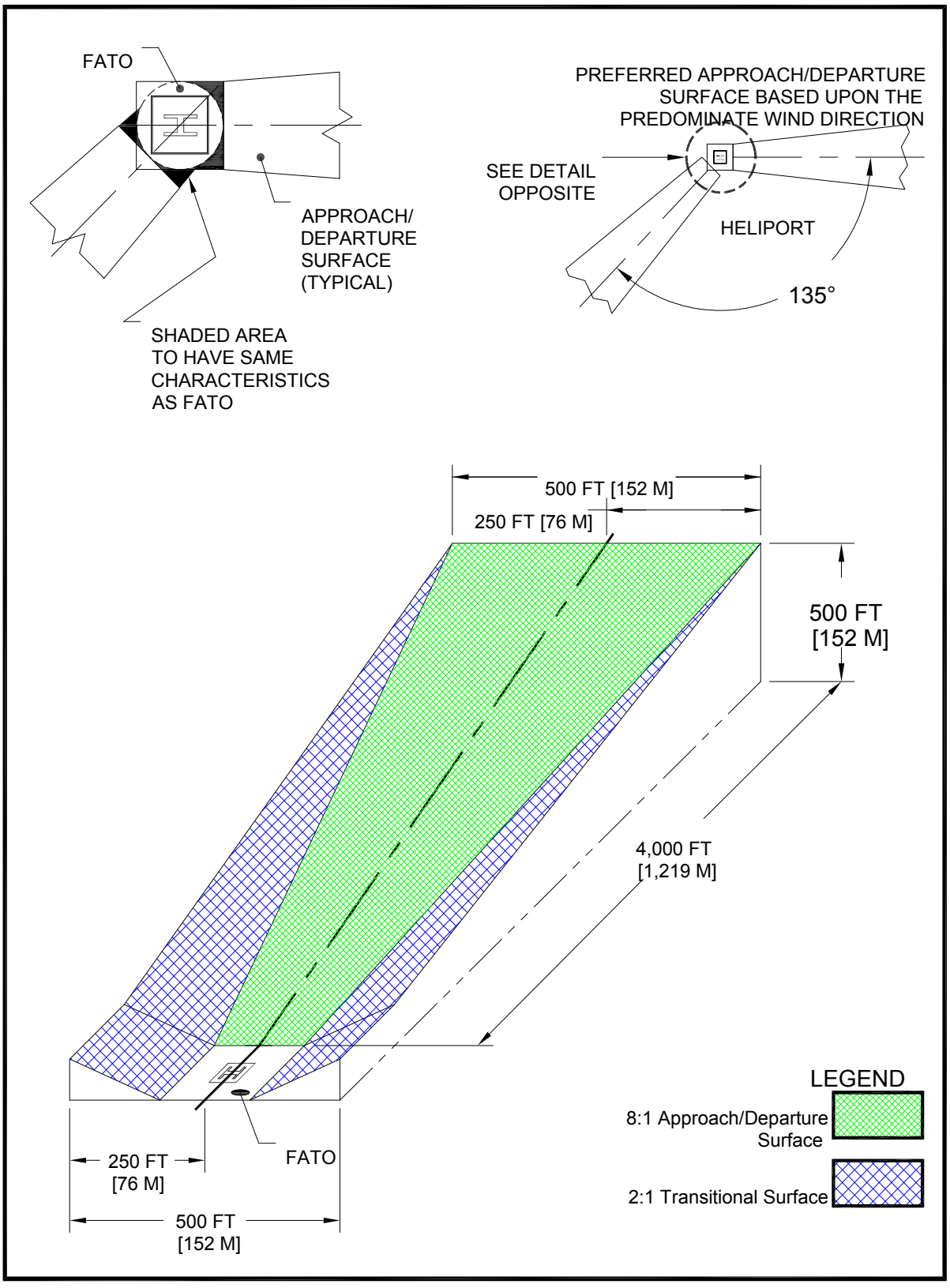
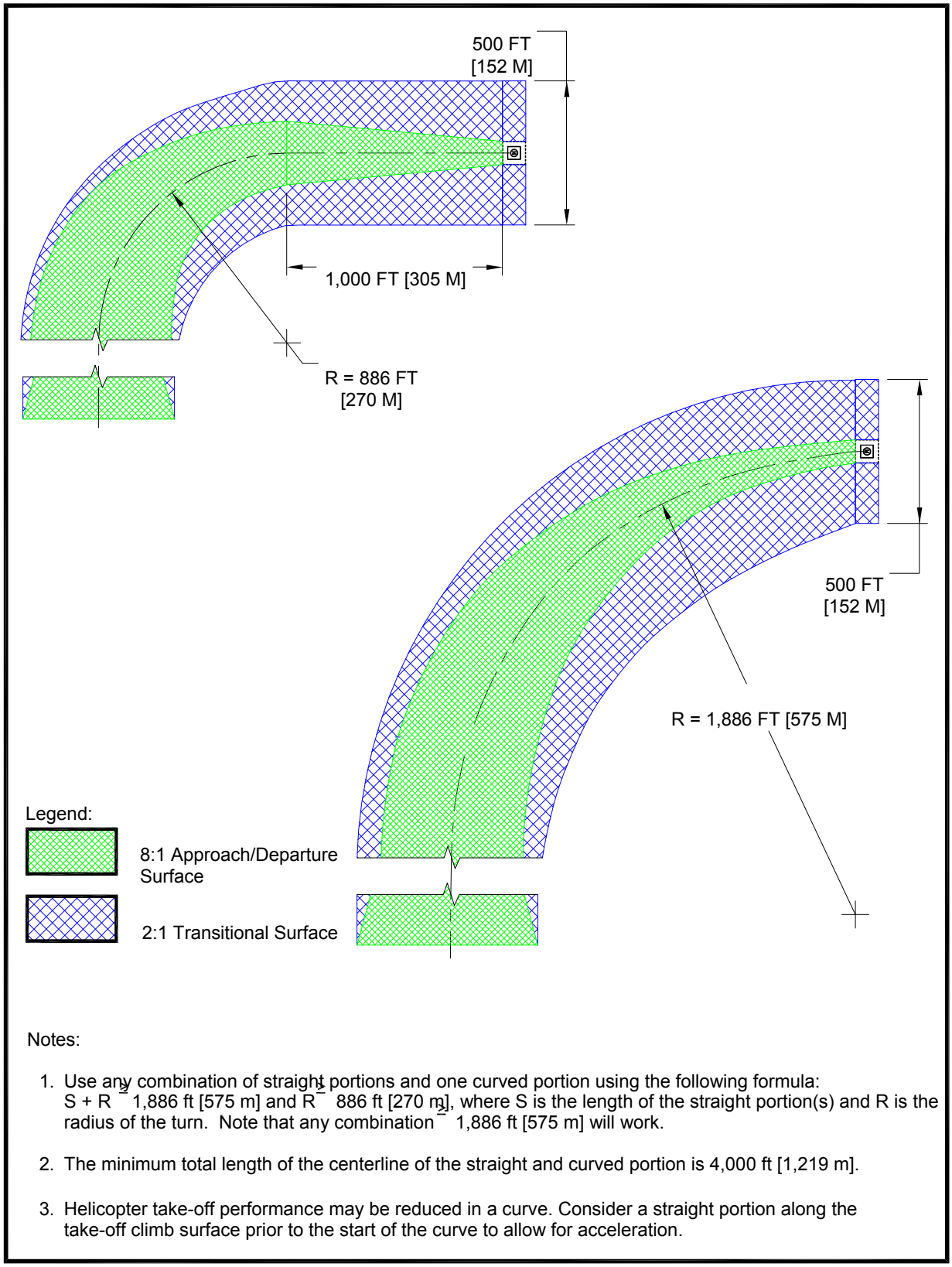



**Figure 2–7. VFR Heliport Approach/Departure and Transitional Surfaces: General Aviation**




Notes:

1. Use any combination of straight portions and one curved portion using the following formula: S + R ≥ 1,886 ft [575 m] and R ≥ 886 ft [270 m], where S is the length of the straight portion(s) and R is the radius of the turn. Note that any combination ≥ 1,886 ft [575 m] will work.
2. The minimum total length of the centerline of the straight and curved portion is 4,000 ft [1,219 m].
3. Helicopter take-off performance may be reduced in a curve. Consider a straight portion along the take-off climb surface prior to the start of the curve to allow for acceleration.

**Figure 2–8. Curved Approach/Departure: General Aviation**

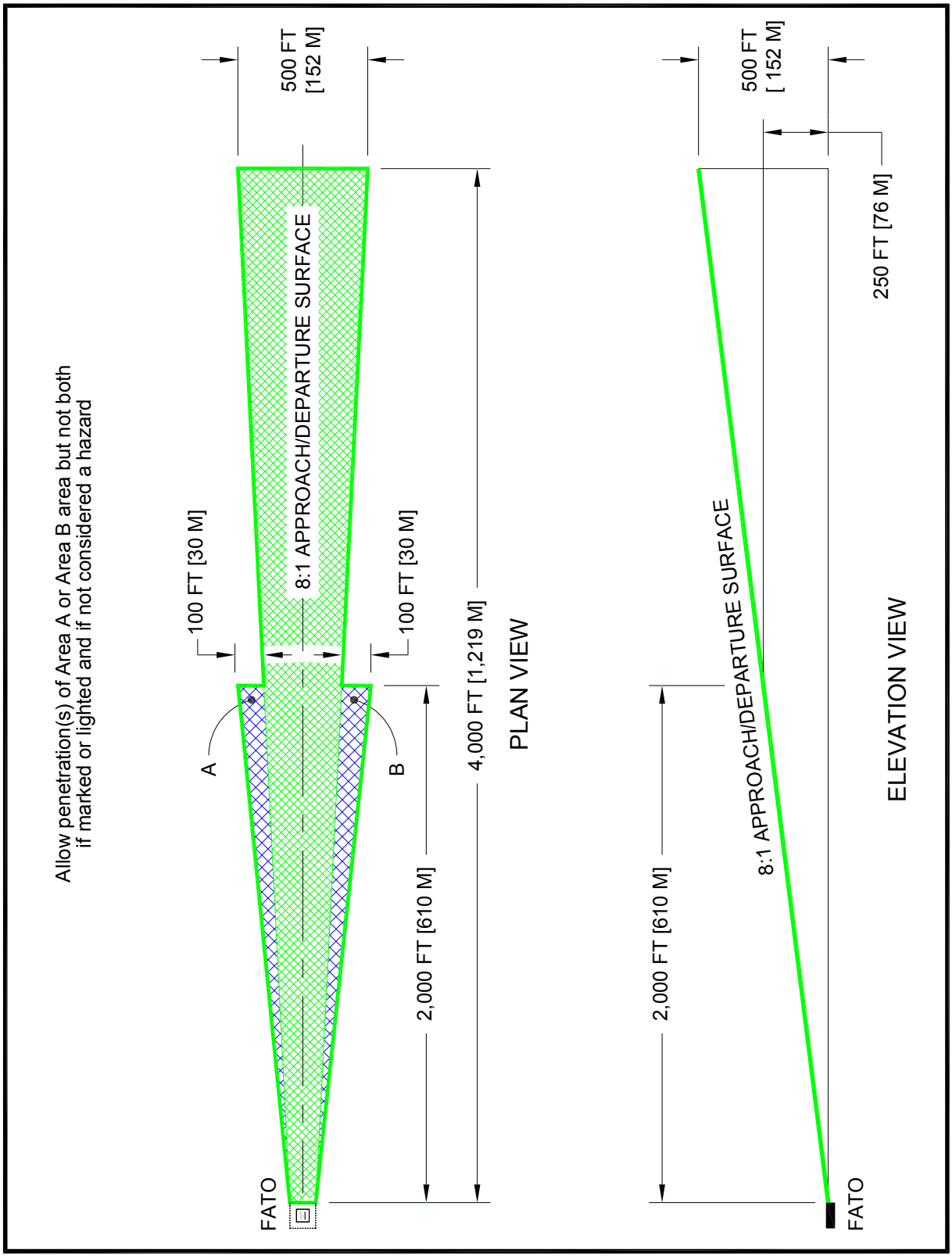
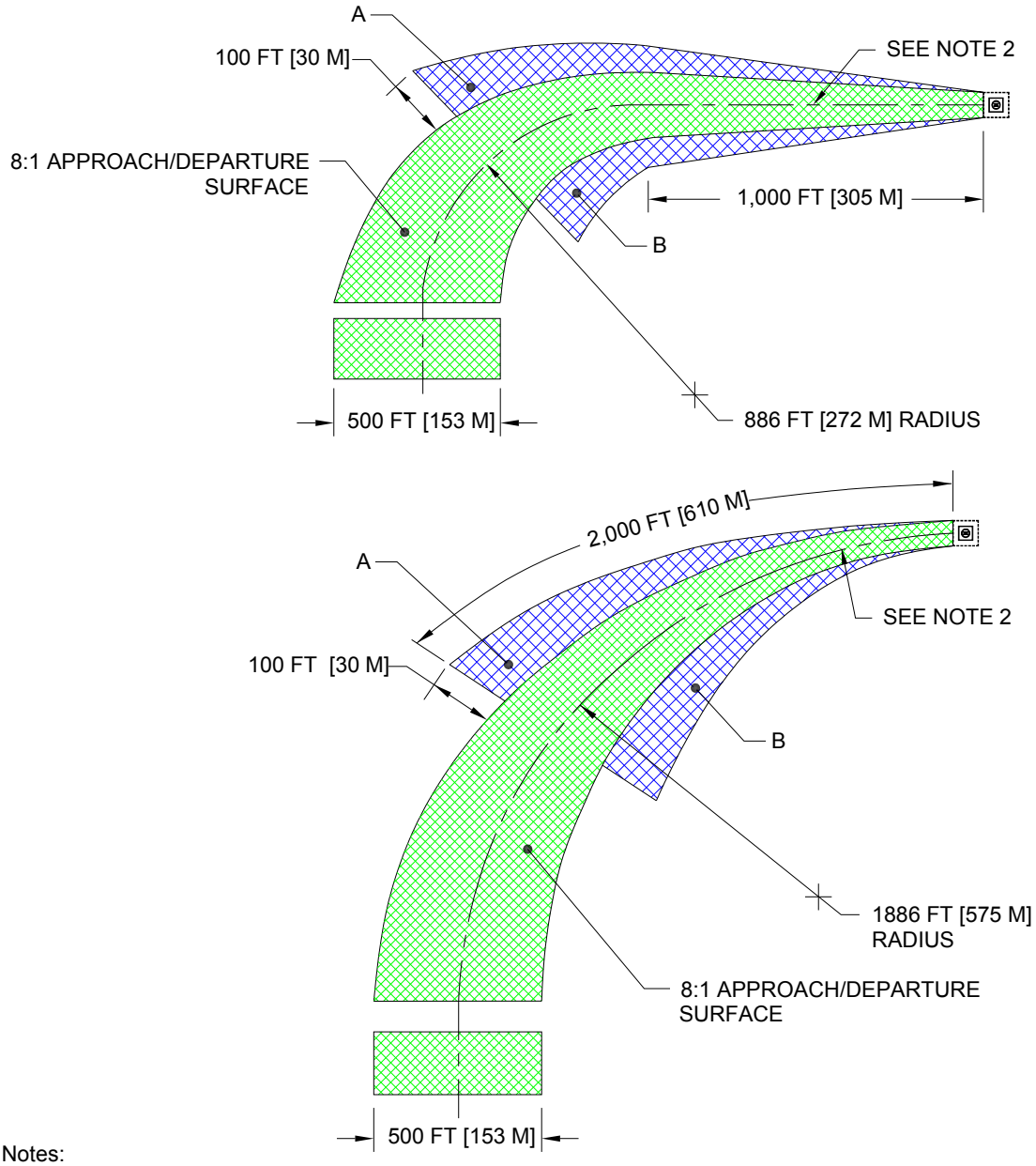



**Figure 2–9. VFR PPR Heliport Lateral Extension of the 8:1 Approach / Departure Surface: General Aviation**




Notes:

1. The approach surface may consist of one curved portion preceded and/or followed by one straight portion such that: S + R ≥1,886 ft [575 m] and R ≥886 ft [270 m], where S is the length of the straight portion(s) and R is the radius of the turn. Note that any combination ≥1,886 ft [575 m] will work.
2. The minimum total length of the centerline of the straight and curved portions is 4,000 ft [1,219 m].
3. Helicopter take-off performance may be reduced in a curve. Consider a straight portion along the take-off climb surface prior to the start of the curve to allow for acceleration.
4. Allow penetration(s) of Are a A or Area B area but not both if marked or lighted and if not considered a hazard.

**Figure 2–10. VFR PPR Heliport Lateral Extension of the Curved 8:1 Approach / Departure Surface: General Aviation**

**d. Flight path alignment guidance**. As an option, use flight path alignment markings and/or flight path alignment lights (see paragraphs 215 and 216) where it is desirable and practicable to indicate available approach and/or departure flight path direction(s). See Figure 2–11.

**e. Periodic review of obstructions.** Vigilant heliport operators reexamine obstacles in the vicinity of approach/departure paths on at least an annual basis. This reexamination includes an appraisal of the growth of trees near approach and departure paths. Paragraph 111 provides additional information on hazards to air navigation. Pay particular attention to obstacles that need to be marked or lighted. It may be helpful to maintain a list of the GPS coordinates and the peak elevation of obstacles.

**211. Heliport protection zone (HPZ).** The FAA recommends the establishment of an HPZ for each approach/departure surface. The HPZ is the area under the 8:1 approach/departure surface starting at the FATO perimeter and extending out for a distance of 280 feet (85.3 m), as illustrated in Figure 2–12. The HPZ is intended to enhance the protection of people and property on the ground. This is achieved through heliport owner control over the HPZ. Such control includes clearing HPZ areas (and maintaining them clear) of incompatible objects and activities. The FAA discourages residences and places of public assembly in an HPZ. (Churches, schools, hospitals, office buildings, shopping centers, and other uses with similar concentrations of persons typify places of public assembly.) Do not locate hazardous materials, including fuel, in the HPZ.

**212. Wind cone.**

**a. Specification.** Use a wind cone conforming to AC 150/5345-27, Specification for Wind Cone Assemblies, to show the direction and magnitude of the wind. Use a color that provides the best possible color contrast to its background.

**b. Wind cone location.** Locate the wind cone so it provides the pilot with valid wind direction and speed information in the vicinity of the heliport under all wind conditions.

**(1)** At many landing sites, there may be no single, ideal location for the wind cone. At other sites, it may not be possible to site a wind cone at the ideal location. In such cases, install more than one wind cone in order to provide the pilot with all the wind information needed for safe operations.

**(2)** Place the wind cone so a pilot on the approach path can see it clearly when the helicopter is 500 feet (150 m) from the TLOF.

**(3)** Place the wind cone so pilots can see it from the TLOF.

**(4)** To avoid presenting an obstruction hazard, locate the wind cone(s) outside the safety area, and so it does not penetrate the approach/departure or transitional surfaces.

**c. Wind cone lighting.** At a heliport intended for night operations, illuminate the wind cone, either internally or externally, to ensure it is clearly visible.

**213. Taxiways and taxi routes.** Taxiways and taxi routes provide for the movement of helicopters from one part of a landing facility to another. They provide a connecting path between the FATO and a parking area. They also provide a maneuvering aisle within the parking area. A taxi route includes the taxiway plus the appropriate clearances needed on both sides. The relationship between a taxiway and a taxi route is illustrated in Figure 2–13, Figure 2–14, and Figure 2–15. At heliports with no parking or refueling area outside the TLOF(s), it is not necessary to provide a taxi route or taxiway.

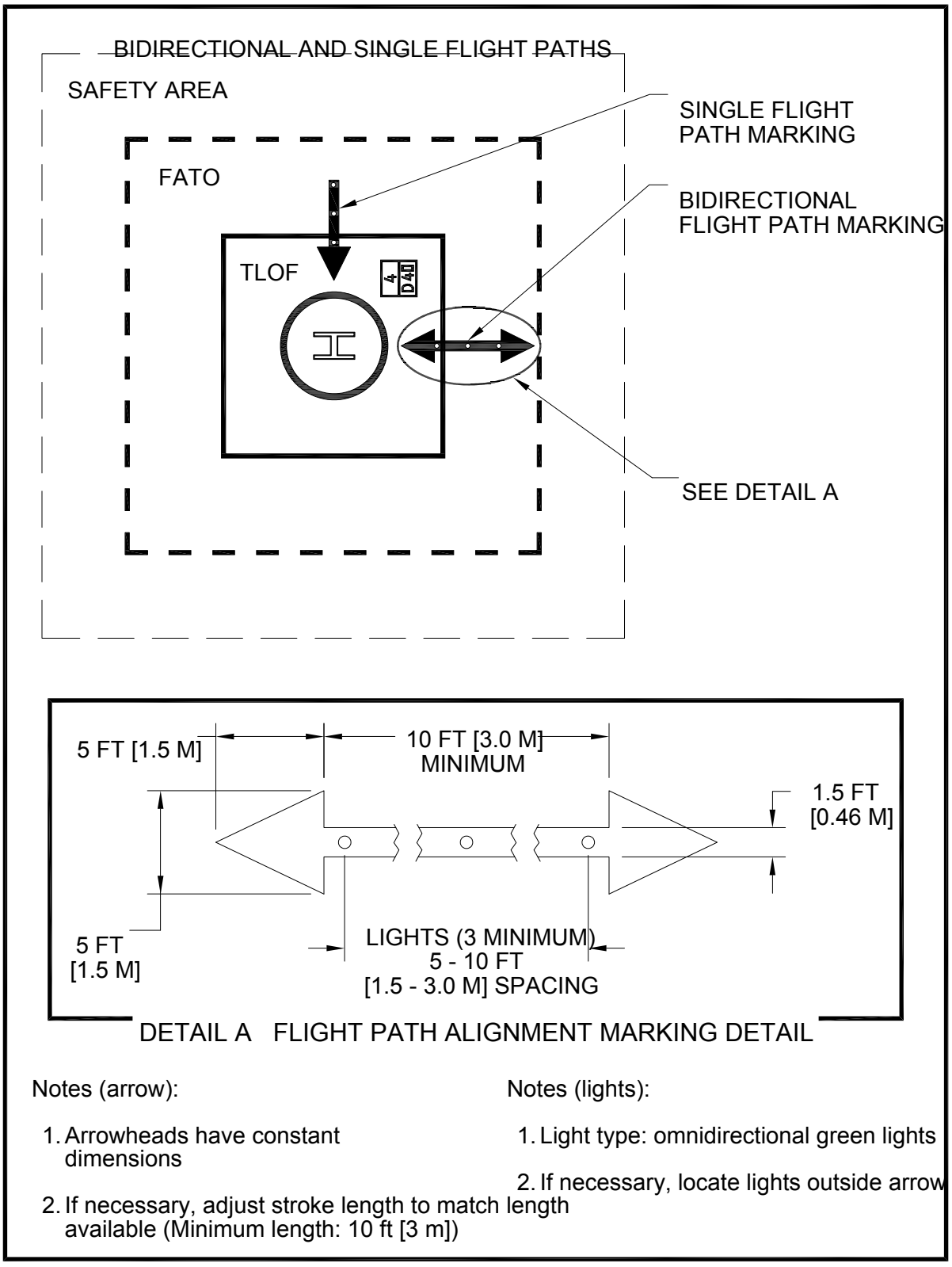



**Figure 2–11. Flight Path Alignment Marking and Lights: General Aviation**

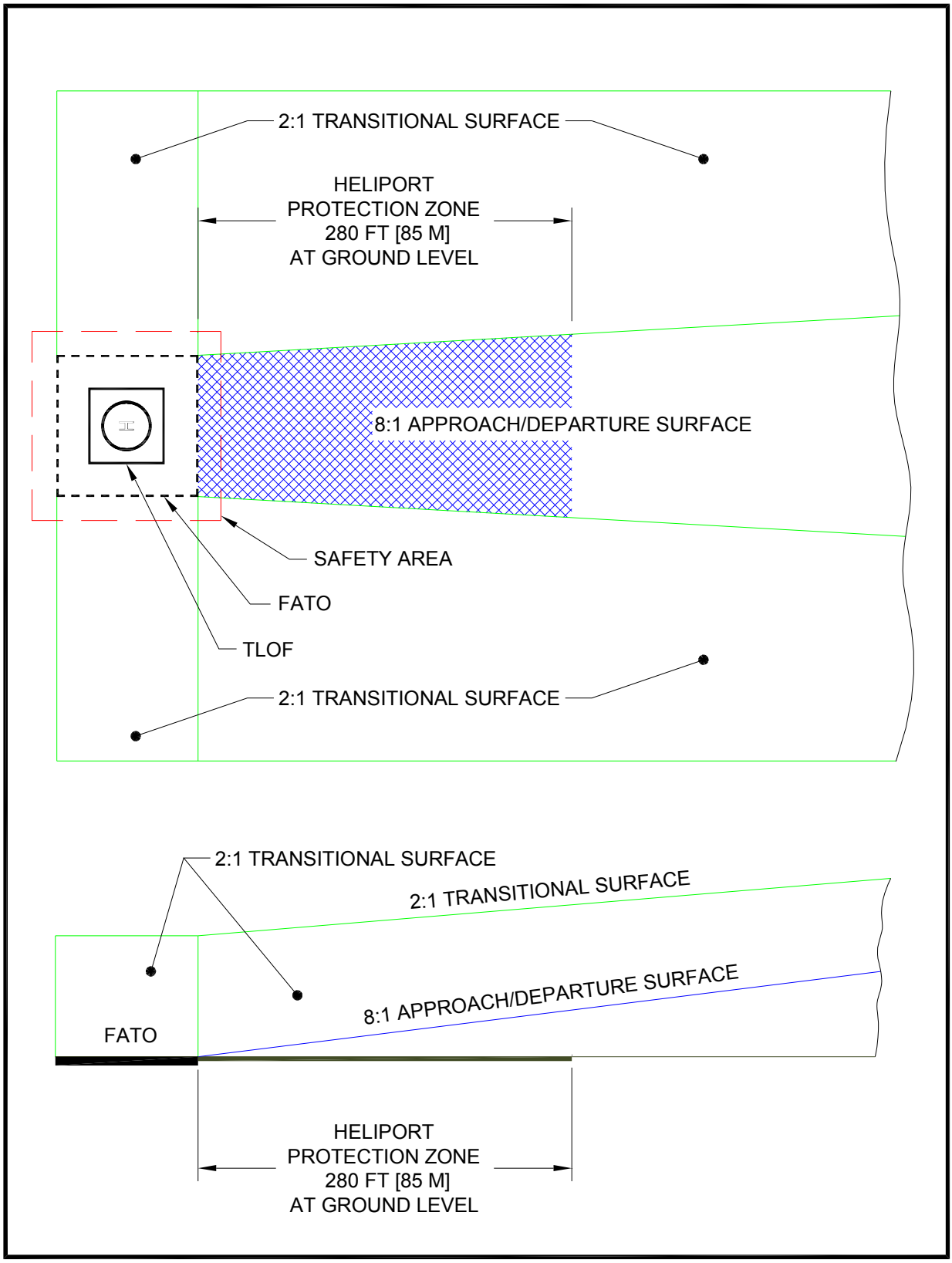



**Figure 2–12. Heliport Protection Zone: General Aviation**

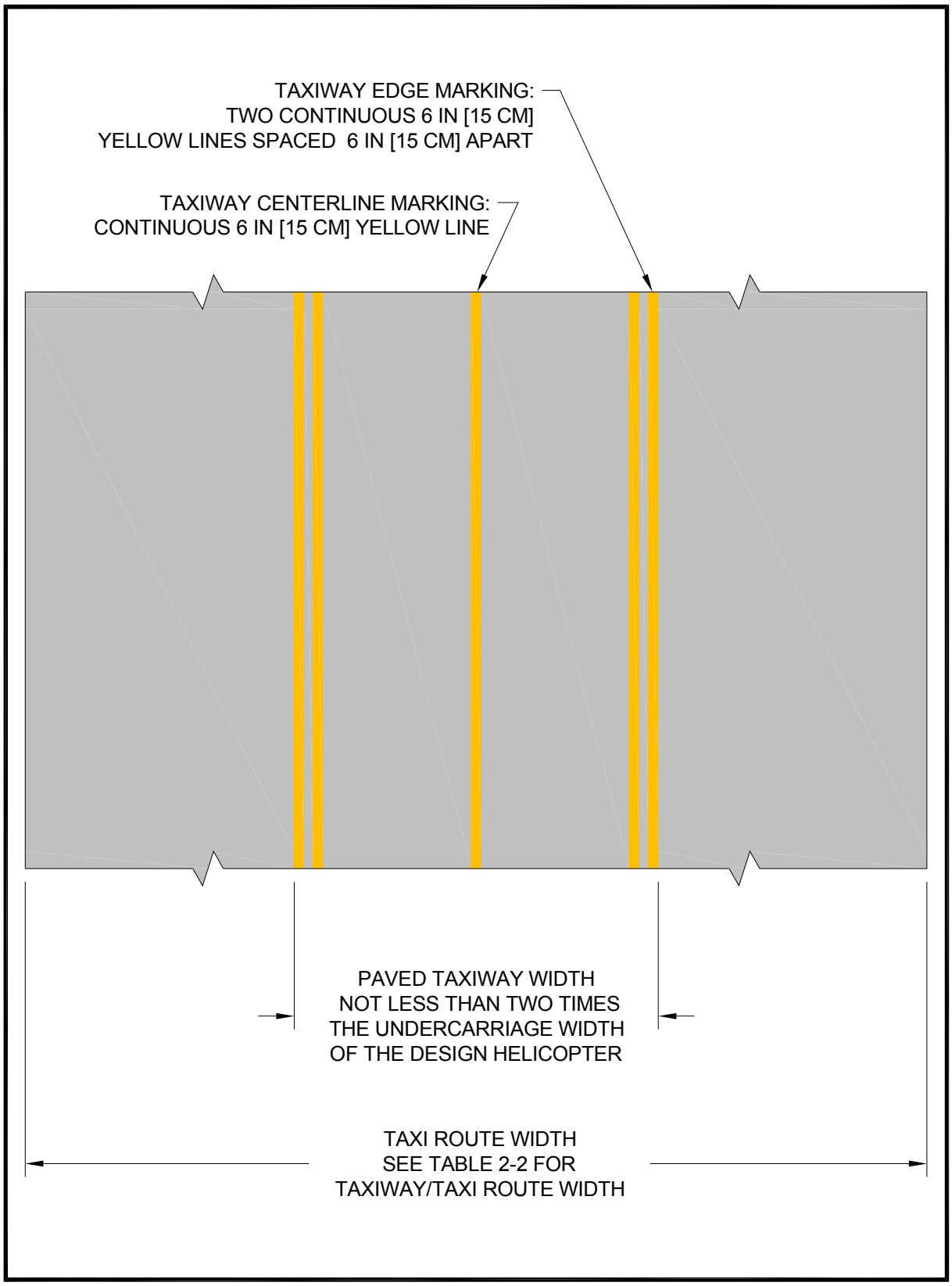



**Figure 2–13. Taxiway/Taxi Route Relationship – Paved Taxiway: General Aviation**

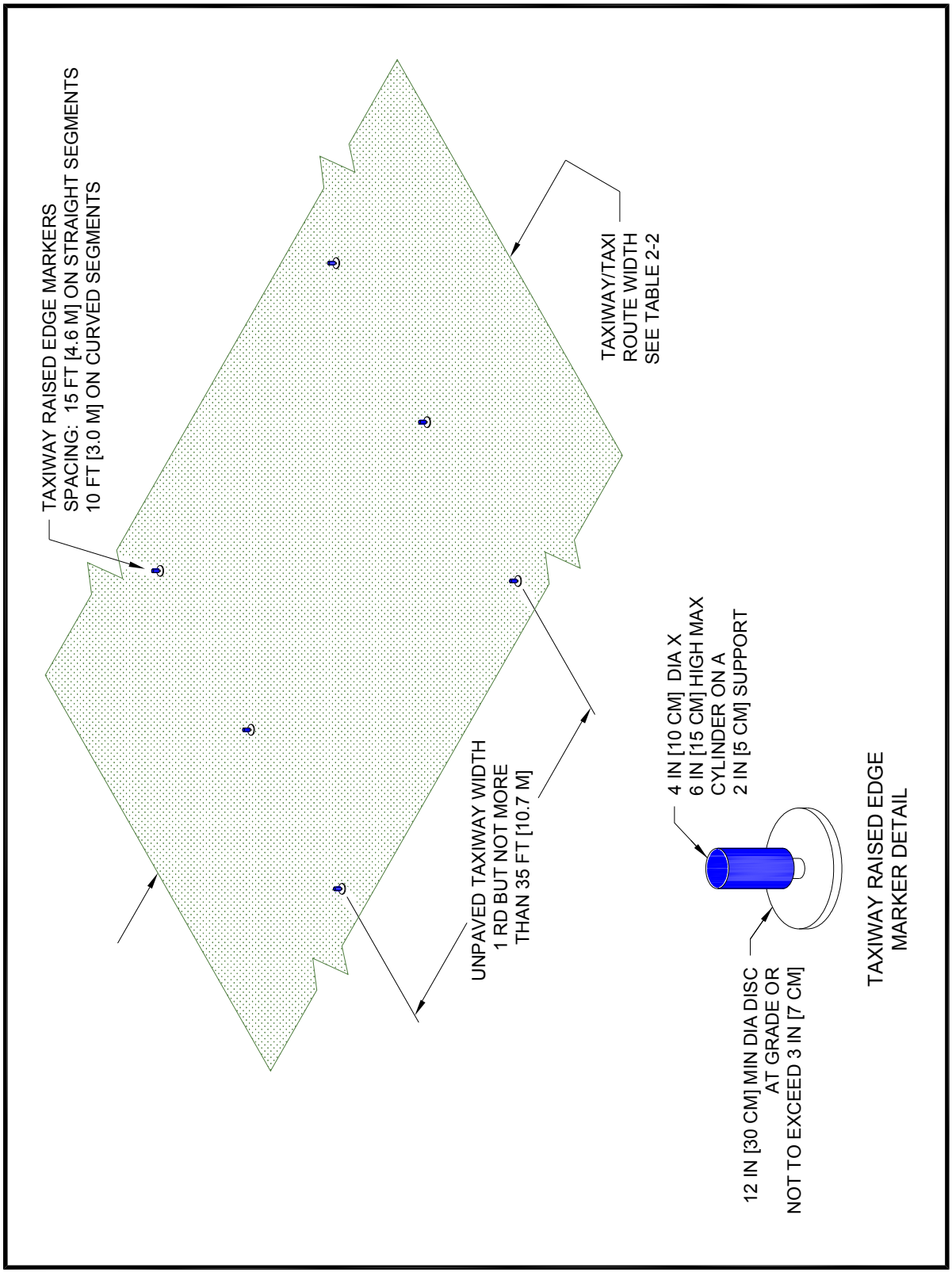



**Figure 2–14. Taxiway/Taxi Route Relationship –**
**Unpaved Taxiway with Raised Edge Markers: General Aviation**

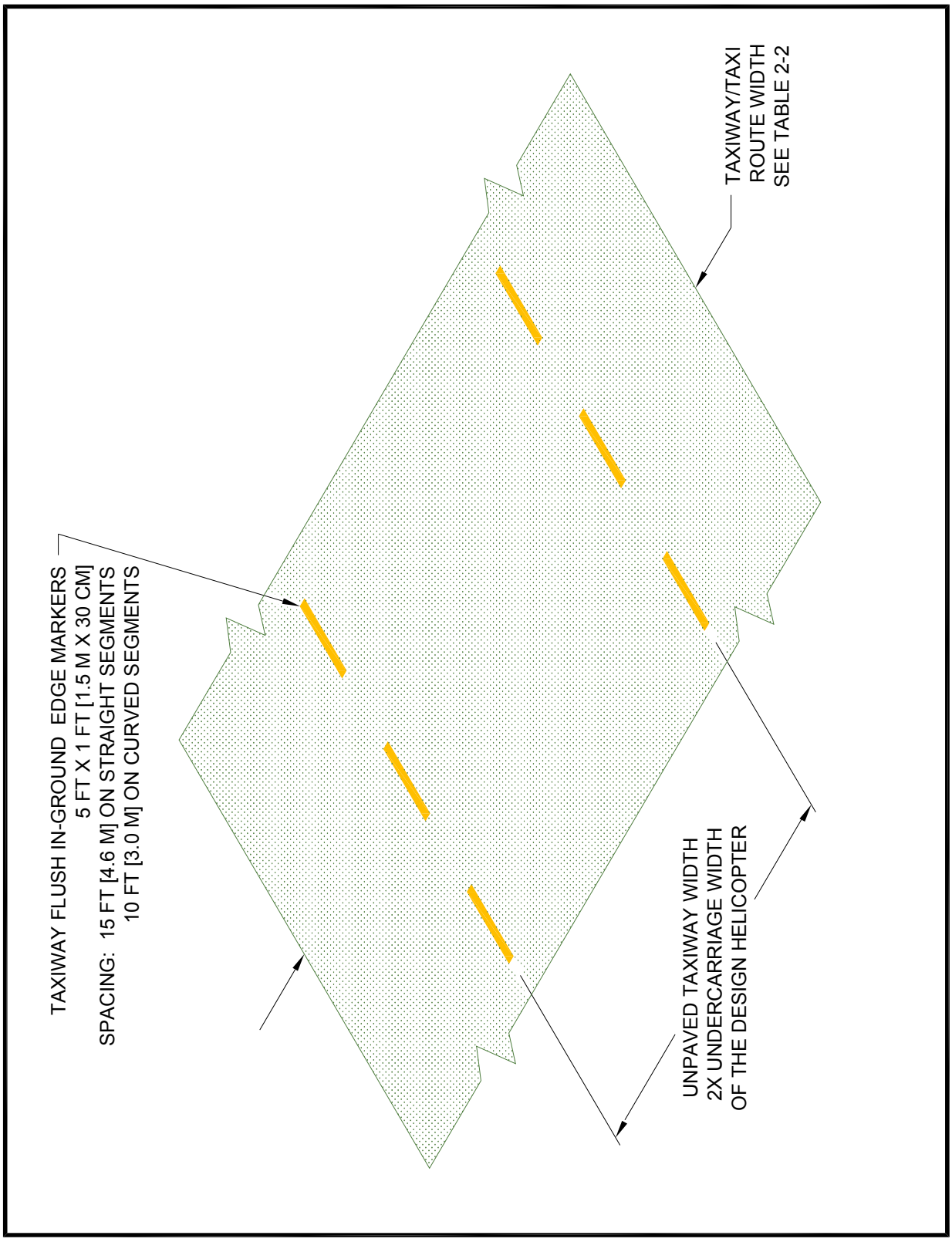



**Figure 2–15. Taxiway/Taxi Route Relationship –**
**Unpaved Taxiway with Flush Edge Markers: General Aviation**

**a. Taxiway/taxi route widths.** The dimensions of taxiways and taxi routes are a function of helicopter size, taxiway/taxi route marking, and type of taxi operations (ground taxi versus hover taxi). These dimensions are defined in Table 2-2. Normally, the requirement for hover taxi dictates the taxiway/taxi route widths. However, when the fleet comprises a combination of large ground taxiing helicopters and smaller air taxiing helicopters, the larger aircraft may dictate the taxiway/taxi route widths. If wheel-equipped helicopters taxi with wheels not touching the surface, design the facility with hover taxiway widths rather than ground taxiway widths. Where the visibility of the centerline marking cannot be guaranteed at all times, such as locations where snow or dust commonly obscure the centerline marking and it is not practical to remove it, determine the minimum taxiway/taxi route dimensions as if there was no centerline marking.

**b. Surfaces.** For ground taxiways, provide a portland cement concrete, asphalt, or stabilized surfaces, such as turf, in accordance with the standards of items P-217 of AC 150/5370-10. For unpaved portions of taxiways and taxi routes, provide a turf cover or treat the surface in some way to prevent dirt and debris from being raised by a taxiing helicopter's rotor wash.

**c. Gradients.** Taxiway and taxi route gradient standards are defined in Chapter 7.

**214. Helicopter parking.** If more than one helicopter at a time is expected at a heliport, design the facility with an area designated for parking helicopters. The size of this area depends on the number and size of specific helicopters to be accommodated. It is not necessary that every parking position accommodate the design helicopter. Construct individual parking positions to accommodate the helicopter size and weights expected to use the parking position at the facility. However, use the design helicopter to determine the separation between parking positions and taxi routes. Use the larger helicopter to determine the separation between parking positions intended for helicopters of different sizes. Build the parking positions to support the static loads of the helicopter intended to use the parking area. Design parking areas as one large, paved, apron or as individual, paved, parking positions. Ground taxi turns of wheeled helicopters are significantly larger than a hover turn. Consider the turn radius of helicopters when designing taxi intersections and parking positions for wheeled helicopters. Design heliport parking areas so helicopters will be parked in an orientation that keeps the "avoid areas" around the tail rotors clear of passenger walkways. See Figure 2–16, Figure 2–17, and Figure 2–19.

**a. Location.** Do not locate aircraft parking areas under an approach/departure surface. However, as an option, allow aircraft parking areas under the transitional surfaces.

**(1)** For "turn around" parking positions, locate the parking position to provide a minimum distance between the tail rotor circle and any object, building, safety area, or other parking position. The minimum distance is 10 feet (3 m) for ground taxi operations and the greater of 10 feet (3 m) or $^1/_3$ RD for hover taxi operations. See Figure 2–19.

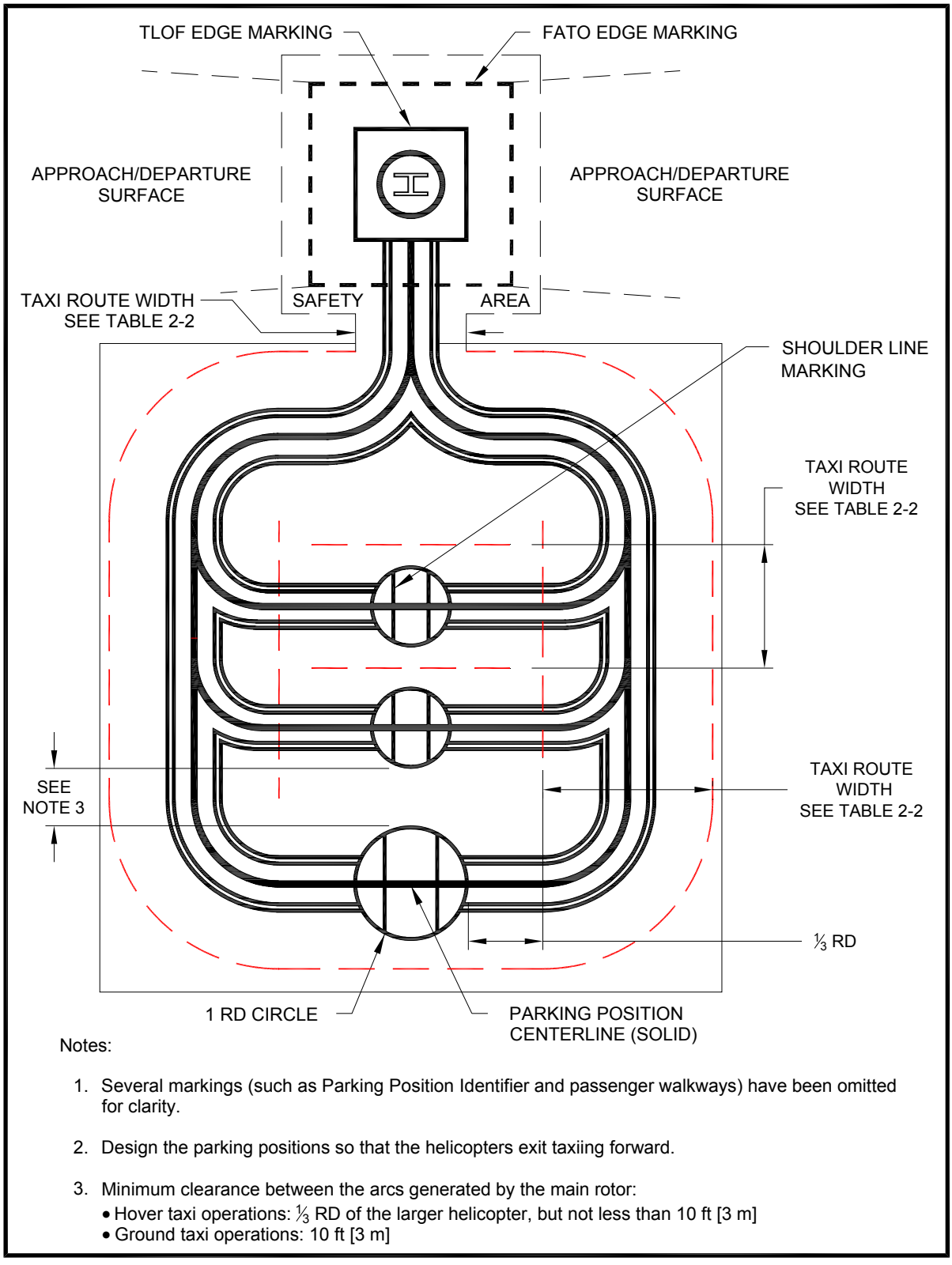
**(2)** For "taxi-through" and "back-out" parking positions, locate the parking position to provide a minimum distance between the main rotor circle and any object, building, safety area, or other parking position. The minimum distance is 10 feet (3 m) for ground taxi operations and the greater of 10 feet (3 m) or $^1/_3$ RD for hover taxi operations. See Figure 2–20.

**(3)** Locate the parking position to provide a minimum distance between the main rotor circle and the edge of any taxi route. Design parking positions such that the helicopter taxis through, turns around, or backs out to depart. The minimum distance is $^1/_3$ RD for "turn around" and "taxi through" parking areas, and ½ RD for "back-out" parking areas. See Figure 2–16, Figure 2–17, and Figure 2–18.

**Table 2-2. Taxiway/Taxi Route Dimensions – General Aviation Heliports**

| Taxiway (TW) Type | Minimum Width of Paved Area | Centerline Marking Type | TW Edge Marking Type | Lateral Separation Between TW Edge Markings | Total Taxi Route Width |
|---|---|---|---|---|---|
| Ground Taxiway | 2 x UC | Painted | Painted | 2 x UC | 1 ½ RD |
| | | | Elevated | 1 RD but not greater than 35 ft (10.7 m) | |
| | Unpaved but stabilized for ground taxi | None | Flush | 2 x UC | |
| | | | Elevated | 1 RD but not greater than 35 ft (10.7 m) | |
| Hover Taxiway | 2 x UC | Painted | Painted | 2 x UC | 2 RD |
| | Unpaved | None | Elevated or Flush | 1 RD but not greater than 35 ft (10.7 m) | |

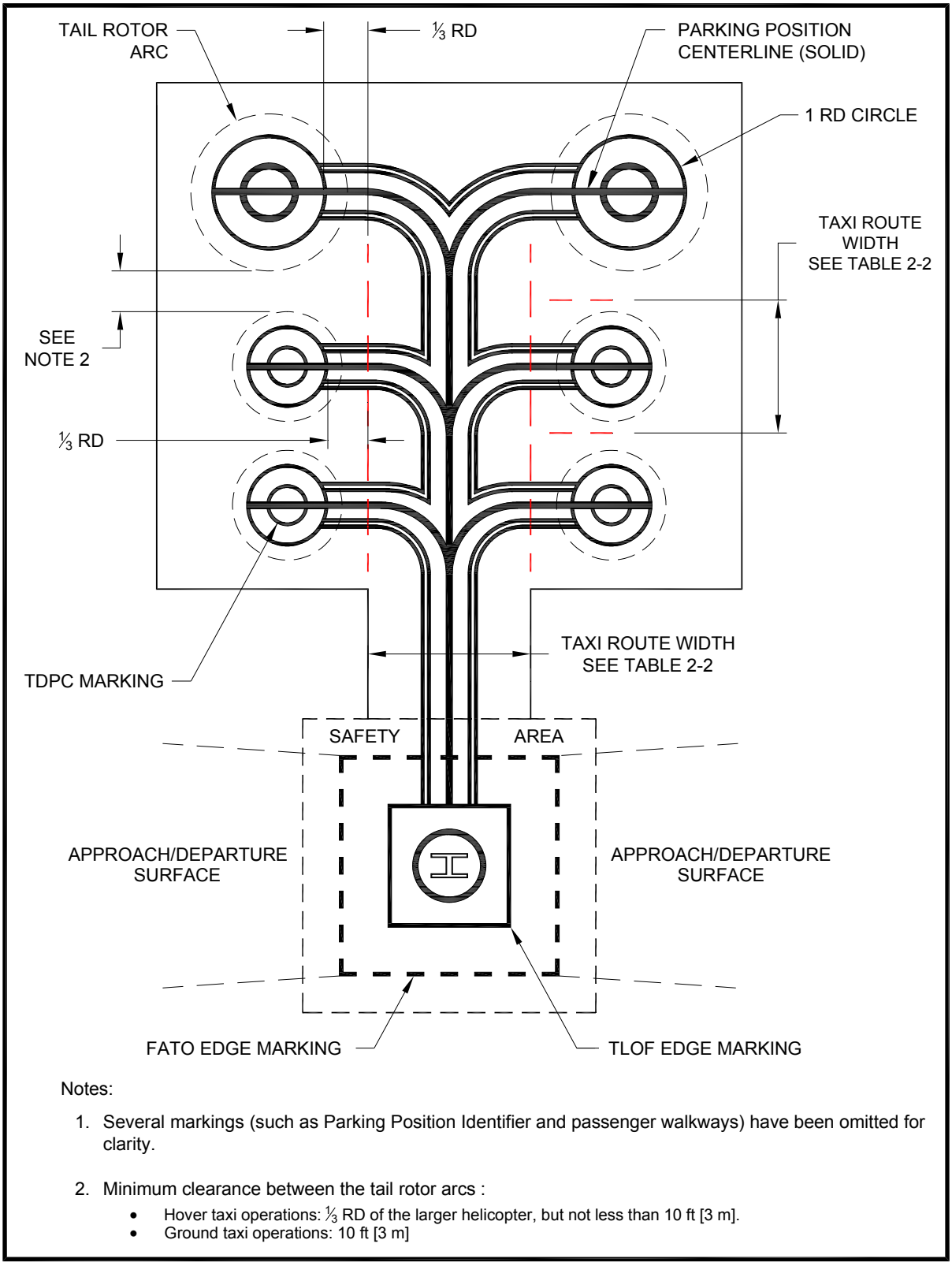
RD: rotor diameter of the design helicopter
TW: taxiway
UC: undercarriage length or width (whichever is greater) of the design helicopter




Notes:

1. Several markings (such as Parking Position Identifier and passenger walkways) have been omitted for clarity.
2. Design the parking positions so that the helicopters exit taxiing forward.
3. Minimum clearance between the arcs generated by the main rotor:
   - Hover taxi operations: ⅓ RD of the larger helicopter, but not less than 10 ft [3 m]
   - Ground taxi operations: 10 ft [3 m]

**Figure 2–16. Parking Area Design – "Taxi-through" Parking Positions: General Aviation**

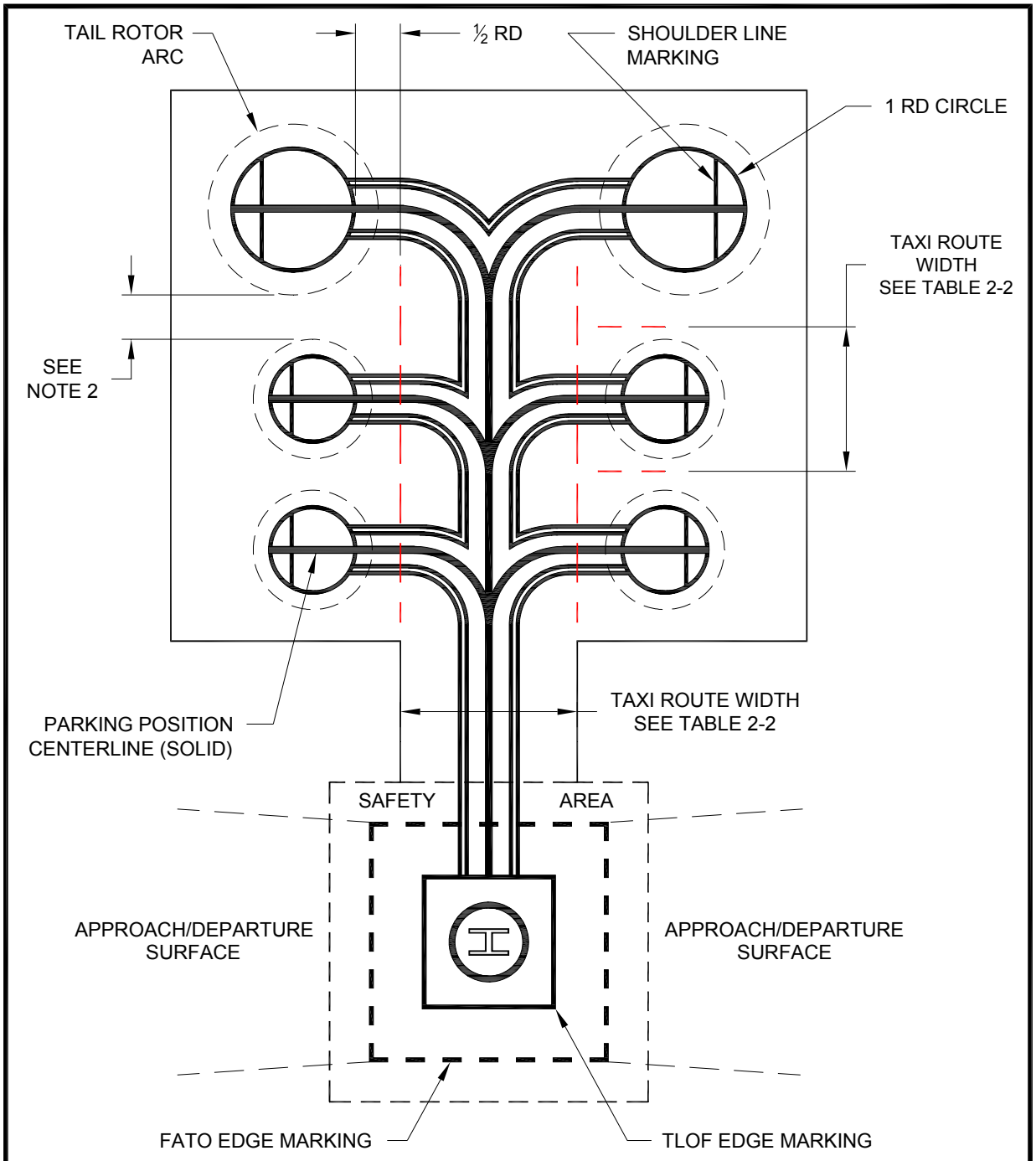



Notes:

1. Several markings (such as Parking Position Identifier and passenger walkways) have been omitted for clarity.

2. Minimum clearance between the tail rotor arcs :
   - Hover taxi operations: ⅓ RD of the larger helicopter, but not less than 10 ft [3 m].
   - Ground taxi operations: 10 ft [3 m]

**Figure 2–17. Parking Area Design – "Turn-around" Parking Positions: General Aviation**

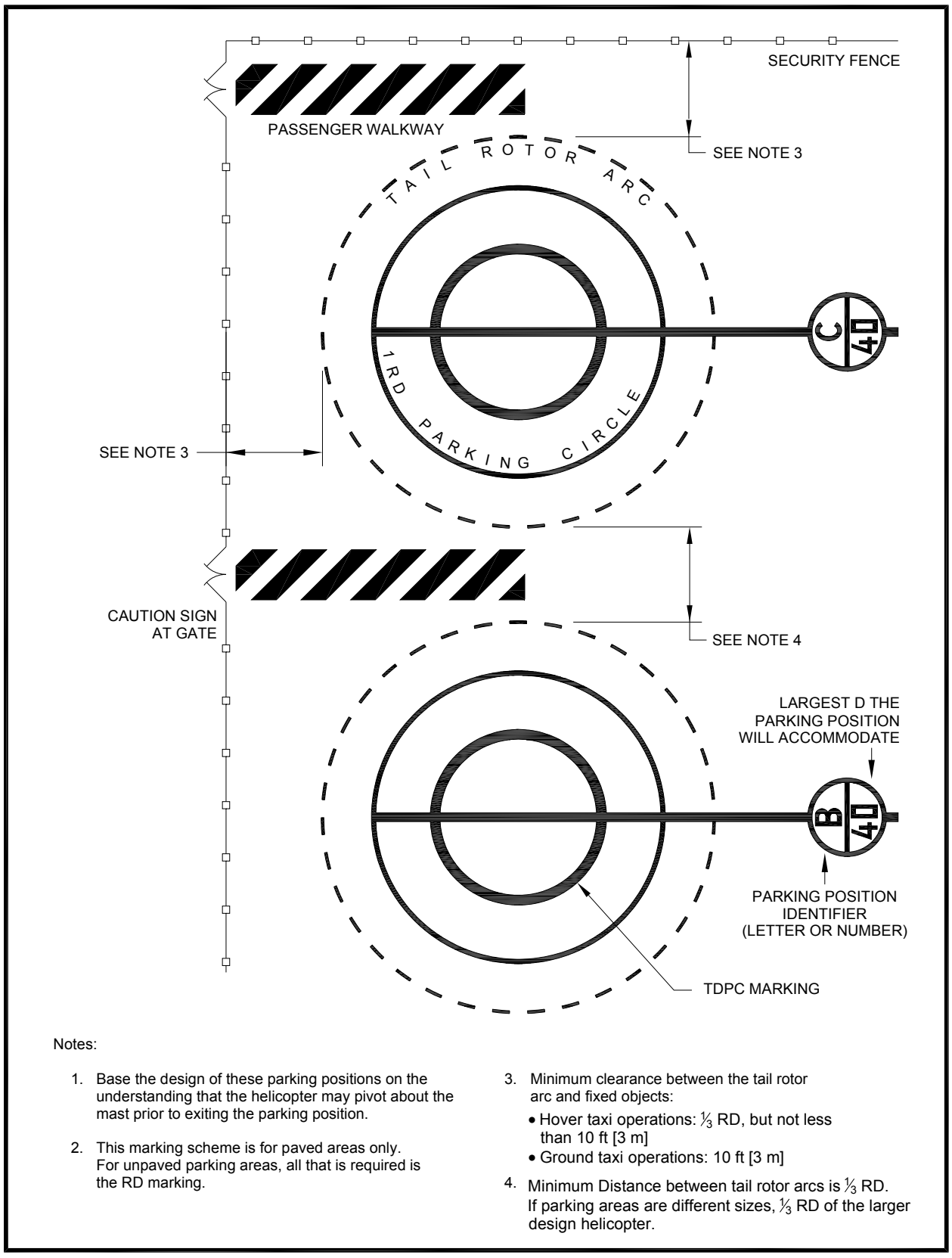



Notes:

1. Several markings (such as Parking Position Identifier and passenger walkways) have been omitted for clarity.

2. Minimum clearance between the tail rotor arcs :
   - Hover taxi operations: ⅓ RD of the larger helicopter, but not less than 10 ft [3 m].
   - Ground taxi operations: 10 ft [3 m]

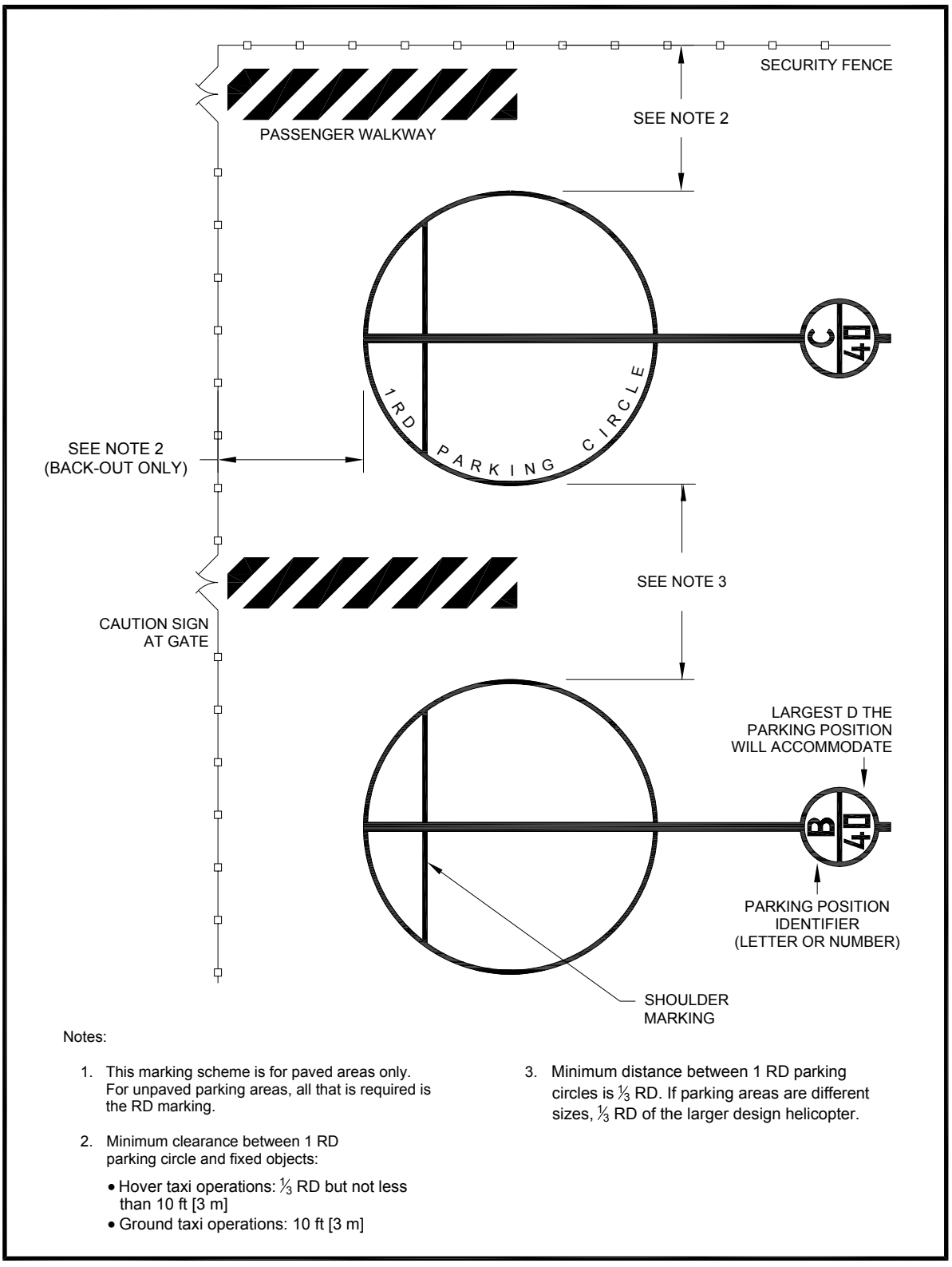
**Figure 2–18. Parking Area Design – "Back-out" Parking Positions: General Aviation**




Notes:

1. Base the design of these parking positions on the understanding that the helicopter may pivot about the mast prior to exiting the parking position.
2. This marking scheme is for paved areas only. For unpaved parking areas, all that is required is the RD marking.
3. Minimum clearance between the tail rotor arc and fixed objects:
   - Hover taxi operations: ⅓ RD, but not less than 10 ft [3 m]
   - Ground taxi operations: 10 ft [3 m]
4. Minimum Distance between tail rotor arcs is ⅓ RD. If parking areas are different sizes, ⅓ RD of the larger design helicopter.

**Figure 2–19. "Turn-around" Parking Position Marking: General Aviation**




Notes:

1. This marking scheme is for paved areas only. For unpaved parking areas, all that is required is the RD marking.
2. Minimum clearance between 1 RD parking circle and fixed objects:
   - Hover taxi operations: ⅓ RD but not less than 10 ft [3 m]
   - Ground taxi operations: 10 ft [3 m]
3. Minimum distance between 1 RD parking circles is ⅓ RD. If parking areas are different sizes, ⅓ RD of the larger design helicopter.

**Figure 2–20. "Taxi-through" and "Back-out" Parking Position Marking: General Aviation**

**b. Size.** Parking position sizes are dependent upon the helicopter size. The clearance between parking positions are dependent upon the type of taxi operations (ground taxi or hover taxi) and the intended paths for maneuvering in and out of the parking position. The more demanding requirement will dictate what is required at a particular site. Usually, the parking area requirements for skid-equipped helicopters will be the most demanding. However, when the largest helicopter is a very large, wheeled aircraft (for example, the S-61), and the skid-equipped helicopters are all much smaller, the parking requirements for wheeled helicopters may be the most demanding. If wheel-equipped helicopters taxi with wheels not touching the surface, design parking areas based on hover taxi operations rather than ground taxi operations.

**(1)** If all parking positions are the same size, design them to accommodate the largest helicopter that will park at the heliport.

**(2)** When there is more than one parking position, as an option design the facility with parking positions of various sizes with at least one position that will accommodate the largest helicopter that will park at the heliport. Design other parking positions to be smaller, for the size of the individual or range of individual helicopters parking at that position. Figure 2–21 provides guidance on parking position identification, size, and weight limitations.

**(3)** "Taxi-through" parking positions are illustrated in Figure 2–16. When using this design for parking positions, the heliport owner and operator take steps to ensure all pilots are informed that "turn-around" or "back-up" departures from the parking position are not permitted.

**(4)** "Turn-around" parking positions are illustrated in Figure 2–17.

**(5)** "Back-out" parking positions are illustrated in Figure 2–18. When using this design for parking positions, design the adjacent taxiway to accommodate hover taxi operations so the width of the taxiway will be adequate to support "back-out" operations.

**c. Parking pads.** When partially paving a parking area, design the smallest dimension of the paved parking pad to be a minimum of two times the maximum dimension (length or width, whichever is greater) of the undercarriage or the RD, whichever is less, of the largest helicopter that will use the parking position. Place the parking pad in the center of the parking position circle**.**

**d. Walkways.** At parking positions, provide marked walkways where practicable. Design the pavement to drain away from walkways.

**e. Fueling.** Design the facility to allow fueling with the use of a fuel truck or a specific fueling area with stationary fuel tanks.

**(1)** Various federal, state, and local requirements for petroleum handling facilities apply to systems for storing and dispensing fuel. Guidance is found in AC 150/5230-4, Aircraft Fuel Storage, Handling, and Dispensing on Airports. Additional information may be found in various National Fire Protection Association (NFPA) publications. For more reference material, see Appendix D.

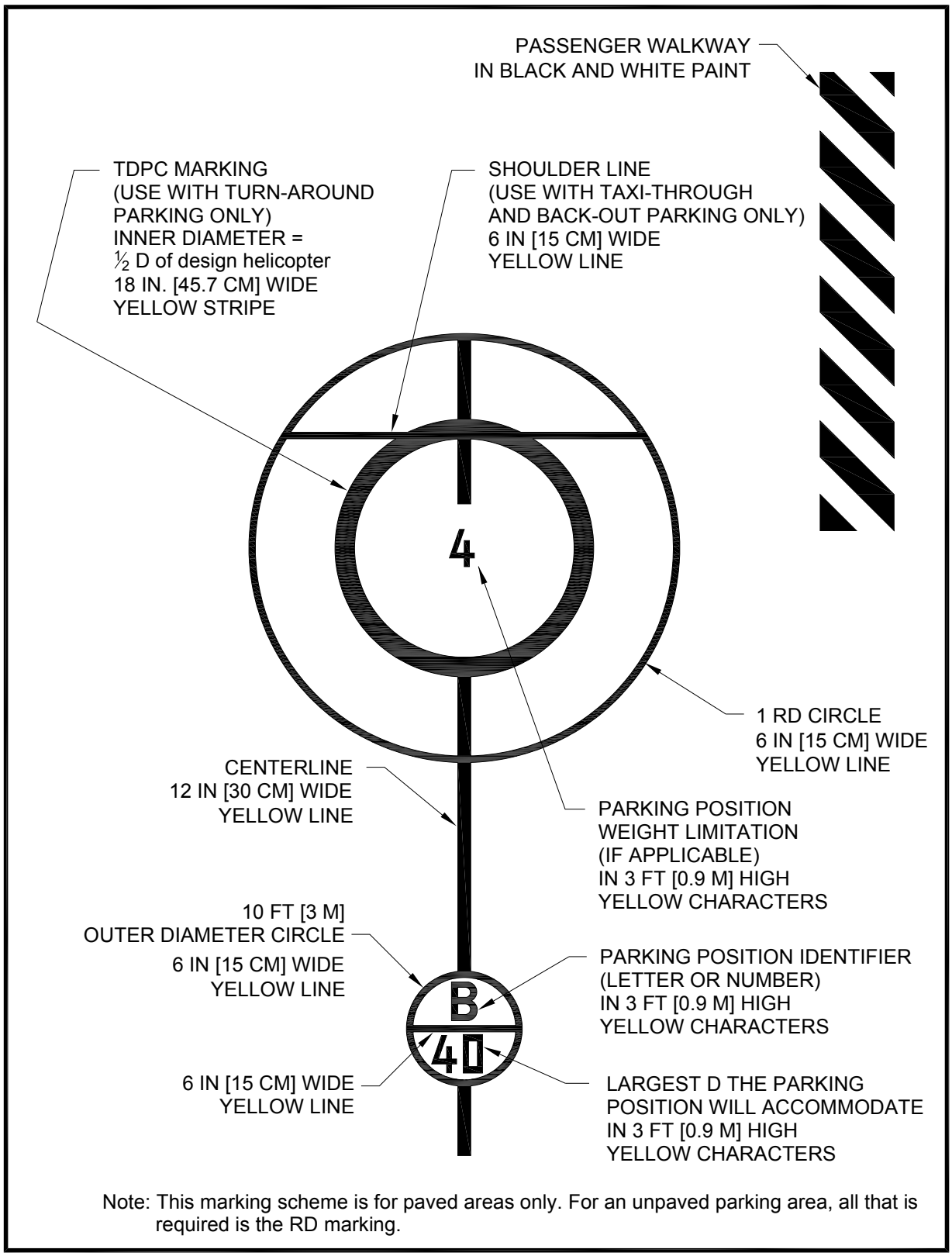



**Figure 2–21. Parking Position Identification, Size, and Weight Limitations: General Aviation**

**(2)** Do not locate fueling equipment in the TLOF, FATO, or safety area. Design and mark separate fueling locations to minimize the potential for helicopters to collide with the dispensing equipment. Design fueling areas so there is no object tall enough to be hit by the main or tail rotor blades within a distance of RD from the center point of the position where the helicopter would be fueled (providing ½ RD clearance from the rotor tips). If this is not practical at an existing facility, install long fuel hoses.

**(3) Lighting.** Light the fueling area if night fueling operations are contemplated. Ensure any light poles do not constitute an obstruction hazard.

**f. Tiedowns.** Install recessed tiedowns to accommodate extended or overnight parking of based or transient helicopters. Recess any tiedowns so they will not be a hazard to helicopters. Ensure any depression associated with the tiedowns is of a diameter not greater than ½ the width of the smallest helicopter landing wheel or landing skid anticipated to be operated on the heliport surface. In addition, provide storage for tiedown chocks, chains, cables and ropes off the heliport surface to avoid fouling landing gear. Find guidance on recessed tiedowns in AC 20-35, Tiedown Sense.

**215. Heliport markers and markings.** Markers and/or surface markings identify the facility as a heliport. Use paint or preformed materials for surface markings. (See AC 150/5370-10, Item P-620, for specifications for paint and preformed material.). As options, use reflective paint and reflective markers, though overuse of reflective material can be blinding to a pilot using landing lights. As an option, outline lines/markings with a 6-inch (15 cm) wide line of a contrasting color to enhance conspicuity. Place markings that define the edges of a TLOF, FATO, taxiway or apron within the limits of those areas. Use the following markers and markings.

**a. Heliport identification marking.** The identification marking identifies the location as a heliport, marks the TLOF and provides visual cues to the pilot.

**(1) Standard heliport identification symbol**. Mark the TLOF with a white "H" marking. The "H" has a minimum height of the lesser of 0.3 D or 10 feet (3 m). Locate the "H" in the center of the TLOF and orient it on the axis of the preferred approach/departure path. Place a one-foot wide bar under the "H" when it is necessary to distinguish the preferred approach/departure direction. The proportions and layout of the letter "H" are illustrated in Figure 2–23. For a height of "H" less than 10 feet (3 m), reduce other dimensions proportionately.

**(2) Nonstandard heliport identification marking**. As an option use a distinctive marking, such as a company logo, to identify the facility as a PPR heliport. However, a nonstandard marking does not necessarily provide the pilot with the same degree of visual cueing as the standard heliport identification symbol. To compensate, increase the size of the safety area when the standard heliport identification symbol "H" is not used. See Table 2-1.

**b. TLOF markings.**

**(1) TLOF perimeter marking.** Define the TLOF perimeter with markers and/or lines. If the heliport operator does not mark the TLOF, increase the size of the safety area as described in paragraph 209.a and Table 2-1.

**(a) Paved TLOFs.** Define the perimeter of a paved or hard surfaced TLOF with a continuous, 12-inch-wide (30 cm), white line. See Figure 2–25.

**(b) Unpaved TLOFs.** Define the perimeter of an unpaved TLOF with a series of 12-inch-wide (30 cm), flush, in-ground markers, each approximately 5 feet (1.5 m) in length with end-to-end spacing of not more than 6 inches (15 cm). See Figure 2–25.

**(2) Touchdown/positioning circle (TDPC) marking.** A TDPC marking provides guidance to allow a pilot to touch down in a specific position on paved surfaces. When the pilot's seat is over the

marking, the undercarriage will be inside the LBA, and all parts of the helicopter will be clear of any obstacle by a safe margin. A TDPC marking is a yellow circle with an inner diameter of ½ D and a line width of 18 in (46 m). Locate a TDPC marking in the center of a TLOF. (See Figure 2–23). As an option, at PPR heliports where the TLOF width is less than 16 feet (5 m), omit the TDPC marking.

**(3) TLOF size and weight limitations.** Mark the TLOF to indicate the length and weight of the largest helicopter it will accommodate, as shown in Figure 2–23. Place these markings in a box in the lower right-hand corner of a rectangular TLOF, or on the right-hand side of the "H" of a circular TLOF, when viewed from the preferred approach direction. The box is 5 feet (1.5 m) square. The numbers are 18 inches (46 cm) high. (See Figure C–1). If necessary, allow this marking to interrupt the TDPC marking. (See Figure 2–23 and Figure C–1.) The numbers are black with a white background. This marking is optional at a TLOF with a turf surface. This marking is also optional at PPR heliports, since the operator ensures all pilots using the facility are thoroughly knowledgeable with this and any other facility limitations.

**(a) TLOF size limitation**. This number is the length (D) of the largest helicopter the TLOF will accommodate, as shown in Figure 2–23. The marking consists of the letter "D" followed by the dimension in feet. Do not use metric equivalents for this purpose. Center this marking in the lower section of the TLOF size/weight limitation box.

**(b) TLOF weight limitations.** If a TLOF has limited weight-carrying capability, mark it with the maximum takeoff weight of the design helicopter, in units of thousands of pounds, as shown in Figure 2–23. Do not use metric equivalents for this purpose. Center this marking in the upper section of a TLOF size/weight limitation box. If the TLOF does not have a weight limit, add a diagonal line, extending from the lower left hand corner to the upper right hand corner, to the upper section of the TLOF size/weight limitation box. See Figure 2–23.

**c. Extended pavement/structure markings.** As an option, increase the pavement or structure without a corresponding increase in the length and width or diameter of the FATO to accommodate pedestrians and/or support operations. Whether or not this increased area is part of the LBA, mark the area outside the TLOF with 12-inch-wide (30 cm) diagonal black and white stripes. See Figure 2–24 for marking details.

**d. FATO markings.**

**(1) FATO perimeter marking.** Define the perimeter of a load-bearing FATO with markers and/or lines. Do not mark the FATO perimeter if any portion of the FATO is not a load-bearing surface. In such cases, mark the perimeter of the LBA (see paragraph (b) below).

**(a) Paved FATOs.** Define the perimeter of a paved load-bearing FATO with a 12-inch-wide (30 cm) dashed white line. Define the corners of the FATO. The perimeter marking segments are approximately 5 feet (1.5 m) in length, and with end-to-end spacing of approximately 5 feet (1.5 m). See Figure 2–25.

**(b) Unpaved FATOs.** Define the perimeter of an unpaved load-bearing FATO with 12-inch-wide (30 cm), flush, in-ground markers. Define the corners of the FATO. The rest of the perimeter markers are approximately 5 feet (1.5 m) in length, and have end-to-end spacing of approximately 5 feet (1.5 m). See Figure 2–26.

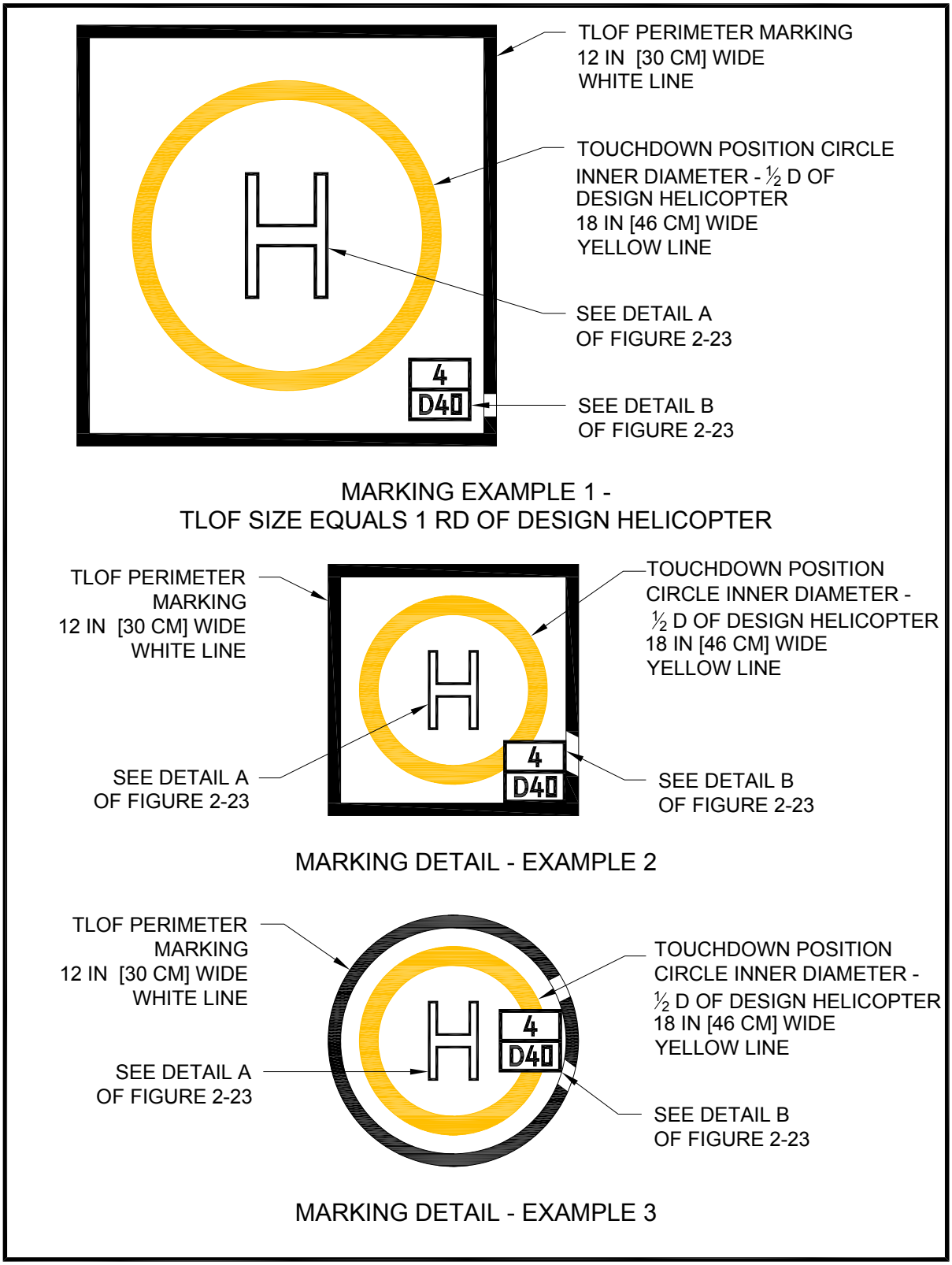
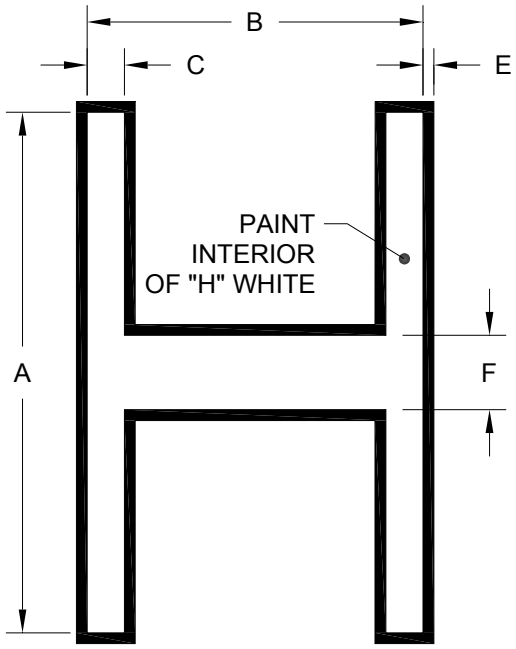
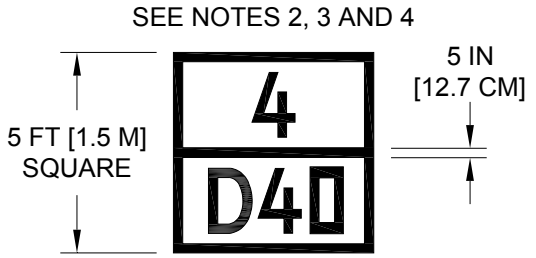



**Figure 2–22. Standard and Alternate TLOF Marking: General Aviation**




| | "H" SIZE | |
|---|---|---|
| DIMENSION | STANDARD TLOF MARKING | ALTERNATE TLOF MARKING |
| A | 10'-0" [3 M] | 0.3D |
| B | 6'-8" [1.8 M] | 0.66A |
| C | 1'-0" [30 CM] | 0.1A |
| E | 0'-3" [7 CM] | 0.02A |
| F | 2'-0" [61 CM] | 0.2A |

DETAIL A
HELIPORT IDENTIFICATION SYMBOL





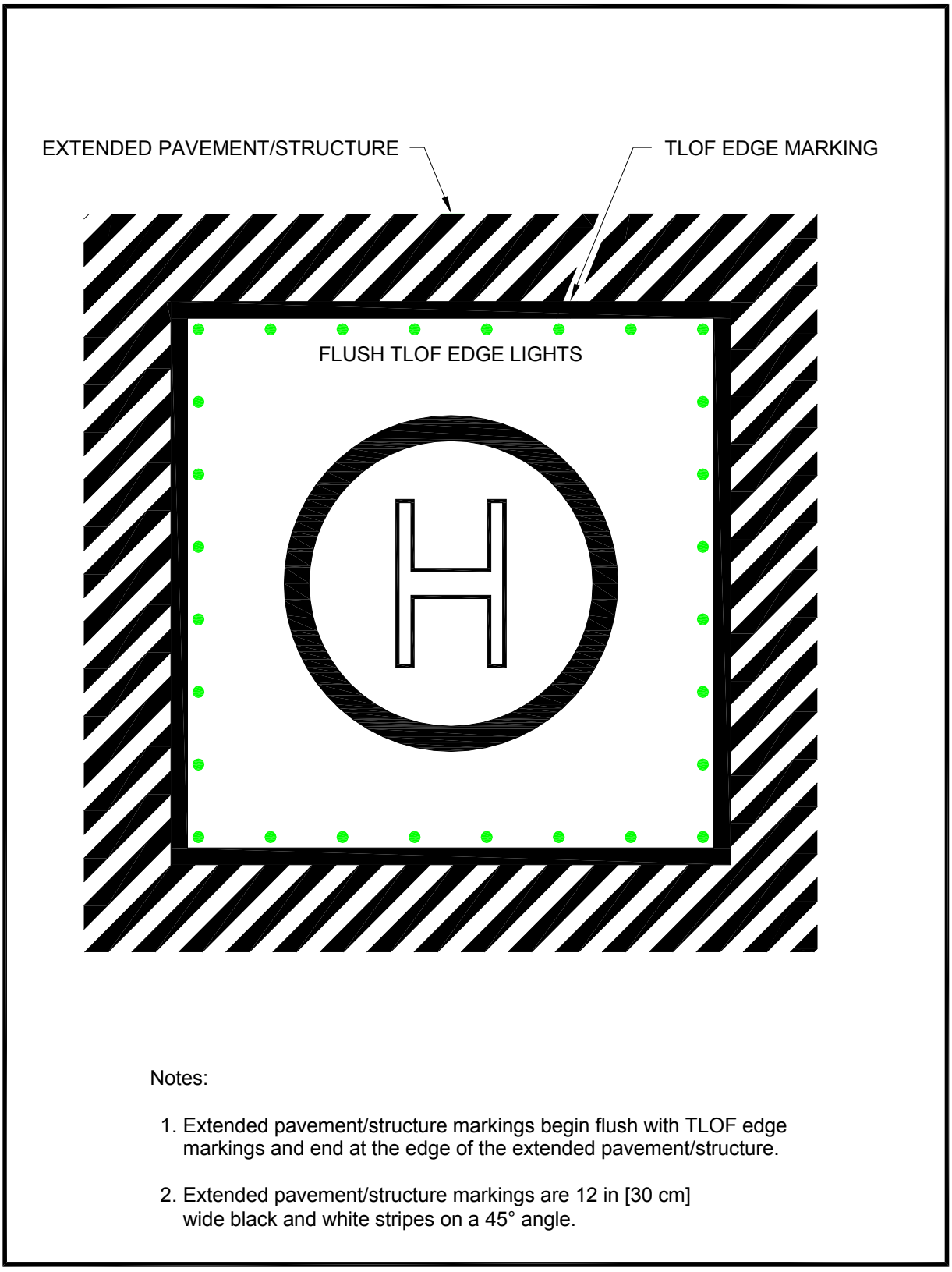


DETAIL B
TLOF SIZE/WEIGHT LIMITATION "BOX"

Notes:

1. See Appendix C for the form and proportion of the numbers used in the TLOF Size and Weight Limitation Box.
2. Characters within the TLOF Size and Weight Limitation Box are black on a white background.
3. "4" indicates the maximum takeoff weight (4,000 lbs) of the TLOF design helicopter, in units of thousands of pounds.
4. "D40" indicates the overall length of the largest helicopter (40 ft) for which the TLOF is designed.

**Figure 2–23. Standard Heliport Identification Symbol, TLOF Size and Weight Limitations: General Aviation**

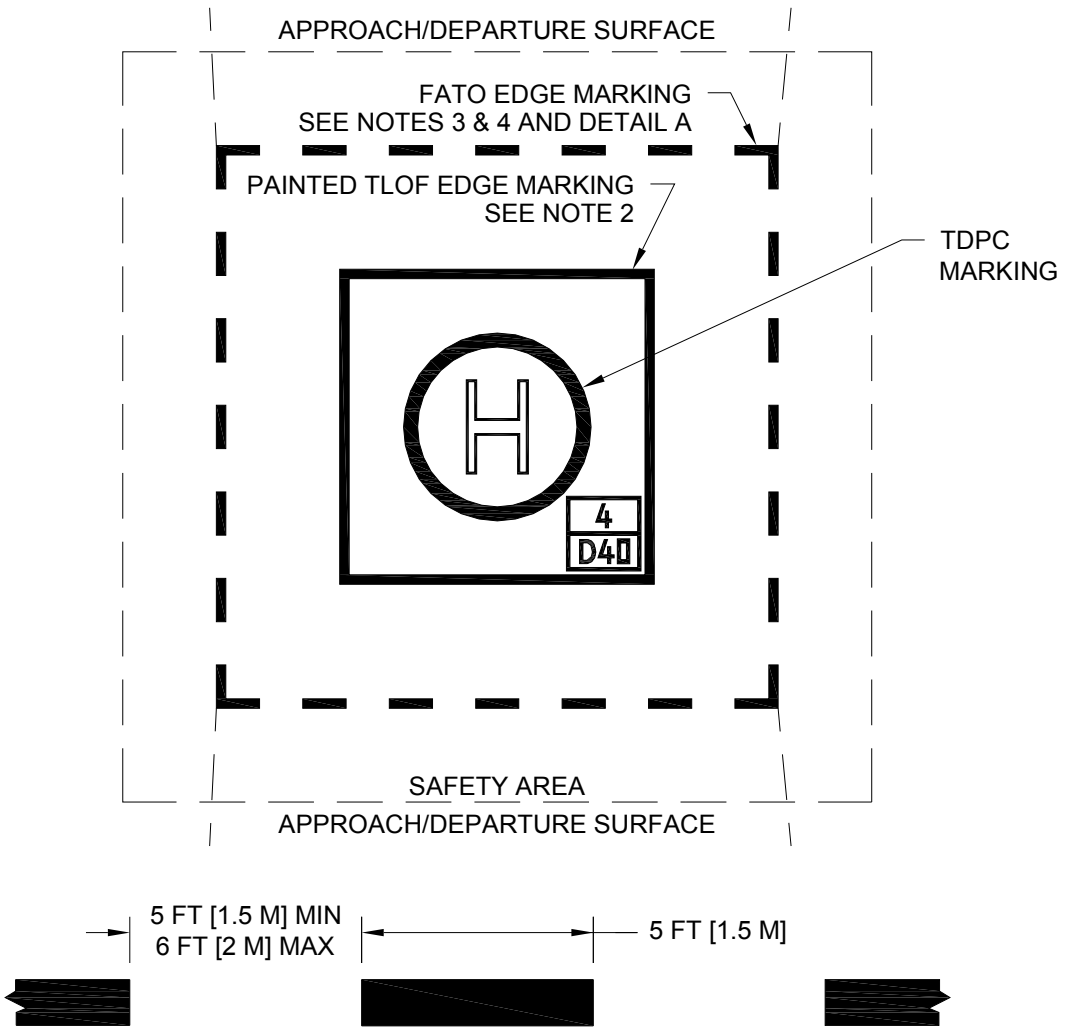



Notes:

1. Extended pavement/structure markings begin flush with TLOF edge markings and end at the edge of the extended pavement/structure.

2. Extended pavement/structure markings are 12 in [30 cm] wide black and white stripes on a 45° angle.

**Figure 2–24. Extended Pavement / Structure Marking: General Aviation**




DETAIL A FATO MARKING DETAIL

Notes:

1. Mark the perimeter of the TLOF and FATO.
2. Define the perimeter of a paved or hard surfaced TLOF with a continuous 12 in [30 cm] white line.
3. Define paved FATO perimeters with a 12 in [30 cm] wide dashed line per Detail A.
4. Define unpaved FATO perimeters with flush in-ground markers per Detail A.
5. See Figure 2-23 for " H", Touchdown/Position, Overall Length and Weight Limitation box dimensions.

**Figure 2–25. Paved TLOF/Paved FATO – Paved TLOF/ Unpaved FATO – Marking: General Aviation**

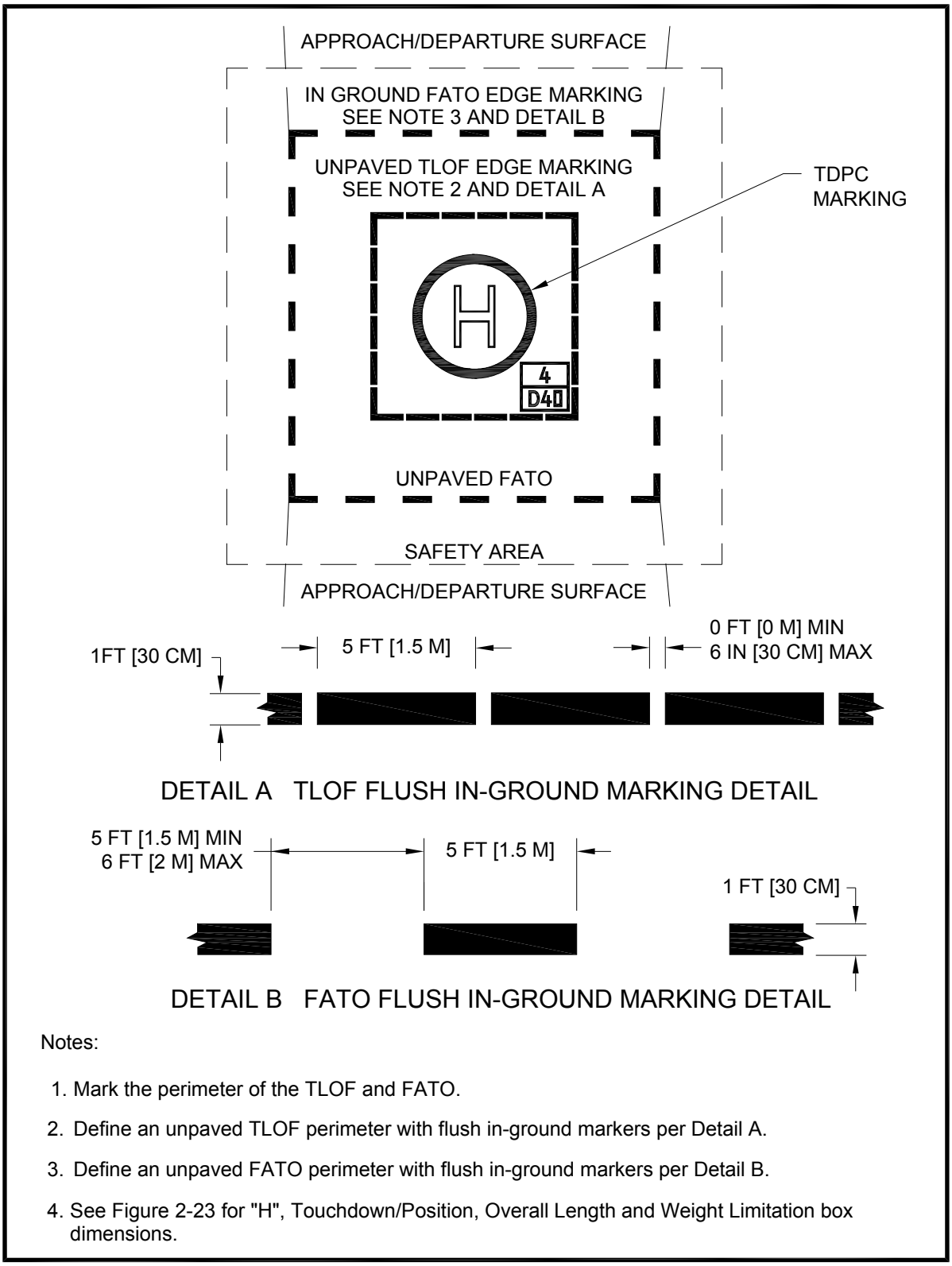



**Figure 2–26. Unpaved TLOF/Unpaved FATO – Marking: General Aviation**

**e. Flight path alignment guidance marking.** An optional flight path alignment guidance marking consists of one or more arrows to indicate the preferred approach/departure direction(s). Mark it on the TLOF, FATO and/or safety area surface as shown in Figure 2–11. The shaft of the each arrow is 18 inches (50 cm) in width and at least 10 feet (3 m) in length. Use a color which provides good contrast against the background color of the surface. An arrow pointing toward the center of the TLOF depicts an approach direction. An arrow pointing away from the center of the TLOF depicts a departure direction. In the case of a flight path limited to a single approach direction or a single departure path, the arrow marking is unidirectional. In the case of a heliport with only a bidirectional approach/takeoff flight path available, the arrow marking is bidirectional.

**f. Taxiway and taxi route markings.**

**(1) Paved taxiway markings.** Mark the centerline of a paved taxiway with a continuous 6-inch (15 cm) yellow line. As an option, mark both edges of the paved portion of the taxiway with two continuous 6-inch (15 cm) wide yellow lines spaced 6 inches (15 cm) apart. Figure 2–13 illustrates taxiway centerline and edge markings.

**(2) Unpaved taxiway markings.** Use either raised or in-ground flush edge markers to provide strong visual cues to pilots. Space them longitudinally at approximately 15-foot (5 m) intervals on straight segments and at approximately 10-foot (3 m) intervals on curved segments. Figure 2–14 and Figure 2–15 illustrate taxiway edge markings.

**(a)** Raised-edge markers are blue, 4 inches (10 cm) in diameter, and 8 inches (20 cm) high, as illustrated in Figure 2–14.

**(b)** In-ground, flush edge markers are yellow, 12 inches (30 cm) wide, and approximately 5 feet (1.5 m) long.

**(3) Raised edge markers in grassy areas.** Tall grass sometimes obscures raised edge markers Address this issue by using 12-inch (30 cm) diameter solid material disks around the poles supporting the raised markers.

**(4) Taxiway to parking position transition requirements.** For paved taxiways and parking areas, taxiway centerline markings continue into parking positions and become the parking position centerlines.

**g. Helicopter parking position markings.** Helicopter parking positions have the following markings:

**(1) Paved parking position identifications.** Mark parking position identifications (numbers or letters) if there is more than one parking position. These markings are yellow characters 36 inches (91 cm) high. See Figure 2–21 and Figure C–1.

**(2) Rotor diameter circle.** Define the circle of the RD of the largest helicopter that will park at that position with a 6-inch (15 cm) wide, solid yellow line with an outside diameter of RD. In paved areas, this is a painted line (see Figure 2–21). In unpaved areas, use a series of flush markers, 6 inches (15 cm) in width, a maximum of 5 feet (1.5 m) in length, and with end-to-end spacing of approximately 5 feet (1.5 m).

**(3) Touchdown/positioning circle (TDPC) marking.** An optional TDPC marking provides guidance to allow a pilot to touch down in a specific position on paved surfaces. When the pilot's seat is over the marking, the undercarriage will be inside the LBA, and all parts of the helicopter will be clear of any obstacle by a safe margin. A TDPC marking is a yellow circle with an inner diameter of ½ D and a line width of 18 in (46 cm). Locate a TDPC marking in the center of a parking area. See Figure 2–21 and Figure 2–25. The FAA recommends a TDPC marking for "turn-around" parking areas.

**(4) Maximum length marking.** This marking on paved surfaces indicates the D of the largest helicopter that the position is designed to accommodate (for example, 49). This marking consists of yellow characters at least 36 inches (91 cm) high. See Figure 2–21 and Figure C–1.

**(5) Parking position weight limit.** If a paved parking position has a weight limitation, mark it in units of 1,000 lbs as illustrated in Figure 2–21. (A 4 indicates a weight-carrying capability of up to 4,000 lbs. Do not use metric equivalents for this purpose.) This marking consists of yellow characters 36 inches (91 cm) high. When necessary to minimize the possibility of being misread, place a bar under the number. See Figure 2–21, Figure 2–25, and Figure C–1.

**(6) Shoulder line markings.** As an option, use shoulder line markings for paved parking areas (Figure 2–21) to ensure safe rotor clearance. Locate a 6-inch (15 cm) wide solid yellow shoulder line, perpendicular to the centerline and extending to the RD marking, so it is under the pilot's shoulder such that the main rotor of the largest helicopter the position will accommodate will be entirely within the rotor diameter parking circle (see Figure 2–21). Use ¼ D from the center of parking area to define the location of shoulder line. The FAA recommends a shoulder line marking for "taxi-through" and "back-out" parking areas.

**h. Walkways.** Figure 2–21 illustrates one marking scheme.

**i. Closed heliport.** Obliterate all markings of a permanently closed heliport, FATO, or TLOF. If it is impractical to obliterate markings, place a yellow "X" over the "H" as illustrated in Figure 2–27. Make the yellow "X" large enough to ensure early pilot recognition that the heliport is closed. Remove the wind cone(s) and other visual indications of an active heliport.

**j. Marking sizes.** See Appendix C for guidance on the proportions of painted numbers.

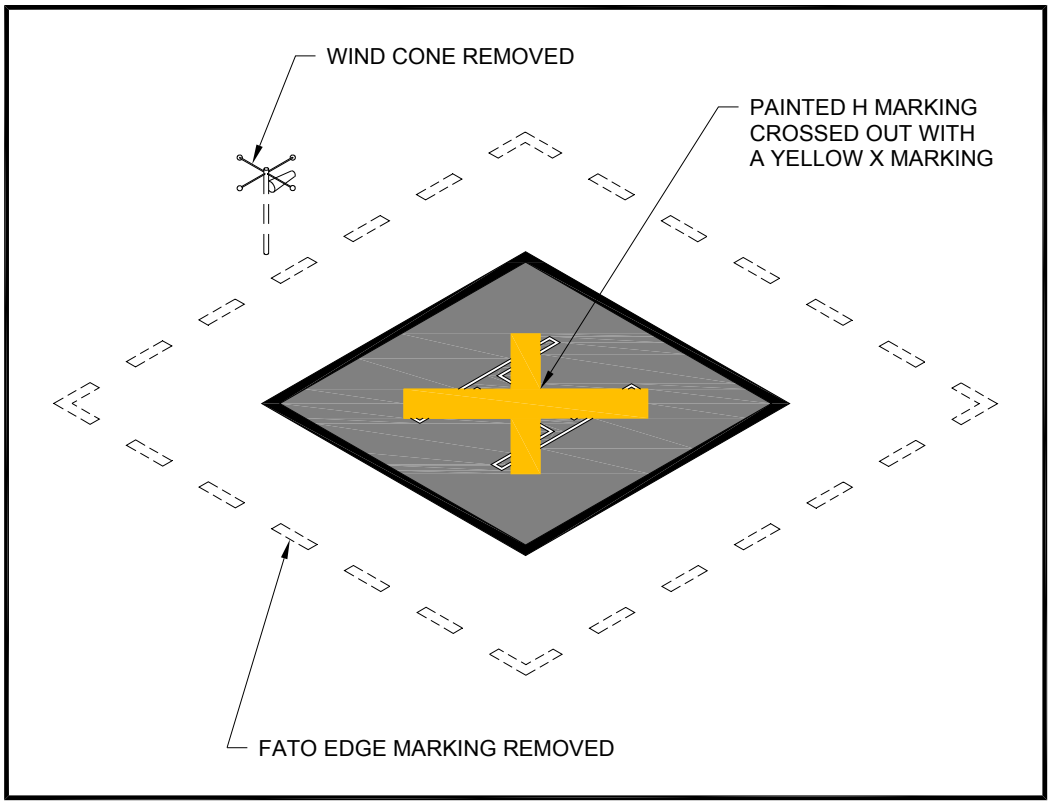



**Figure 2–27. Marking a Closed Heliport: General Aviation**

**216. Heliport lighting.** If the heliport operator intends for the facility to support night operations, light it with FATO and/or TLOF perimeter lights as described below. Design flush light fixtures and installation methods to support point loads of the design helicopter transmitted through a skid or wheel.

**a. TLOF perimeter lights.** Use flush green lights meeting the requirements of FAA Airports Engineering Brief 87, Heliport Perimeter Light for Visual Meteorological Conditions (VMC), to define the TLOF perimeter. Use a minimum of. As an option at PPR facilities, use three light fixtures per side of a square or rectangular TLOF. Locate a light at each corner, with additional lights uniformly spaced between the corner lights. Using an odd number of lights on each side will place lights along the centerline of the approach. Define a circular TLOF using an even number of lights, with a minimum of eight, uniformly spaced. Space the lights at a maximum of 25 feet (7.6 m). Locate flush lights within 1 foot (30 cm) inside or outside of the TLOF perimeter.

**(1) Raised TLOF perimeter lights.** As an option, use raised, omnidirectional lights meeting the requirements of EB 87. Locate them on the outside edge of the TLOF or the outer edge of the safety net, as shown in Figure 2–28. Lighting on the outer edge of the safety net provides better visual cues to pilots at a distance from the heliport since it outlines a larger area. Make sure the raised lights do not penetrate a horizontal plane at the FATO elevation by more than 2 inches (5 cm). See Figure 7–3.

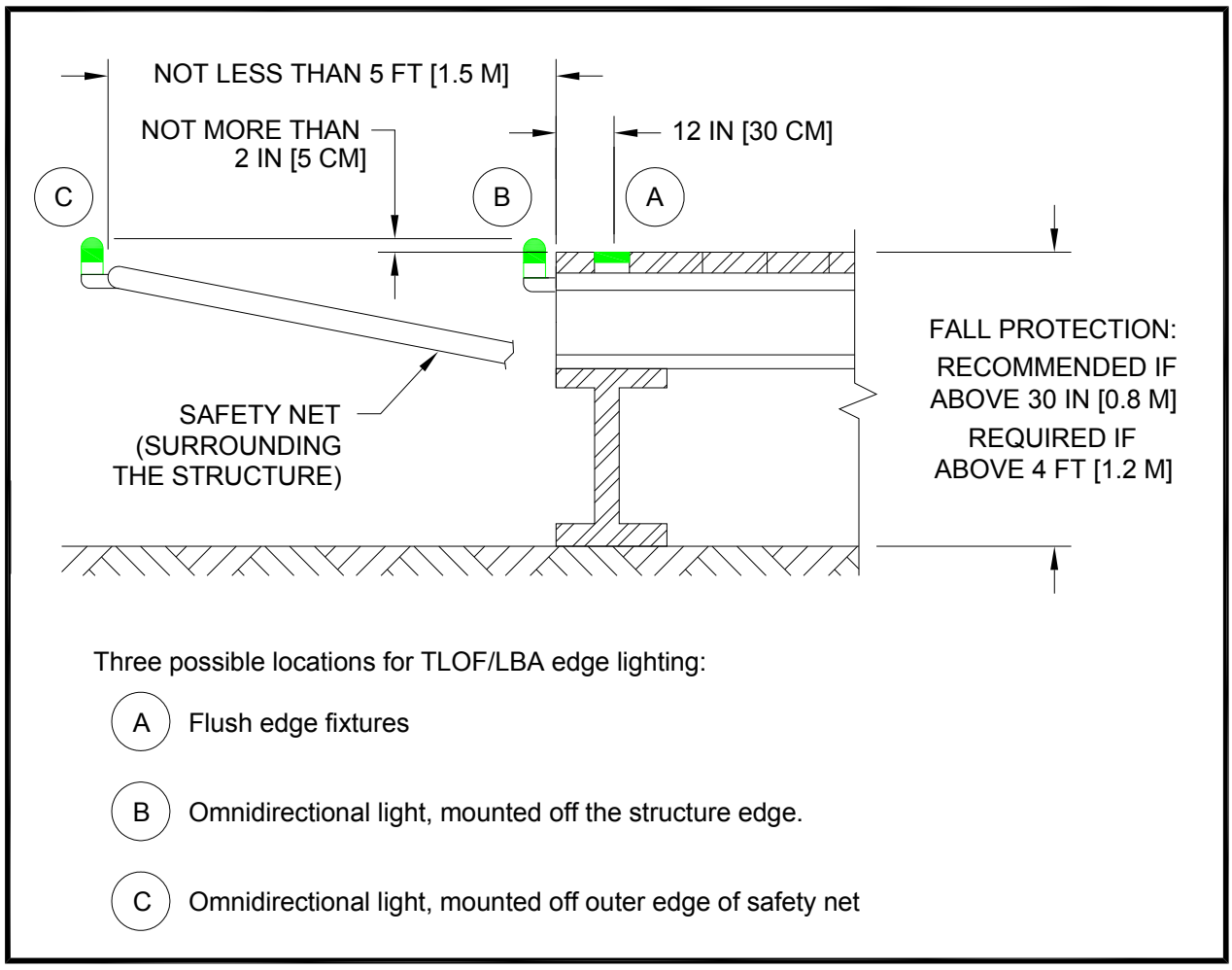



**Figure 2–28. Elevated TLOF – Perimeter Lighting: General Aviation**

**(2) PPR facilities.** Use flush lights for PPR heliports. As an option if only the TLOF is load bearing, use raised omnidirectional lights. Locate the raised lights outside and within 10 feet (3 m) of the edge of the TLOF. Make sure the lights do not penetrate a horizontal plane at the TLOF elevation by more than 2 inches (5 cm). As an option when the pavement or structure is larger than the TLOF, mount perimeter lights on the outer edge of the pavement or structure or the inner or outer edge of the safety net.

**b. Load-bearing FATO perimeter lights.** Green lights meeting the requirements of EB 87 define the perimeter of a load bearing FATO. Do not light the FATO perimeter if any portion of the FATO is not a load-bearing surface. Use a minimum of four. As an option at PPR facilities, use a minimum of three flush or raised light fixtures per side of a square or rectangular FATO. Locate a light at each corner, with additional lights uniformly spaced between the corner lights. Using an odd number of lights on each side will place lights along the centerline of the approach. To define a circular FATO, use an even number of lights, with a minimum of eight, uniformly spaced. Space lights at a maximum of 25 feet (7.6 m). Locate flush lights within 1 foot (30 cm) inside or outside of the FATO perimeter (See Figure 2–29). As an option, use a square or rectangular pattern of FATO perimeter lights even if the TLOF is circular. At a distance during nighttime operations, a square or rectangular pattern of FATO perimeter lights provides the pilot with better visual alignment cues than a circular pattern, but a circular pattern may be more effective in an urban environment. In the case of an elevated FATO with a safety net, mount the perimeter lights a similar manner as discussed in paragraph 215.a(1). As an option, locate raised FATO perimeter lights, no more than 8 inches (20 cm) high, 10 feet (3 m) from the FATO perimeter. (See Figure 2–30.) When a heliport on an airport is sited near a taxiway, there may be a concern that a pilot may confuse the green taxiway centerline lights with the FATO perimeter lights. As an option in such cases, use yellow lights as an alternative color for marking the FATO.

**c. Floodlights.** The FAA has not evaluated floodlights for effectiveness in visual acquisition of a heliport. However, if ambient light does not adequately illuminate markings for night operations, use floodlights to illuminate the TLOF, the FATO, and/or the parking area. If possible, mount these floodlights on adjacent buildings to eliminate the need for tall poles. Take care, however, to place floodlights clear of the TLOF, the FATO, the safety area, and the approach/departure surfaces, and transitional surfaces and ensure floodlights and their associated hardware do not constitute an obstruction hazard. Aim floodlights down to provide adequate illumination on the surface. Make sure floodlights that might interfere with pilot vision during takeoff and landings are capable of being turned off by pilot control or at pilot request.

**d. Landing direction lights.** As an option when it is necessary to provide directional guidance, install landing direction lights. Landing direction lights are a configuration of five green, omnidirectional lights meeting the standards of EB 87, on the centerline of the preferred approach/departure path. Space these lights at 15-foot (5 m) intervals beginning at a point not less than 20 feet (6 m) and not more than 60 feet (18 m) from the TLOF perimeter and extending outward in the direction of the preferred approach/departure path, as illustrated in Figure 2–31.

**e. Flight path alignment lights.** As an option, install flight path alignment lights meeting the requirements of EB 87. Place them in a straight line along the direction of approach and/or departure flight paths. If necessary, extend them across the TLOF, FATO, safety area or any suitable surface in the immediate vicinity of the FATO or safety area. Install three or more green lights spaced at 5 feet (1.5 m) to 10 feet (3.0 m). See Figure 2–11.

**f. Taxiway and taxi route lighting.**

**(1) Taxiway centerline lights.** Use flush bidirectional green lights meeting the standards of AC 150/5345-46, Specification for Runway and Taxiway Light Fixtures for type L-852A (straight segments) or L-852B (curved segments) to define taxiway centerlines. Space these lights at maximum 50-foot (15 m) longitudinal intervals on straight segments and at maximum 25-foot (7.6 m) intervals on curved segments, using a minimum of four lights to define the curve. Uniformly offset taxiway centerline lights

no more than two feet (0.6 m) if necessary to ease painting the taxiway centerline. As an option, use green retroreflective markers meeting requirements for Type I markers in AC 150/5345-39, Specification for L-853, Runway and Taxiway Retroreflective Markers, in lieu of the L-852A or L-852B lighting fixtures.

**(2) Taxiway edge lights.** Use omnidirectional blue lights to light the edges of a taxiway. As an option, use blue retroreflective markers to identify the edges of the taxiway in lieu of lights. Make sure retroreflective markers are no more than 8 inches (20 cm) tall.

**(a) Straight segments.** Space lights at 50-foot (15.2 m) longitudinal intervals on straight segments.

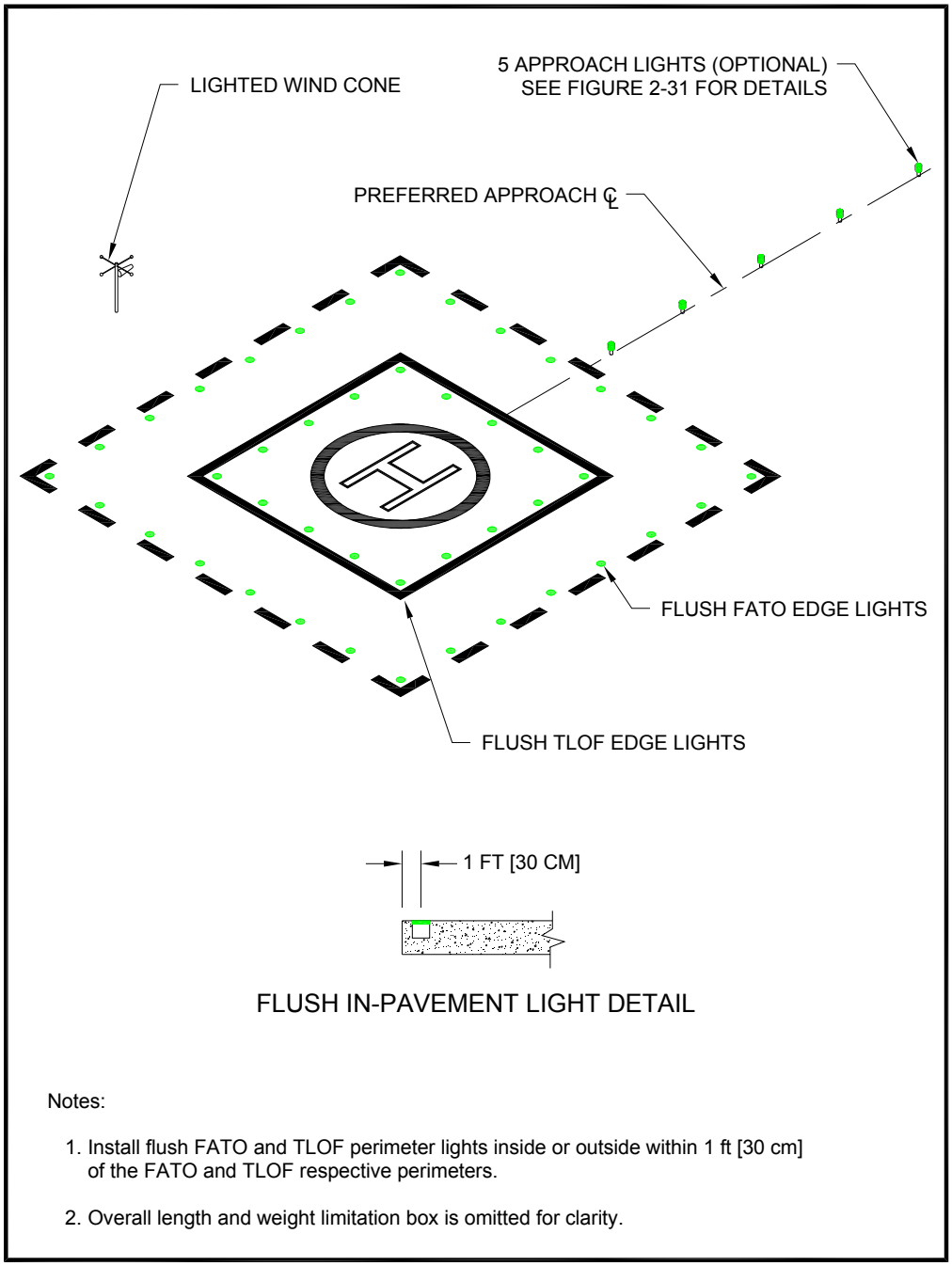



**Figure 2–29. TLOF/FATO Flush Perimeter Lighting: General Aviation**

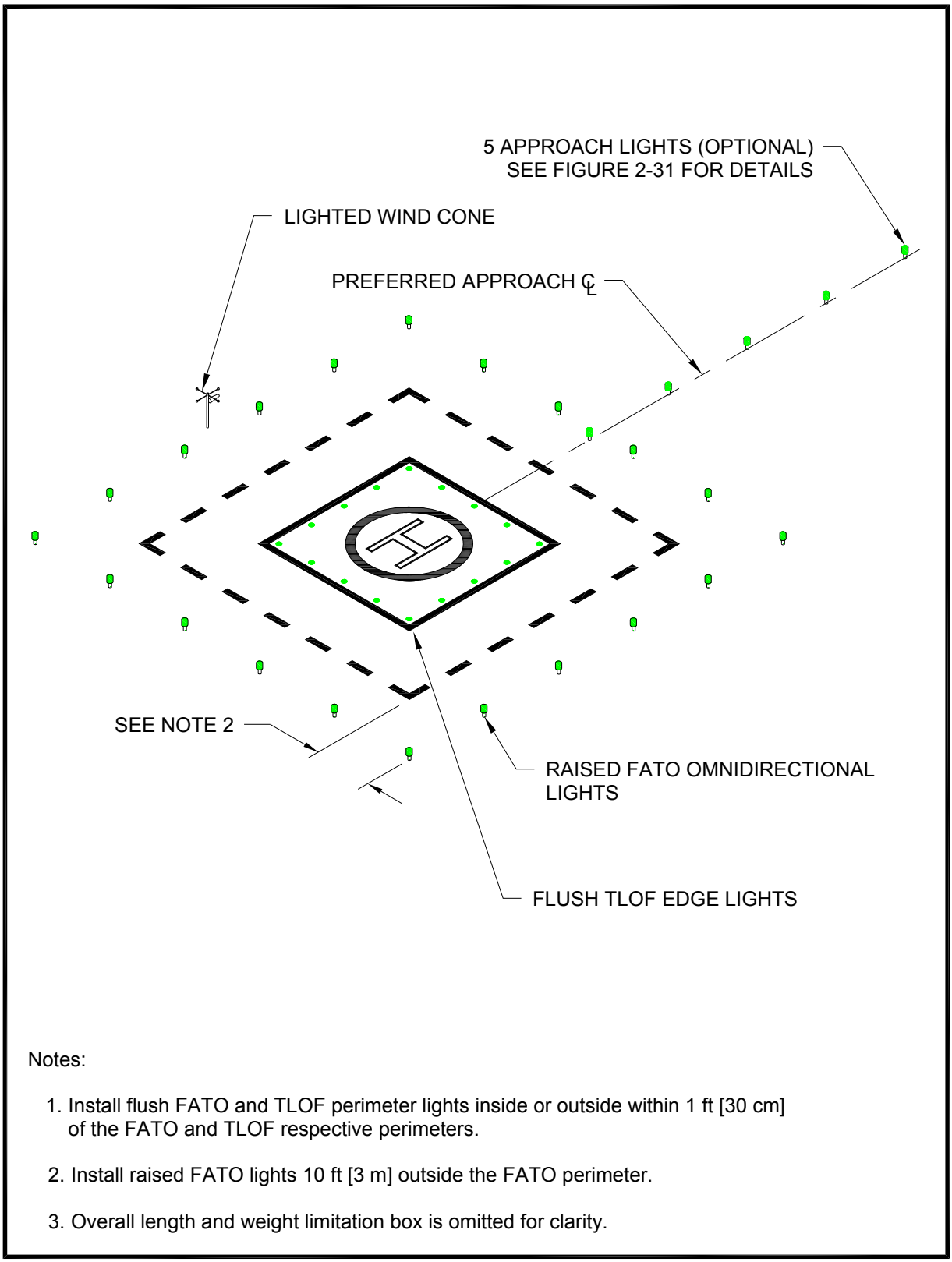



**Figure 2–30. TLOF Flush and FATO Raised Perimeter Lighting: General Aviation**

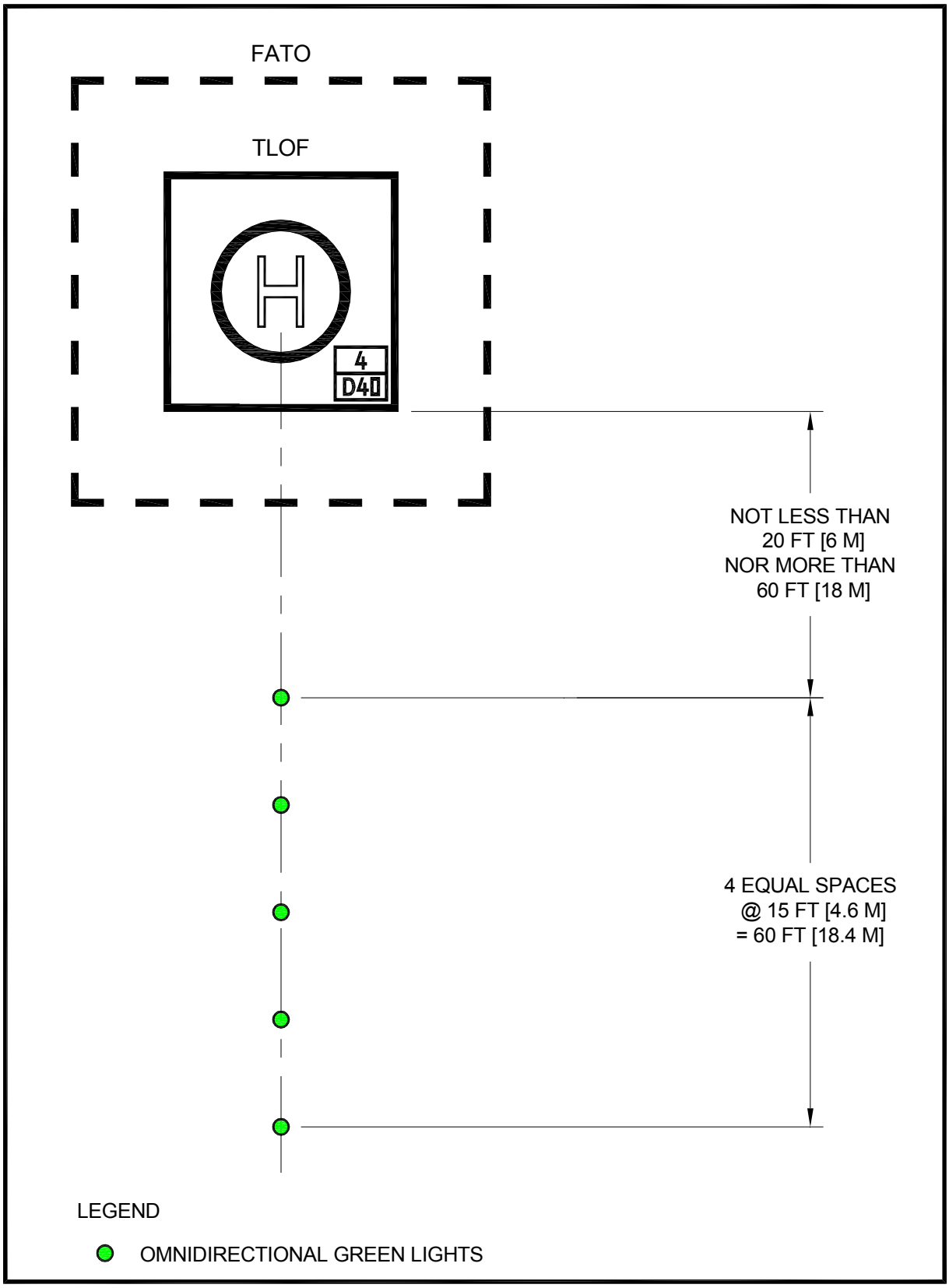



**Figure 2–31. Landing Direction Lights: General Aviation**

**(b) Curved segments**. Curved taxiway edges require shorter spacing of edge lights. Base the spacing on the radius of the curve. AC 150/5340-30, Design and Installation Detail for Airport Visual Aids, shows the applicable spacing for curves. Space taxiway edge lights uniformly. On curved edges of more than 30 degrees from point of tangency (PT) of the taxiway section to PT of the intersecting surface, install at least three edge lights. For radii not listed in AC 150/5340-30, determine spacing by linear interpolation.

**(c) Paved taxiways.** Use flush lights meeting the standards of AC 150/5345-46 for type L-852T.

**(d) Unpaved taxiways.** Use raised lights meeting the standards of AC 150/5345-46 for type L-861T. The lateral spacing for the lights or reflectors is equal to the RD of the design helicopter, but not more than 35 feet (10.7 m).

**g. Heliport identification beacon.** A heliport identification beacon is optional equipment. It is the most effective means to aid the pilot in visually locating the heliport. Locate the beacon, flashing white/green/yellow at the rate of 30 to 45 flashes per minute, on or close to the heliport. Find guidance on heliport beacons in AC 150/5345-12, Specification for Airport and Heliport Beacon. As an option, allow the beacon to be pilot controllable such that it is "on" only when needed.

**217. Marking and lighting of difficult-to-see objects.** It is difficult for a pilot to see unmarked wires, antennas, poles, cell towers, and similar objects, even in the best daylight weather, in time to take evasive action. While pilots can avoid such objects during en route operations by flying well above them, approaches and departures require operations near the ground where obstacles may be a factor. This paragraph discusses the marking and lighting of objects near, but outside and below the approach/departure surface. Find guidance on marking and lighting objects in AC 70/7460-1, Obstruction Marking and Lighting.

**a. Airspace.** If difficult-to-see objects penetrate the applicable object identification surfaces illustrated in Figure 2–32 and Figure 2–33, mark these objects to make them more conspicuous. If a heliport supports operations between dusk and dawn, light these difficult-to-see objects. The object identification surfaces in Figure 2–32 and Figure 2–33 are described as follows:

**(1)** In all directions from the safety area except under the approach/departure paths, the object identification surface starts at the safety area perimeter and extends out horizontally for a distance of 100 feet (30.5 m).

**(2)** Under the approach/departure surface, the object identification surface starts from the outside edge of the FATO and extends horizontally out for a distance of 800 feet (244 m) along the approach path. From this point, the object identification surface extends out for an additional distance of 3,200 feet (975 m) along the approach path while rising on an 8:1 slope (8 units horizontal in 1 unit vertical). From the point 800 feet (244 m) from the FATO perimeter, the object identification surface is 100 feet (30.5 m) beneath the approach/departure surface.

**(3)** The width of this object identification surface under the approach/departure surface increases as a function of distance from the safety area. From the safety area perimeter, the object identification surface extends laterally to a point 100 feet (30.5 m) outside the safety area perimeter. At the upper end of the surface, the object identification surface extends laterally 200 feet (61 m) on either side of the approach/departure path.

**b. Shielding of objects.** Title 14 CFR Part 77.9, Construction or alteration requiring notice, provides that if there are a number of objects close together, it may not be necessary to mark all of them if they are shielded. To meet the shielding guidelines, part 77 requires that an object "be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in the congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation."

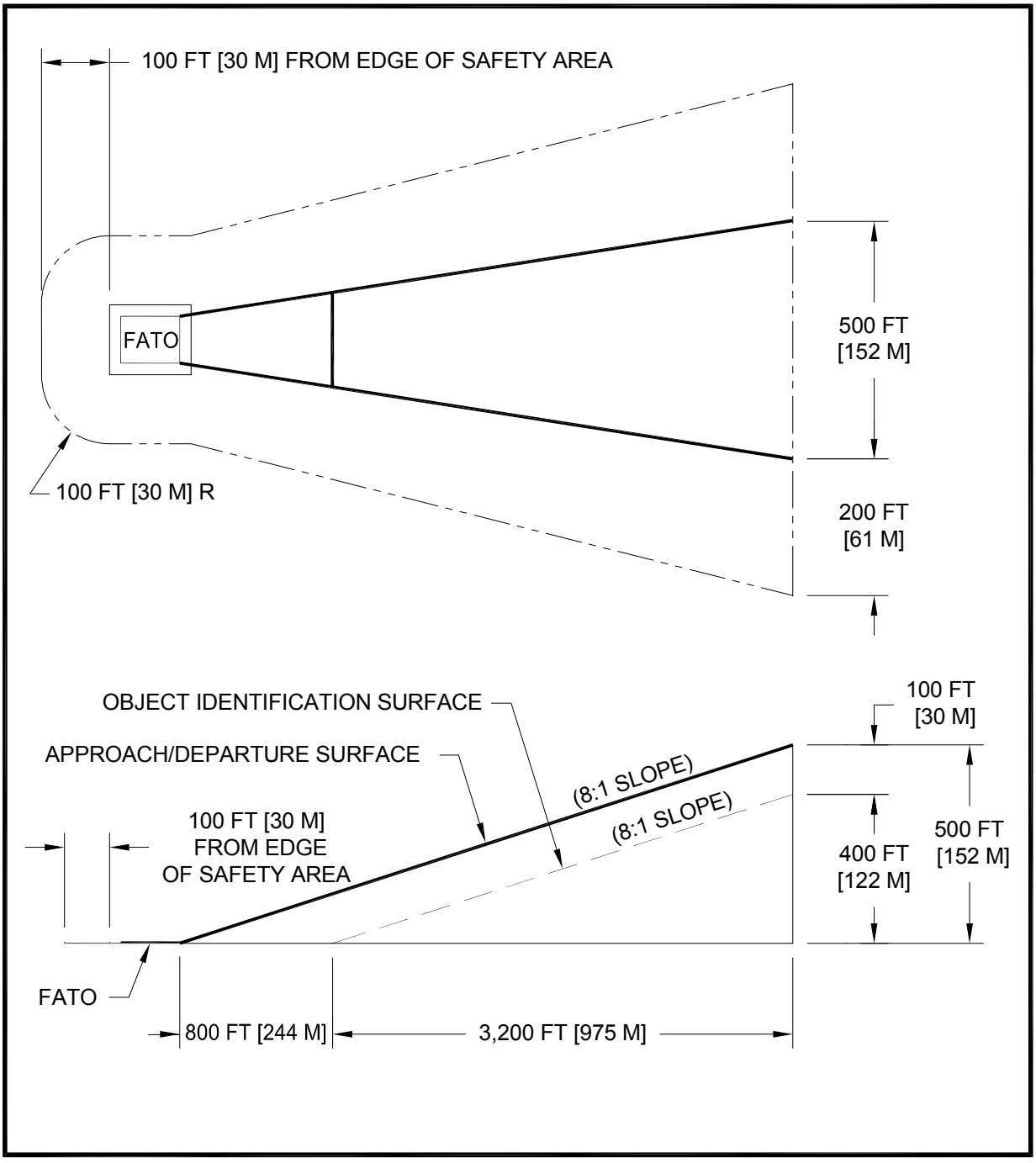



**Figure 2–32. Airspace Where Marking and Lighting are Recommended: Straight Approach: General Aviation**

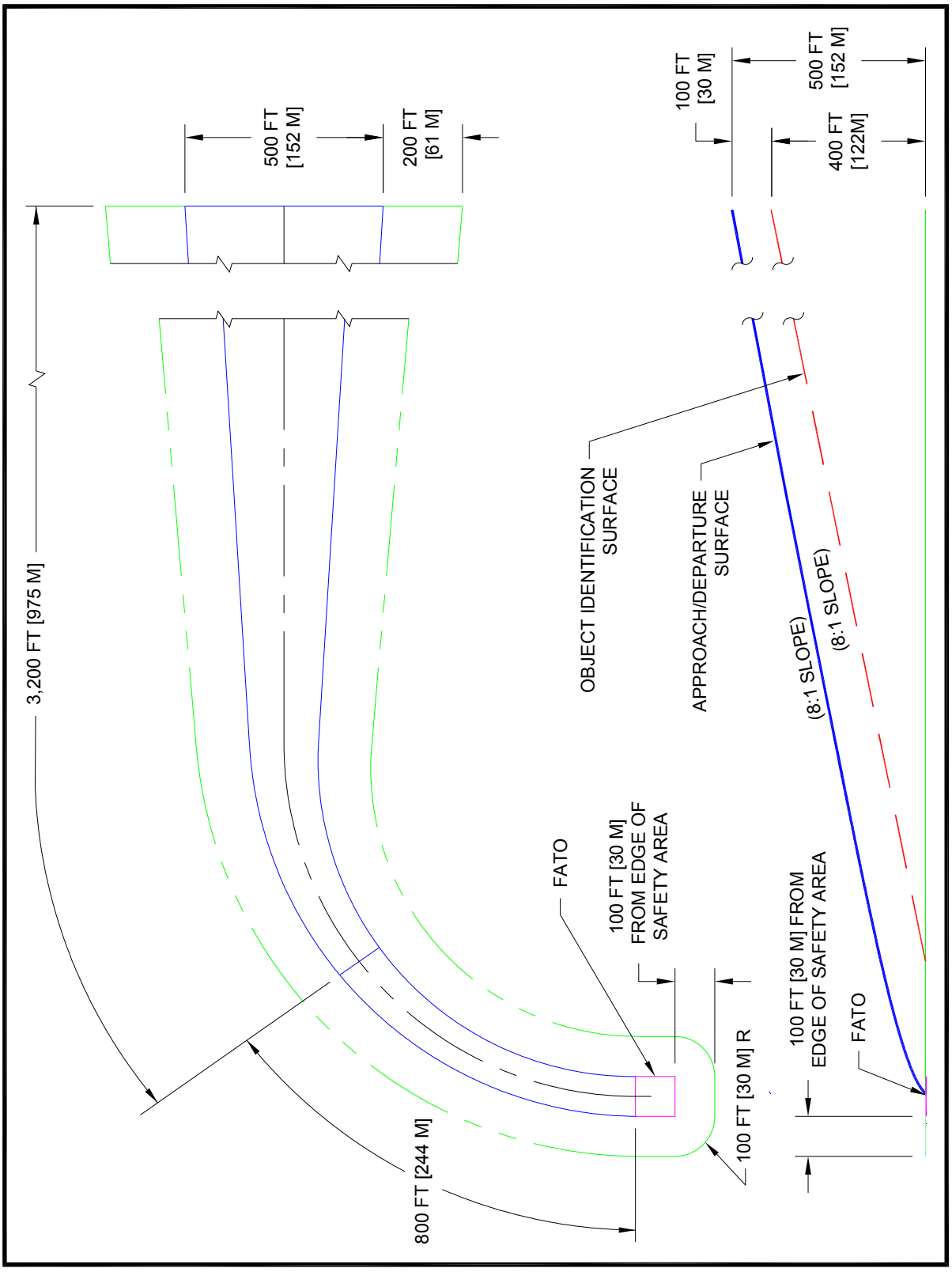



**Figure 2–33. Airspace Where Marking and Lighting are Recommended: Curved Approach: General Aviation**

**c. Equipment/object marking.** Make heliport maintenance and servicing equipment, as well as other objects used in the airside operational areas, conspicuous with paint, reflective paint, reflective tape, or other reflective markings. Reference AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport.

**218. Safety considerations.** Consider the following safety enhancements in the design of a heliport. Address other areas, such as the effects of rotor downwash, based on site conditions and the design helicopter.

**a. Security.** Provide a heliport with appropriate means of keeping the operational areas clear of people, animals, and vehicles. Use a method to control access depending upon the helicopter location and types of potential intruders.

**(1)** Safety barrier. At ground-level general aviation heliports, erect a safety barrier around the helicopter operational areas in the form of a fence or a wall. Construct the barrier no closer to the operation areas than the outer perimeter of the safety area. Make sure the barrier does not penetrate any approach/departure (primary or transitional) surface. If necessary in the vicinity of the approach/departure paths, install the barrier well outside the outer perimeter of the safety area.

**(2)** Make sure any barrier is high enough to present a positive deterrent to persons inadvertently entering an operational area and yet low enough to be non-hazardous to helicopter operations.

**(3)** Control access to airside areas in a manner commensurate with the barrier (for example, build fences with locked gates). Display a cautionary sign similar to that illustrated in Figure 2–34 at access points.

**b. Rescue and fire-fighting services.** Heliports are subject to state and local rescue and fire-fighting regulations. Provide a fire hose cabinet or extinguisher at each access gate/door and each fueling location. Locate fire hose cabinets, fire extinguishers, and other fire-fighting equipment near, but below the level of, the TLOF. Find additional information in various NFPA publications. For more reference material, see Appendix D.

**c. Communications.** Use a Common Traffic Advisory Frequency (CTAF) radio to provide arriving helicopters with heliport and traffic advisory information but do not use this radio to control air traffic. Contact the Federal Communications Commission (FCC) for information on CTAF licensing.

**d. Weather information.** An automated weather observing system (AWOS) measures and automatically broadcasts current weather conditions at the heliport site. When installing an AWOS, locate it at least 100 feet (30 m) and not more than 700 feet (213 m) from the TLOF and such that its instruments will not be affected by rotor wash from helicopter operations. Find guidance on AWOS systems in AC 150/5220-16, Automated Weather Observing Systems (AWOS) for Non-Federal Applications, and FAA Order 6560.20, Siting Criteria for Automated Weather Observing Systems (AWOS). Other weather observing systems will have different siting criteria.

**e. Winter operations.** Swirling snow raised by a helicopter's rotor wash can cause the pilot to lose sight of the intended landing point and/or hide objects that need to be avoided. Design the heliport to accommodate the methods and equipment used for snow removal. Design the heliport to allow the snow to be removed sufficiently so it will not present an obstruction hazard to the tail rotor, main rotor, or undercarriage. Find guidance on winter operations in AC 150/5200-30, Airport Winter Safety and Operations.




**Figure 2–34. Caution Sign: General Aviation**

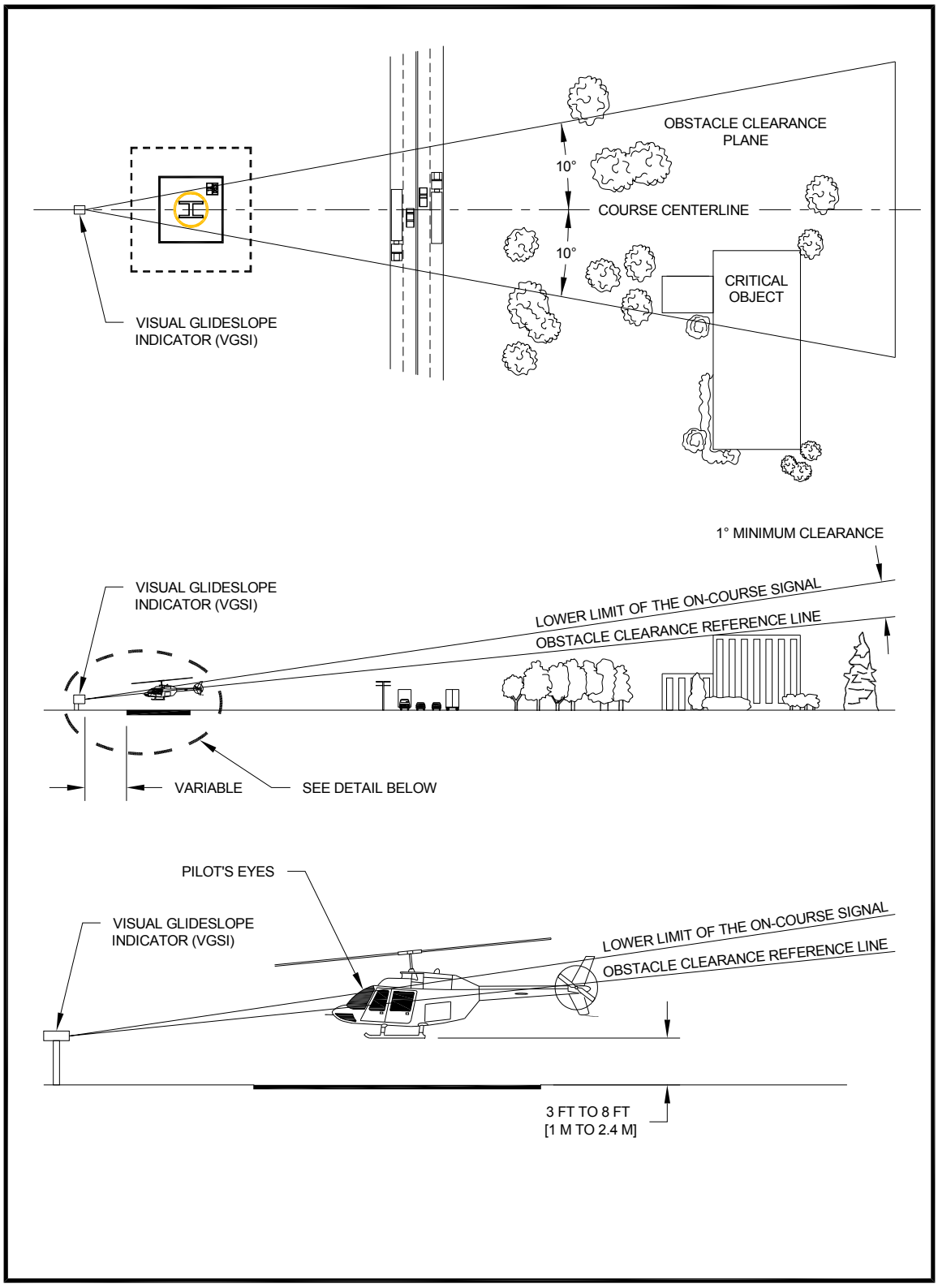



**Figure 2–35. Visual Glideslope Indicator Siting and Clearance Criteria: General Aviation**

**219. Visual glideslope indicators (VGSI).** A visual glideslope indicator (VGSI) provides pilots with visual vertical course and descent cues. Install the VGSI such that the lowest on-course visual signal provides a minimum of 1 degree of clearance over any object that lies within 10 degrees of the approach course centerline.

**a. Siting.** The optimum location of a VGSI is on the extended centerline of the approach path at a distance that brings the helicopter to a hover with the undercarriage between 3 and 8 feet (0.9 to 2.5 m) above the TLOF. Figure 2–35 illustrates VGSI clearance criteria. To properly locate the VGSI, estimate the vertical distance from the undercarriage to the pilot's eye.

**b. Control of the VGSI.** As an option, allow the VGSI to be pilot controllable such that it is "on" only when needed.

**c. VGSI needed.** A VGSI is an optional feature. However, provide a VGSI if one or more of the following conditions exist, especially at night:

**(1)** Obstacle clearance, noise abatement, or traffic control procedures require a particular slope to be flown.

**(2)** The environment of the heliport provides few visual surface cues.

**d. Additional guidance.** Find additional guidance in AC 150/5345-52, Generic Visual Glideslope Indicators (GVGI), and AC 150/5345-28, Precision Approach Path Indicator (PAPI) Systems.

**220. Terminal facilities.** A heliport terminal provides curbside access for passengers using private autos, taxicabs, and public transit vehicles. Public waiting areas need the usual amenities, and a counter for rental car services may be desirable. Design passenger auto parking areas to accommodate current requirements, with the ability to expand them to meet future requirements. Readily available public transportation may reduce the requirement for employee and service personnel auto parking spaces. Build attractive and functional heliport terminal buildings or sheltered waiting areas. Find guidance on designing terminal facilities in AC 150/5360-9, Planning and Design of Airport Terminal Building Facilities at Non-Hub Locations. At PPR heliports, the number of people using the facility may be so small that there is no need for a terminal building, and minimal needs for other facilities and amenities.

**221. Zoning and compatible land use.** The FAA encourages general aviation heliport operators to promote the adoption of the following zoning measures where state and local statutes permit to ensure the heliport will continue to be available and to protect the investment in the facility.

**a. Zoning to limit building/object heights.** Find general guidance on drafting an ordinance that would limit building and object heights in AC 150/5190-4, A Model Zoning Ordinance to Limit Height of Objects Around Airports. Substitute the heliport surfaces for the airport surfaces in the model ordinance.

**b. Zoning for compatible land use.** The FAA encourages public agencies to enact zoning ordinances to control the use of property within the HPZ and the approach/departure path environment, restricting activities to those that are compatible with helicopter operations. See paragraph 211.

**c. Air rights and property easements.** Use air rights and property easements as options to prevent the encroachment of obstacles in the vicinity of a heliport.

# Chapter 3. Transport Heliports

**301. General.** A transport heliport is intended to accommodate air carrier operators providing scheduled service, or unscheduled service with large helicopters.

**302. Applicability.** The standards in this chapter apply to projects funded under the Airport Improvement Program (AIP) or Passenger Facility Charge (PFC) program. For other projects/heliports, these standards are the FAA's recommendations for designing all transport heliports. The design standards in this chapter assume there will never be more than one helicopter within the final approach and takeoff area (FATO) and the associated safety area. If there is a need for more than one touchdown and lift-off area (TLOF) at a heliport, locate each TLOF within its own FATO and within its own safety area. Figure 3–1 illustrates a typical transport heliport.

**303. Access by individuals with disabilities.** Various laws require heliports operated by public entities and those receiving federal financial assistance to meet accessibility requirements. See paragraph 114.

**304. Heliport site selection.**

**a. Long term planning.** Public agencies and others planning to develop a transport heliport consider the possible future need for instrument operations and future expansion.

**b. Property requirements.** The property needed for a transport heliport depends upon the volume and types of users and the scope of amenities provided. Property requirements for helicopter operators and for passenger amenities frequently exceed that required for "airside" purposes.

**c. Turbulence.** Air flowing around and over buildings, stands of trees, terrain irregularities, etc. can create turbulence on ground-level and roof-top heliports that may affect helicopter operations. Where the FATO is located near the edge and top of a building or structure, or within the influence of turbulent wakes from other buildings or structures, assess the turbulence and airflow characteristics in the vicinity of, and across the surface of the FATO to determine if an air-gap between the roof, roof parapet or supporting structure, and/or some other turbulence mitigating design measure is necessary. FAA Technical Report FAA/RD-84/25, Evaluating Wind Flow around Buildings on Heliport Placement addresses the wind's effect on helicopter operations. Take the following actions in selecting a site to minimize the effects of turbulence.

**(1) Ground-level heliports.** Features such buildings, trees, and other large objects can cause air turbulence and affect helicopter operations from sites immediately adjacent to them. Therefore, locate the landing and takeoff area away from such objects in order to minimize air turbulence in the vicinity of the FATO and the approach/departure paths.

**(2) Elevated heliports.** Establishing a 6 foot (1.8 m) or more air gap on all sides above the level of the roof will generally minimize the turbulent effect of air flowing over the roof edge. If an air gap is included in the design, keep it free at all times of objects that would obstruct the airflow. If it is not practical to include an air gap or some other turbulence mitigating design measure where there is turbulence, operational limitations may need to be considered under certain wind conditions (see paragraph 101).

**d. Electromagnetic effects.** Nearby electromagnetic devices, such as a large ventilator motor, elevator motor or other large electrical consumer may cause temporary aberrations in the helicopter magnetic compass and interfere with other onboard navigational equipment.

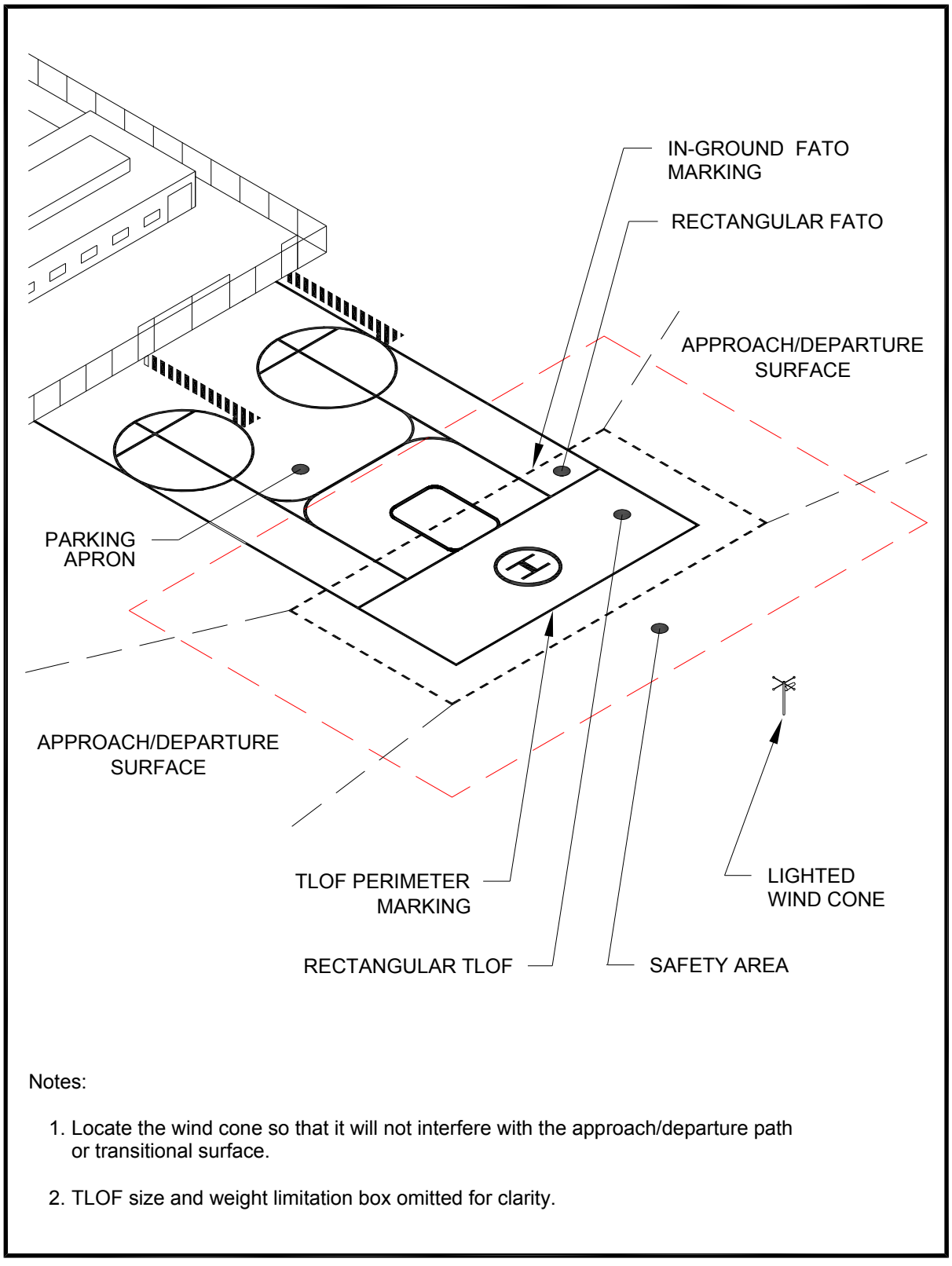



**Figure 3–1. Typical Transport Heliport: Transport**

**305. Basic layout.** The heliport consists of a TLOF contained within a FATO. A safety area surrounds the FATO. The relationship of the TLOF to the FATO and the safety area is shown in Figure 3–2. A FATO contains only one TLOF. Provide appropriate approach/departure airspace to allow safe approaches to and departures from landing sites. To the extent feasible, align the preferred approach/departure path with the predominant winds (see paragraph 309). Where helicopter flight manuals specify the minimum size required for operations, take the size into account in the design of the facility.

**306. Touchdown and liftoff area (TLOF).**

**a. TLOF location.** The TLOF of a transport heliport is normally at ground level but may be developed with the TLOF located on a pier or, when carefully planned, on the roof of a building. The TLOF is centered in the load-bearing area (LBA), and on the major axis of the FATO.

**b. TLOF size.** The TLOF is a square or rectangular surface whose minimum length and width is the rotor diameter (RD) of the design helicopter but not less than 50 feet (15.2 m). Increasing the LBA centered on the TLOF may provide some safety and operational advantages.

**c. Elongated TLOF:** An elongated TLOF can provide an increased safety margin and greater operational flexibility. As an option, design an elongated TLOF with a landing position in the center and two takeoff positions, one at either end, as illustrated in Figure 3–3. Design the landing position to have a minimum length of the RD of the design helicopter, but not less than 50 feet (15.2 m). If the TLOF is elongated, also provide an elongated FATO.

**d. Ground-level TLOF surface characteristics.**

**(1) Design loads.** Design the TLOF and any supporting TLOF structure to be capable of supporting the dynamic loads of the design helicopter.

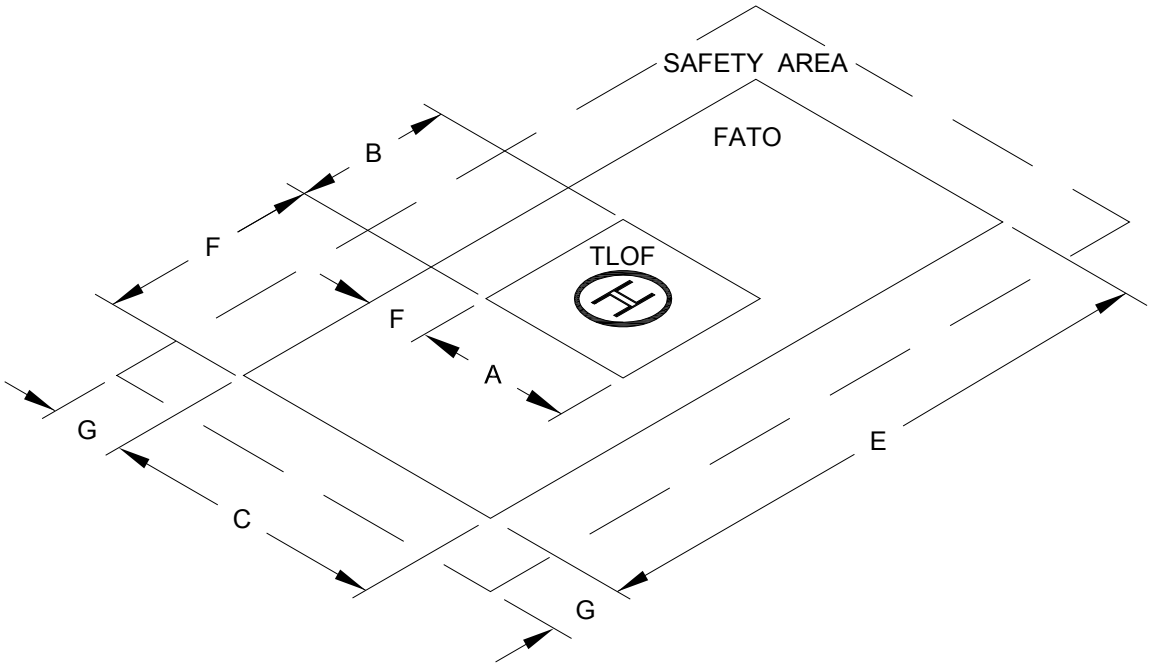
**(2) Paving.** Construct the TLOF of portland cement concrete (PCC) (see AC 150/5370-10, Standards for Specifying Construction of Airports items P-501) where feasible. Use a broomed or roughened pavement finish to provide a skid-resistant surface for helicopters and non-slippery footing for people.

**e. Rooftop and other elevated TLOFs.**

**(1) Design loads.** Design elevated TLOFs and any TLOF supporting structure to be capable of supporting the dynamic loads of the design helicopter. An elevated heliport is illustrated in Figure 3–4.

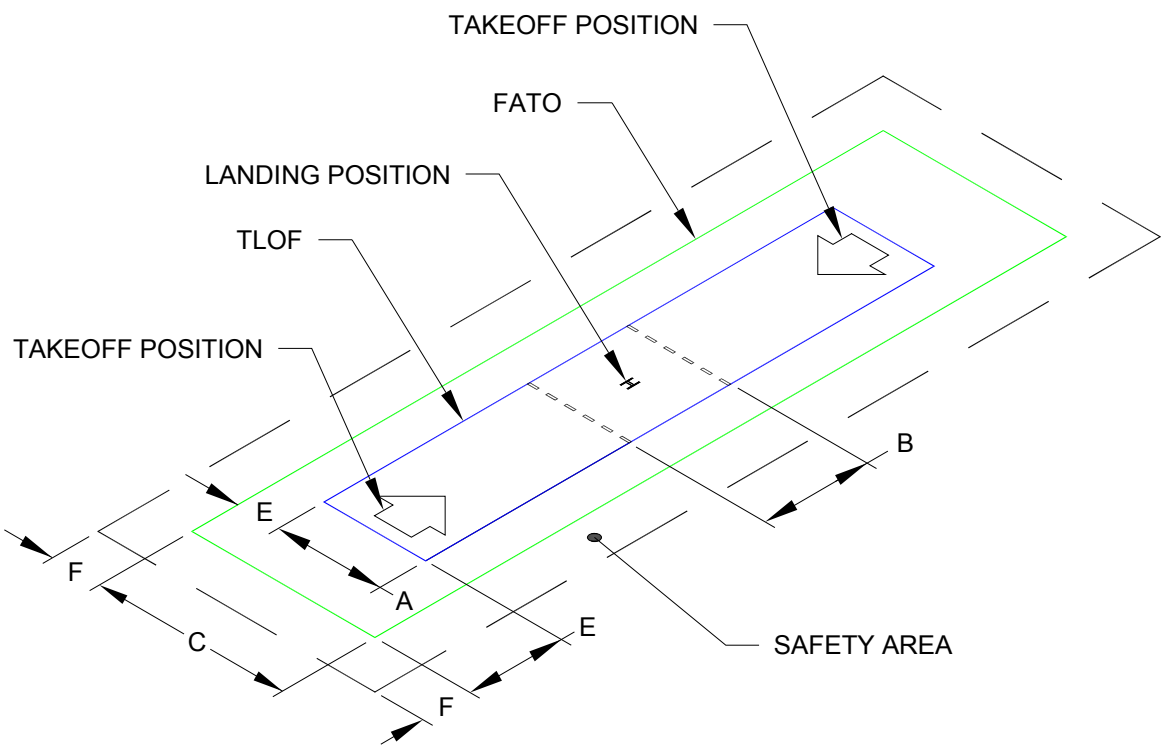
**(2) TLOF surface characteristics.** Construct rooftop and other elevated heliport TLOFs of metal, concrete, or other materials subject to local building codes. Provide TLOF surfaces with a skid-resistant surface finish for helicopters and non-slippery footing for people.

**f. TLOF gradients.** Recommended TLOF gradients are defined in Chapter 7.




| DIM | ITEM | VALUE | NOTES |
|---|---|---|---|
| A | Minimum TLOF Width | 1 RD but not less than 50 ft [15 m] | |
| B | Minimum TLOF Length | 1 RD but not less than 50 ft [15 m] | |
| C | Minimum FATO Width | 2 RD but not less than 100 ft [30 m] | |
| E | Minimum FATO Length | 2 RD but not less than 200 ft [60 m] | See paragraph 306.a.(2) and figure 3-5 for adjustments for elevations above 1,000 ft [304 m] |
| F | Minimum Separation Between the Perimeters of the TLOF and FATO | 3/4 D - 1/2 RD | |
| G | Minimum Safety Area Width | 1/2 RD but not less than 30 ft [9 m] | |

**Figure 3–2. TLOF/FATO Safety Area Relationships and Minimum Dimensions: Transport**




| DIM | ITEM | VALUE | NOTES |
|---|---|---|---|
| A | Minimum TLOF Width | 1 RD but not less than 50 ft [15 m] | |
| B | Minimum TLOF/Landing Position Length | 1 RD but not less than 50 ft [15 m] | |
| C | Minimum FATO Width | 2 RD but not less than 100 ft [30 m] | |
| E | Minimum Separation Between the Perimeters of the TLOF and FATO | ¾ D - ½ RD | |
| F | Minimum Safety Area Width | ½ RD but not less than 30 ft [9 m] | |

**Figure 3–3. Elongated FATO with Two Takeoff Positions: Transport**

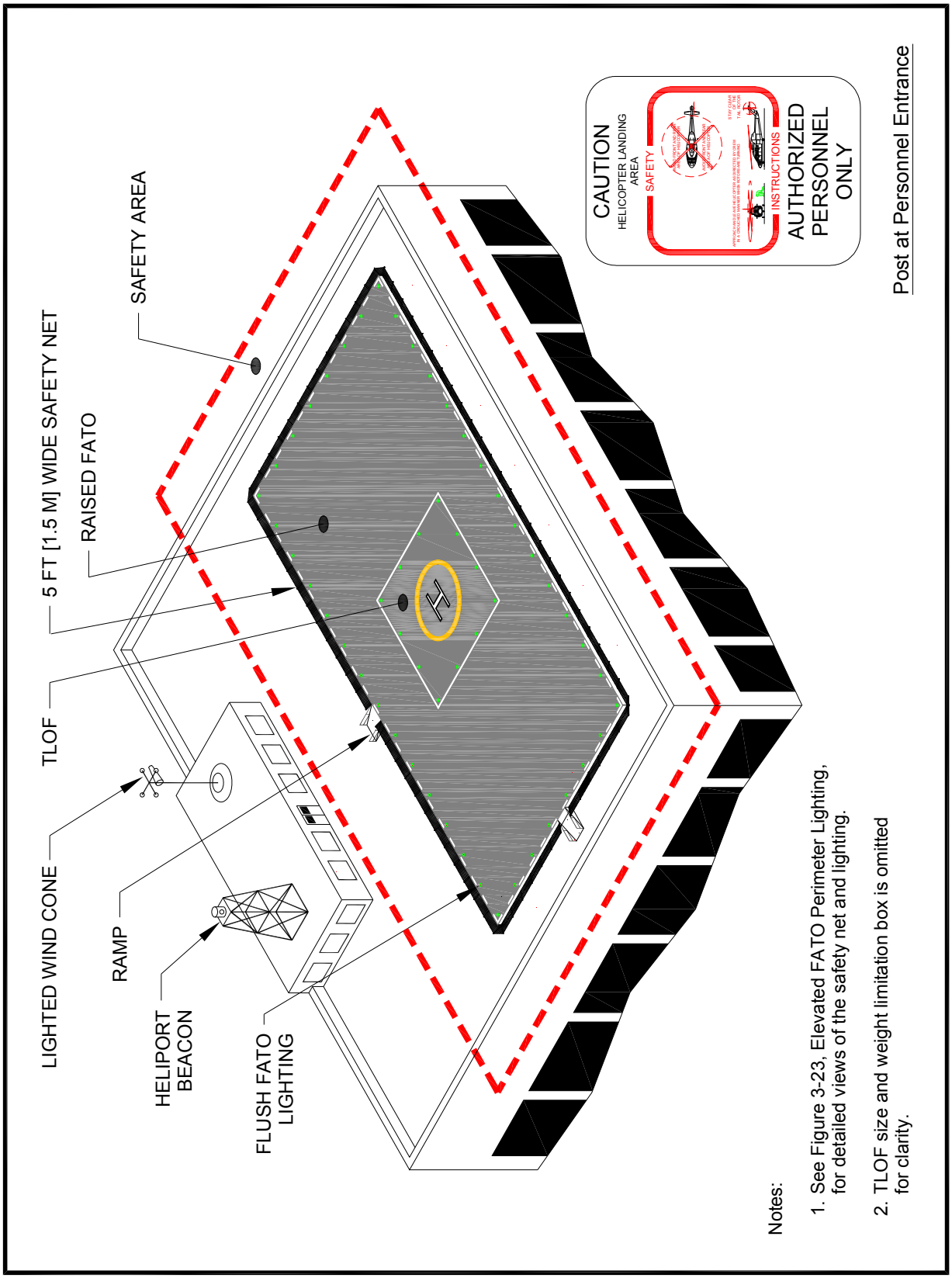



**Figure 3–4. Elevated Heliport: Transport**

**307. Final approach and takeoff area (FATO).** A transport heliport has at least one FATO. The FATO contains a TLOF within its borders at which arriving helicopters terminate their approach, and from which departing helicopters take off.

**a. FATO size.** The FATO is a rectangular surface with the long axis aligned with the preferred flight path. See Figure 3–2.

**(1) FATO width.** The minimum width of a FATO is at least 2.0 times the RD of the design helicopter but not less than 100 feet (30.5 m).

**(2) FATO length.** The minimum length of the FATO is 2.0 times the RD of the design helicopter but not less than 200 feet (61 m). At elevations above 1000 feet MSL, a longer FATO is required to provide an increased safety margin and greater operational flexibility. Use the additional FATO length depicted in Figure 3–5.

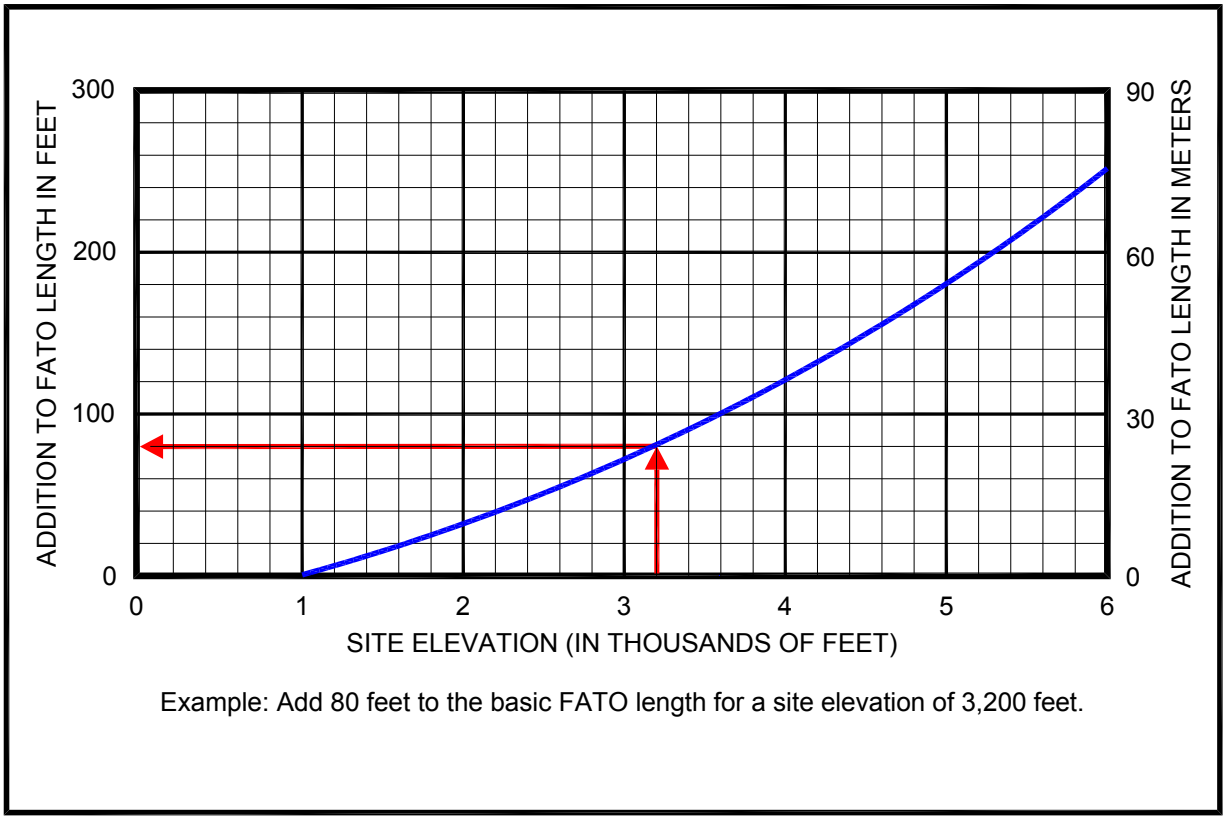



**Figure 3–5. Additional FATO Length for Heliports at Higher Elevations: Transport**

**(3)** Design the minimum distance between the TLOF perimeter and the FATO perimeter to be not less than ¾ D - ½ RD, where D and RD are of the design helicopter.

**b. FATO surface characteristics.**

**(1)** Design the entire FATO to support the dynamic loads of the design helicopter.

**(2)** If the FATO surface is unpaved, treat it to prevent loose stones and any other flying debris caused by rotor wash.

**(3)** Design the portion of the FATO abutting the TLOF to be contiguous with the TLOF, with the adjoining edges at the same elevation.

**c. Rooftop and other elevated FATOs.**

**(1) Design loads.** Design elevated FATOs and any FATO supporting structure to be capable of supporting the dynamic loads of the design helicopter

**(2) Elevation.** Elevate the FATO above the level of any object in the safety area that cannot be removed.

**(3) Obstructions.** Elevator penthouses, cooling towers, exhaust vents, fresh air vents, and other raised features can affect heliport operations. Establish control mechanisms to ensure obstruction hazards are not installed after the heliport is operational.

**(4) Air quality.** Helicopter exhaust can affect building air quality if the heliport is too close to fresh air vents. When designing a building intended to support a helipad, locate fresh air vents accordingly. When adding a helipad to an existing building, relocate fresh air vents if necessary or, if relocation is not practical, installing charcoal filters or a fresh air intake bypass louver system for HVAC systems may be adequate.

**(5) FATO surface characteristics.** Construct rooftop and other elevated heliport FATOs of metal, concrete, or other materials subject to local building codes. Provide the FATO surface with non-slippery footing for people.

**(6) Safety net.** If the platform is elevated 4 feet (1.2 m) or more above its surroundings, Title 29 CFR Part 1910.23, Guarding Floor and Wall Openings and Holes, requires the provision of fall protection. The FAA recommends such protection for all platforms elevated 30 inches (76 cm) or more. However, do not use permanent railings or fences since they would be safety hazards during helicopter operations. As an option, install a safety net, meeting state and local regulations but not less than 5 feet (1.5 m) wide. Design the safety net to have a load-carrying capability of 50 lb/sq ft (244 kg/sq m). Do not allow the net, as illustrated in Figure 3–23, to project above the level of the FATO. Fasten both the inside and outside edges of the safety net to a solid structure. Construct nets of materials that are resistant to environmental effects.

**(7) Access to elevated FATOs.** Title 29 CFR Part 1926.34, Means of Egress, requires two separate access points for an elevated structure such as one supporting an elevated FATO. Design stairs in compliance with Title 29 CFR Part 1910.24, Fixed Industrial Stairs. Design handrails required by this standard to fold down or be removable to below the level of the FATO so they will not be hazards during helicopter operations.

**d. Mobile objects within the FATO.** The FATO design standards in this AC assume the TLOF and FATO are closed to other aircraft if a helicopter or other mobile object is within the FATO or the safety area.

**e. Fixed objects within the FATO.** Remove all fixed objects projecting above the FATO elevation except for lighting fixtures, which may project a maximum of 2 inches (5 cm). See Figure 7–3. For ground level heliports, remove all above-ground objects to the extent practicable.

**f. FATO/FATO separation.** If a heliport has more than one FATO, separate the perimeters of two FATOs so the respective safety areas do not overlap. This separation assumes simultaneous approach/departure operations will not take place. If the heliport operator intends for the facility to support simultaneous operations, provide a minimum 200 foot (61 m) separation.

**g. FATO gradients.** Recommended FATO gradients are defined in Chapter 7.

**308. Safety area.** The safety area surrounds the FATO.

**a. Safety area width.** The safety area extends outward on all sides of the FATO for a distance of at least ½ RD but not less than 30 feet (9 m).

**b. Mobile objects within the safety area.** The safety area design standards of this AC assume the TLOF and FATO are closed to other aircraft if a helicopter or other mobile object is within the FATO or the safety area.

**c. Fixed objects within a safety area**. Remove all fixed objects within a safety area projecting above the FATO elevation except for lighting fixtures, which may project a maximum of 2 inches (5 cm). See Figure 7–3. For ground level heliports, remove all above-ground objects to the extent practicable.

**d. Safety area surface.** The safety area need not be load bearing. Figure 3–6 depicts a safety area extending over water. If possible, make the portion of the safety area abutting the FATO contiguous with the FATO with the adjoining edges at the same elevation. This is needed to avoid the risk of catching a helicopter skid or wheel. Clear the safety area of flammable materials and treat the area to prevent loose stones and any other flying debris caused by rotor wash.

**e. Safety area gradients.** Safety area gradients are detailed in Chapter 7.

**309. VFR approach/departure paths.** The purpose of approach/departure airspace, shown in Figure 3–7 and Figure 3–8, is to provide sufficient airspace clear of hazards to allow safe approaches to and departures from the TLOF.

**a. Number of approach/departure paths.** Align preferred approach/departure paths with the predominant wind direction so downwind operations are avoided and crosswind operations are kept to a minimum. To accomplish this, design a transport heliport to have more than one approach/departure path. Base other approach/departure paths on the assessment of the prevailing winds or, when this information is not available, separate such flight paths and the preferred flight path by at least 135 degrees. See Figure 3–7.

**b. VFR Approach/Departure and Transitional Surfaces.** Figure 3–7 and Figure 3–8 illustrate the approach/departure and transitional surfaces.

**(1)** An approach/departure surface is centered on each approach/departure path. The approach /departure path starts at the edge of the FATO and slopes upward at 8:1 (8 units horizontal in 1 unit vertical) for a distance of 4,000 feet (1,219 m) where the width is 500 feet (152 m) at a height of 500 feet (152 m) above the heliport elevation.

**(2)** The transitional surfaces start from the edges of the FATO parallel to the flight path center line, and from the outer edges of approach/departure surface, and extend outwards at a slope of 2:1 (2 units horizontal in 1 units vertical) for a distance of 250 feet (76 m) from the centerline. The transitional surfaces start at the edge of the FATO parallel to the approach/departure surfaces and extend to the end of the approach/departure surface. The transitional surface does not apply on the FATO edge opposite the approach/departure surface.

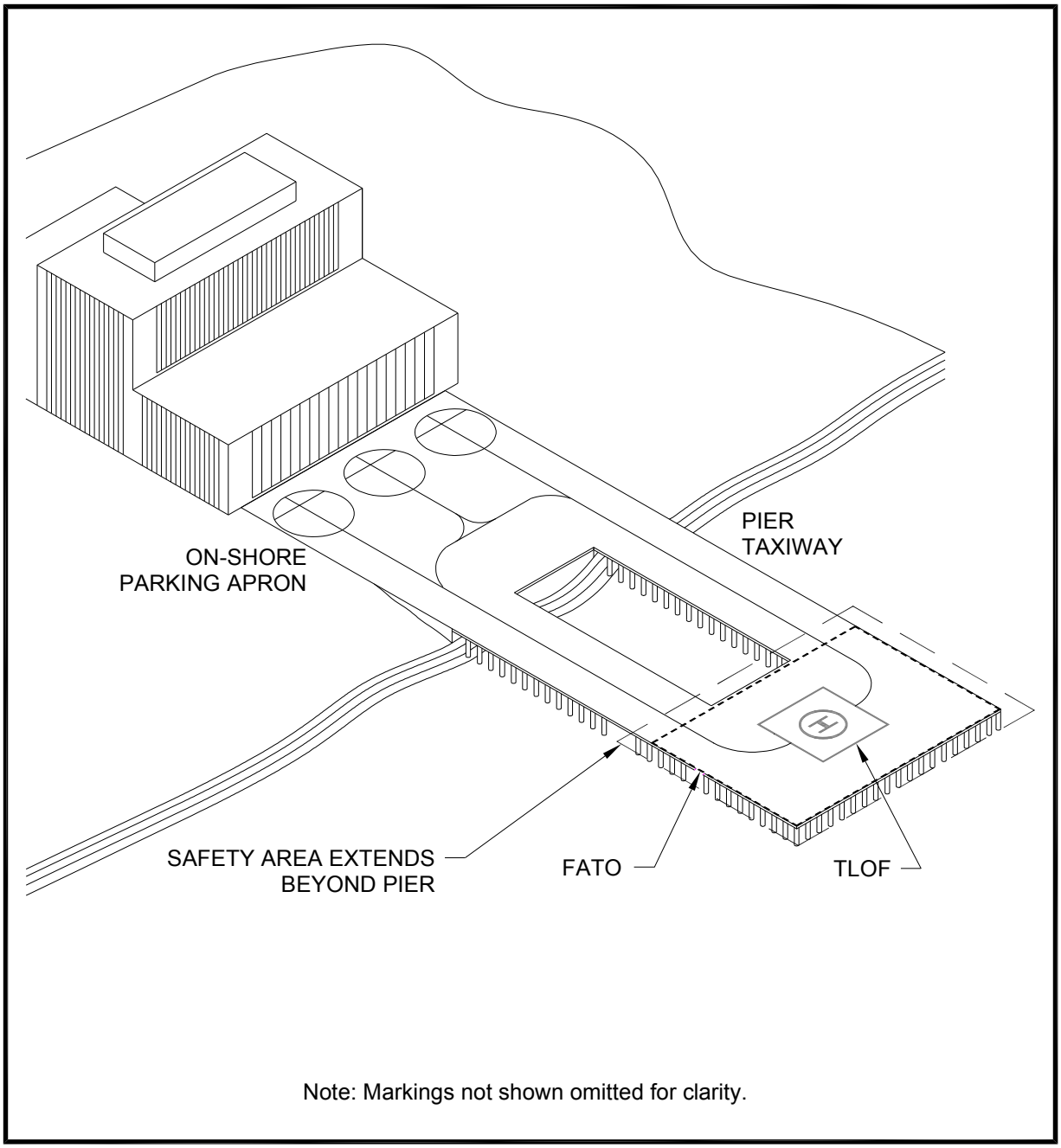



**Figure 3–6. Non-load-bearing Safety Area: Transport**

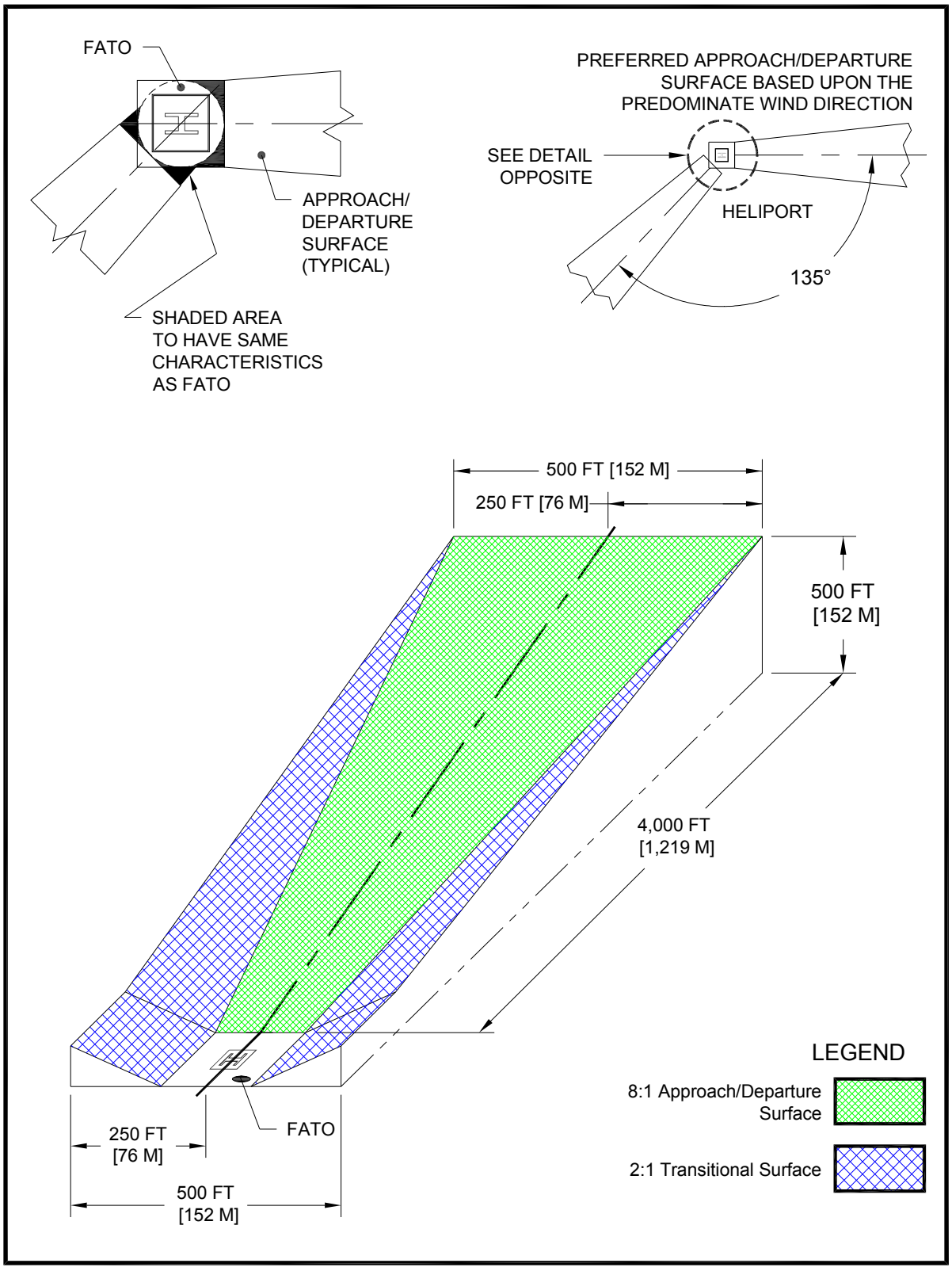



**Figure 3–7. VFR Heliport Approach/Departure and Transitional Surfaces: Transport**

**(3)** Make sure the approach/departure and transitional surfaces are free of penetrations unless an FAA aeronautical study determines such penetrations not to be hazards. The FAA conducts such aeronautical studies only at public heliports and private airports with FAA-approved approach procedures. Paragraph 111 provides additional information on hazards to air navigation.

**c. Curved VFR approach/departure paths.** As an option, include one curve in VFR approach/departure paths. As an option, design these paths to use the airspace above public lands, such as freeways or rivers. When including a curved portion in the approach/departure path, make sure the sum of the radius of arc defining the center line and the length of the straight portion originating at the FATO is not less than 1,886 feet (575 m). Design the approach/departure path so the minimum radius of the curve is 886 feet (270 m) and that the curve follows a 1,000 feet (305 m) straight section. Design the approach/departure path so the combined length of the center line of the curved portion and the straight portion is 4,000 feet (1,219 m). See Figure 3–8.

**d. Flight path alignment guidance.** As an option, use flight path alignment markings and/or flight path alignment lights (see paragraphs 301.d and 301.g) where it is desirable and practicable to indicate available approach and/or departure flight path direction(s). See Figure 3–9.

**e. Periodic review of obstructions.** Vigilant heliport operators reexamine obstacles in the vicinity of approach/departure paths on at least an annual basis. This reexamination includes an appraisal of the growth of trees near approach and departure paths. Paragraph 111 provides additional information on hazards to air navigation. Pay particular attention to obstacles that need to be marked or lighted. It may be helpful to maintain a list of the GPS coordinates and the peak elevation of obstacles.

**310. Heliport protection zone (HPZ).** The FAA recommends the establishment of an HPZ for each approach/departure surface. The HPZ is the area under the approach/departure surface starting at the FATO perimeter and extending out for a distance of 400 feet (122 m), as illustrated in Figure 3–10. The HPZ is intended to enhance the protection of people and property on the ground. This is achieved through heliport owner control over the HPZ. Such control includes clearing HPZ areas (and maintaining them clear) of incompatible objects and activities. The FAA discourages residences and places of public assembly in an HPZ. (Churches, schools, hospitals, office buildings, shopping centers, and other uses with similar concentrations of persons typify places of public assembly.) Do not locate hazardous materials, including fuel, in the HPZ.

**311. Wind cone.**

**a. Specification.** Use a wind cone conforming to AC 150/5345-27, Specification for Wind Cone Assemblies, to show the direction and magnitude of the wind. Use a color that provides the best possible color contrast to its background.

**b. Wind cone location.** Locate the wind cone so it provides the pilot with valid wind direction and speed information in the vicinity of the heliport under all wind conditions.

**(1)** At many landing sites, there may be no single, ideal location for the wind cone. At other sites, it may not be possible to site a wind cone at the ideal location. In such cases, install more than one wind cone in order to provide the pilot with all the wind information needed for safe operations.

**(2)** Place the wind cone so a pilot on the approach path can see it clearly when the helicopter is 500 feet (150 m) from the TLOF.

**(3)** Place the wind cone so pilots can see it from the TLOF.

**(4)** To avoid presenting an obstruction hazard, locate the wind cone(s) outside the safety area, and so it does not penetrate the approach/departure or transitional surfaces.

**c. Wind cone lighting.** For night operations, illuminate the wind cone, either internally or externally, to ensure it is clearly visible.

**312. Taxiways and taxi routes.** Taxiways and taxi routes provide for the movement of helicopters from one part of a landing facility to another. They provide a connecting path between the FATO and a parking area. They also provide a maneuvering aisle within the parking area. A taxi route includes the taxiway plus the appropriate clearances needed on both sides. The relationship between a taxiway and a taxi route is illustrated in Figure 3–11.

**a. Taxiway/taxi route widths.** The dimensions of taxiways and taxi routes are a function of helicopter size and type of taxi operations (ground taxi or hover taxi). Find these dimensions in Table 3-1. Normally, the requirement for hover taxi dictates the taxiway/taxi route widths. However, when the fleet comprises a combination of large ground taxiing helicopters and smaller air taxiing helicopters, the larger aircraft may dictate the taxiway/taxi route widths. If wheel-equipped helicopters taxi with wheels not touching the surface, design the facility with hover taxiway widths rather than ground taxiway widths. Where the visibility of the centerline marking cannot be guaranteed at all times, such as locations where snow or dust commonly obscure the centerline marking and it is not practical to remove it, determine the minimum taxiway/taxi route dimensions as if there was no centerline marking.

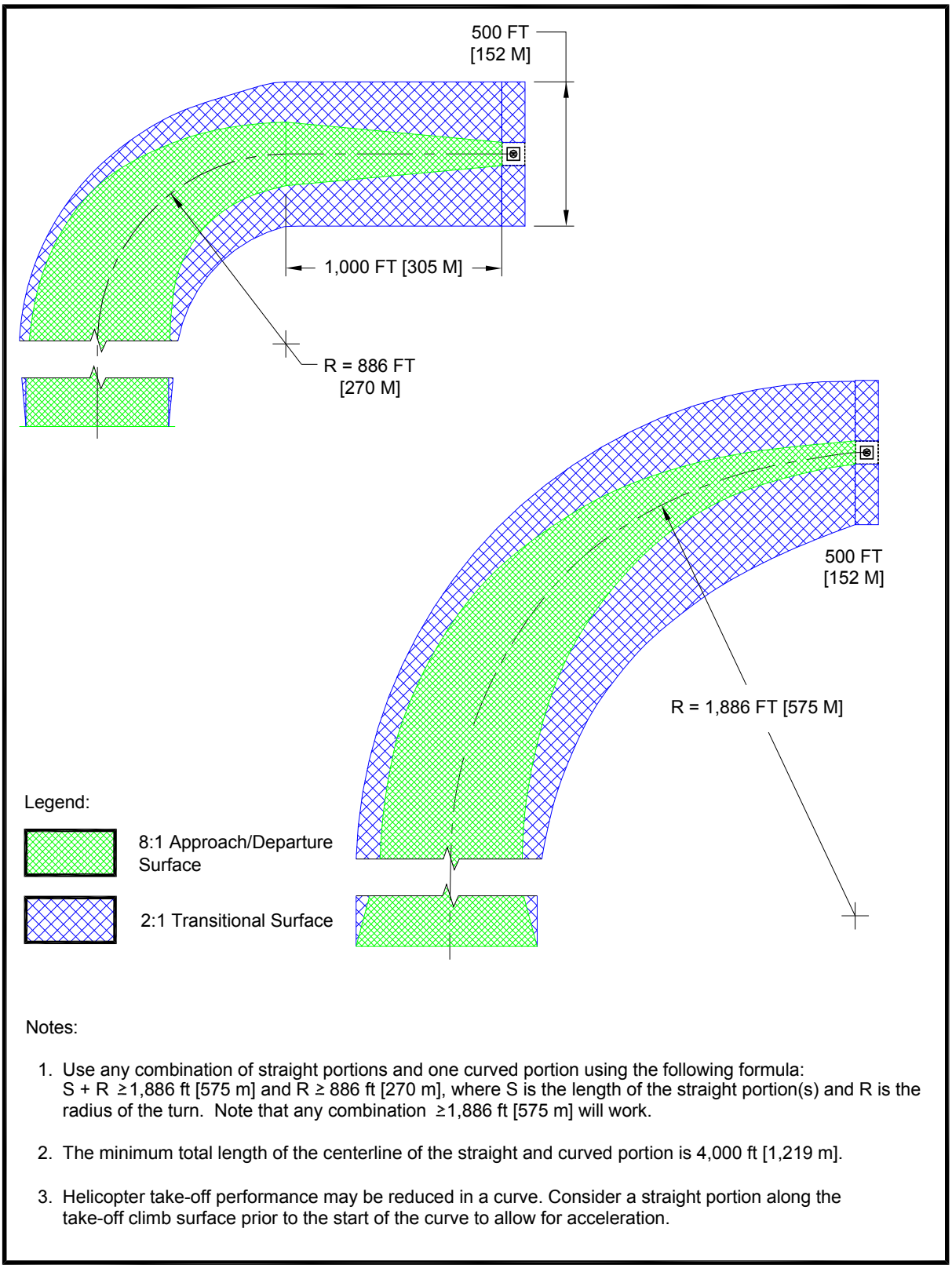
**b. Surfaces.** For ground taxiways, provide a portland cement concrete or asphalt surface. For unpaved portions of taxi routes, provide a turf cover or treat the ground in some way to prevent dirt and debris from being raised by a taxiing helicopter's rotor wash.

**c. Gradients.** See Chapter 7 for taxiway and taxi route gradient standards.

**313. Helicopter parking.** A transport heliport has a paved apron for parking helicopters. The size of the apron depends on the number and size of specific helicopters to be accommodated. It is not necessary that every parking position accommodate the design helicopter. Design individual parking positions to accommodate the helicopter size and weight expected to use the parking position at the facility. However, use the design helicopter to determine the separation between parking positions and taxi routes. Use the larger helicopter to determine the separation between parking positions intended for helicopters of different sizes. Design parking positions to support the static loads of the helicopter intended to use the parking area. Ground taxi turns of wheeled helicopters are significantly larger than a hover turn. Consider the turn radius of helicopters when designing taxi intersections and parking positions for wheeled helicopters. Design heliport parking areas so helicopters will be parked in an orientation that keeps the "avoid areas" around the tail rotors (see Figure 3–12) clear of passenger walkways. Establish separate aprons for specific functions such as passenger boarding, maintenance, and parking of based and transient helicopters.

**Table 3-1. Taxiway and Taxi Route Dimensions – Transport Heliports**

| Taxiway (TW) | Centerline Marking Type | TW Edge Marking Type | Minimum Width of Paved Area | Lateral Separation Between TW Edge Markings | Total Taxi Route Width |
|---|---|---|---|---|---|
| Ground Taxiway | Painted | Painted | 2 x UC | 2 x UC | 1½ RD |
| Hover Taxi | Painted | Painted | 2 x UC | 2 x UC | 2 RD |
| RD: rotor diameter of the design helicopter<br>TW: taxiway<br>UC: undercarriage length or width (whichever is larger) of the design helicopter | | | | | |



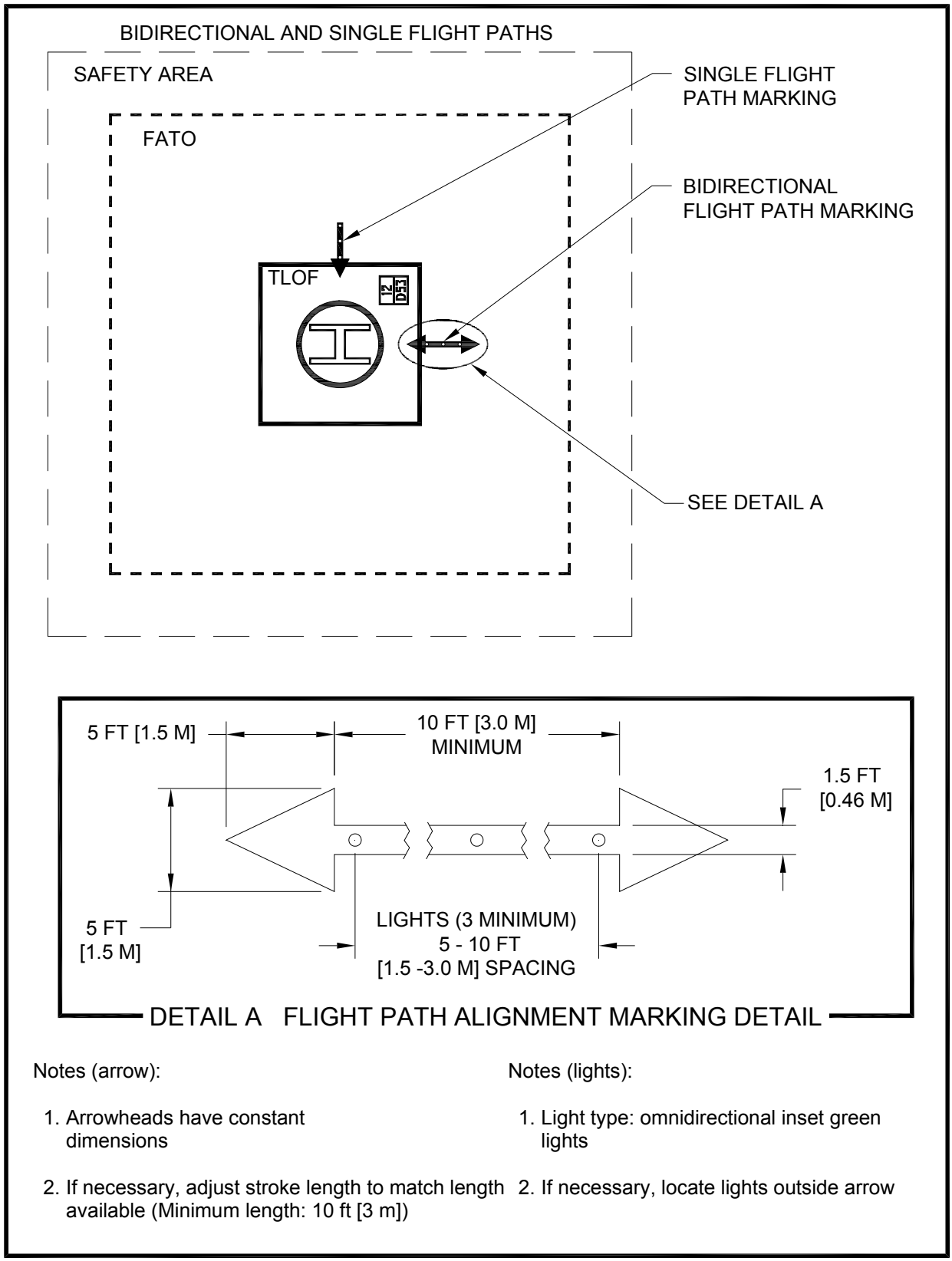

Notes:

1. Use any combination of straight portions and one curved portion using the following formula: S + R ≥1,886 ft [575 m] and R ≥ 886 ft [270 m], where S is the length of the straight portion(s) and R is the radius of the turn. Note that any combination ≥1,886 ft [575 m] will work.

2. The minimum total length of the centerline of the straight and curved portion is 4,000 ft [1,219 m].

3. Helicopter take-off performance may be reduced in a curve. Consider a straight portion along the take-off climb surface prior to the start of the curve to allow for acceleration.

**Figure 3–8. Curved Approach/Departure: Transport**




Notes (arrow):

1. Arrowheads have constant dimensions
2. If necessary, adjust stroke length to match length available (Minimum length: 10 ft [3 m])

Notes (lights):

1. Light type: omnidirectional inset green lights
2. If necessary, locate lights outside arrow

**Figure 3–9. Flight Path Alignment Marking and Lights: Transport**

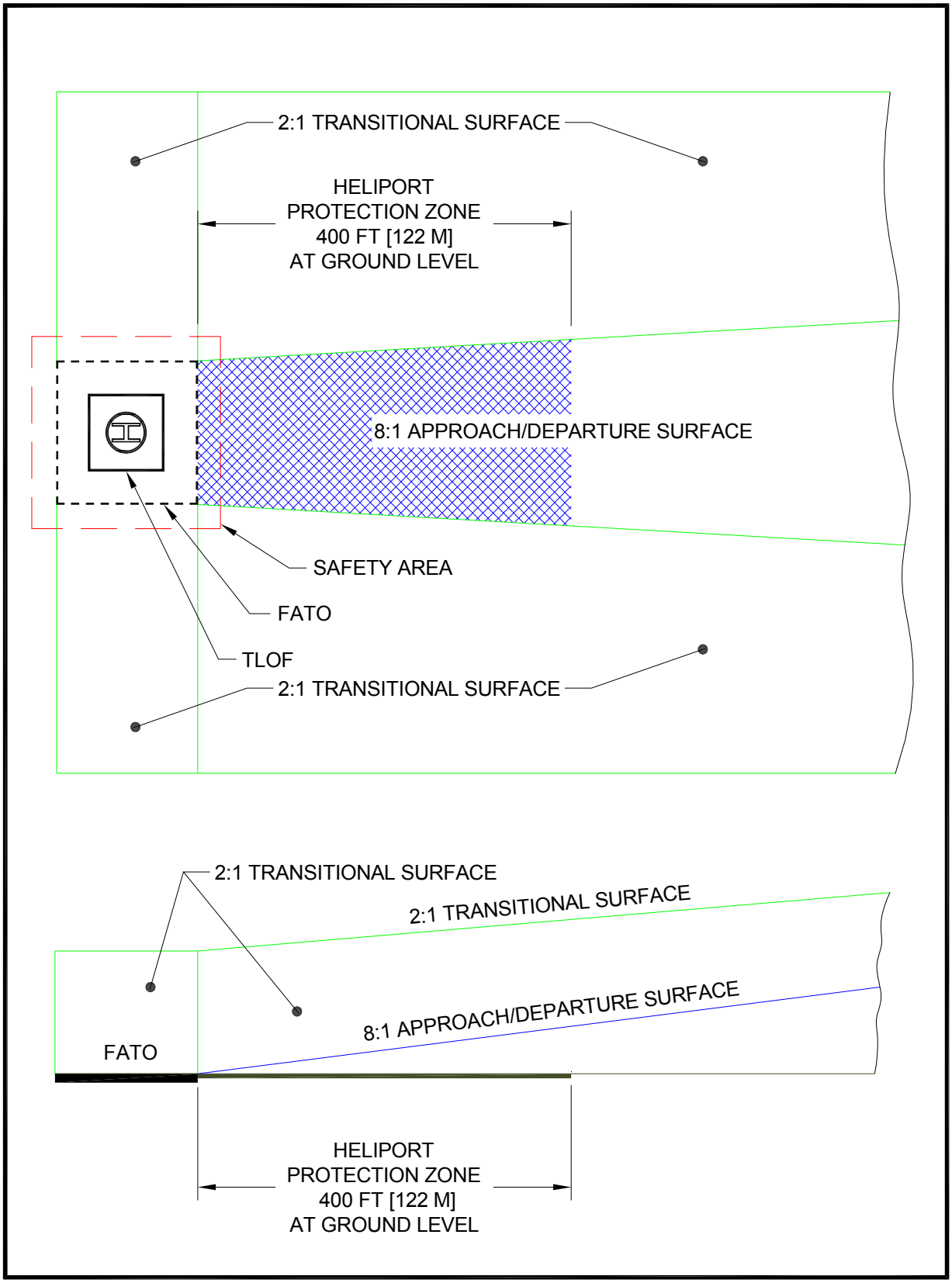



**Figure 3–10. Heliport Protection Zone: Transport**

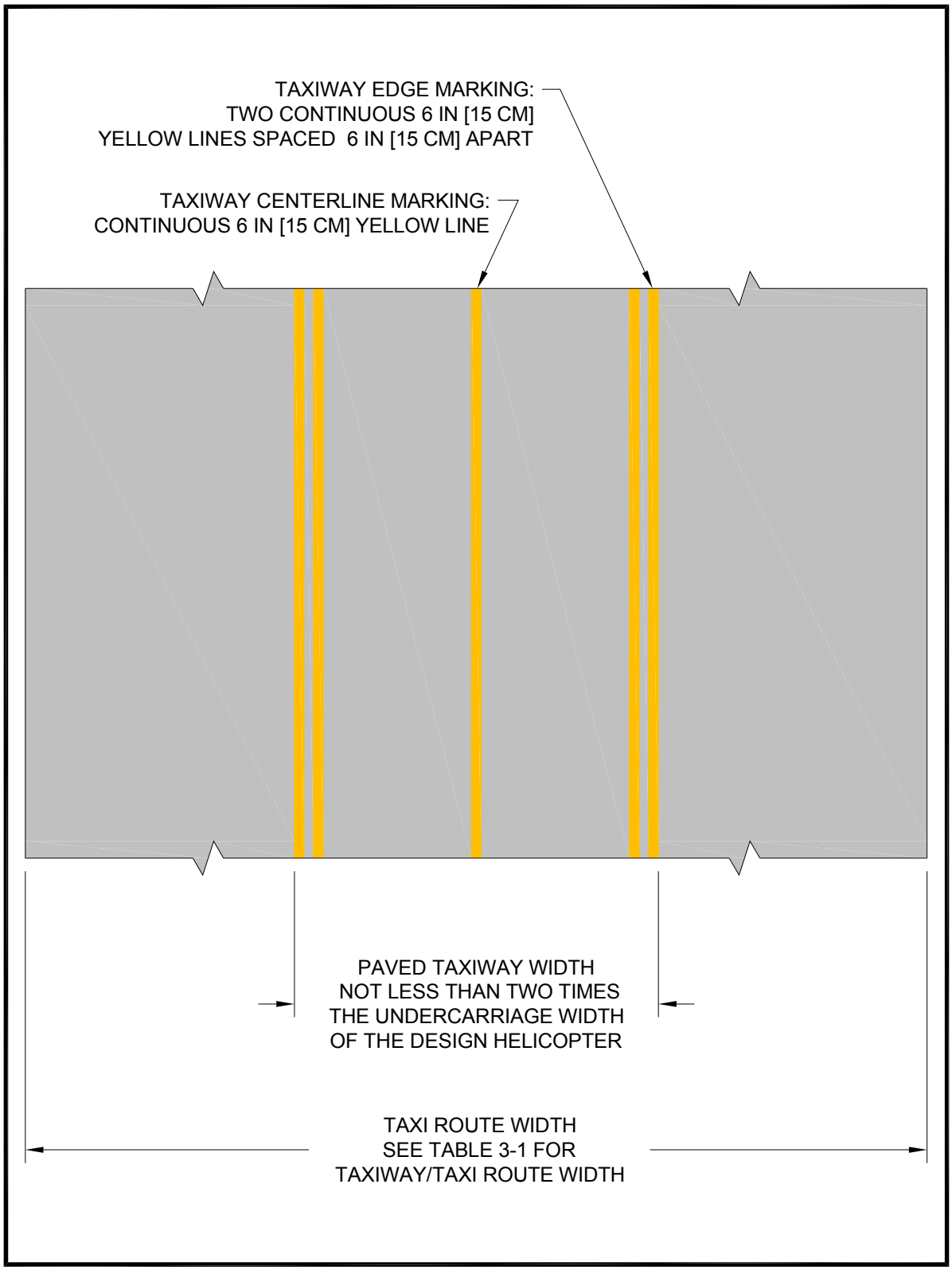
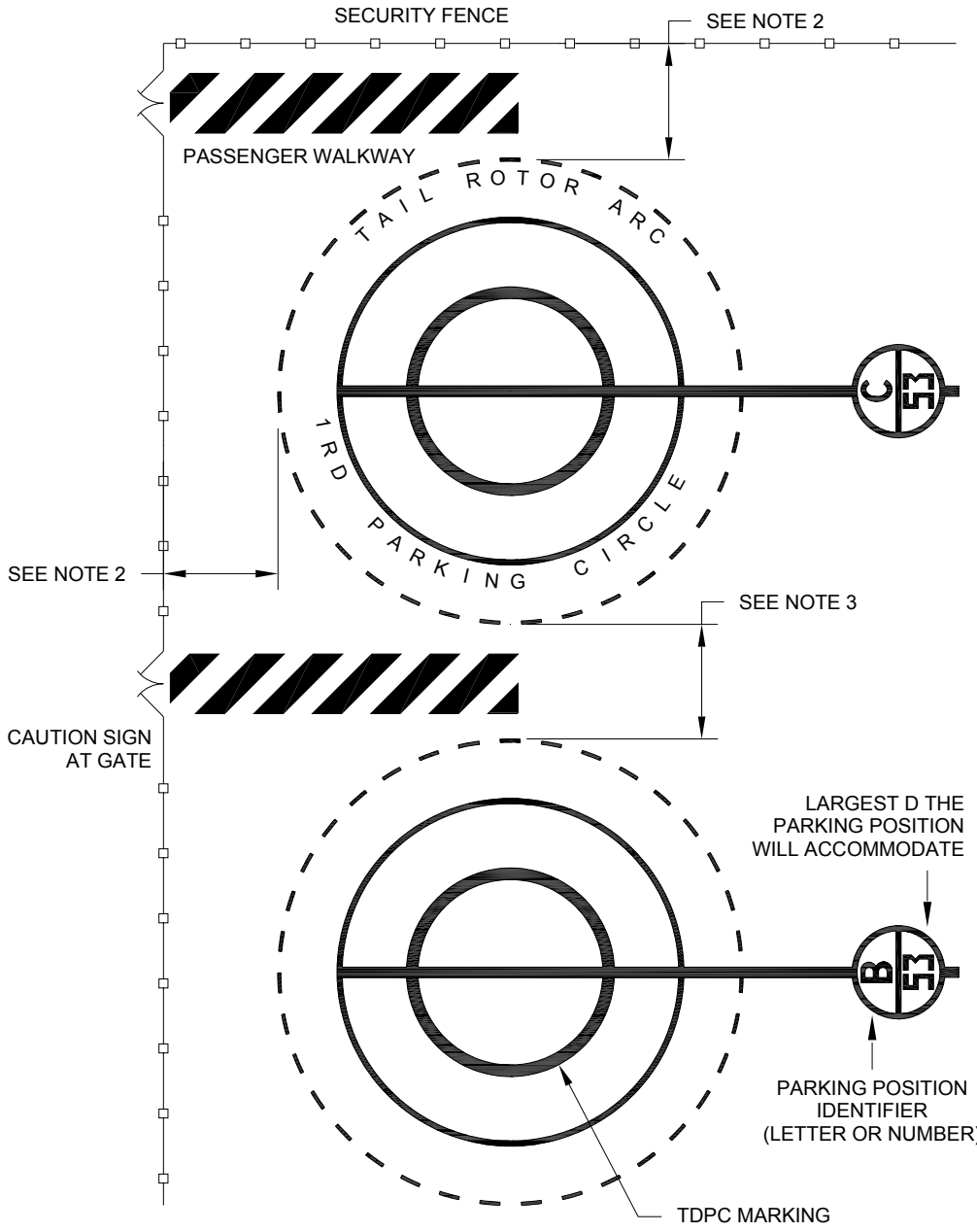


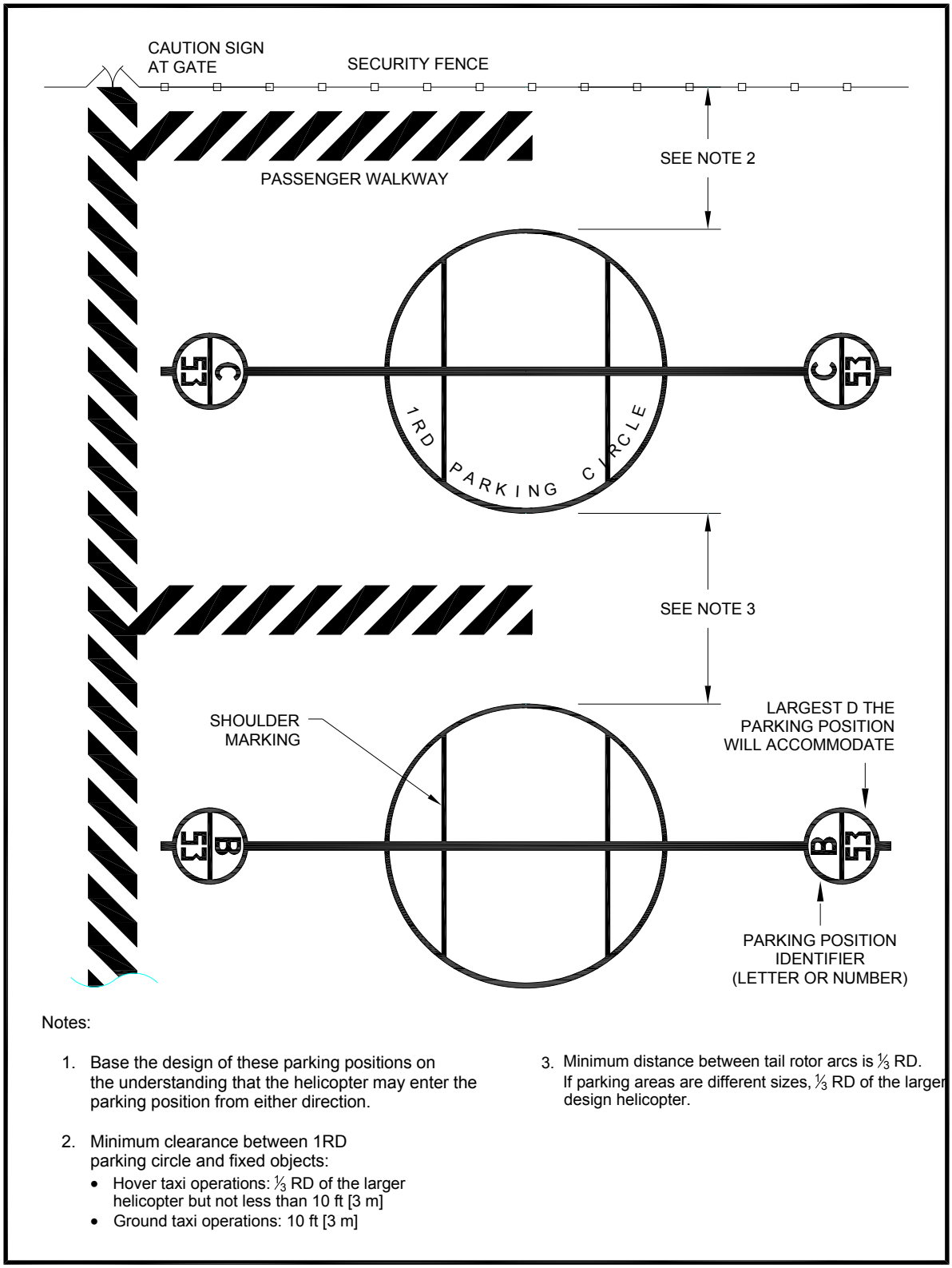

**Figure 3–11. Taxiway/Taxi Route Relationship, Centerline and Edge Marking: Transport**




Notes:

1. Base the design of these parking positions on the understanding that the helicopter may pivot about the mast prior to exiting the parking position.
2. Minimum clearance between the tail rotor arc and fixed objects:
   - Hover taxi operations: ⅓ RD of the larger helicopter but not less than 10 ft [3 m]
   - Ground taxi operations: 10 ft [3 m]
3. Minimum distance between tail rotor arcs is ⅓ RD. If parking areas are different sizes, ⅓ RD of the larger design helicopter.

**Figure 3–12. "Turn-around" Helicopter Parking Position Marking: Transport**




Notes:

1. Base the design of these parking positions on the understanding that the helicopter may enter the parking position from either direction.
2. Minimum clearance between 1RD parking circle and fixed objects:
   - Hover taxi operations: ⅓ RD of the larger helicopter but not less than 10 ft [3 m]
   - Ground taxi operations: 10 ft [3 m]
3. Minimum distance between tail rotor arcs is ⅓ RD. If parking areas are different sizes, ⅓ RD of the larger design helicopter.

**Figure 3–13. "Taxi-through" Helicopter Parking Position Marking: Transport**

**a. Location.** Do not locate aircraft parking areas under an approach/departure surface. As an option, allow aircraft parking areas under the transitional surfaces.

**(1)** For "turn around" parking positions, locate the parking position to provide a minimum distance between the tail rotor arc and any object, building, or safety area. The standard for this distance is 10 feet (3 m) for ground taxi operations and the greater of 10 feet (3 m) or $^{1}/_{3}$ RD for hover taxi operations. See Figure 3–12 and Figure 3–14.

**(2)** For "taxi-through" parking positions, locate the parking position to provide a minimum distance between the main rotor circle and any object, building, or safety area. The standard for this distance is 10 feet (3 m) for ground taxi operations and the greater of 10 feet (3 m) or $^{1}/_{3}$ RD for hover taxi operations. See Figure 3–13 and Figure 3–15.

**(3)** Locate the parking position to provide a minimum distance between the tail rotor arc and the edge of any taxi route. The standard for this distance is ½ RD but not less than 30 feet (9.1 m).

**b. Size.** Parking position sizes are dependent upon the helicopter size. The clearances between parking positions are dependent upon the type of taxi operations (ground-taxi or hover/ taxi) and the intended paths for maneuvering in and out of the parking position. The more demanding operation will dictate what is needed at a particular site. Usually, the parking area needs for skid-equipped helicopters will be the most demanding. However, when the largest helicopter is a very large, wheeled aircraft (for example, the S-61), and the skid-equipped helicopters are all much smaller, the parking size needs for wheeled helicopters may be the most demanding. If wheel-equipped helicopters taxi with wheels not touching the surface, design parking areas based on hover taxi operations rather than ground taxi operations.

**(1)** If all parking positions are the same size, design them to be large enough to accommodate the largest helicopter that will operate at the heliport.

**(2)** As an option when there is more than one parking position, design the facility with parking positions of various sizes with at least one position that will accommodate the largest helicopter that will park at the heliport. Design other parking positions to be smaller, for the size of the individual or range of individual helicopters parking at that position.

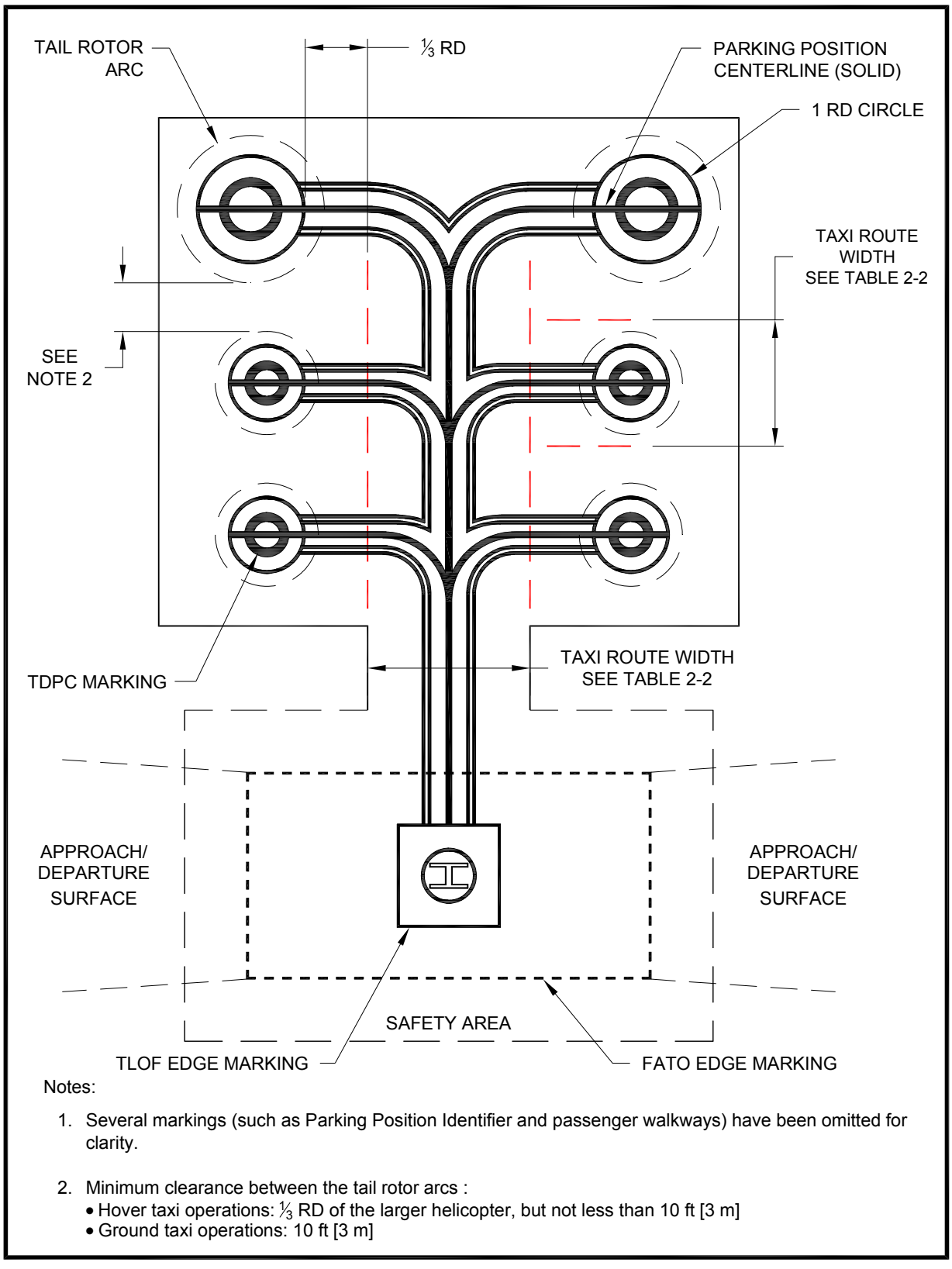
**(3)** "Turn-around" parking positions are illustrated in Figure 3–14.

**(4)** "Taxi-through" parking positions are illustrated in Figure 3–15. When using this design for parking positions, the heliport owner and operator take steps to ensure all pilots are informed that "turn-around" departures from the parking position are not permitted.

**(5)** Do not design "back-out" parking positions at transport heliports.

**c. Passenger walkways.**, Provide marked walkways at parking positions. Locate passenger walkways to minimize passenger exposure to various risks during passenger loading and unloading. Design the pavement so spilled fuel does not drain onto passenger walkways or toward parked helicopters.

**d. Fueling**. Design the facility to allow fueling with the use of a fuel truck or a specific fueling area with stationary fuel tanks.

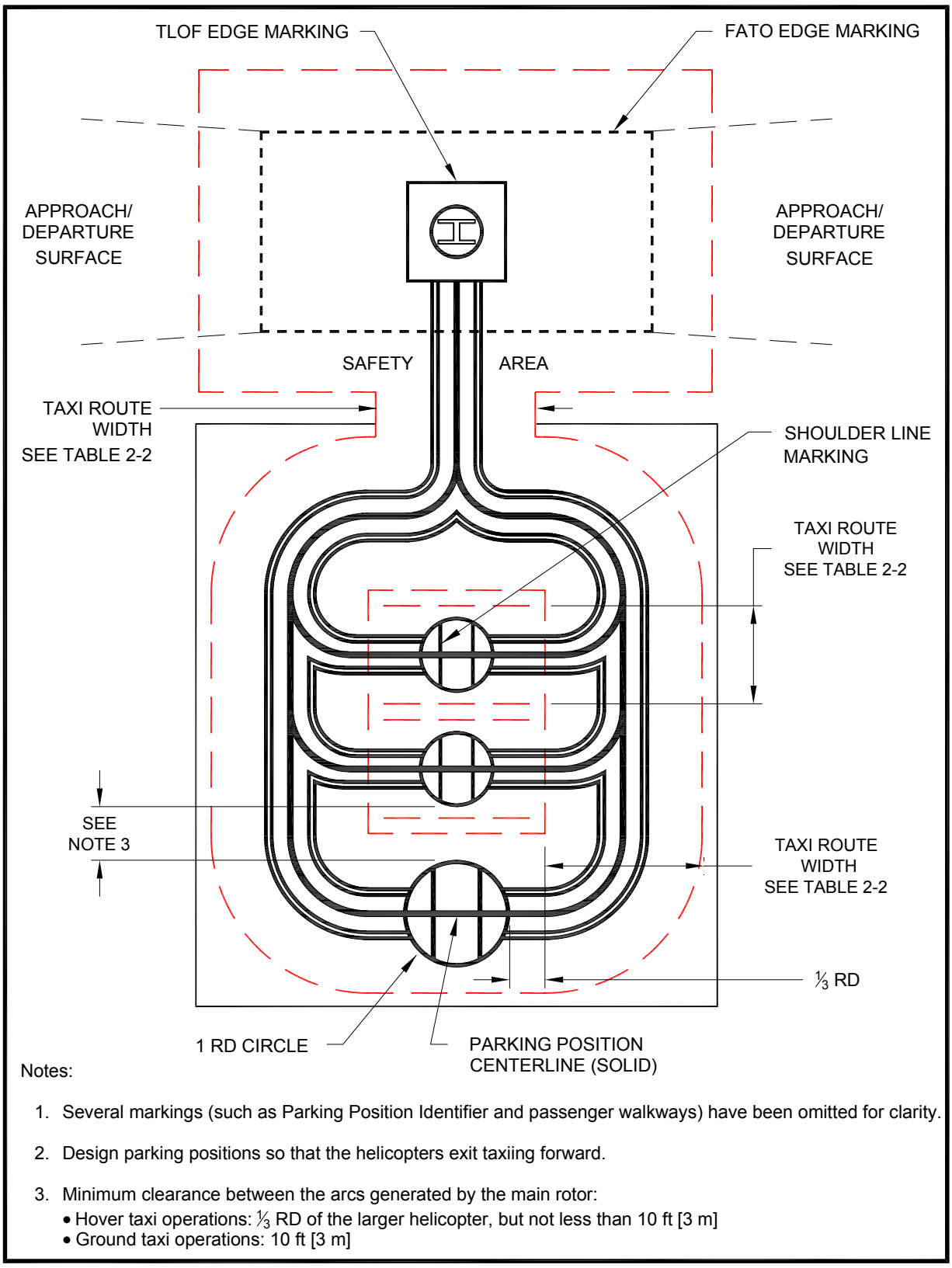



Notes:

1. Several markings (such as Parking Position Identifier and passenger walkways) have been omitted for clarity.

2. Minimum clearance between the tail rotor arcs :
   - Hover taxi operations: ⅓ RD of the larger helicopter, but not less than 10 ft [3 m]
   - Ground taxi operations: 10 ft [3 m]

**Figure 3–14. Parking Area Design – "Turn-around" Parking Positions: Transport**




Notes:

1. Several markings (such as Parking Position Identifier and passenger walkways) have been omitted for clarity.
2. Design parking positions so that the helicopters exit taxiing forward.
3. Minimum clearance between the arcs generated by the main rotor:
   - Hover taxi operations: ⅓ RD of the larger helicopter, but not less than 10 ft [3 m]
   - Ground taxi operations: 10 ft [3 m]

**Figure 3–15. Parking Area Design – "Taxi-through" Parking Position**

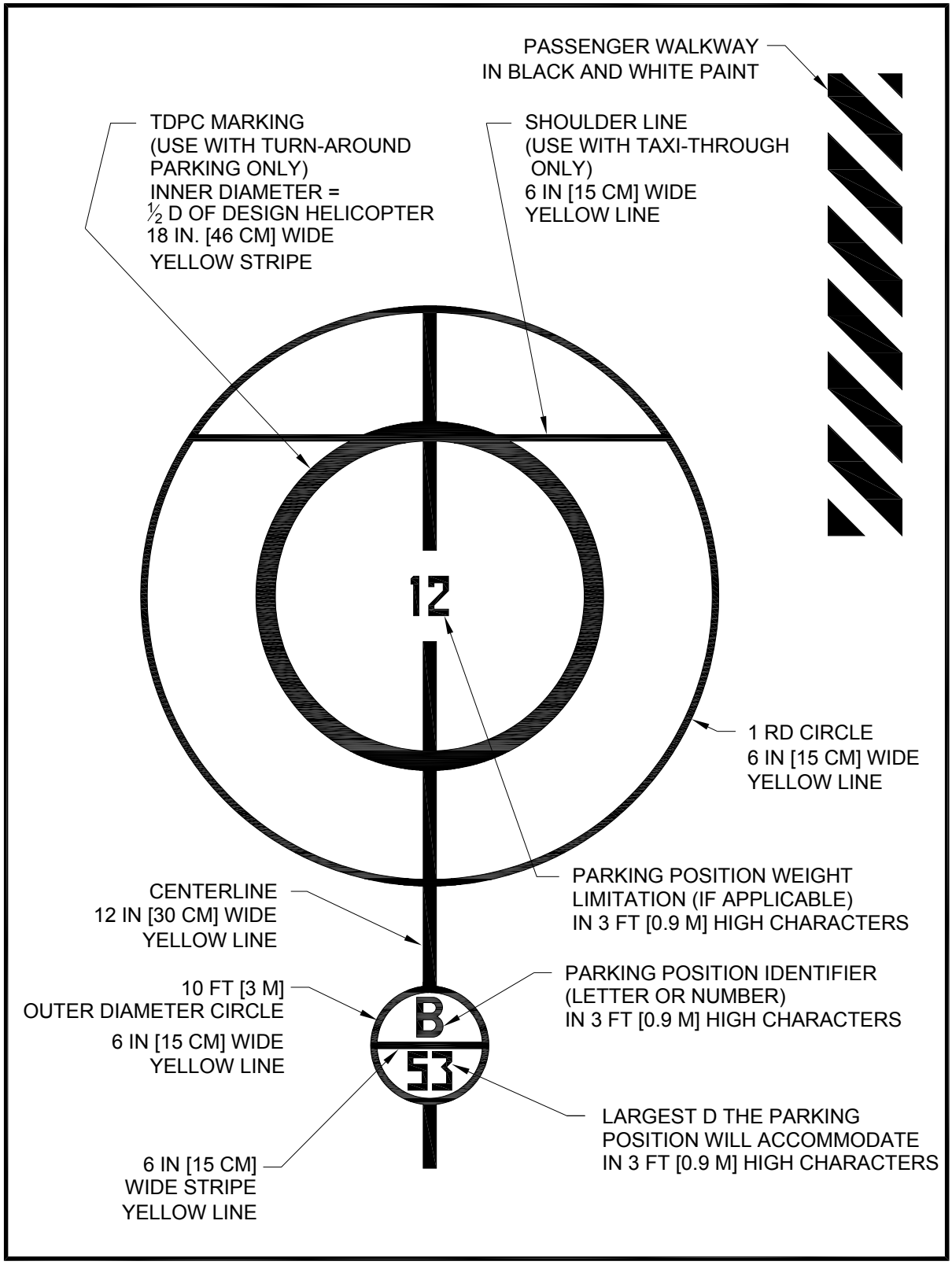



**Figure 3–16. Parking Position Identification, Size and Weight Limitations: Transport**

**(1)** Various federal, state, and local requirements for petroleum handling facilities apply to systems for storing and dispensing fuel. Find guidance in AC 150/5230-4, Aircraft Fuel Storage, Handling, and Dispensing on Airports. Find additional information in various National Fire Protection Association (NFPA) publications. For a list of more resources, see Appendix D.

**(2)** Do not locate fueling equipment in the TLOF, FATO, or safety area. Design separate fueling locations and mark them to minimize the potential for helicopters to collide with the dispensing equipment. Design fueling areas so there is no object tall enough to be hit by the main or tail rotor blades within a distance of RD of the design helicopter from the center point of the position where the helicopter is fueled (providing ½ RD clearance from the rotor tips). If this is not practical at an existing facility, install long fuel hoses.

**(3)** Lighting. Light the fueling area if night fueling operations are contemplated. Ensure any light poles do not constitute an obstruction hazard.

**e. Tiedowns.** Install recessed tiedowns to accommodate extended or overnight parking of based or transient helicopters. Ensure any depression associated with the tiedowns is of a diameter not greater than one-half the width of the smallest helicopter landing wheel or landing skid anticipated to be operated on the heliport surface. In addition, provide storage for tiedown chocks, chains, cables, and ropes off the heliport surface to avoid fouling landing gear. Find guidance on tiedowns in AC 20-35, Tiedown Sense.

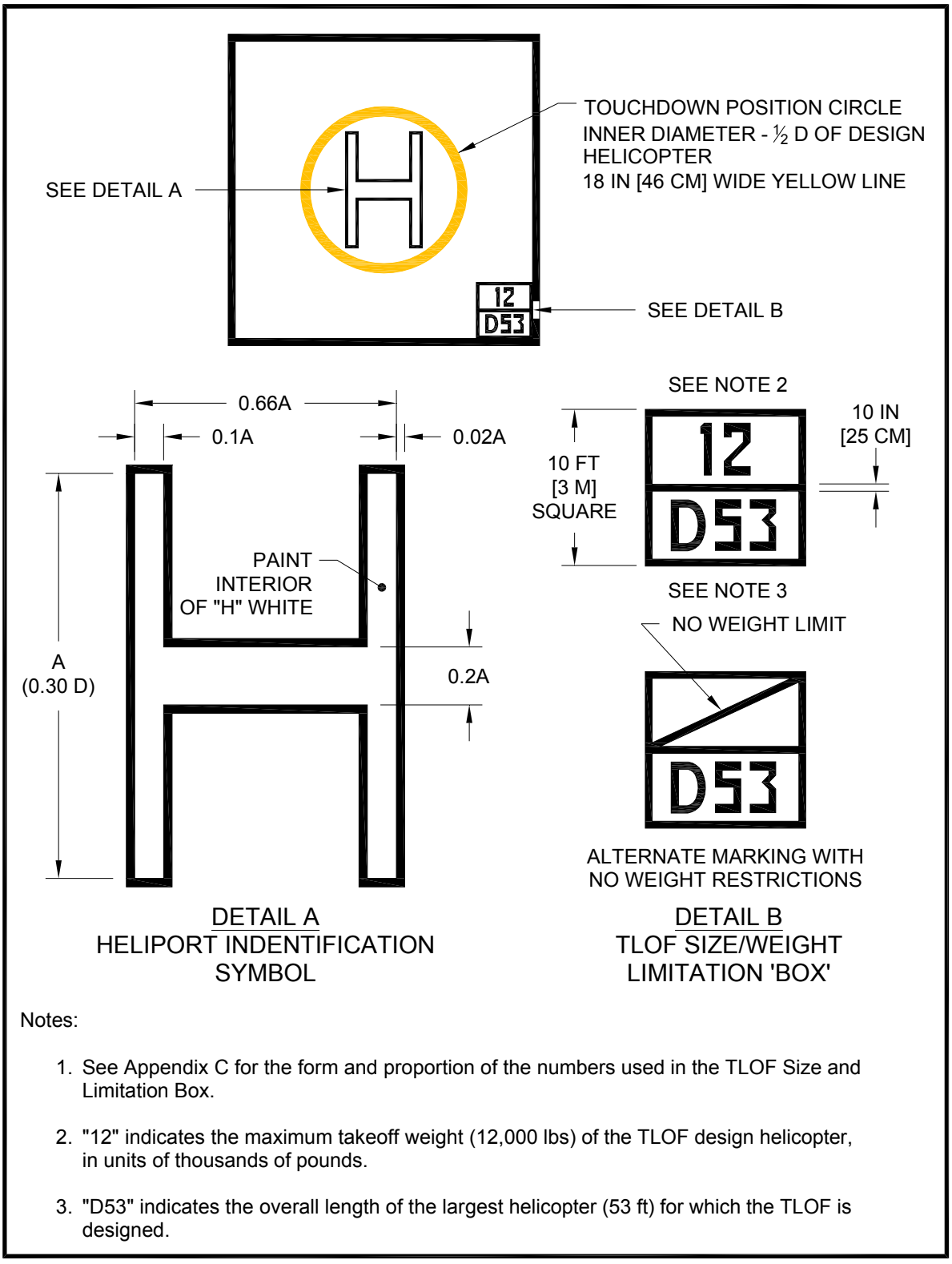
**314. Heliport markers and markings.** Markers and/or surface markings identify the facility as a heliport. Use surface markings of paint or preformed material. (See AC 150/5370-10, Item P-620, for specifications for paint and preformed material). As an option, use reflective paint and reflective markers, though remember overuse of reflective material can be blinding to a pilot using landing lights. As an option, outline lines/markings with a 6-inch (15 cm) wide line of a contrasting color to enhance conspicuity. Place markings that define the edges of a TLOF, FATO, taxiway or apron within the limits of those areas. Use the following markers and markings.

**a. Heliport identification marking.** The identification marking identifies the location as a heliport, marks the TLOF and provides visual cues to the pilot. The marking consists of a white "H." The "H" has a minimum height of 0.3 D. Locate the "H" in the center of the TLOF and orient it on the axis of the preferred approach/departure path. Place a one-foot wide bar under the "H" when it is necessary to distinguish the preferred approach/departure direction. The proportions and layout of the letter "H" are illustrated in Figure 3–17.

**b. TLOF markings.**

**(1) TLOF perimeter marking.** Define the perimeter of a TLOF with a continuous 12-inch (30 cm) wide, white line, as shown in Figure 3–18.

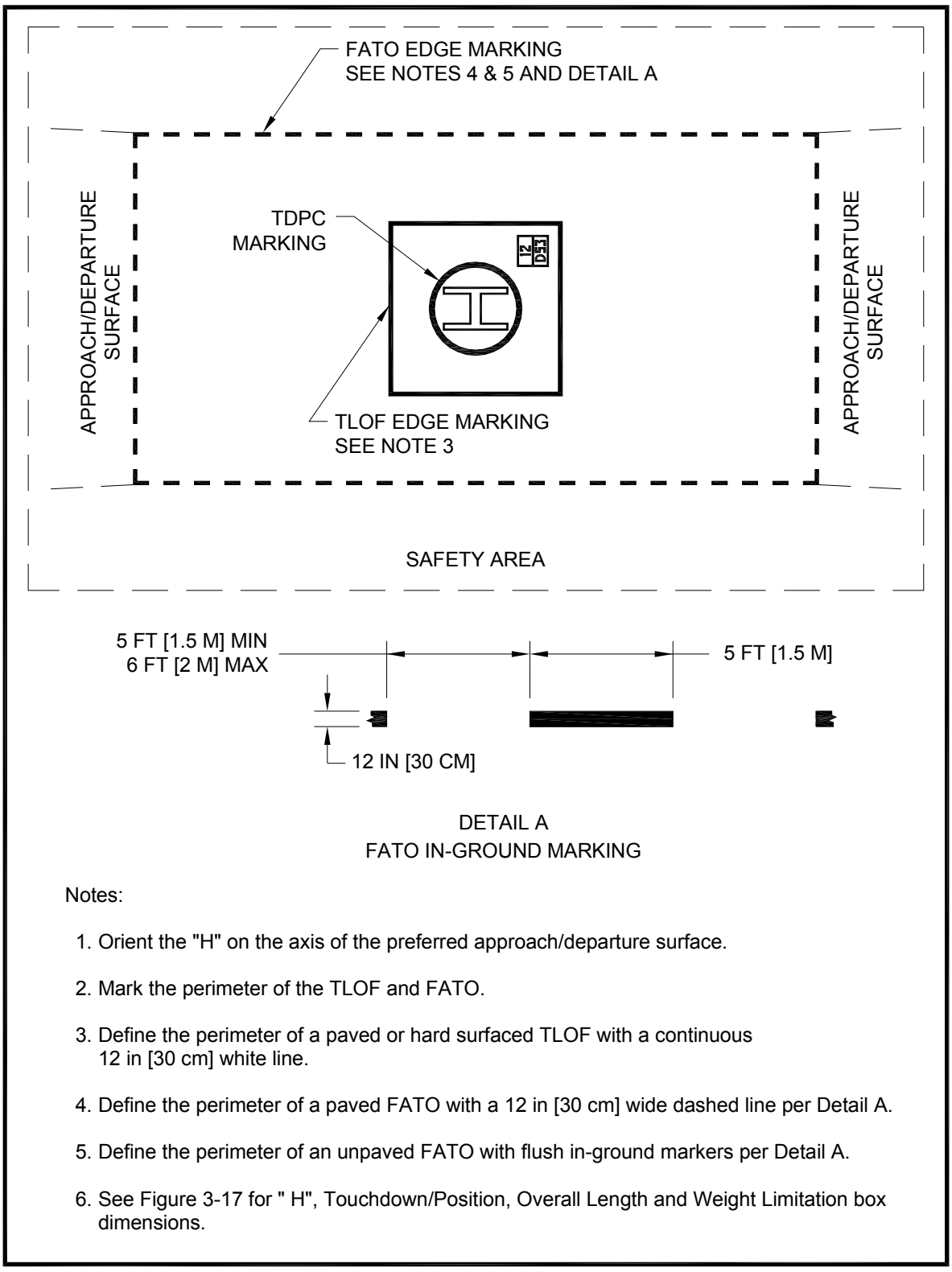
**(2) Touchdown/positioning circle (TDPC) marking.** A TDPC marking provides guidance to allow a pilot to touch down in a specific position on paved surfaces. When the pilot's seat is over the marking, the undercarriage will be inside the LBA, and all parts of the helicopter will be clear of any obstacle by a safe margin. A TDPC marking is a yellow circle with an inner diameter of ½ D and a line width of 18 in (46 cm). Locate a TDPC marking in the center of a TLOF. See Figure 3–17.




Notes:

1. See Appendix C for the form and proportion of the numbers used in the TLOF Size and Limitation Box.
2. "12" indicates the maximum takeoff weight (12,000 lbs) of the TLOF design helicopter, in units of thousands of pounds.
3. "D53" indicates the overall length of the largest helicopter (53 ft) for which the TLOF is designed.

**Figure 3–17. Standard Heliport Identification Symbol, TLOF Size and Weight Limitations: Transport**




Notes:

1. Orient the "H" on the axis of the preferred approach/departure surface.
2. Mark the perimeter of the TLOF and FATO.
3. Define the perimeter of a paved or hard surfaced TLOF with a continuous 12 in [30 cm] white line.
4. Define the perimeter of a paved FATO with a 12 in [30 cm] wide dashed line per Detail A.
5. Define the perimeter of an unpaved FATO with flush in-ground markers per Detail A.
6. See Figure 3-17 for " H", Touchdown/Position, Overall Length and Weight Limitation box dimensions.

**Figure 3–18. Paved TLOF/Paved FATO – Paved TLOF/Unpaved FATO – Marking: Transport**

**(3) TLOF size and weight limitations.** Mark the TLOF to indicate the length and weight of the largest helicopter it will accommodate, as shown in Figure 3–17. Place these markings in a box in the lower right-hand corner of the TLOF, or the on right-hand side of the "H" of a circular TLOF, when viewed from the preferred approach direction. The box is 10 feet square (3 m). The numbers are 36" (92 cm) high (see Figure C–2). The numbers are black with a white background.

**(4) TLOF size limitation.** This number is the length (D) of the largest helicopter the TLOF will accommodate, as shown in Figure 3–17. The marking consists of the letter "D" followed by the dimension in feet. Do not use metric equivalents for this purpose. Center this marking in the lower section of the TLOF size/weight limitation box.

**(5) TLOF weight limitations.** If a TLOF has limited weight-carrying capability, mark it with the maximum takeoff weight of the design helicopter, in units of thousands of pounds, as shown in Figure 3–17. Do not use metric equivalents for this purpose. Center this marking in the upper section of a TLOF size/weight limitation box. If the TLOF does not have a weight limit, add a diagonal line, extending from the lower left hand corner to the upper right hand corner, to the upper section of the TLOF size/weight limitation box.

**c. FATO markings.**

**(1) FATO perimeter marking.**

**(a) Paved FATOs.** Define the perimeter of a paved FATO with a 12-inch (30 cm) wide dashed white line. Define the corners of the FATO. The marking segments are approximately 5 feet (1.5 m) in length, and with end-to-end spacing of approximately 5 feet (1.5 m). See Figure 3–18.

**(b) Unpaved FATOs.** Mark the perimeter of an unpaved FATO with 12-inch (30 cm) wide, flush in-ground markers. Define the corners of the FATO. They are approximately 5 feet (1.5 m) in length, and with end-to-end spacing of approximately 5 feet (1 5 m). See Figure 3–18.

**d. Flight path alignment guidance marking.** An optional flight path alignment guidance marking consists of one or more arrows to indicate the preferred approach/departure direction(s). Place it on the TLOF, FATO and/or safety area surface as shown in Figure 3–9. The shaft of the arrow is 18 inches (50 cm) in width and at least 10 feet (3 m) in length. When combined with a flight path alignment guidance lighting system described in paragraph 301.g, it takes the form shown in Figure 3–9, which includes scheme for marking the arrowheads. Use a color that provides good contrast against the background color of the surface. An arrow pointing toward the center of the TLOF depicts an approach direction. An arrow pointing away from the center of the TLOF depicts a departure direction. In the case of a flight path limited to a single departure path, the arrow marking is unidirectional. In the case of a heliport with only a bidirectional approach /takeoff flight path available, the arrow marking is bidirectional.

**e. Taxiway and taxi route markings.**

**(1) Taxiway markings.** Mark the centerline of a taxiway with a continuous 6-inch (15 cm) yellow line. Mark both edges of the taxiway with two continuous 6- inch (15 cm) wide yellow lines spaced 6 inches (15 cm) apart. Figure 3–11 illustrates taxiway centerline and edge markings.

**(2) Taxiway to parking position transition requirements.** For paved taxiways and parking areas, taxiway centerline markings continue into parking positions and become the parking position centerlines.

**f. Helicopter parking position markings.** Helicopter parking positions have the following markings.

**(1) Paved parking position identifications.** Mark parking position identifications (numbers or letters) if there is more than one parking position. These markings are yellow characters 36 inches (91 cm) high. See Figure 3–16 and Figure C–1.

**(2) Rotor diameter circle.** Define the circle of the RD of the largest helicopter that will park at that position with a 6-inch (15 cm) wide, solid yellow line with an outside diameter of RD. See Figure 3–12.

**(3) Touchdown/positioning circle (TDPC) marking.** An optional TDPC marking provides guidance to allow a pilot to touch down in a specific position on paved surfaces. When the pilot's seat is over the marking, the undercarriage will be inside the LBA, and all parts of the helicopter will be clear of any obstacle by a safe margin. A TDPC marking is a yellow circle with an inner diameter of ½ D and a line width of 18 in (46 cm). Locate a TDPC marking in the center of a parking area. See Figure 3–16. The FAA recommends a TDPC marking for "turn-around" parking areas.

**(4) Maximum length marking.** This marking on paved surfaces indicates the D of the largest helicopter that the position will accommodate (for example, 49). This marking is in yellow characters at least 36 inches (91 cm) high. See Figure 3–17 and Figure C–1.

**(5) Parking position weight limit.** If a paved parking position has a weight limitation, mark it in units of 1,000 lbs as illustrated in Figure 3–16. (A "12" indicates a weight-carrying capability of up to 9,000 lbs. Do not use metric equivalents for this purpose.) This marking consists of yellow characters 36 inches (91 cm) high. When necessary to minimize the possibility of being misread, place a bar under the number. See Figure 3–17 and Figure C–1.

**(6) Shoulder line markings.** Use optional shoulder line markings for paved parking areas (Figure 3–12) to ensure safe rotor clearance. Locate a 6-inch (15 cm) wide solid yellow shoulder line, perpendicular to the centerline and extending to the RD marking, so it is under the pilot's shoulder. This ensures the main rotor of the largest helicopter the position will accommodate will be entirely within the rotor diameter parking circle. See Figure 3–16. The FAA recommends a shoulder line marking for "taxi through" parking areas.

**(7) Walkways.** Figure 3–12 illustrates one marking scheme.

**g. Closed heliport.** Obliterate all markings of a permanently closed heliport, FATO, or TLOF. If it is impractical to obliterate markings, place a yellow "X" over the "H", as illustrated in Figure 3–19. Make the yellow "X" large enough to ensure early pilot recognition that the heliport is closed. Remove the wind cone(s) and other visual indications of an active heliport.

**h. Marking sizes.** See Appendix C for guidance on the proportions of painted numbers.

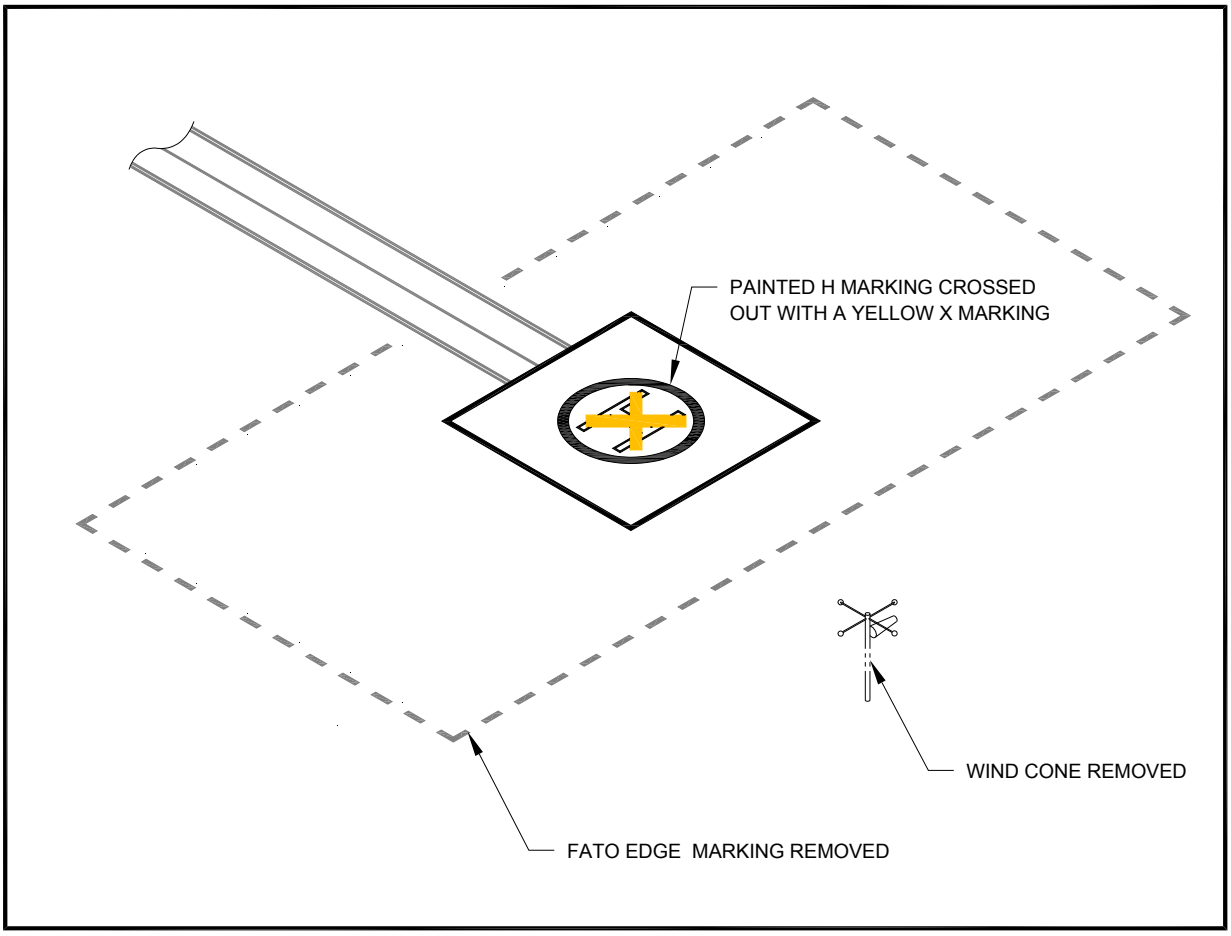



**Figure 3–19. Marking a Closed Heliport: Transport**

**315. Heliport lighting.** For night operations, light the heliport with FATO and/or TLOF perimeter lights as described below. Design flush light fixtures and installation methods to support point loads of the design helicopter transmitted through a skid or wheel.

**a. TLOF – perimeter lights.** Use flush green lights meeting the requirements of FAA Airports Engineering Brief 87, Heliport Perimeter Light for Visual Meteorological Conditions (VMC), to define the TLOF perimeter. Use a minimum of four light fixtures per side of the TLOF. Locate a light is located at each corner, with additional lights uniformly spaced between the corner lights. Using an odd number of lights on each side will place lights along the centerline of the approach. Install lights at a maximum spacing of 25 feet (7.6 m). Locate flush lights within 1 foot (30 cm) (inside or outside) of the TLOF perimeter. Figure 3–20 and Figure 3–21 illustrate this lighting.

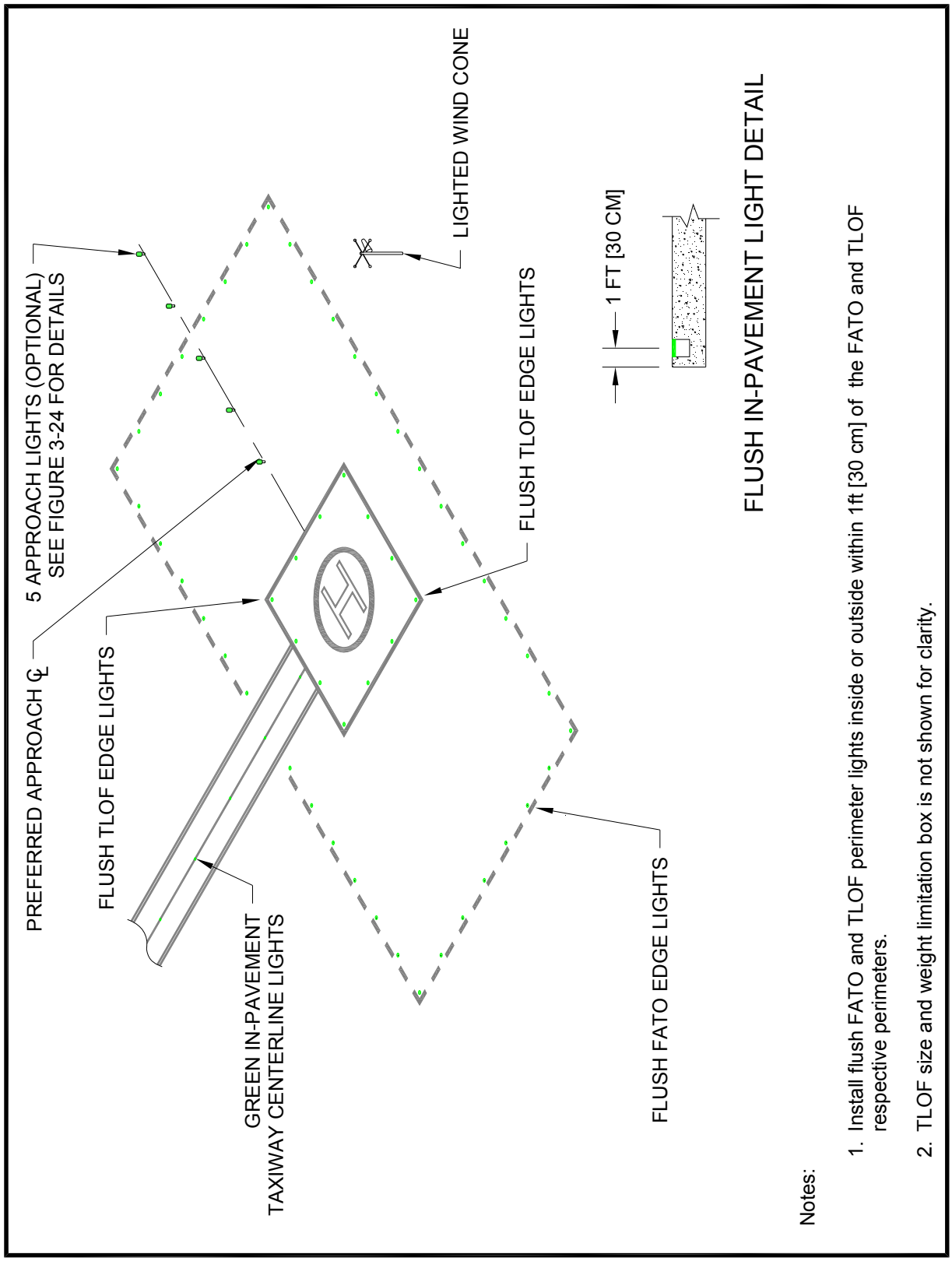



**Figure 3–20. TLOF and FATO Flush Perimeter Lighting: Transport**

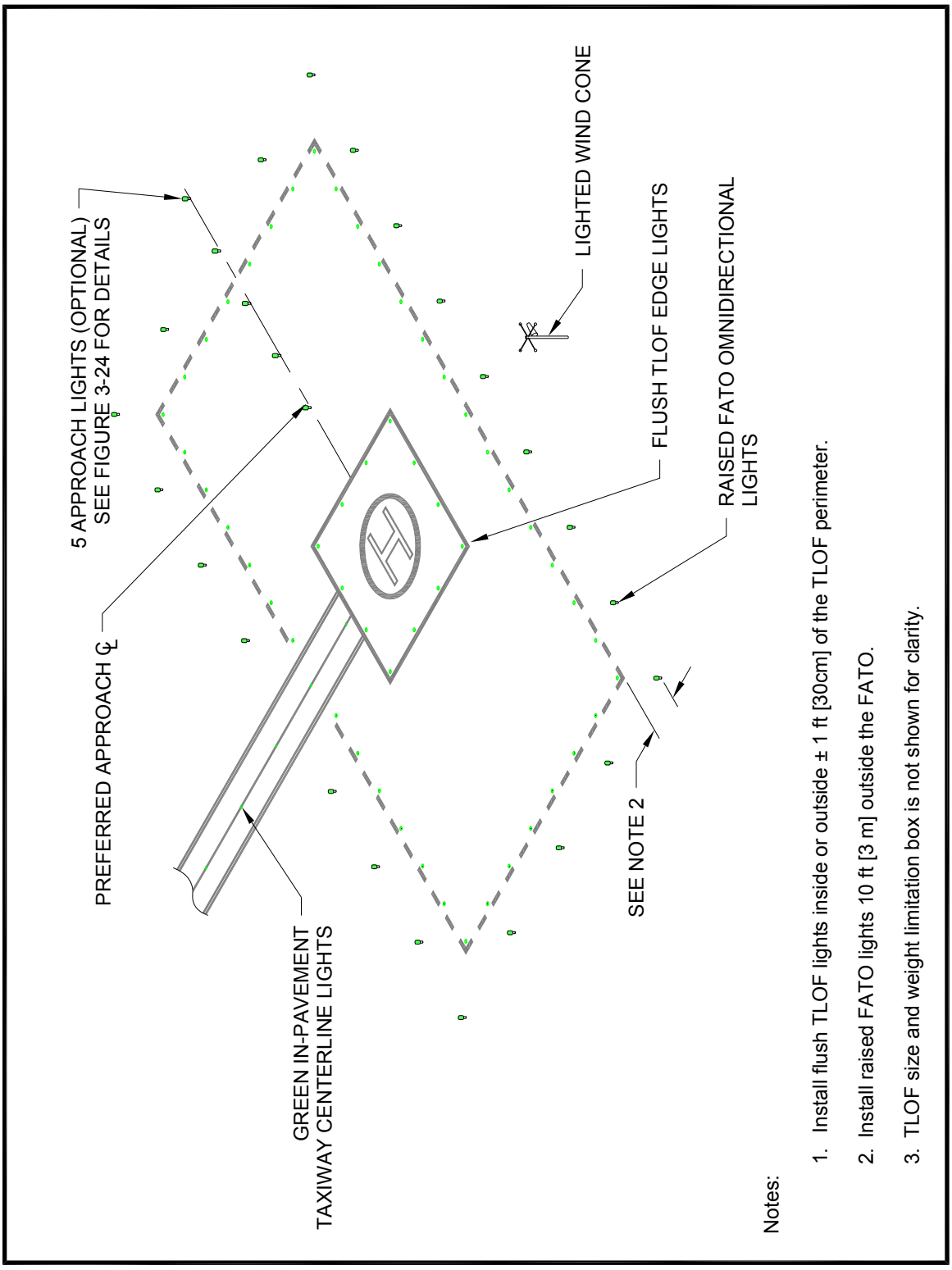



**Figure 3–21. FATO Raised and TLOF Flush Perimeter Lighting: Transport**

**b. Optional TLOF lights.** As an option, install a line of 7 green, flush lights meeting the standards of EB 87 spaced at 5-foot (1.5 m) intervals in the TLOF pavement. Align these lights on the centerline of the approach course to provide close-in directional guidance and improve TLOF surface definition. These lights are illustrated in Figure 3–22.

**c. Ground level FATO perimeter lights.** Use green lights meeting the requirements of EB 87 to define the limits of the FATO. Locate a light at each corner with additional lights uniformly spaced between the corner lights with a maximum interval of 25 feet (8 m) between lights. Using an odd number of lights on each side will place lights along the centerline of the approach. Locate flush lights within 1 foot (30 cm) inside or outside of the FATO perimeter. Mount raised light fixtures frangibly, no more than 8 inches (20 cm) high, and locate them 10 feet (3 m) out from the FATO perimeter. Make sure they do not penetrate a horizontal plane at the FATO elevation by more than 2 inches (5 cm). See Figure 3–21 and Figure 7–3.

**d. Elevated FATO – perimeter lights.** Lighting for an elevated FATO is the same as for a ground level FATO. As an option, locate lights at the outside edge of the safety net, as shown in Figure 3–23. Make sure the raised lights do not penetrate a horizontal plane at the FATO elevation by more than 2 inches (5 cm). See Figure 7–3.

**e. Floodlights.** Use floodlights to illuminate the parking apron. If possible, mount these floodlights on adjacent buildings to eliminate the need for tall poles. Take care, however, to place floodlights clear of the TLOF, the FATO, the safety area, and the approach/departure surfaces and transitional surfaces and ensure the floodlights and their associated hardware do not constitute an obstruction hazard. Aim floodlights down to provide illumination on the apron surface. Make sure floodlights that might interfere with pilot vision during takeoff and landings are capable of being turned off by pilot control or at pilot request.

**f. Landing direction lights.** As an option when it is necessary to provide directional guidance, install landing direction lights. Landing direction lights are a configuration of five green omnidirectional lights meeting the standards of EB 87 on the centerline of the preferred approach/departure path. Space these lights at 15-foot (4.6 m) intervals beginning at a point not less than 30 feet (9 m) and not more than 60 feet (18 m) from the TLOF perimeter and extending outward in the direction of the preferred approach/departure path, as illustrated in Figure 3–24.

**g. Flight path alignment lights.** As an option, install flight path alignment lights meeting the requirements of EB 87. Place them in a straight line along the direction of approach and/or departure flight paths, extending as necessary across the TLOF, FATO, safety area or any suitable surface in the immediate vicinity of the FATO or safety area. Install three or more green lights spaced at 5 feet (1.5 m) to 10 feet (3.0 m). See Figure 3–9.

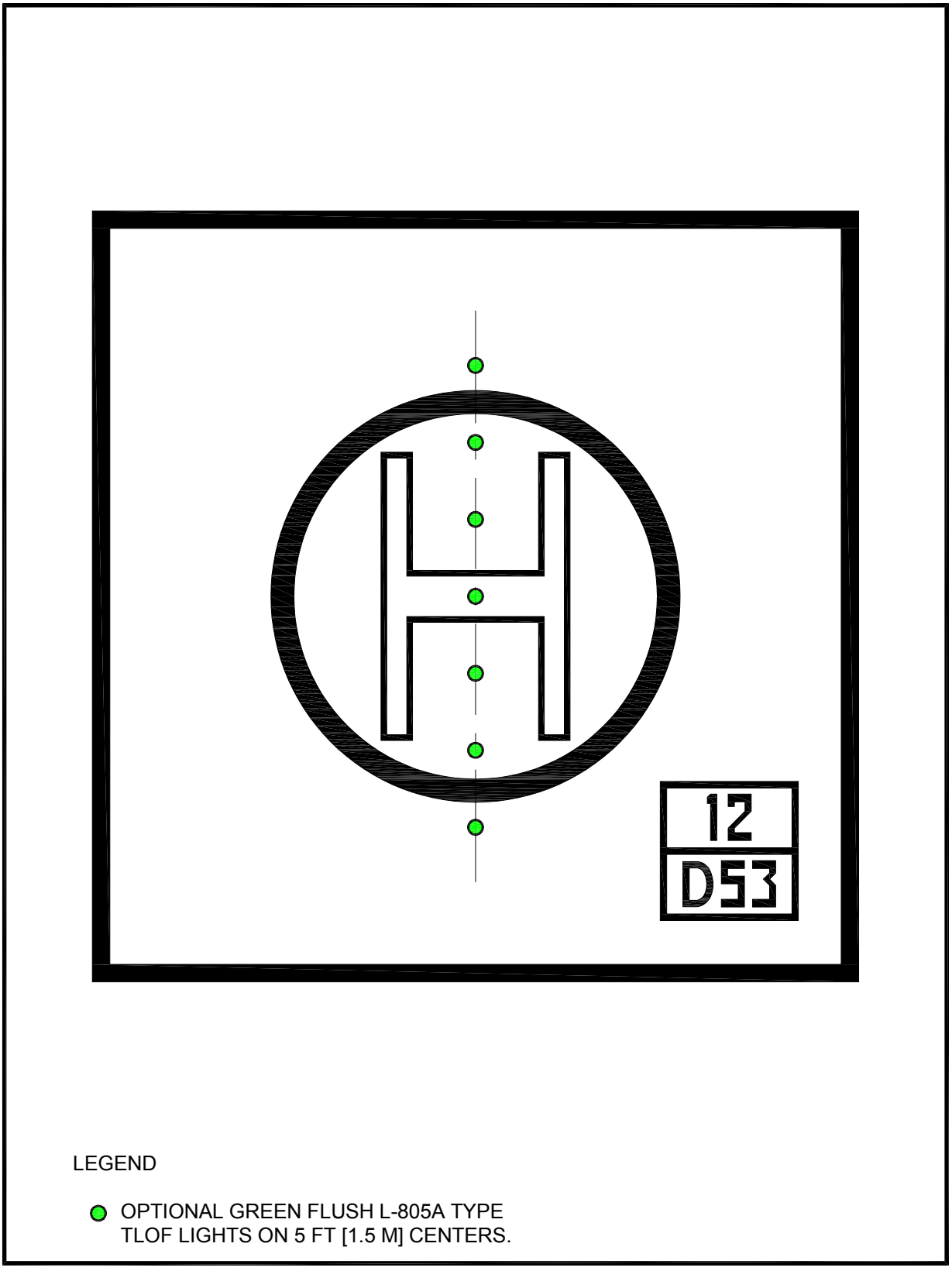



**Figure 3–22. Optional TLOF Lights: Transport**

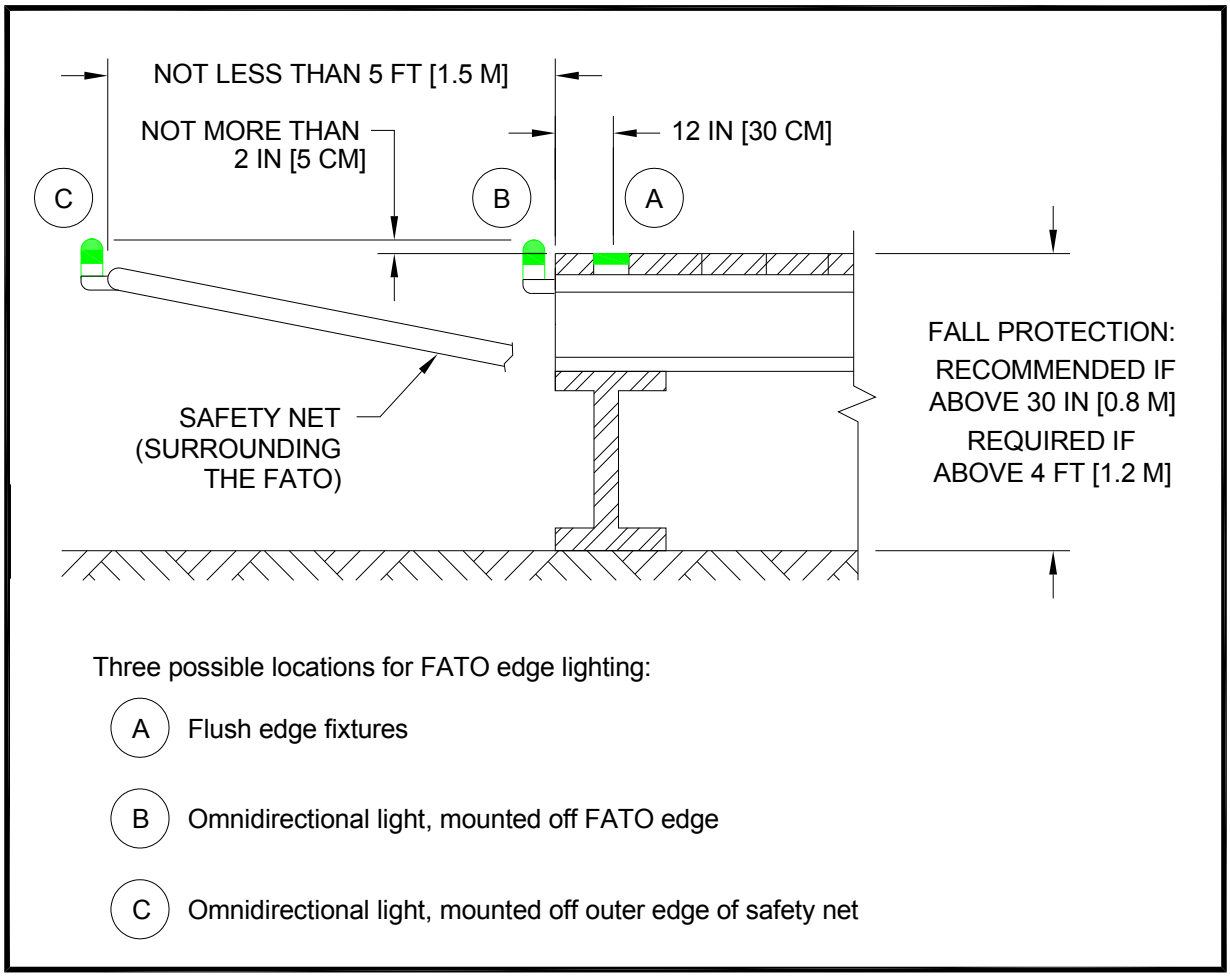



**Figure 3–23. Elevated FATO – Perimeter Lighting: Transport**

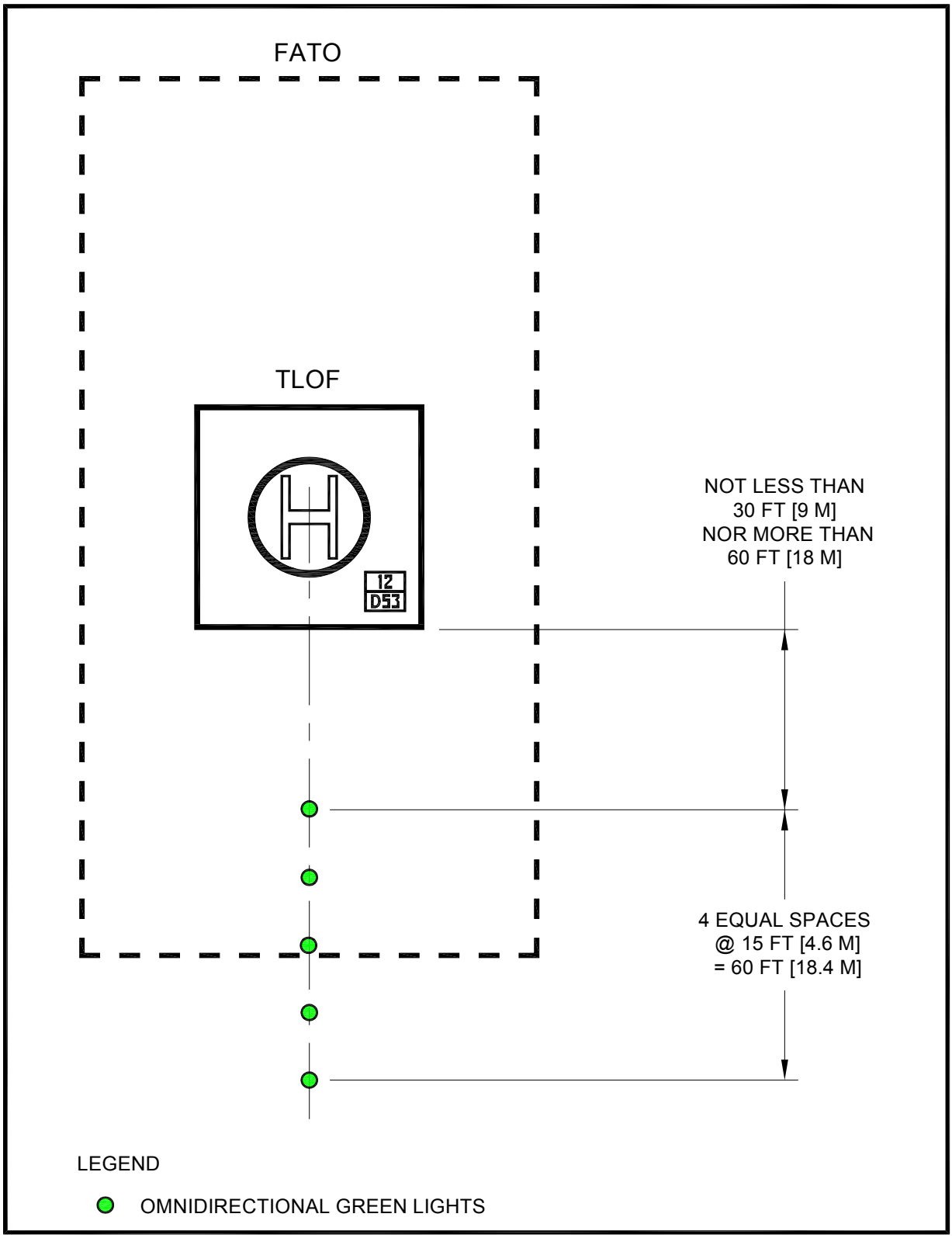



**Figure 3–24. Landing Direction Lights: Transport**

**h. Taxiway and taxi route lighting.**

**(1)** Taxiway centerline lights. Define taxiway centerlines with flush bidirectional green lights meeting the standards of AC 150/5345-46, Specification for Runway and Taxiway Light Fixtures, for type L-852A (straight segments) or L-852B (curved segments). Space these lights at maximum 50-foot (15 m) longitudinal intervals on straight segments and at maximum 25-foot (7.6 m) intervals on curved segments, with a minimum of four lights needed to define the curve. As an option, uniformly offset taxiway centerline lights no more than two feet (0.6 m) to ease painting the taxiway centerline. Do not use retroreflective markers.

**(2)** Taxiway edge lights. Use flush omnidirectional blue lights meeting the standards of AC 150/5345-46 for type L-852T to mark the edges of a taxiway. Do not use retroreflective markers.

**(a)** Straight segments. Space lights at 50-foot (15.2 m) longitudinal intervals on straight segments.

**(b)** Curved segments. Curved taxiway edges require shorter spacing of edge lights. Base the spacing on the radius of the curve. AC 150/5340-30, Design and Installation Detail for Airport Visual Aids shows the applicable spacing for curves. Space taxiway edge lights uniformly. On curved edges of more than 30 degrees from point of tangency (PT) of the taxiway section to PT of the intersecting surface, install have at least three edge lights. For radii not listed in AC 150/5340-30, determine spacing by linear interpolation.

**i. Heliport identification beacon.** Install a heliport identification beacon. Locate the beacon, flashing white/green/yellow at the rate of 30 to 45 flashes per minute, on or close to the heliport. Find guidance on heliport beacons in AC 150/5345-12, Specification for Airport and Heliport Beacon.

**316. Marking and lighting of difficult-to-see objects.** It is difficult for a pilot to see unmarked wires, antennas, poles, cell towers, and similar objects, even in the best daylight weather, in time to take evasive action. While pilots can avoid such objects during en route operations by flying well above them, approaches and departures require operations near the ground where obstacles may be a factor. This paragraph discusses the marking and lighting of objects near, but outside and below the approach/departure surface. Find guidance on marking and lighting objects in AC 70/7460-1, Obstruction Marking and Lighting.

**a. Airspace.** If difficult-to-see objects penetrate the object identification surfaces illustrated in Figure 3–25 and Figure 3–26, mark these objects to make them more conspicuous. If a heliport supports operations between dusk and dawn, light these difficult-to-see objects. The object identification surfaces in Figure 3–25 and Figure 3–26 are described as follows:

**(1)** In all directions from the safety area except under the approach/departure paths, the object identification surface starts at the safety area perimeter and extends out horizontally for a distance of 100 feet (30.5 m).

**(2)** Under the approach/departure surface, the object identification surface starts from the outside edge of the FATO and extends horizontally out along the approach path for a distance of 800 feet (244 m). From this point, the object identification surface extends out for an additional distance of 3,200 feet (975 m) along the approach path while rising on an 8:1 slope (8 units horizontal in 1 unit vertical). From the point 800 feet (244 m) from the FATO perimeter, the object identification surface is 100 feet (30.5 m) beneath the approach/departure surface.

**(3)** The width of this object identification surface under the approach/departure surface increases as a function of distance from the safety area. From the safety area perimeter, the object identification surface extends laterally to a point 100 feet (30.5 m) outside the safety area perimeter. At the upper end of the surface, the object identification surface extends laterally 200 feet (61 m) on either side of the approach/departure path.

**b. Shielding of objects.** Title 14 CFR Part 77.9, Construction or alteration requiring notice, provides that if there are a number of objects close together, it may not be necessary to mark all of them if they are shielded. To meet the shielding guidelines part 77 requires that an object "be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in the congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation."

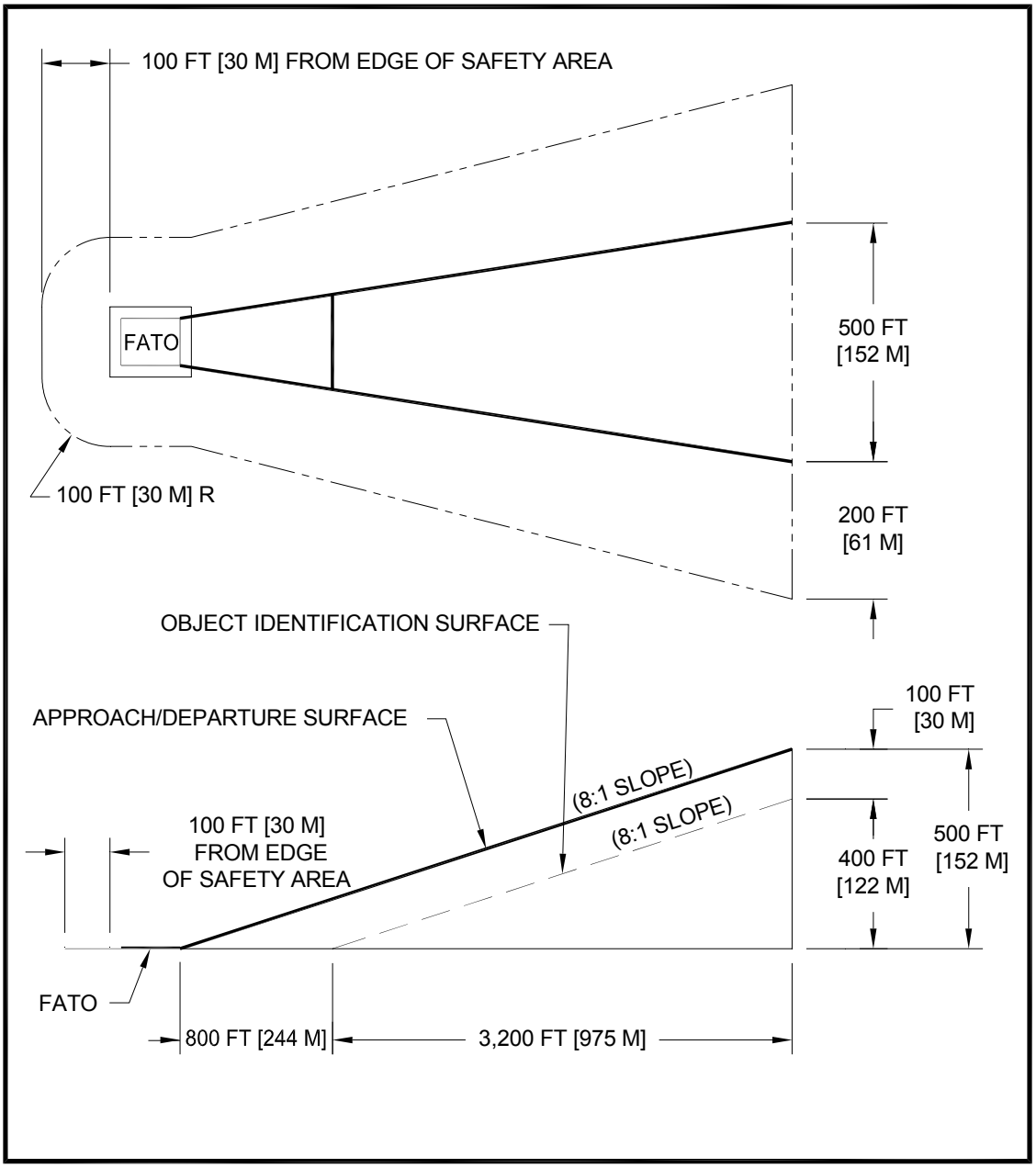



**Figure 3–25. Airspace Where Marking and Lighting are Recommended: Straight Approach: Transport**

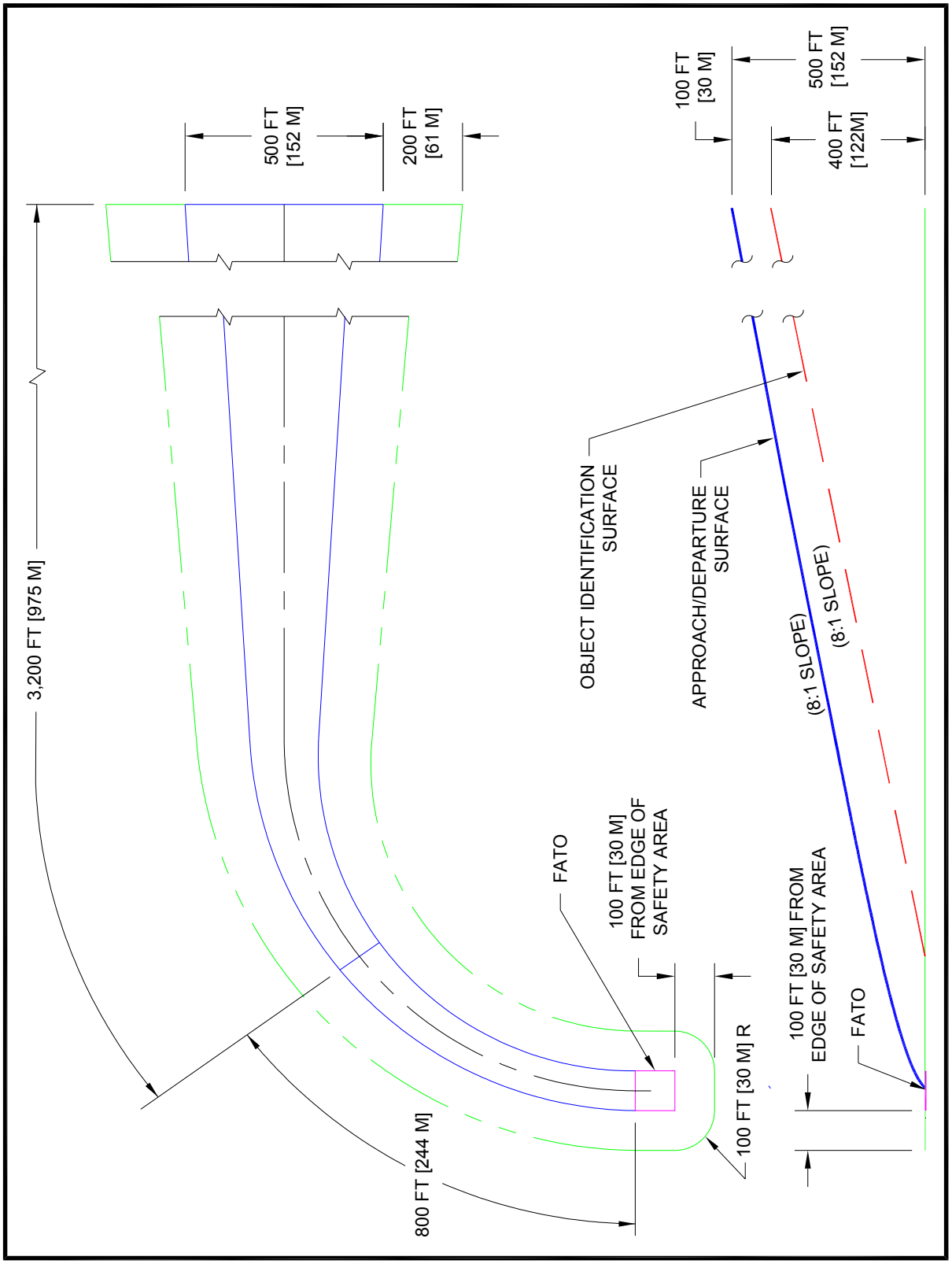



**Figure 3–26. Airspace Where Marking and Lighting are Recommended: Curved Approach: Transport**

**c. Equipment/object marking.** Make heliport maintenance and servicing equipment, as well as other objects used in the airside operational areas, conspicuous with paint, reflective paint, reflective tape, or other reflective markings. Reference AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport.

**317. Safety considerations.** Consider the safety enhancements discussed below in the design of a heliport. Address other areas, such as the effects of rotor downwash, based on site conditions and the design helicopter.

**a. Security.** Provide a means to keep the operational areas of a heliport clear of people, animals, and vehicles. Use a method to control access depending upon the helicopter location and types of potential intruders.

**(1)** Safety barrier. At ground-level transport heliports, erect a safety barrier around the helicopter operational areas in the form of a fence or a wall. Construct the barrier no closer to the operation areas than the outer perimeter of the safety area. Make sure the barrier does not penetrate any approach/departure (primary or transitional) surface. If necessary in the vicinity of the approach/departure paths, install the barrier well outside the outer perimeter of the safety area.

**(2)** Make sure any barrier is high enough to present a positive barrier to persons inadvertently entering an operational area and yet low enough to be non-hazardous to helicopter operations.

**(3)** Control access to airside areas with locked gates and doors. Display a cautionary sign similar to that illustrated in Figure 3–27 on gates and doors.

**b. Rescue and fire-fighting services.** Heliports are subject to state and local rescue and fire-fighting regulations. Provide a fire hose cabinet or extinguisher at each access gate and each fueling location. At elevated TLOF/FATOs, locate fire hose cabinets, fire extinguishers, and other fire-fighting equipment adjacent to, but below the level, of the TLOF/FATO. Find additional information in various NFPA publications. For more reference material, see Appendix D.

**c. Communications.** Use a Common Traffic Advisory Frequency (CTAF) radio to provide arriving helicopters with heliport and traffic advisory information but do not use this radio to control air traffic. Contact the Federal Communications Commission (FCC) for information on CTAF licensing.

**d. Weather information.** An automated weather observing system (AWOS) measures and automatically broadcasts current weather conditions at the heliport site. When installing an AWOS, locate it at least 100 feet (30 m) and not more than 700 feet (213 m) from the TLOF and such that its instruments will not be affected by rotor wash from helicopter operations. Find guidance on AWOS systems in AC 150/5220-16, Automated Weather Observing Systems (AWOS) for Non-Federal Applications, and FAA Order 6560.20, Siting Criteria for Automated Weather Observing Systems (AWOS). Other weather observing systems will have different siting criteria.

**e. Winter operations.** Swirling snow raised by a helicopter's rotor wash can cause the pilot to lose sight of the intended landing point and/or hide objects that need to be avoided.. Design the heliport to accommodate the methods and equipment to be used for snow removal. Design the heliport to allow the snow to be removed sufficiently so it will not present an obstruction hazard to either the tail rotor or the main rotor. Find guidance on winter operations in AC 150/5200-30, Airport Winter Safety and Operations.




**Figure 3–27. Caution Sign: Transport**

**318. Visual glideslope indicators (VGSI).** A visual glideslope indicator (VGSI) provides pilots with visual vertical course and descent cues. Install the VGSI such that the lowest on-course visual signal provides a minimum of 1 degree of clearance over any object that lies within 10 degrees of the approach course centerline.

**a. Siting.** The optimum location of a VGSI is on the extended centerline of the approach path at a distance that brings the helicopter to a hover with the undercarriage between 3 and 8 feet (0.9 to 2.4 m) above the TLOF. Figure 3–28 illustrates VGSI clearance criteria. To properly locate the VGSI, estimate the vertical distance from the undercarriage to the pilot's eye.

**b. Control of the VGSI.** As an option, allow the VGSI to be pilot controllable such that it is "on" only when needed.

**c. VGSI needed.** A VGSI is an optional feature. However, provide a VGSI if one or more of the following conditions exist, especially at night:

**(1)** Obstacle clearance, noise abatement, or traffic control procedures require a particular slope to be flown.

**(2)** The environment of the heliport provides few visual surface cues.

**d. Additional guidance.** AC 150/5345-52, Generic Visual Glideslope Indicators (GVGI), and AC 150/5345-28, Precision Approach Path Indicator (PAPI) Systems, provide additional guidance.

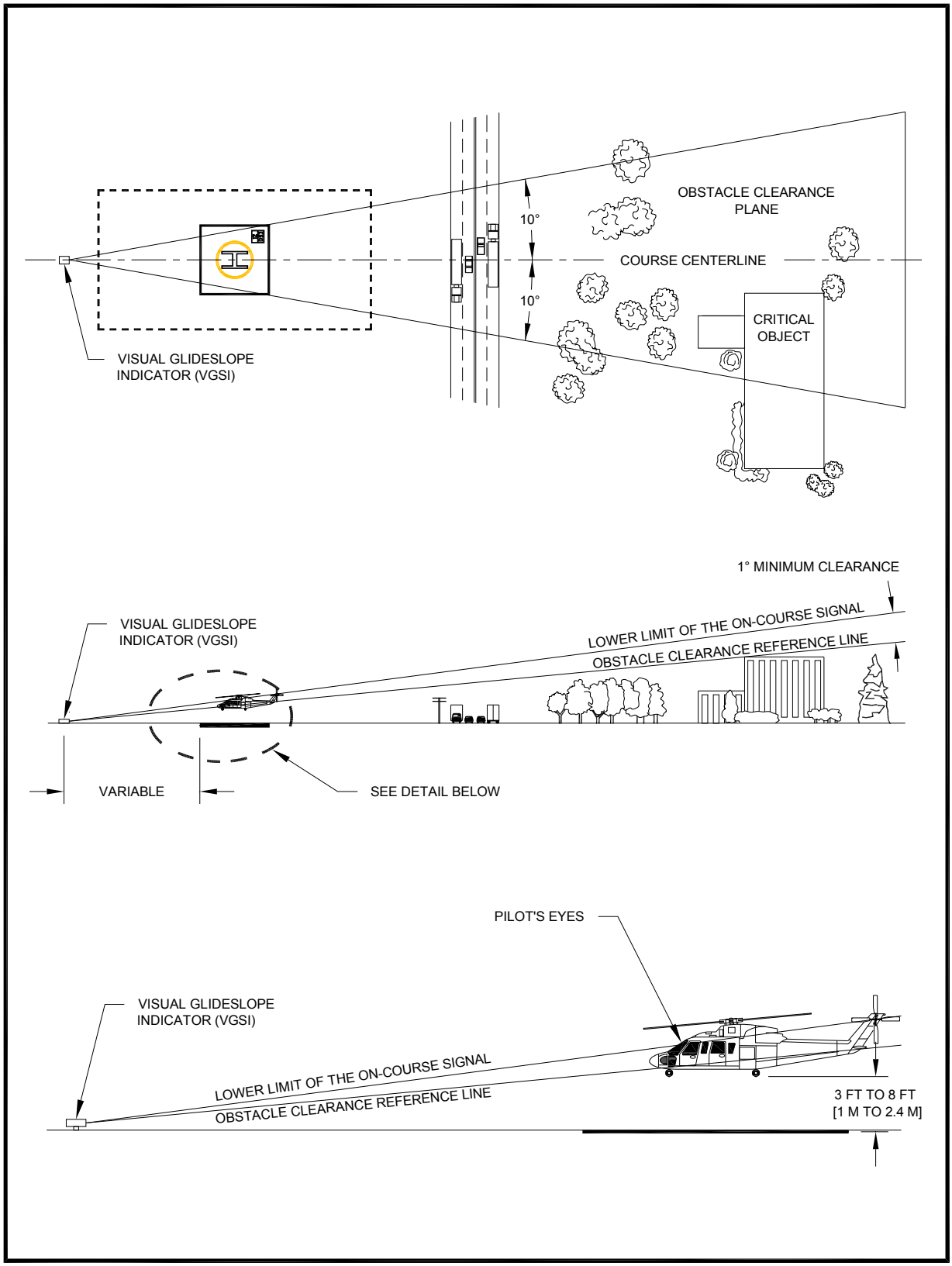



**Figure 3–28. Visual Glideslope Indicator Siting and Clearance Criteria: Transport**

**319. Terminal facilities.**

**a. Design considerations.** A heliport terminal provides curbside access for passengers using private autos, taxicabs, and public transit vehicles. Public waiting areas need the usual amenities, and a counter for rental car services may be desirable. Design passenger auto parking areas to accommodate current requirements, with the ability to expand them to meet future requirements. Readily available public transportation may reduce the requirement for employee and service personnel auto parking spaces. Build attractive and functional heliport terminal buildings or sheltered waiting areas. Find guidance on designing terminal facilities in AC 150/5360-9, Planning and Design of Airport Terminal Building Facilities at Non-Hub Locations.

**b. Security**. Unless screening was carried out at the helicopter passengers' departure location, Transportation Security Administration regulations may require that a screening area and/or screening be provided before passengers enter the airport's secured areas. If needed, provide multiple helicopter parking positions and/or locations in the terminal area to service helicopter passenger and/or cargo interconnecting needs. Find information about passenger screening at the Transportation Security Administration web site (http://www.tsa.gov/public/).

**320. Zoning and compatible land use.** Where state and local statutes permit, the FAA encourages transport heliport operators to promote the adoption of the following zoning measures to ensure the heliport will continue to be available for public use and to protect the community's investment in the facility.

**a. Zoning to limit building/object heights.** Find general guidance on drafting an ordinance that would limit building and object heights in AC 150/5190-4, A Model Zoning Ordinance to Limit Height of Objects Around Airports. Substitute the heliport surfaces for the airport surfaces described in the model ordinance.

**b. Zoning for compatible land use.** The FAA encourages public agencies to enact zoning ordinances to control the use of property within the HPZ and the approach/departure path environment, restricting activities to those that are compatible with helicopter operations. See paragraph 310.

**c. Air rights and property easements.** Use air rights and property easements as options to prevent the encroachment of obstacles in the vicinity of a heliport.

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# Chapter 4. Hospital Heliports

**401. General.** Helicopters are often used to transport injured persons from the scene of an accident to a hospital and to transfer patients from one hospital to another. A hospital heliport accommodates helicopters used by Emergency Medical Services. In some emergencies, a hospital heliport may accommodate large military helicopters.

**402. Applicability.** The standards in this chapter apply to projects funded under the Airport Improvement Program (AIP) or Passenger Facility Charge (PFC) program. For other projects/heliports, these standards are the FAA's recommendations for designing all hospital heliports. This chapter highlights issues that are unique to hospital heliports and issues for which the design standards are different than those recommended for other general aviation heliports, but also includes standards that are common to other general aviation heliports. These standards address the design of a heliport that will accommodate air ambulance helicopter operations and emergency medical service (EMS) personnel and equipment. These standards are based on the understanding that pilots landing at the heliport are familiar with the facility. However, the heliport operator assumes the responsibility of ensuring the necessary information is readily available to pilots. Alternately, the heliport operator may choose to build the heliport to full general aviation standards. The design standards in this chapter assume there will never be more than one helicopter within the final approach and takeoff area (FATO) and the associated safety area. If there is a need for more than one touchdown and lift-off area (TLOF) at a heliport, locate each TLOF within its own FATO. Consider the feasibility of accommodating large military helicopters that might be used in an emergency.

**403. Access by individuals with disabilities.** Various laws require heliports operated by public entities and those receiving federal financial assistance to meet accessibility requirements. See paragraph 114.

**404. Heliport site selection.**

**a. Planning.** Public agencies and others planning to develop a hospital heliport are encouraged to select a site capable of supporting instrument operations, future expansion, and military helicopters that will be used in disaster relief efforts.

**b. Property requirements.** A functional hospital heliport may be as simple as a cleared area on the ground, together with a wind cone and a clear approach/departure path. Figure 4–1 illustrates the essential elements of a ground-level hospital heliport.

**c. Turbulence.** Air flowing around and over buildings, stands of trees, terrain irregularities, etc. can create turbulence on ground-level and roof-top heliports that may affect helicopter operations. Where the FATO is located near the edge and top of a building or structure, or within the influence of turbulent wakes from other buildings or structures, assess the turbulence and airflow characteristics in the vicinity of, and across the surface of the FATO to determine if an air-gap between the roof, roof parapet or supporting structure, and/or some other turbulence mitigating design measure is necessary. FAA Technical Report FAA/RD-84/25, Evaluating Wind Flow Around Buildings on Heliport Placement, addresses the wind's effect on helicopter operations. Take the following actions in selecting a site to minimize the effects of turbulence.

**(1) Ground-level heliports.** Features such buildings, trees, and other large objects can cause air turbulence and affect helicopter operations from sites immediately adjacent to them. Therefore, locate the landing and takeoff area away from such objects in order to minimize air turbulence in the vicinity of the FATO and the approach/departure paths.

**(2) Elevated heliports.** Establishing a 6 foot (1.8 m) or more air gap on all sides above the level of the roof will generally minimize the turbulent effect of air flowing over the roof edge. If an air gap is included in the design, keep it free at all times of objects that would obstruct the airflow. If it is not practical to include an air gap or some other turbulence mitigating design measure where there is turbulence, operational limitations may need to be considered under certain wind conditions. See paragraph 101.

**d. Electromagnetic effects.** Nearby electromagnetic devices, such as a magnetic resonance imaging machine (MRI), large ventilator motor, elevator motor, or other large electrical consumer may cause temporary aberrations in the helicopter magnetic compass and interfere with other onboard navigational equipment. Be alert to the location of any MRI with respect to the heliport location. A warning sign alerting pilots to the presence of an MRI is recommended. Take steps to inform pilots of the locations of MRIs and other similar equipment. For additional information, see FAA Technical Report FAA/RD-92/15, Potential Hazards of Magnetic Resonance Imagers to Emergency Medical Service Helicopter Services.

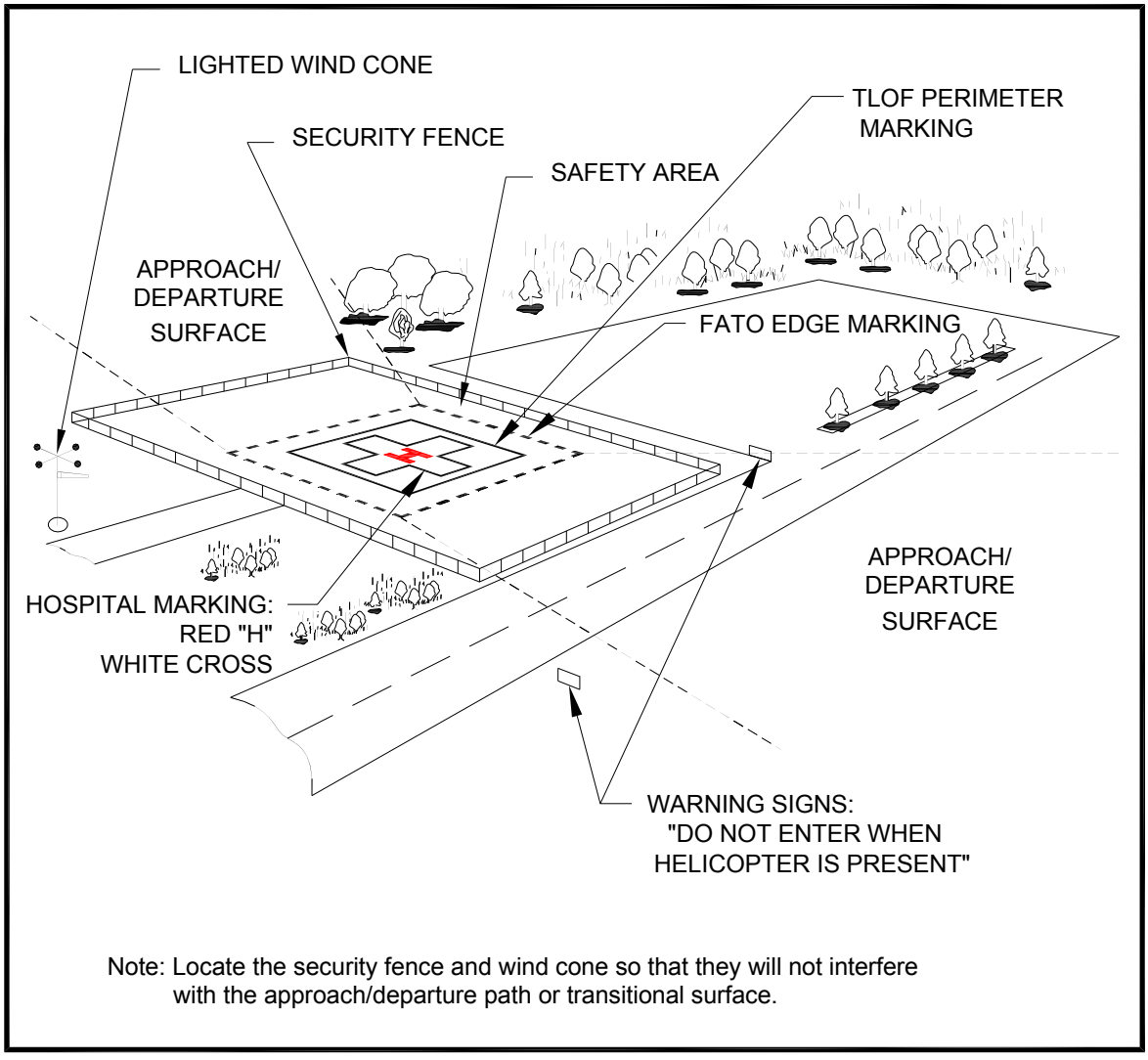
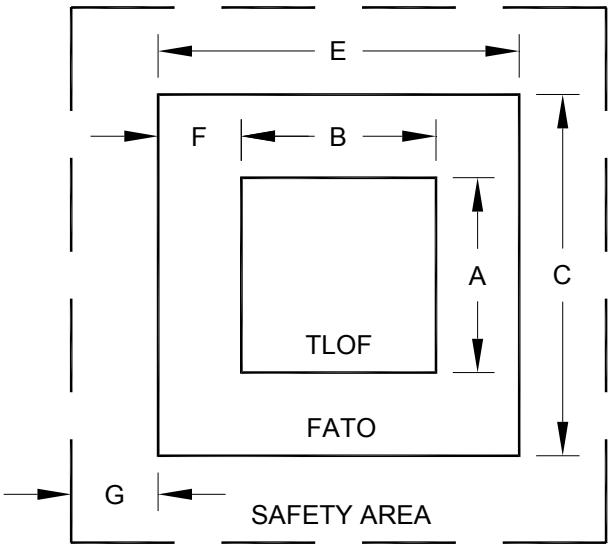



**Figure 4–1. Essential Features of a Ground-level Hospital Heliport: Hospital**




| DIM | ITEM | VALUE | NOTES |
|---|---|---|---|
| A | Minimum TLOF Length | 1 RD but not less than 40 ft [12 m] | |
| B | Minimum TLOF Width | 1 RD but not less than 40 ft [12 m] | |
| C | Minimum FATO Length | 1 ½ D | See Paragraph 406.b.(1) for adjustments of elevations above 1,000 ft |
| E | Minimum FATO Width | 1 ½ D | |
| F | Minimum Separation Between the Perimeters of the TLOF and FATO | ¾ D - ½ RD | |
| G | Minimum Safety Area Width | see Table 4-1 | |

Note: For a circular TLOF and FATO, dimensions A, B, C and E refer to diameters.

**Figure 4–2. TLOF/FATO Safety Area Relationships and Minimum Dimension: Hospital**

**405. Basic layout.** The heliport consists of a TLOF contained within a FATO. A safety area surrounds the FATO. The relationship of the TLOF to the FATO and the safety area is shown in Figure 4–2. A FATO contains only one TLOF. Provide appropriate approach/departure airspace to allow safe approaches to and departures from landing sites. To the extent feasible, align the preferred approach/departure path with the predominant winds. See paragraph 409.

**406. Touchdown and liftoff area (TLOF).**

**a. TLOF location.** TLOFs of hospital heliports are at ground level, on an elevated structure, or at rooftop level. Center the TLOF within the FATO.

**b. TLOF size.** The minimum TLOF dimension (length, width, or diameter) is equal to the rotor diameter (RD) of the design helicopter but not less than 40 feet (12 m). Design the TLOF to be rectangular or circular. Each design shape has its advantages. A square or rectangular shape provides the pilot with better alignment cues than a circular shape, but a circular TLOF may be more recognizable in an urban environment. Increasing the load-bearing area (LBA) centered on the TLOF may provide some safety and operational advantages. Increasing the TLOF dimensions may enhance safety factors and/or operational efficiency.

**(1) Elevated hospital heliport.** If the FATO outside the TLOF is non-load-bearing, increase the minimum width, length or diameter of the TLOF to the overall length (D) of the design helicopter.

**(2) Elongated TLOF.** An elongated TLOF can provide an increased safety margin and greater operational flexibility. As an option, design an elongated TLOF with a landing position in the center and two takeoff positions, one at either end, as illustrated in Figure 4–3. Design the landing position to have a minimum length of the RD of the design helicopter. If the TLOF is elongated, also provided an elongated FATO.

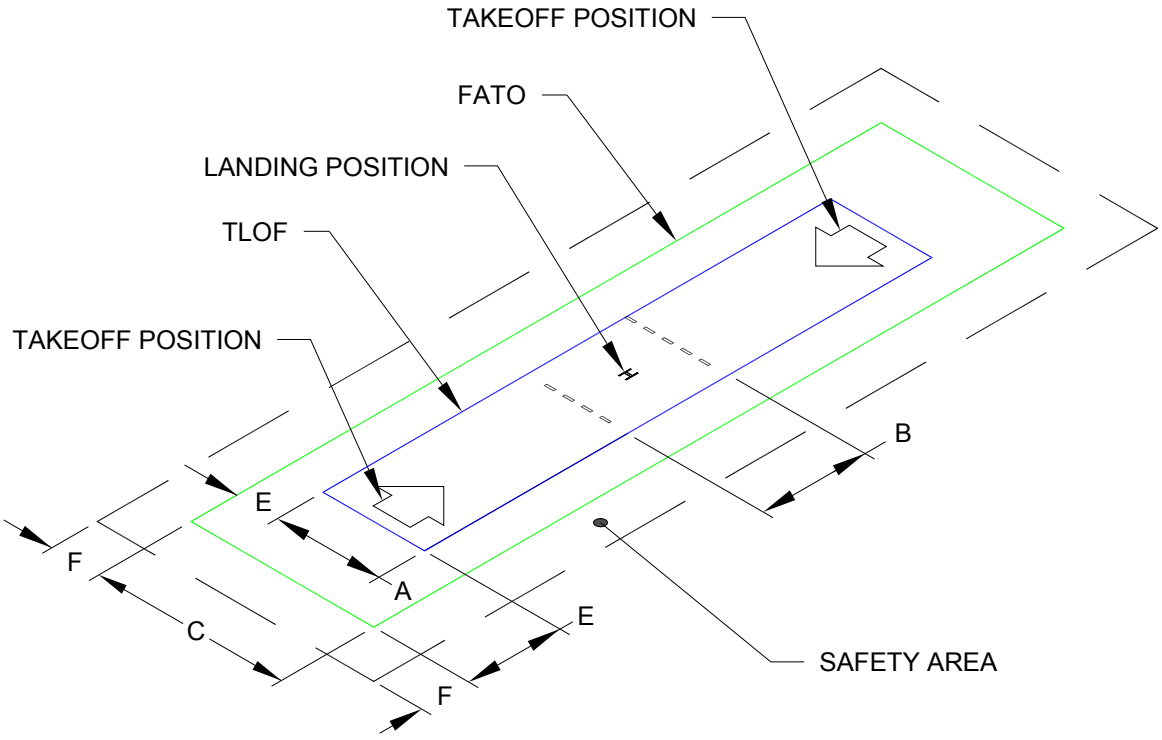
**c. Ground-level TLOF surface characteristics.**

**(1) Design loads.** Design the TLOF and any supporting TLOF structure to be capable of supporting the dynamic loads of the design helicopter.

**(2) Paving.** The standard for the TLOF surface is either paved or aggregate-turf (see AC 150/5370-10, Standards for Specifying Construction of Airports items P-217 and P-501). Use portland cement concrete (PCC) when feasible for ground-level facilities. An asphalt surface is less desirable for heliports as it may rut under the wheels or skids of a parked helicopter. This has been a factor in some rollover accidents. Use a broomed or roughened pavement finish to provide a skid-resistant surface for helicopters and non-slippery footing for people.

**d. Rooftop and other elevated TLOFs.**

**(1) Design loads.** Design elevated TLOFs and any TLOF supporting structure to be capable of supporting the dynamic loads of the design helicopter.




| DIM | ITEM | VALUE | NOTES |
|---|---|---|---|
| A | Minimum TLOF Width | 1 RD | but not less then 40 ft [12 m] |
| B | Minimum TLOF/Landing Position Length | 1 RD | but not less then 40 ft [12 m] |
| C | Minimum FATO Width | 1 ½ D | |
| E | Minimum Separation Between the Perimeters of the TLOF and FATO | ¾ D - ½ RD | |
| F | Minimum Safety Area Width | see Table 4-1 | |

Note: For a circular TLOF and FATO, dimensions A, B, C and E refer to diameters.

**Figure 4–3. Elongated FATO with Two Takeoff Positions: Hospital**

**(2) Elevation.** Elevate the TLOF above the level of any obstacle in the FATO and safety area that cannot be removed. Exception: Edge restraints of minimal height (no higher than 4 inches) on ramps may project above the elevation of the edge of the TLOF.

**(3) Obstructions.** Elevator penthouses, cooling towers, exhaust vents, fresh-air vents, and other raised features can affect heliport operations. Establish control mechanisms to ensure obstruction hazards are not installed after the heliport is operational.

**(4) Air Quality.** Helicopter exhaust can affect building air quality if the heliport is too close to fresh air vents. When designing a building intended to support a helipad, locate fresh air vents accordingly. When adding a helipad to an existing building, relocate fresh air vents if necessary or, if

relocation is not practical, installing charcoal filters or a fresh air intake bypass louver system for HVAC systems may be adequate.

**(5) TLOF surface characteristics.** Construct rooftop and other elevated heliport TLOFs of metal, concrete, or other materials subject to local building codes. Use a finish for TLOF surfaces that provides a skid-resistant surface for helicopters and non-slippery footing for people.

**(6) Safety net.** If the platform is elevated 4 feet (1.2 m) or more above its surroundings, Title 29 CFR Part 1910.23, Guarding Floor and Wall Openings and Holes, requires the provision of fall protection. The FAA recommends such protection for all platforms elevated 30 inches (76 cm) or more. However, do not use permanent railings or fences since they would be safety hazards during helicopter operations. As an option, install a safety net, meeting state and local regulations but not less than 5 feet (1.5 m) wide. Design the safety net to have a load carrying capability of 25 lbs/sq ft (122 kg/sq m). Make sure the net, as illustrated in Figure 4–29, does not project above the level of the TLOF. Fasten both the inside and outside edges of the safety net to a solid structure. Construct nets of materials that are resistant to environmental effects.

**(7) Access to elevated TLOFs.** Title 29 CFR Part 1926.34, Means of Egress requires two separate access points for an elevated structure such as an elevated TLOF. Provide access to and from the TLOF via a ramp in order to provide for quick and easy transportation of a patient on a gurney. Build ramps in accordance with state and local requirements. Design the width of the ramp, and any turns in the ramp, to be wide enough to accommodate a gurney with a person walking on each side. Design straight segments of the ramp to be at least 6 feet (1.8 m) wide. Additional width may be required in the turns. Provide the ramp with a slip-resistant surface, with a slope no steeper than 12:1 (12 units horizontal in 1 unit vertical). While it is possible to move a gurney to and from the TLOF using a lift, avoid this, since it invariably results in a delay in the movement of patients in time-critical conditions. Design stairs in compliance with Title 29 CFR Part 1910.24, Fixed Industrial Stairs. Design handrails required by this standard to fold down or be removable to below the level of the TLOF so they will not be hazards during helicopter operations.

**e. TLOF gradients.** Recommended TLOF gradients are defined in Chapter 7.

**407. Final approach and takeoff area (FATO).** A hospital heliport has at least one FATO. The FATO contains a TLOF within its borders at which arriving helicopters terminate their approach and from which departing helicopters take off.

**a. FATO location.** FATOs of hospital heliports are at ground level, on an elevated structure, or on a rooftop. To avoid or minimize the need for additional ground transport, locate the FATO to provide ready access to the hospital's emergency room, but such that buildings and other objects are outside the safety area and below obstacle clearance surfaces. The relationship of the FATO to the TLOF and the safety area is shown in Figure 4–2.

**b. FATO size.**

**(1)** Design the FATO so its minimum width, length, or diameter is 1½ times the overall length (D) of the design helicopter. Design the FATO to be circular or rectangular, regardless of the shape of the TLOF. At elevations above 1,000 feet MSL, include a longer FATO to provide an increased safety margin and greater operational flexibility. Use the additional FATO length as depicted in Figure 4–4.

**(2)** Design the minimum distance between the TLOF perimeter and the FATO perimeter to be not less than ¾ D – ½ RD, where D is the overall length and RD is the rotor diameter of the design helicopter. Note that if the TLOF and FATO are not of similar shape, this applies at all points of the TLOF perimeter. The relationship of the TLOF to the FATO and the safety area is shown in Figure 4–2.

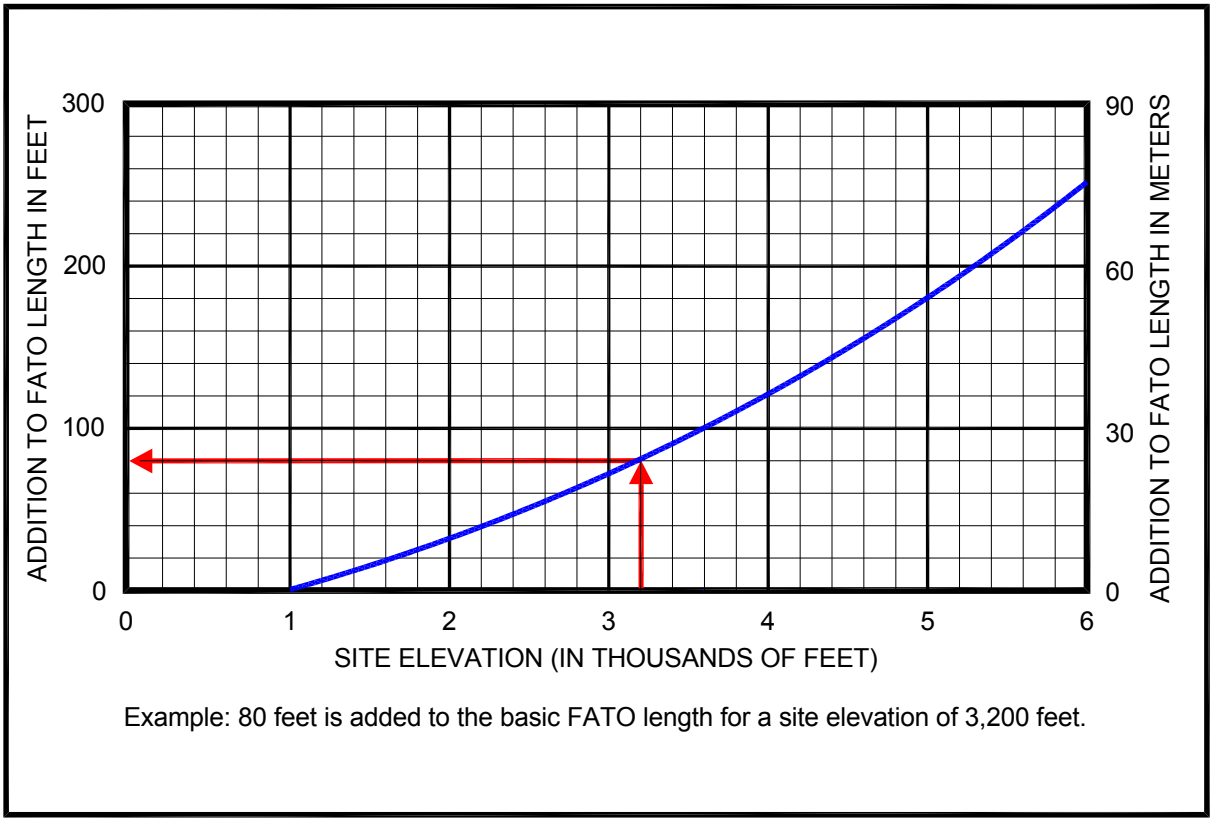



**Figure 4–4. Additional FATO Length for Heliports at Higher Elevation: Hospital**

**c. FATO Surface characteristics.** If the heliport operator marks the TLOF, the FATO outside the TLOF need not be load-bearing.

**(1) Ground-level hospital heliports.** If the heliport operator does not mark the TLOF, and/or intends that the helicopter be able to land anywhere within the FATO, design the FATO outside the TLOF and any FATO supporting structure, like the TLOF, to be capable of supporting the dynamic loads of the design helicopter.

**(2) Elevated hospital heliports.** The FATO outside the TLOF may extend into clear airspace. However, there are some helicopter performance benefits and increased operational flexibility if the FATO outside the TLOF is load bearing. Design the FATO outside of the TLOF to be load-bearing unless the minimum width and length or diameter of TLOF is increased to the overall length of the design helicopter.

**(3)** If the FATO is load bearing, design the portion abutting the TLOF to be contiguous with the TLOF, with the adjoining edges at the same elevation.

**(4)** If the FATO is unpaved, treat the FATO to prevent loose stones and any other flying debris caused by rotor downwash.

**(5)** When the FATO or the LBA in which it is located is elevated 4 feet (1.2 m) or more above its surroundings, part 1910.23 requires the provision of fall protection. The FAA recommends such protection for all platforms elevated 30 inches (76 cm) or more. However, do not use permanent railings or fences, since they would be safety hazards during helicopter operations. As an option, install a safety net, meeting state and local regulations but not less than 5 feet (1.5 m) wide. Design the safety net to have a load carrying capability of 25 lbs/sq ft (122 kg/sq m). Make sure the net, as illustrated in Figure 4–29,

does not project above the level of the TLOF. Fasten both the inside and outside edges of the safety net to a solid structure. Construct nets of materials that are resistant to environmental effects.

**d. Mobile objects within the FATO.** The FATO design standards in this AC assume the FATO is closed to other aircraft if a helicopter or other mobile object is within the FATO or the associated safety area.

**e. Fixed objects within the FATO.** Remove all fixed objects projecting above the FATO elevation except for lighting fixtures, which may project a maximum of 2 inches (5 cm). See Figure 7–3. For ground level heliports, remove all above-ground objects to the extent practicable.

**f. FATO/FATO separation.** If a heliport has more than one FATO, separate the perimeters of the two FATOs so the respective safety areas do not overlap. This separation assumes simultaneous approach/departure operations will not take place. If the heliport operator intends for the facility to support simultaneous operations, provide a minimum 200 foot (61 m) separation.

**g. FATO gradients.** Recommended FATO gradients are defined in Chapter 7.

**408. Safety area.** A safety area surrounds a FATO.

**a. Safety area width.** The standards for the width of the safety area are shown in Table 4-1. The width is the same on all sides. The provision or absence of standard heliport markings affects the width standards. As an option, design the safety area to extend into clear airspace.

**b. Mobile objects within the safety area.** The safety area design standards of this AC assume the TLOF and FATO are closed to other aircraft if a helicopter or other mobile object is within the FATO or the safety area.

**c. Fixed objects within a safety area.** Remove all fixed objects within a safety area projecting above the FATO elevation except for lighting fixtures, which may project a maximum of 2 inches (5 cm). See Figure 7–3. For ground level heliports, remove all above-ground objects to the extent practicable.

**d. Safety area surface.** The safety area need not be load bearing. Figure 4–5 depicts a non-load-bearing safety area. If possible, design the portion of the safety area abutting the FATO to be contiguous with the FATO with the adjoining edges at the same elevation. This is needed in order to avoid the risk of catching a helicopter skid or wheel. Clear the safety area of flammable materials and treat the area to prevent loose stones and any other flying debris caused by rotor wash.

**e. Safety gradients.** Recommended safety area gradients are defined in Chapter 7.

**Table 4-1. Minimum VFR Safety Area Width as a Function of Hospital Heliport Markings**

| | | | | |
|---|---|---|---|---|
| **TLOF Perimeter Marked** | Yes | Yes | No | No |
| **FATO Perimeter Marked** | Yes | Yes | Yes | Yes |
| **Standard Hospital Marking Symbol** | Yes | No | Yes | No |
| **Hospital heliports** | ⅓ RD but not less than 10 ft (3 m)** | ⅓ RD but not less than 20 ft (6 m)** | ½ D but not less than 20 ft (6 m) | ½ D but not less than 30 ft (9 m) |

D: overall length of the design helicopter
RD: rotor diameter of the design helicopter
** Also applies when the heliport operator does not mark the FATO. Do not mark the FATO if (a) the FATO (or part of the FATO) is a non-load bearing surface and/or (b) the TLOF is elevated above the level of a surrounding load bearing area.

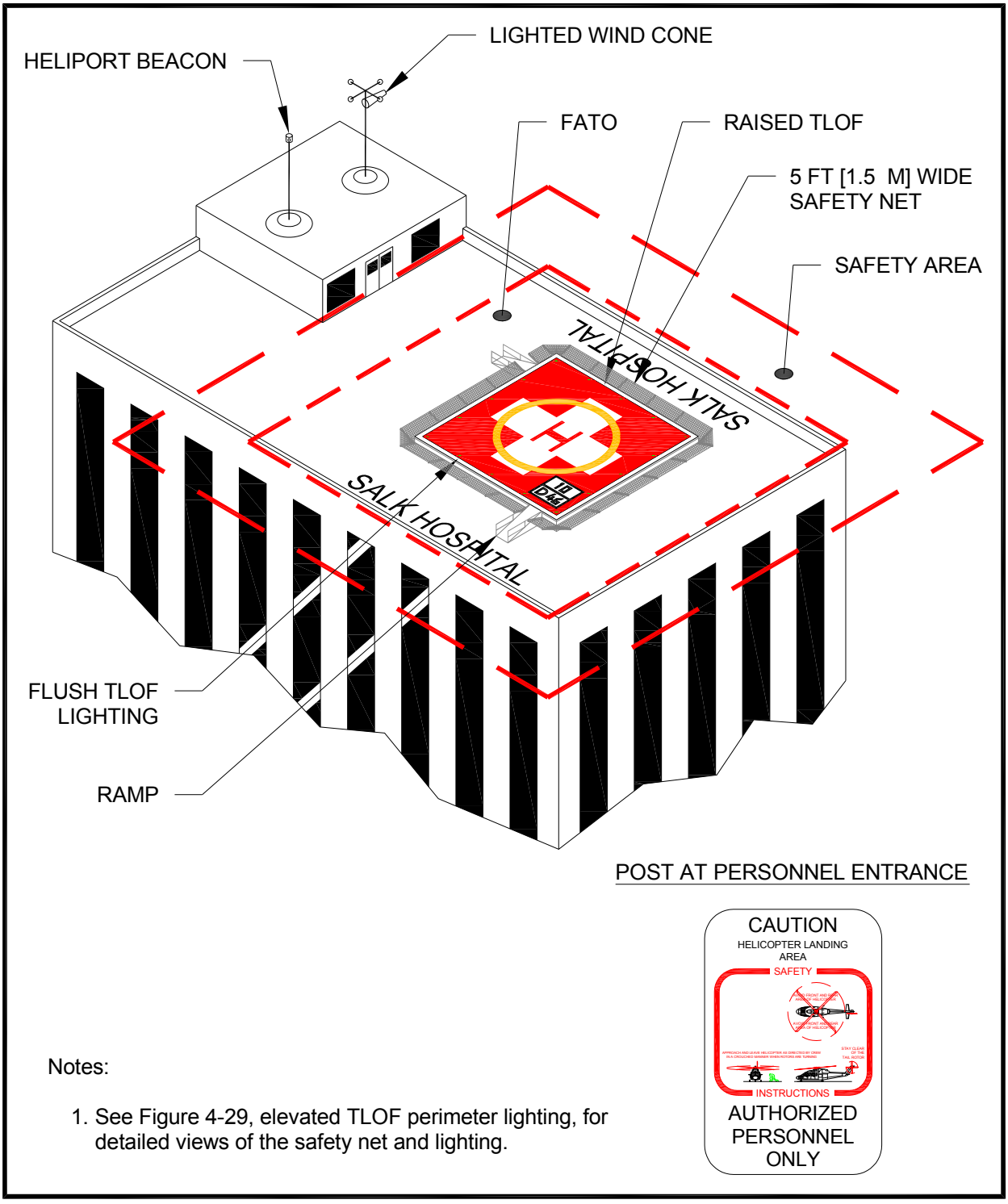



**Figure 4–5. Rooftop Hospital Heliport: Hospital**

**409. VFR approach/departure paths.** The purpose of approach/departure airspace as shown in Figure 4–6 is to provide sufficient airspace clear of hazards to allow safe approaches to and departures from the TLOF.

**a. Number of approach/departure paths.** Align preferred approach/departure paths with the predominant wind direction so downwind operations are avoided and crosswind operations are kept to a minimum. To accomplish this, design the heliport to have more than one approach/departure path. Base other approach/departure paths on the assessment of the prevailing winds or, when this information is not available, separate such flight paths and the preferred flight path by at least 135 degrees. (See Figure 4–6.) Designing a hospital heliport to have only a single approach/departure path is an undesirable option. A second flight path provides additional safety margin and operational flexibility. If it is not feasible to provide complete coverage of wind through multiple approach/departure paths, operational limitations may be necessary under certain wind conditions. See paragraph 101.

**b. VFR approach/departure and transitional surfaces.** Figure 4–6 illustrates the approach/departure and transitional surfaces.

**(1)** An approach/departure surface is centered on each approach/departure path. The approach/departure path starts at the edge of the FATO and slopes upward at 8:1 (8 units horizontal in 1 unit vertical) for a distance of 4,000 feet (1,219 m) where the width is 500 feet (152 m) at a height of 500 feet (152 m) above the heliport elevation.

**(2)** The transitional surfaces start from the edges of the FATO parallel to the flight path center line, and from the outer edges of approach/departure surface, and extend outwards at a slope of 2:1 (2 units horizontal in 1 unit vertical) for a distance of 250 feet (76 m) from the centerline. The transitional surface is not applied on the FATO edge opposite the approach/departure surface. See Figure 4–6.

**(3)** Make sure the approach/departure and transitional surfaces are free of penetrations unless an FAA aeronautical study determines such penetrations not to be hazards. The FAA conducts such aeronautical studies only at public heliports; heliports operated by a federal agency or the Department of Defense; and private airports with FAA-approved approach procedures. Paragraph 111 provides additional information on hazards to air navigation.

**(4)** At hospital heliports, an alternative to considering transitional surfaces is to increase the size of the 8:1 approach/departure surface for a distance of 2,000 feet (610 m) as shown in Figure 2–9 and Figure 2–11. The lateral extensions on each side of the 8:1 approach/departure surface start at the width of the FATO and increase so at a distance of 2,000 feet (610 m) from the FATO they are 100 feet (30 m) wide. Make sure obstacles do not penetrate into both Area A and Area B. Make sure obstacles do not penetrate into Area A or Area B unless the FAA determines that the penetration is not a hazard. Mark or light all such penetrations. See paragraph 111 for more information on hazard determinations.

**c. Curved VFR approach/departure paths.** As an option, include one curve in VFR approach/departure paths. As an option, design these paths to use the airspace above public lands, such as freeways or rivers. When including a curved portion in the approach/departure path, make sure the sum of the radius of the arc defining the center line and the length of the straight portion originating at the FATO is not less than 1,886 feet (575 m). Design the approach/departure path so the minimum radius of the curve is 886 feet (270 m) and that the curve follows a 1,000 feet (305 m) straight section. Design the approach/departure path so the combined length of the center line of the curved portion and the straight portion is 4,000 feet (1,219 m). See Figure 4–7. Figure 4–9 shows a curved approach/departure path for an 8:1 approach/departure surface.

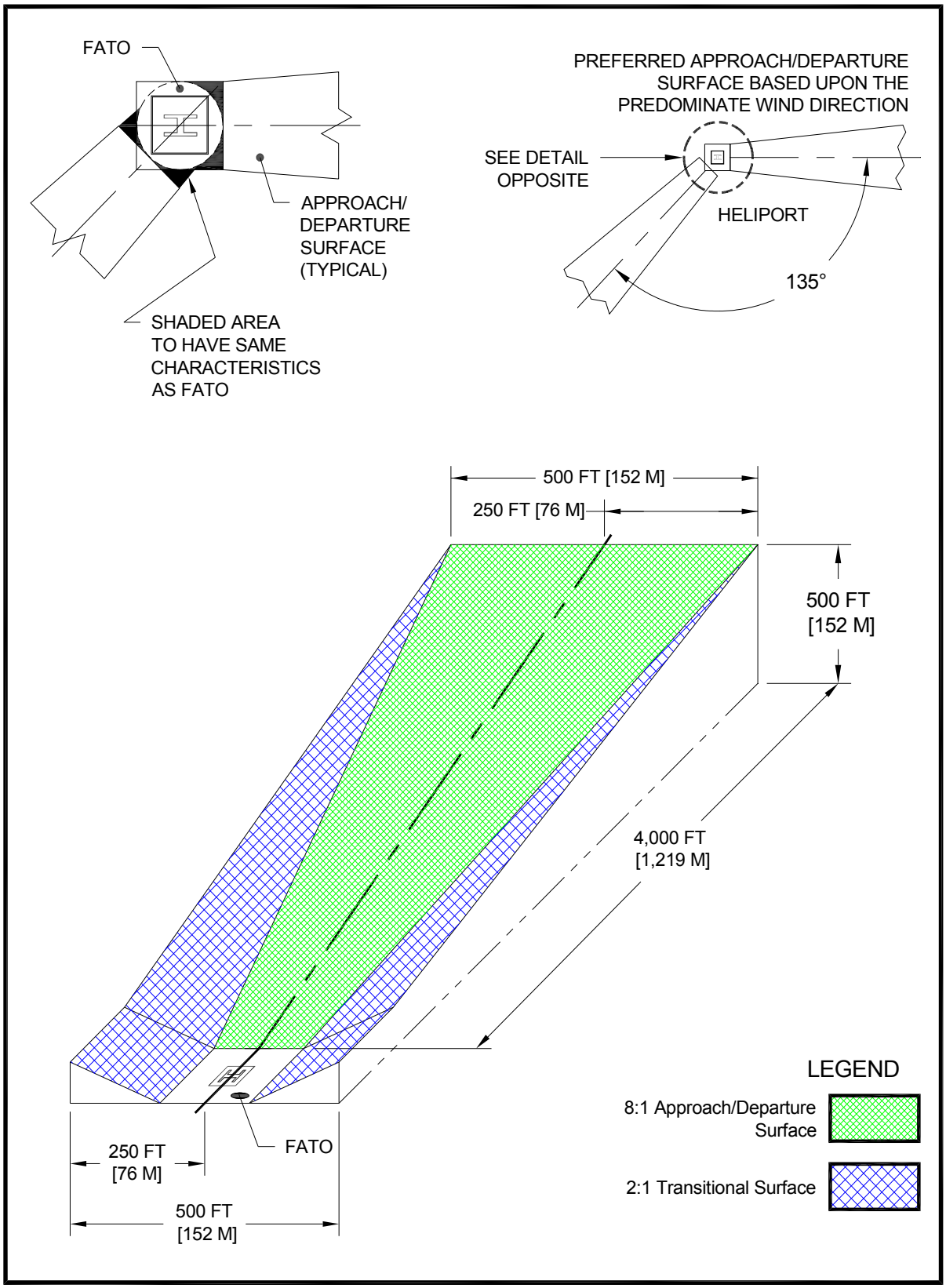
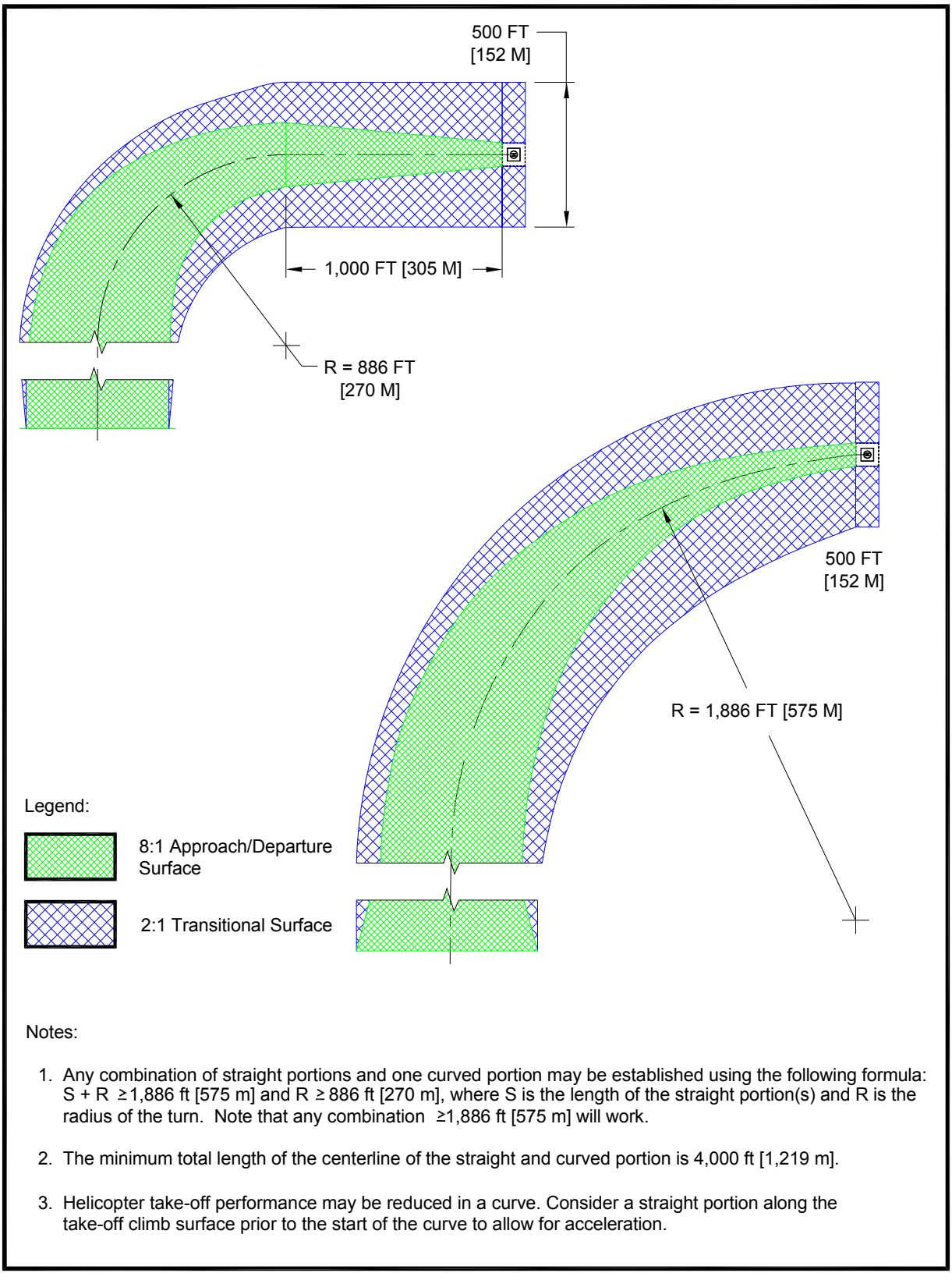



**Figure 4–6. VFR Heliport Approach/Departure and Transitional Surfaces: Hospital**




Notes:

1. Any combination of straight portions and one curved portion may be established using the following formula: S + R ≥1,886 ft [575 m] and R ≥ 886 ft [270 m], where S is the length of the straight portion(s) and R is the radius of the turn. Note that any combination ≥1,886 ft [575 m] will work.
2. The minimum total length of the centerline of the straight and curved portion is 4,000 ft [1,219 m].
3. Helicopter take-off performance may be reduced in a curve. Consider a straight portion along the take-off climb surface prior to the start of the curve to allow for acceleration.

**Figure 4–7. Curved Approach/Departure: Hospital**

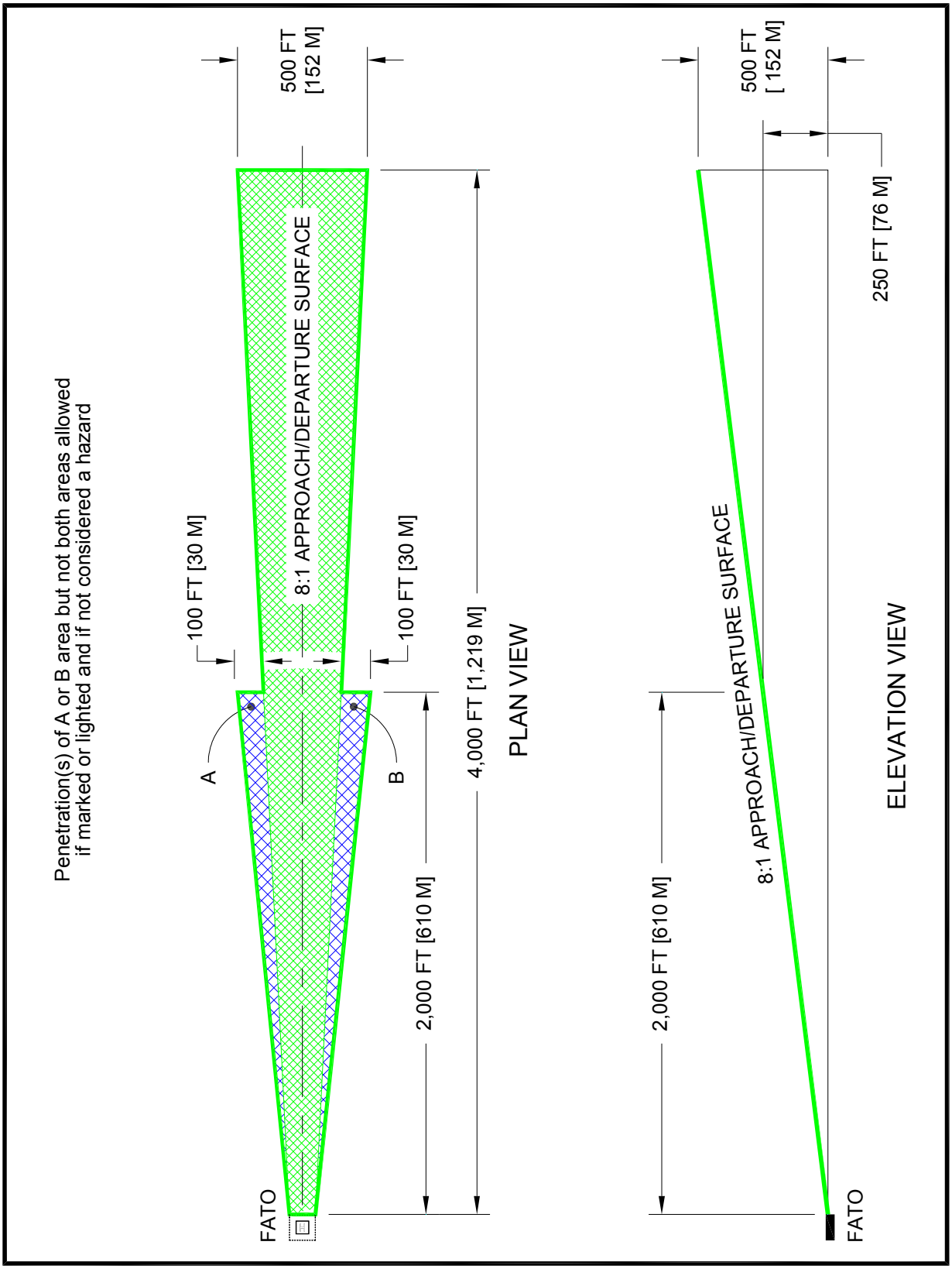
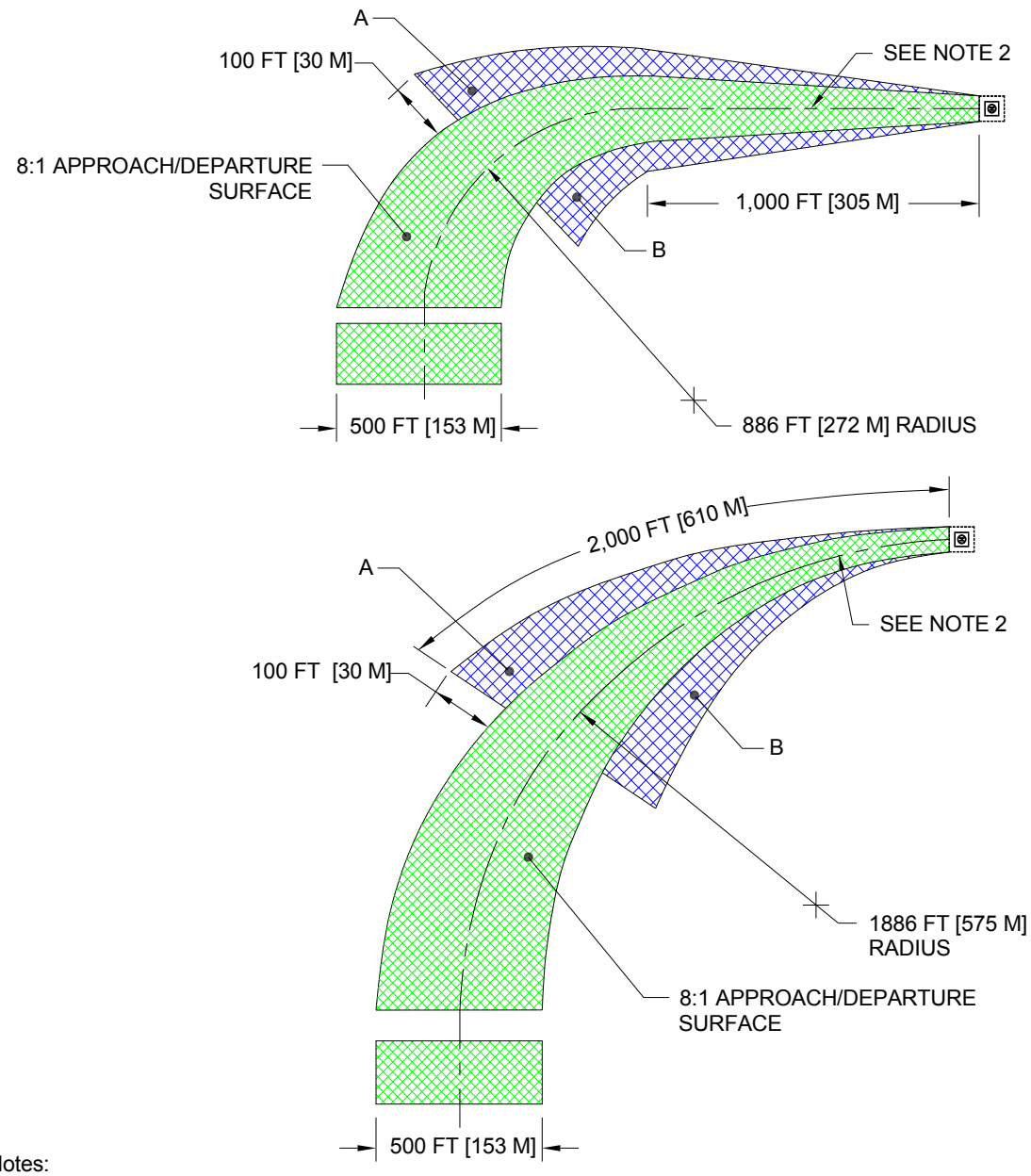



**Figure 4–8. VFR Heliport Lateral Extension of the 8:1 Approach / Departure Surface: Hospital**




Notes:

1. The approach surface may consist of one curved portion preceded and/or followed by one straight portion such that: S + R ≥ 1,886 ft [575 m] and R ≥ 886 ft [270 m], where S is the length of the straight portion(s) and R is the radius of the turn. Note that any combination ≥ 1,886 ft [575 m] will work.

2. The minimum total length of the centerline of the straight and curved portions is 4,000 ft [1,219 m].

3. Helicopter take-off performance may be reduced in a curve. Consider a straight portion along the take-off climb surface prior to the start of the curve to allow for acceleration.

4. Penetration(s) of A or B area but not both areas allowed if marked or lighted and if not considered a hazard.

**Figure 4–9. VFR Heliport Lateral Extension of the Curved 8:1 Approach/Departure Surface: Hospital**

**d. Flight path alignment guidance.** As an option, use flight path alignment markings and/or flight path alignment lights (see paragraphs 414 and 415) where it is desirable and practicable to indicate available approach and/or departure flight path direction(s). See Figure 4–10.

**e. Periodic review of obstructions.** Vigilant heliport operators reexamine obstacles in the vicinity of approach/departure paths on at least an annual basis. This reexamination includes an appraisal of the growth of trees near approach and departure paths. Paragraph 111 provides additional information on hazards to air navigation. Pay particular attention to obstacles that need to be marked or lighted. It may be helpful to maintain a list of the GPS coordinates and the peak elevation of obstacles.

**410. Heliport protection zone (HPZ)** The FAA recommends the establishment of an HPZ for each approach/departure surface. The HPZ is the area under the 8:1 approach/departure surface starting at the FATO perimeter and extending out for a distance of 280 feet (85.3 m), as illustrated in Figure 4–11. The HPZ is intended to enhance the protection of people and property on the ground. This is achieved through heliport owner control over the HPZ. Such control includes clearing HPZ areas (and maintaining them clear) of incompatible objects and activities. The FAA discourages residences and places of public assembly in an HPZ. (Churches, schools, hospitals, office buildings, shopping centers, and other uses with similar concentrations of persons typify places of public assembly.) Do not locate hazardous materials, including fuel, in the HPZ.

**411. Wind cone.**

**a. Specification.** Use a wind cone conforming to AC 150/5345-27, Specification for Wind Cone Assemblies, to show the direction and magnitude of the wind. Use a color that provides the best possible color contrast to its background.

**b. Wind cone location.** Locate the wind cone so it provides the pilot with valid wind direction and speed information in the vicinity of the heliport under all wind conditions.

**(1)** At many landing sites, there may be no single, ideal location for the wind cone. At other sites, it may not be possible to site a wind cone at the ideal location. In such cases, install more than one wind cone in order to provide the pilot with all the wind information needed for safe operations.

**(2)** Place the wind cone so a pilot on the approach path is able to see it clearly when the helicopter is 500 feet (150 m) from the TLOF.

**(3)** Place the wind cone so pilots can see it from the TLOF.

**(4)** To avoid presenting an obstruction hazard, locate the wind cone(s) outside the safety area, so it does not penetrate the approach/departure or transitional surfaces.

**c. Wind cone lighting.** For night operations, illuminate the wind cone, either internally or externally, to ensure it is clearly visible.

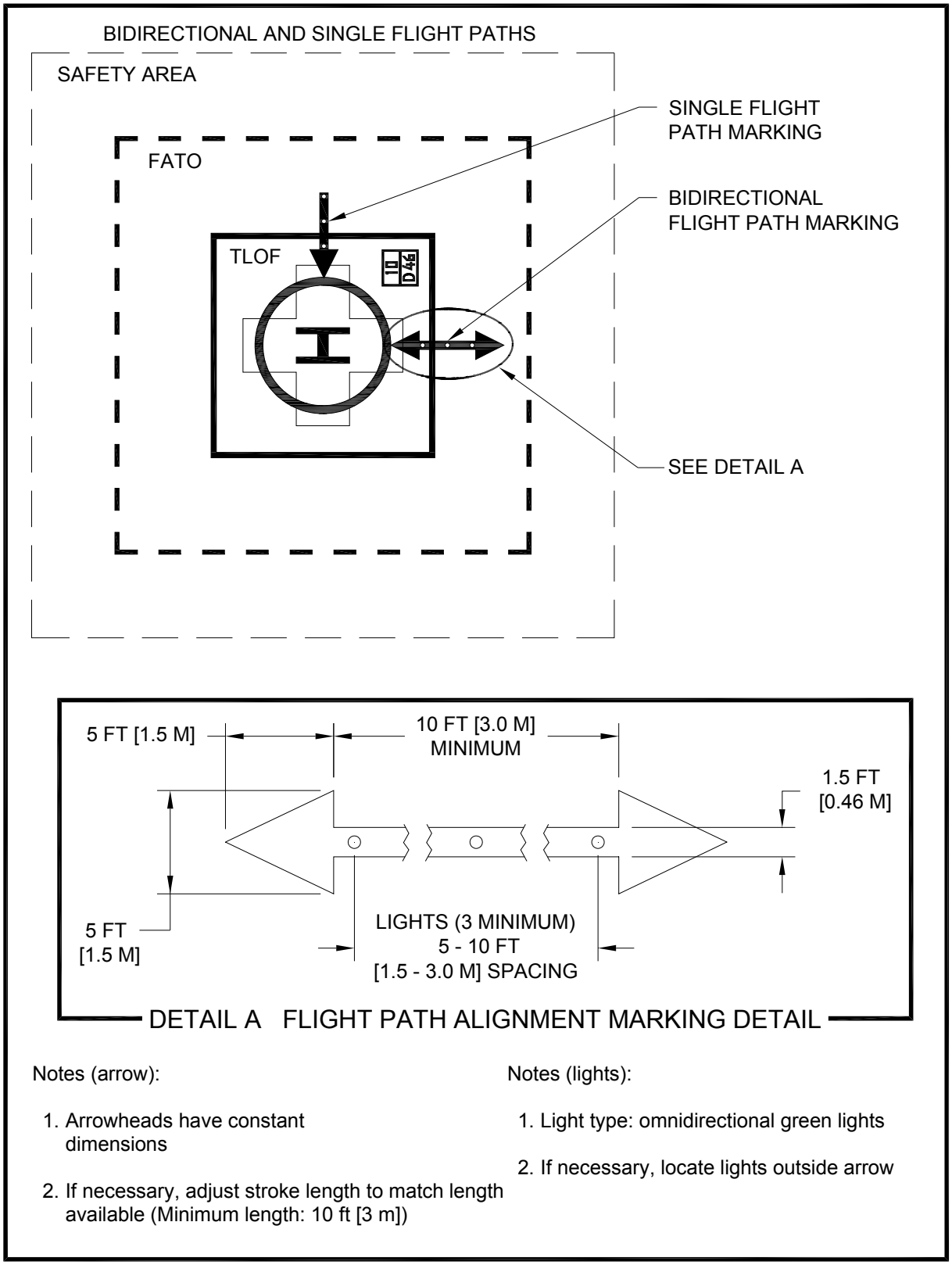



**Figure 4–10. Flight Path Alignment Marking and Lights: Hospital**

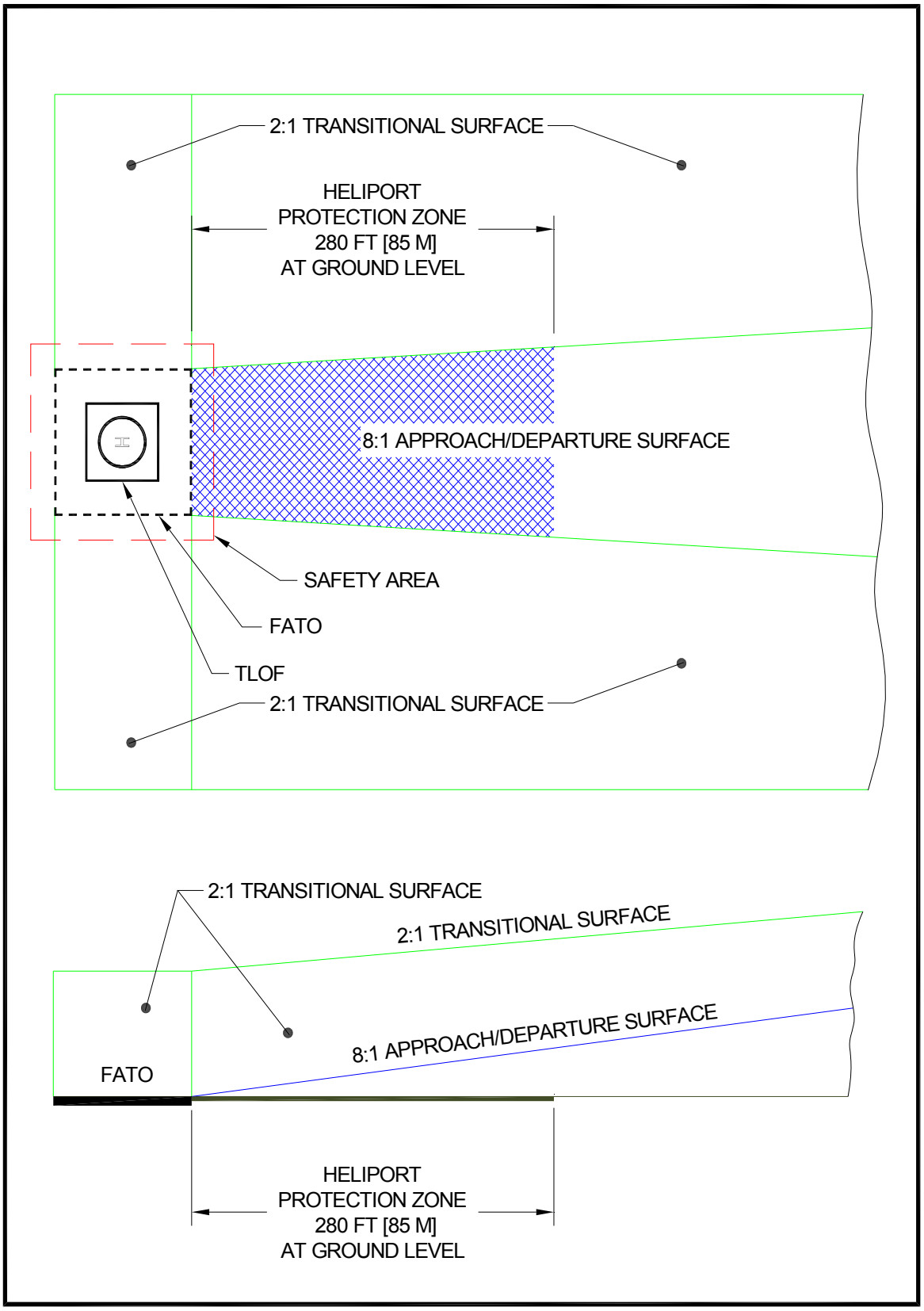



**Figure 4–11. Heliport Protection Zone: Hospital**

**412. Taxiways and taxi routes.** Taxiways and taxi routes provide for the movement of helicopters from one part of a landing facility to another. They provide a connecting path between the FATO and a parking area. They also provide a maneuvering aisle within the parking area. A taxi route includes the taxiway plus the appropriate clearances needed on both sides. The relationship between a taxiway and a taxi route is illustrated in Figure 4–12, Figure 4–13, and Figure 4–14. At hospital heliports with no parking or refueling area outside the TLOF(s), it is not necessary to provide a taxi route or taxiway.

**a. Taxiway/taxi route widths.** The dimensions of taxiways and taxi routes are a function of helicopter size, taxiway/taxi route marking, and type of taxi operations (ground taxi versus hover taxi). These dimensions are defined in Table 4-2. Normally, the requirement for hover taxi dictates the taxiway/taxi route widths. However, when the fleet comprises a combination of large ground taxiing helicopters and smaller air taxiing helicopters, the larger aircraft may dictate the taxiway/taxi route widths. If wheel-equipped helicopters taxi with wheels not touching the surface, design the facility with hover taxiway widths rather than ground taxiway widths. Where the visibility of the centerline marking cannot be guaranteed at all times, such as locations where snow or dust commonly obscure the centerline marking and it is not practical to remove it, determine the minimum taxiway/taxi route dimensions as if there was no centerline marking.

**b. Surfaces.** For ground taxiways, provide a surface that is portland cement concrete, asphalt, or a surface, such as turf, stabilized in accordance with the standards of Item P-217 of AC 150/5370-10. For unpaved portions of taxiways and taxi routes, provide a turf cover or treat the surface in some way to prevent dirt and debris from being raised by a taxiing helicopter’s rotor wash.

**c. Gradients.** Taxiway and taxi route gradient standards are defined in Chapter 7.

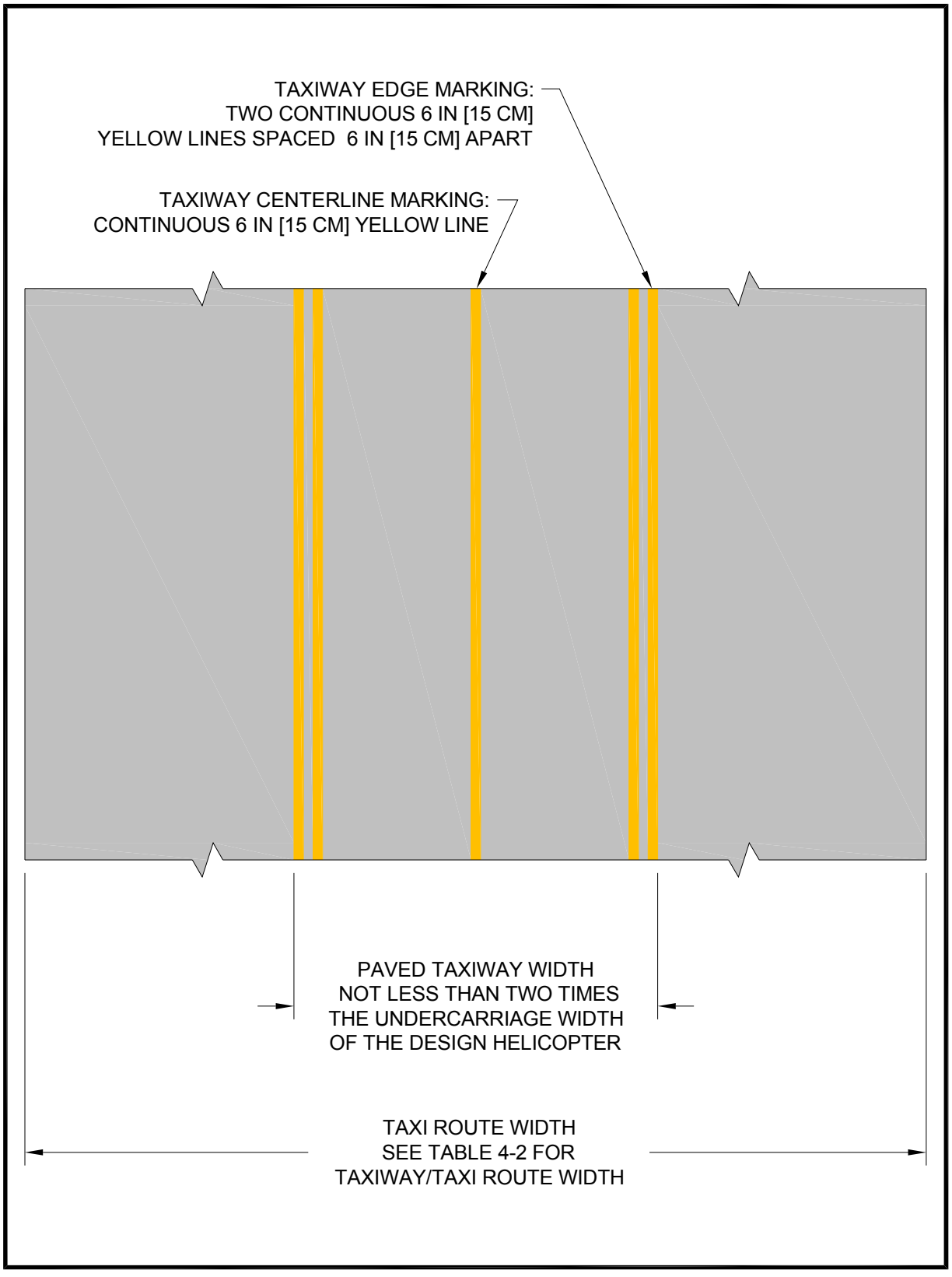



**Figure 4–12. Taxiway/Taxi Route Relationship – Paved Taxiway: Hospital**

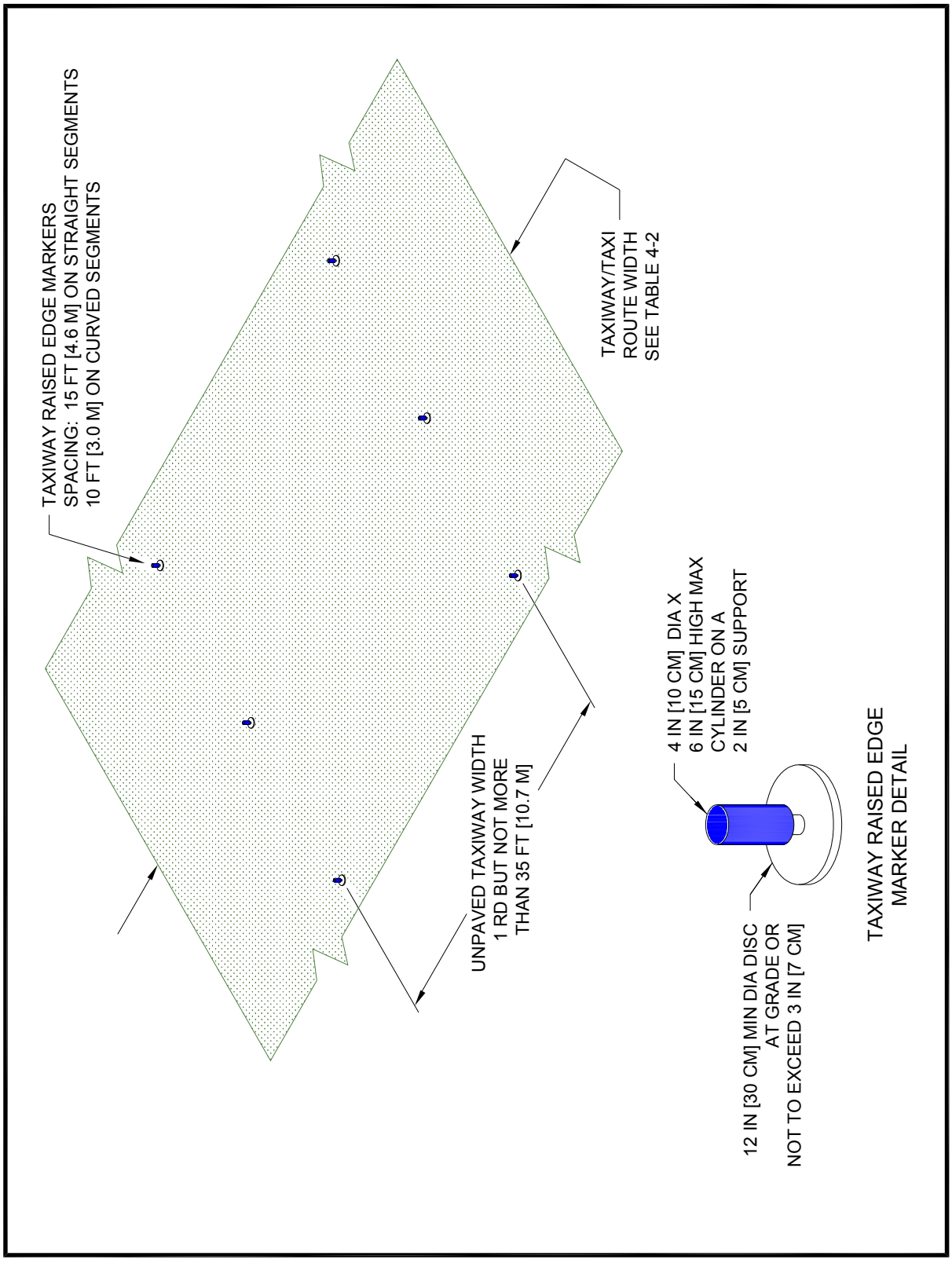



**Figure 4–13. Taxiway/Taxi Route Relationship –**
**Unpaved Taxiway with Raised Edge Markers: Hospital**

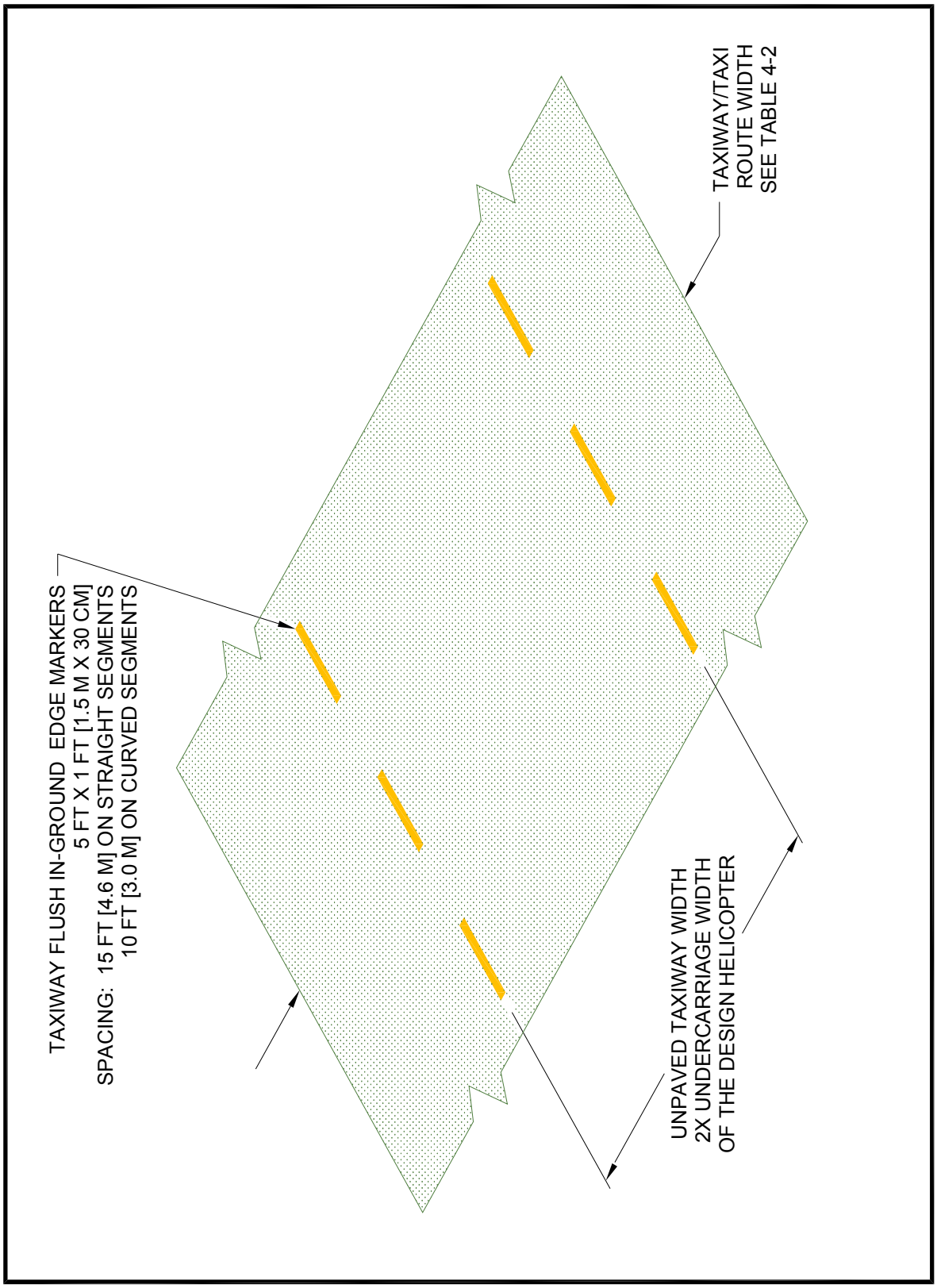



**Figure 4–14. Taxiway/Route Relationship –**
**Unpaved Taxiway with Flush Edge Markers: Hospital**

**Table 4-2. Taxiway / Taxi Route Dimensions – Hospital Heliports**

| Taxiway (TW) Type | Minimum Width of Paved Area | Centerline Marking Type | TW Edge Marking Type | Lateral Separation Between TW Edge Markings | Total Taxi Route Width |
|---|---|---|---|---|---|
| Ground Taxiway | 2 x UC | Painted | Painted | 2 x UC | 1½ RD |
| | | | Elevated | 1 RD but not greater than 35 ft (10.7 m) | |
| | Unpaved but stabilized for ground taxi | None | Flush | 2 x UC | |
| | | | Elevated | 1 RD but not greater than 35 ft (10.7 m) | |
| Hover Taxiway | 2 x UC | Painted | Painted | 2 x UC | 2 RD |
| | Unpaved | None | Elevated or Flush | 1 RD but not greater than 35 ft (10.7 m) | |
| RD: rotor diameter of the design helicopter<br>TW: taxiway<br>UC: undercarriage length or width (whichever is greater) of the design helicopter | | | | | |

**413. Helicopter parking.** If more than one helicopter at a time is expected at a heliport, design the facility with an area designated for parking helicopters. The size of this area depends on the number and size of specific helicopters to be accommodated. It is not necessary that every parking position accommodate the design helicopter. Design individual parking positions to accommodate the helicopter size and weight expected to use the parking position at the facility. However, use the design helicopter to determine the separation between parking positions and taxi routes. Use the larger helicopter to determine the separation between parking positions intended for helicopters of different sizes. Design the parking positions to support the static loads of the helicopter intended to use the parking area. Design parking areas as one large, paved apron or as individual, paved parking positions. Ground taxi turns of wheeled helicopters are significantly larger than a hover turn. Consider the turn radius of helicopters when designing taxi intersections and parking positions for wheeled helicopters. Design heliport parking areas so helicopters will be parked in an orientation that keeps the "avoid areas" around the tail rotors (see Figure 4–18, Figure 4–19, and Figure 4–20) clear of passenger walkways.

**a. Location.** Do not locate aircraft parking areas under an approach/departure surface. However, as an option, allow aircraft parking areas under the transitional surfaces.

**(1)** For "turn around" parking positions, locate the parking position to provide a minimum distance between the tail rotor arc and any object, building, safety area, or other parking position. The minimum distance is 10 feet (3 m) for ground taxi operations and the greater of 10 feet (3 m) or $^1/_3$ RD for hover taxi operations. See Figure 4–15 and Figure 4–18.

**(2)** For "taxi-through" and "back-out" parking positions, locate the parking position to provide a minimum distance between the main rotor circle and any object, building, safety area, or other parking position. The minimum distance is 10 feet (3 m) for ground taxi operations and the greater of 10 feet (3 m) or $^1/_3$ RD for hover taxi operations. See Figure 4–15, Figure 4–17, and Figure 4–19.

**(3)** Locate the parking position to provide a minimum distance between the main rotor circle and the edge of any taxi route. Design parking positions such that the helicopter taxis through, turns around, or backs out to depart. The minimum distance is $^1/_3$ RD for "turn around" and "taxi through" parking areas, and ½ RD for "back-out" parking areas. See Figure 4–15, Figure 4–16, and Figure 4–17.

**b.** Parking position sizes are dependent upon the helicopter size. The clearance between parking positions are dependent upon the type of taxi operations (ground taxi or hover taxi) and the intended paths for maneuvering in and out of the parking position. The more demanding requirement will dictate what is required at a particular site. Usually, the parking area requirements for skid-equipped helicopters will be

the most demanding. However, when the largest helicopter is a very large, wheeled aircraft (for example, the S-61), and the skid-equipped helicopters are all much smaller, the parking requirements for wheeled helicopters may be the most demanding. If wheel-equipped helicopters taxi with wheels not touching the surface, design parking areas based on hover taxi operations rather than ground taxi operations.

**(1)** If all parking positions are the same size, design them to be large enough to accommodate the largest helicopter that will park at the heliport.

**(2)** When there is more than one parking position, as an option design the facility with parking positions of various sizes and at least one position to accommodate the largest helicopter that will park at the heliport. Design other parking positions to be smaller, designed for the size of the individual or range of individual helicopters parking at that position. Figure 4–20 also provides guidance on parking position identification, size, and weight limitations.

**(3)** "Taxi-through" parking positions are illustrated in Figure 4–15. When using this design for parking positions, the heliport owner and operator take steps to ensure all pilots are informed that "turn-around" or "back-up" departures from the parking position are not permitted.

**(4)** "Turn-around" parking positions are illustrated in Figure 4–17.

**(5)** "Back-out" parking positions are illustrated in Figure 4–17. When using this design for parking positions, design the adjacent taxiway to accommodate hover taxi operations so the width of the taxiway will be adequate to support "back-out" operations.

**c. Parking pads.** When partially paving a parking area, design the smallest dimension of the paved parking pad to be a minimum of two times the maximum dimension (length or width, whichever is greater) of the undercarriage or the RD, whichever is less, of the largest helicopter that will use this parking position. Place the parking pad in the center of the parking position circle**.**

**d. Walkways.** At parking positions, provide marked walkways where practicable. Design the pavement to drain away from walkways.

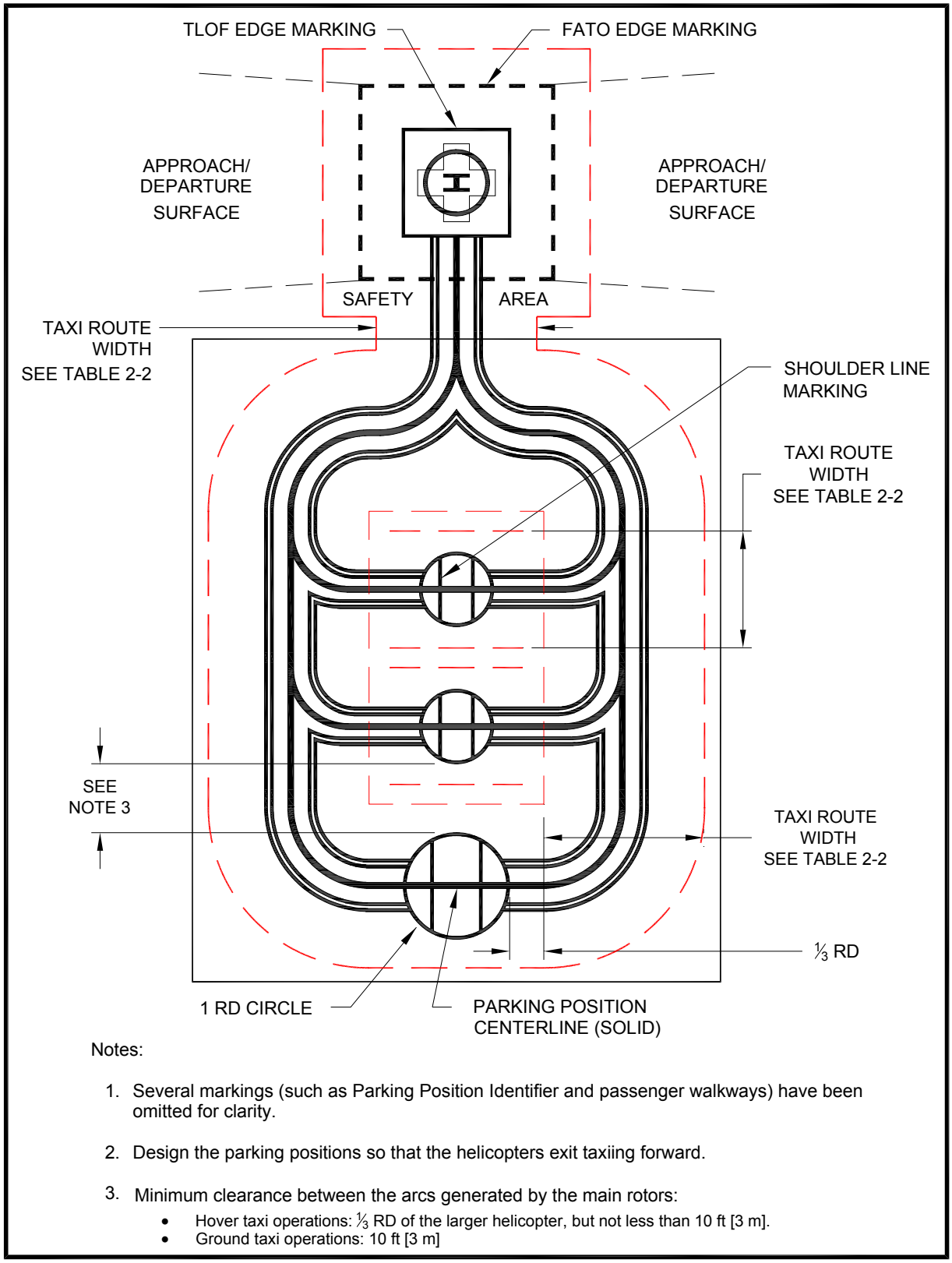
**e. Fueling.** Design the facility to allow fueling with the use of a fuel truck or a specific fueling area with stationary fuel tanks.

**(1)** Various federal, state, and local requirements for petroleum handling facilities apply to systems for storing and dispensing fuel. Find guidance in AC 150/5230-4, Aircraft Fuel Storage, Handling, and Dispensing on Airports. Additional information may be found in various National Fire Protection Association (NFPA) publications. For more reference material, see Appendix D.

**(2)** Do not locate fueling equipment in the TLOF, FATO, or safety area. Design and mark separate fueling locations to minimize the potential for helicopters to collide with the dispensing equipment. Design fueling areas so there is no object tall enough to be hit by the main or tail rotor blades within a distance of RD from the center point of the position where the helicopter would be fueled (providing ½ RD clearance from the rotor tips). If this is not practical at an existing facility, install long fuel hoses.

**(3) Lighting.** Light the fueling area if night fueling operations are contemplated. Ensure any light poles do not constitute an obstruction hazard.

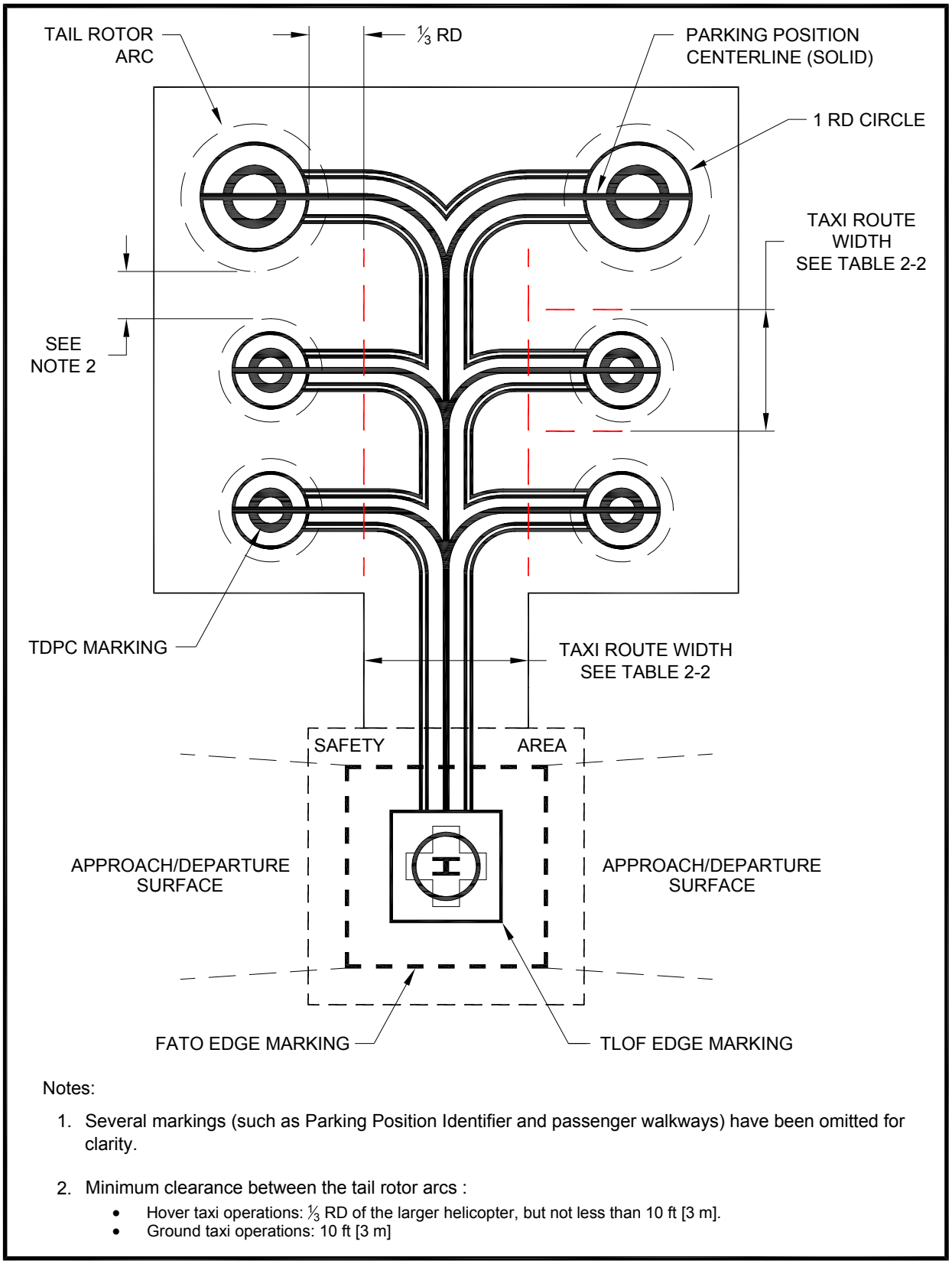
**f. Tiedowns.** Install recessed tiedowns to accommodate extended or overnight parking of based or transient helicopters. If tiedowns are provided, recess them so as not to be a hazard to helicopters. Ensure any depression associated with the tiedowns is of a diameter not greater than ½ the width of the smallest helicopter landing wheel or landing skid anticipated to be operated on the heliport surface. In addition, provide storage for tiedown chocks, chains, cables and ropes off the heliport surface to avoid fouling landing gear. Find guidance on recessed tiedowns in AC 20-35, Tiedown Sense.




Notes:

1. Several markings (such as Parking Position Identifier and passenger walkways) have been omitted for clarity.
2. Design the parking positions so that the helicopters exit taxiing forward.
3. Minimum clearance between the arcs generated by the main rotors:
   - Hover taxi operations: ⅓ RD of the larger helicopter, but not less than 10 ft [3 m].
   - Ground taxi operations: 10 ft [3 m]

**Figure 4–15. Parking Area Design –**
**"Taxi-through" Parking Positions: Hospital**

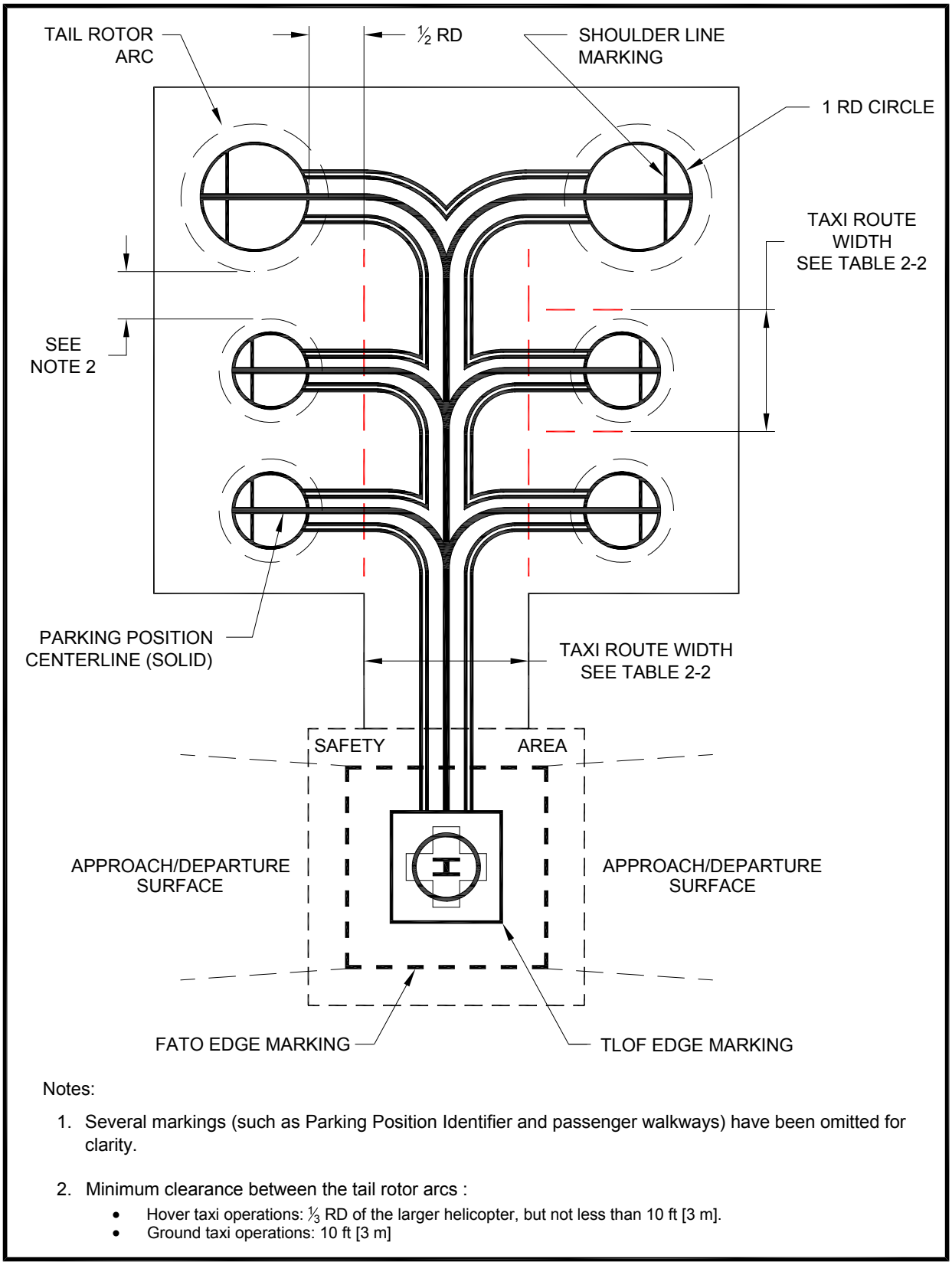



Notes:

1. Several markings (such as Parking Position Identifier and passenger walkways) have been omitted for clarity.

2. Minimum clearance between the tail rotor arcs :
   - Hover taxi operations: ⅓ RD of the larger helicopter, but not less than 10 ft [3 m].
   - Ground taxi operations: 10 ft [3 m]

**Figure 4–16. Parking Area Design – "Turn-around" Parking Positions: Hospital**

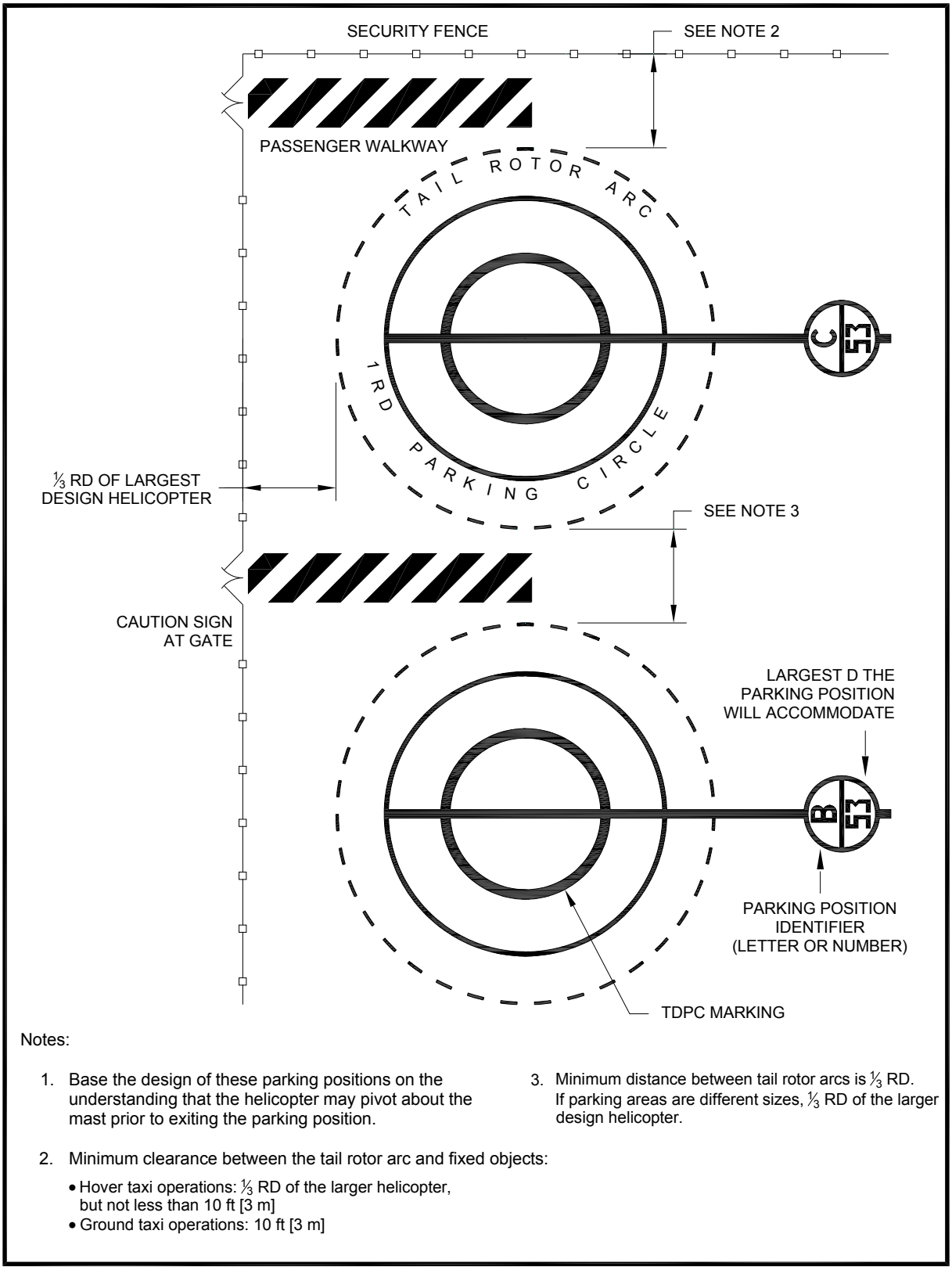



Notes:

1. Several markings (such as Parking Position Identifier and passenger walkways) have been omitted for clarity.

2. Minimum clearance between the tail rotor arcs :
   - Hover taxi operations: ⅓ RD of the larger helicopter, but not less than 10 ft [3 m].
   - Ground taxi operations: 10 ft [3 m]

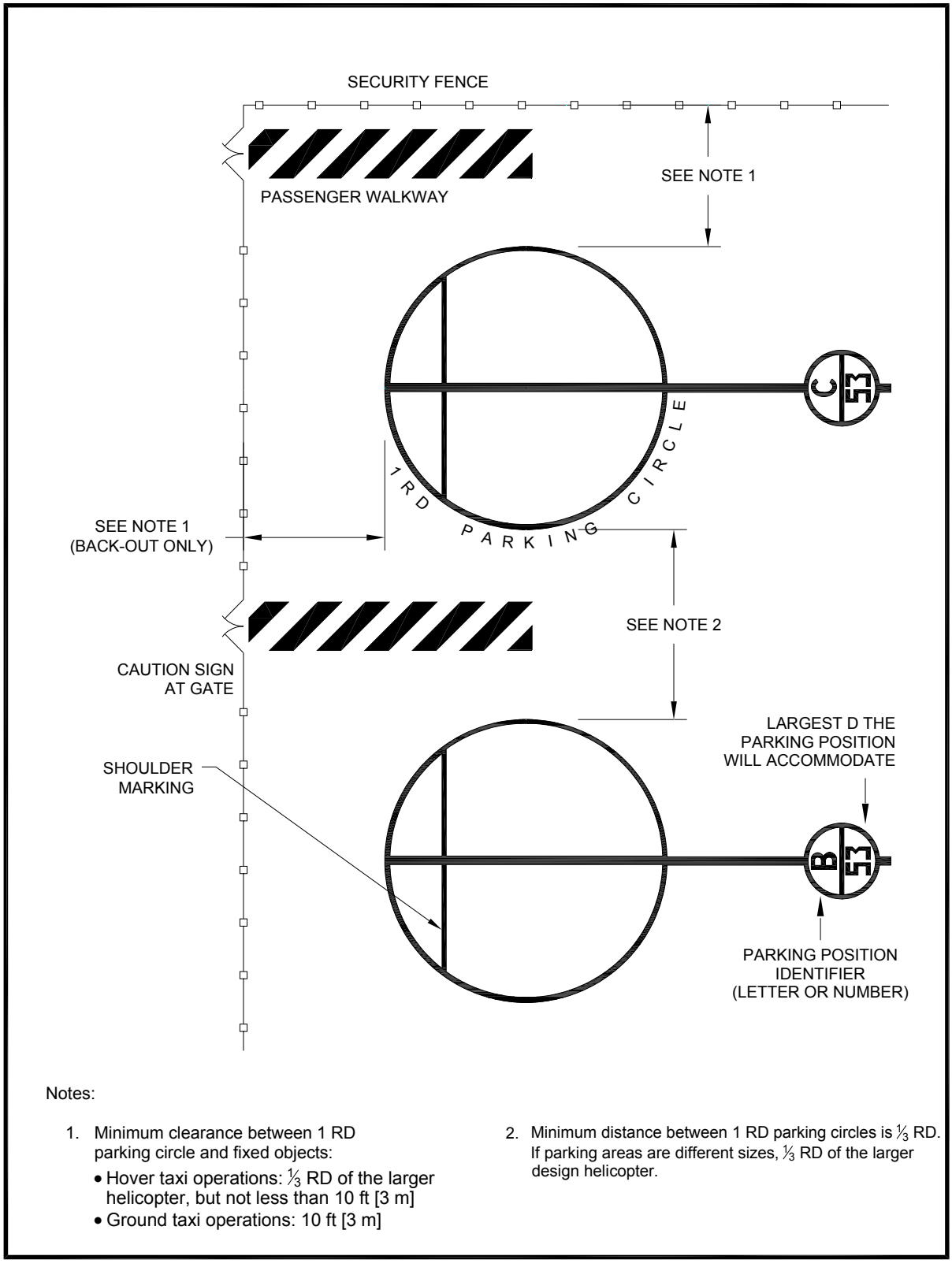
**Figure 4–17. Parking Area Design – "Back-out" Parking Positions: Hospital**




Notes:

1. Base the design of these parking positions on the understanding that the helicopter may pivot about the mast prior to exiting the parking position.
2. Minimum clearance between the tail rotor arc and fixed objects:
   - Hover taxi operations: ⅓ RD of the larger helicopter, but not less than 10 ft [3 m]
   - Ground taxi operations: 10 ft [3 m]
3. Minimum distance between tail rotor arcs is ⅓ RD. If parking areas are different sizes, ⅓ RD of the larger design helicopter.

**Figure 4–18. "Turn-around" Helicopter Parking Position Marking: Hospital**




Notes:

1. Minimum clearance between 1 RD parking circle and fixed objects:
   - Hover taxi operations: ⅓ RD of the larger helicopter, but not less than 10 ft [3 m]
   - Ground taxi operations: 10 ft [3 m]
2. Minimum distance between 1 RD parking circles is ⅓ RD. If parking areas are different sizes, ⅓ RD of the larger design helicopter.

**Figure 4–19. "Taxi-through" and "Back-out" Helicopter Parking Position Marking: Hospital**

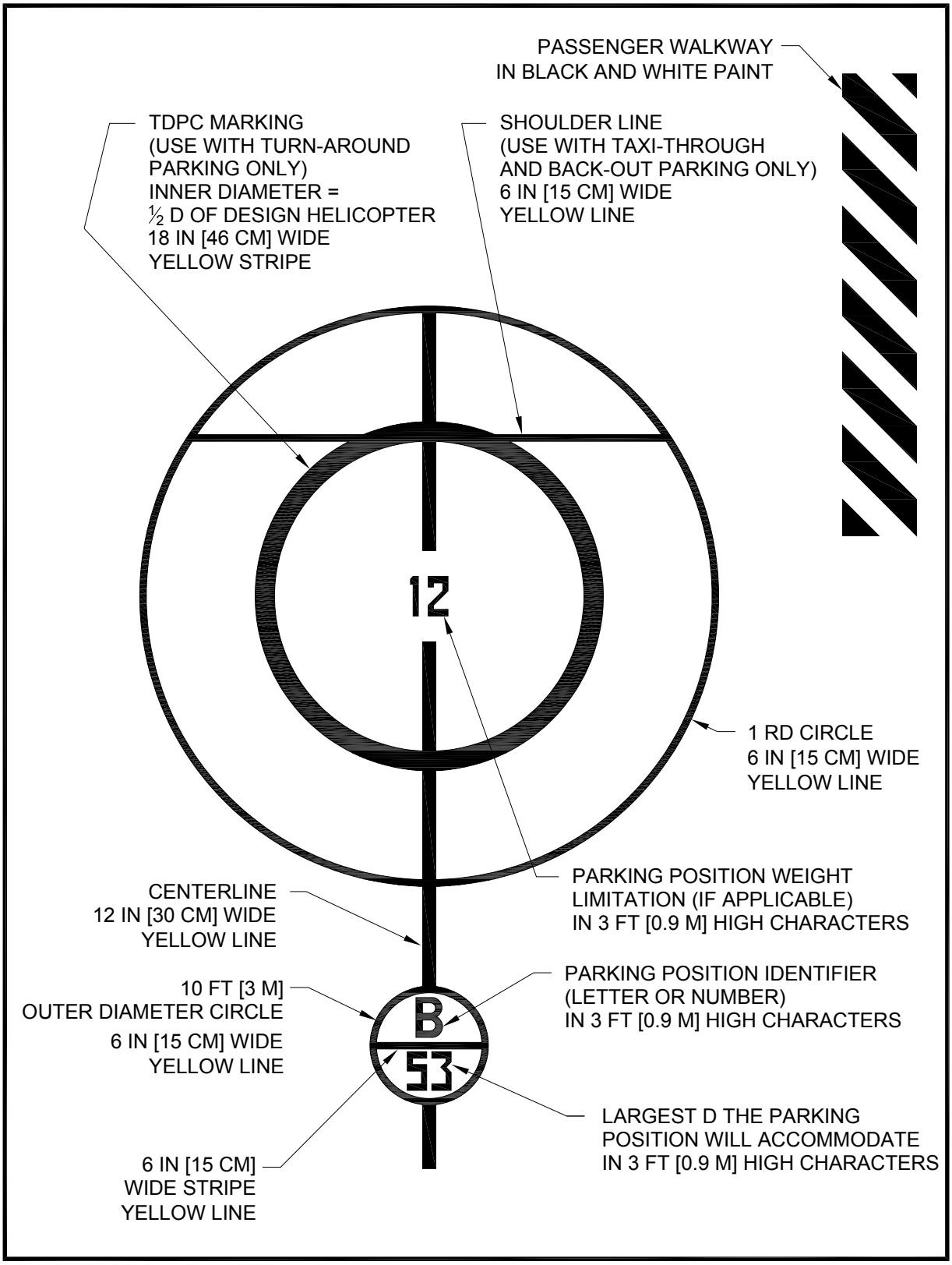



**Figure 4–20. Parking Position Identification, Size, and Weight Limitations: General Aviation**

**414. Heliport markers and markings.** Markers and/or surface markings identify the facility as a heliport. Use paint or preformed material for surface markings (see AC 150/5370-10, Item P-620, for specifications for paint and preformed material). Reflective paint and reflective markers may also be used, though overuse of reflective material can be blinding to a pilot using landing lights. As an option, outline lines/markings with a 6-inch wide (15 cm) line of a contrasting color to enhance conspicuity. Place markings that define the edges of a TLOF, FATO, taxiway or apron within the limits of those areas. Use the following markers and markings:

**a. Hospital heliport identification marking**. The identification marking identifies the location as a hospital heliport, marks the TLOF and provides visual cues to the pilot.

**(1) Standard hospital heliport identification symbol.** Mark the TLOF with a red "H" in a white cross. The minimum height of the "H" is 10 feet (3 m). Locate the "H" in the center of the TLOF and orient it on the axis of the preferred approach/departure path. Place a 12-inch wide red bar under the "H" when it is necessary to distinguish the preferred approach/departure direction. The proportions and layout of the standard hospital heliport identification symbol are illustrated in Figure 4–21. Increase the dimensions of the "H" and cross proportionately for larger TLOFs.

**(2) Alternative marking.** As an alternative to the standard marking, use a red "H" with a white 6-inch (15 cm) wide border within a red cross with a 12 inch (30 cm) wide white border and a surrounding red TLOF. Where it is impractical to paint the whole TLOF red, paint the TLOF so the minimum dimension (length, width, or diameter) of the outer red area is equal to the RD of the design helicopter but not less than 40 feet (12.2 m). Figure 4–22 illustrates this alternative marking. Increase the dimensions of the "H" and cross proportionately for larger TLOFs.

**(3) Winter operations.** In winter weather at a heliport with a dark TLOF surface, the marking in Figure 4–22 will absorb more heat from the sun and more readily melt residual ice and snow. In contrast, the white area in Figure 4–21 is more likely to be icy during winter weather. Consequently, in areas that experience ice and snow, use the markings in Figure 4–22 for unheated TLOFs.

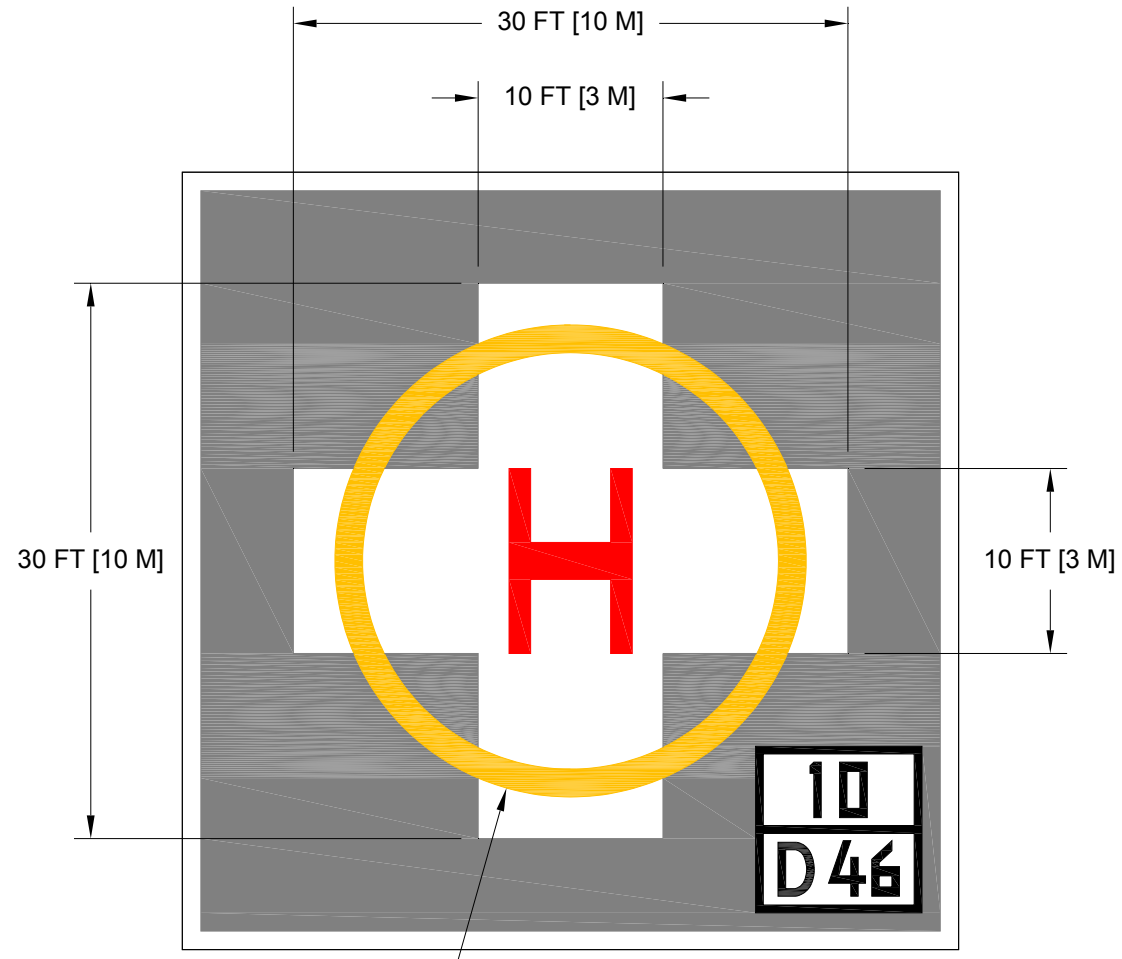
**b. TLOF markings.**

**(1) TLOF perimeter marking.** Mark the TLOF perimeter with markers and/or lines. See paragraph 408 and Table 4-1 for guidance on increasing the size of the safety area if the TLOF perimeter is not marked.

**(a) Paved TLOFs.** Define the perimeter of a paved or hard surfaced TLOF with a continuous, 12-inch-wide (30 cm), white line. See Figure 4–23.

**(b) Unpaved TLOFs.** Define the perimeter of an unpaved TLOF with a series of 12-inch-wide (30 cm), flush, in-ground markers, each approximately 5 feet (1.5 m) in length with end-to-end spacing of not more than 6 inches (15 cm). See Figure 4–24.

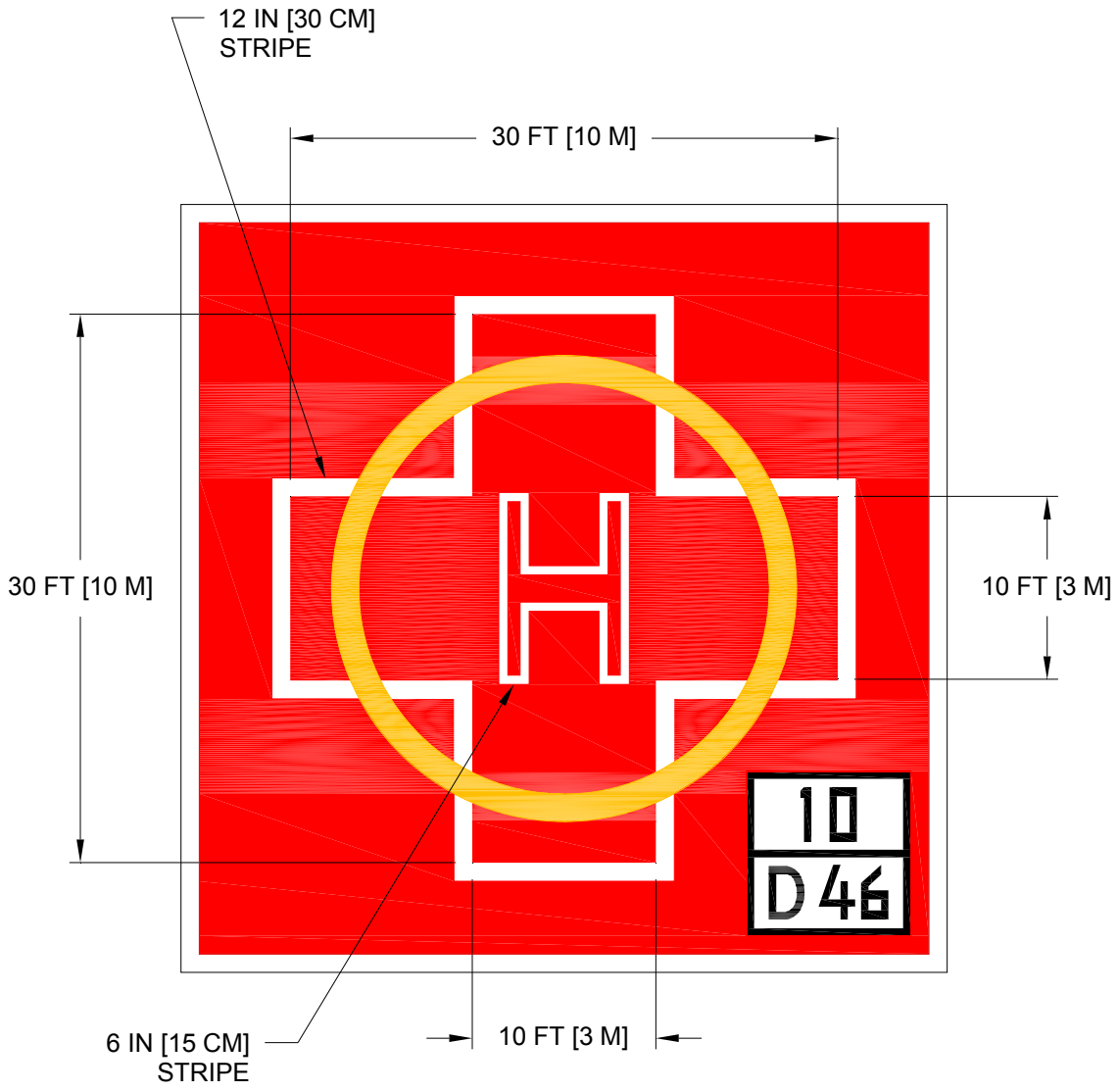
**(2) Touchdown/positioning circle (TDPC) marking.** Use an optional TDPC marking to provide guidance to allow a pilot to touch down in a specific position on paved surfaces. When the pilot's seat is over the marking, the undercarriage will be inside the LBA, and all parts of the helicopter will be clear of any obstacle by a safe margin. A TDPC marking is a yellow circle with an inner diameter of ½ D and a line width of 18 inches (46 cm). Locate a TDPC marking in the center of a TLOF. See Figure 4–21, Figure 4–22, and Figure 4–23.




Notes:

1. Standard TLOF perimeter stripe of 12 in [30 cm]. See figure 4-25 for "H", touchdown position, overall length and weight limitation box dimensions.
2. The standard hospital identification is a red **H** within a white cross.
3. An option may be a red **H** within a white cross surrounded by a 12 in [30 cm] wide red border (not illustrated).
4. The area outside of the cross may be colored red.

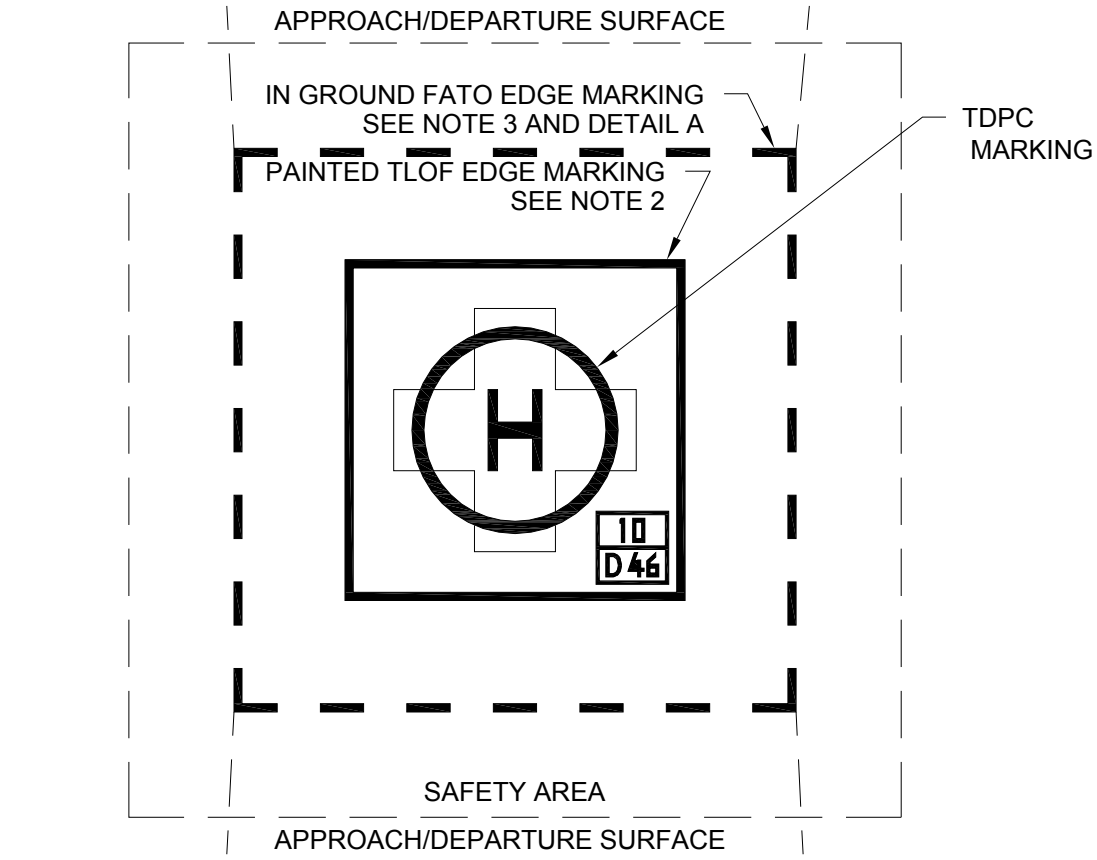
**Figure 4–21. Standard Hospital Heliport Identification Symbols: Hospital**

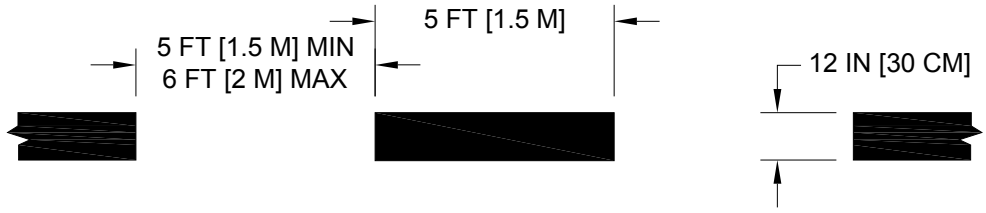



Notes:

1. Standard TLOF perimeter stripe of 12 in [30 cm]. See figure 4-25 for "H", touchdown position, overall length and weight limitation box dimensions.

**Figure 4–22. Alternative Hospital Heliport Identification Symbols: Hospital**



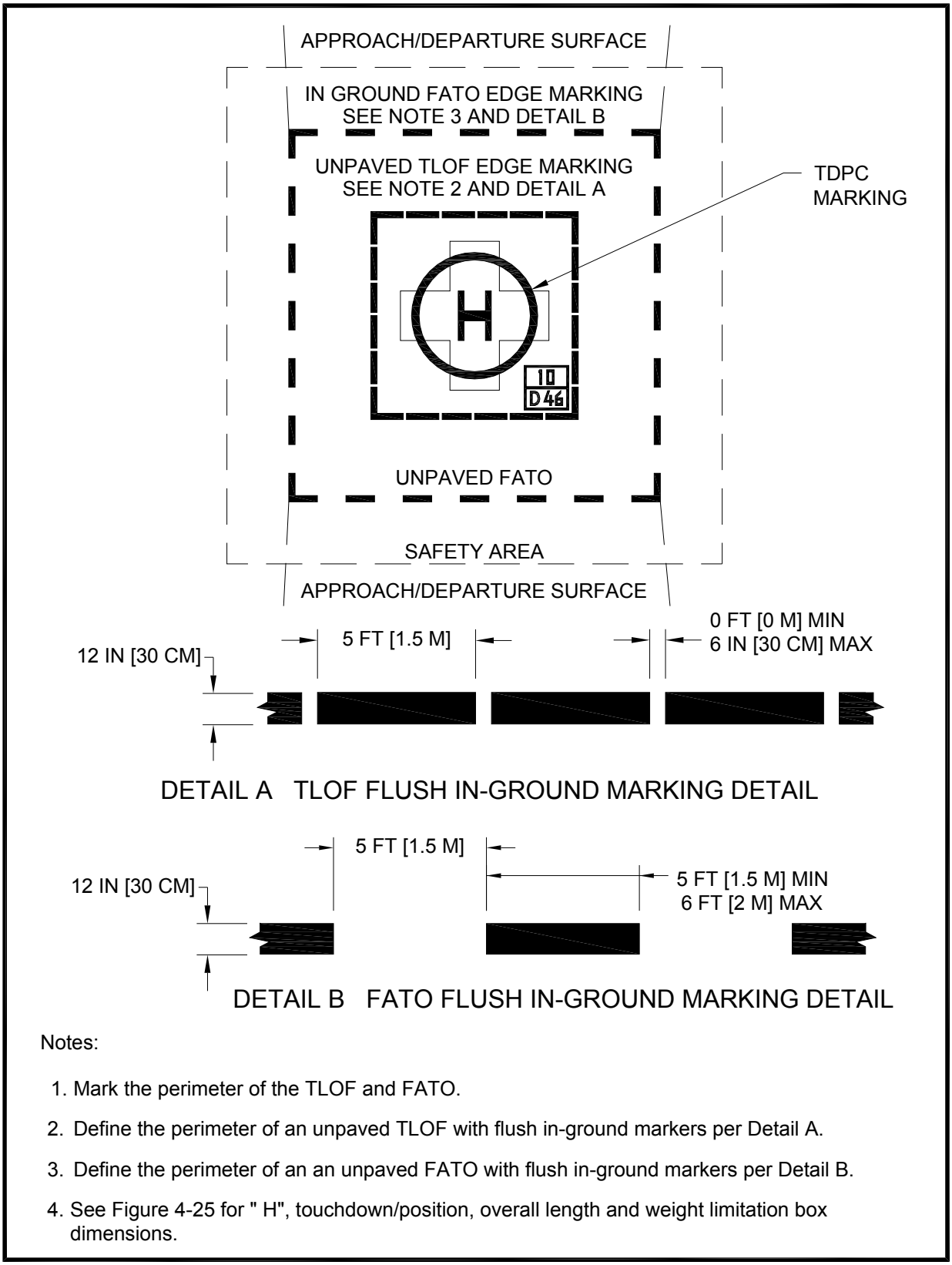




DETAIL A FATO MARKING DETAIL

Notes:

1. Mark the perimeter of the TLOF and the FATO.
2. Define the perimeter of a paved or hard surfaced TLOF with a continuous 12 in [30 cm] white line.
3. Define the perimeter of the FATO with a 12 in [30 cm] wide dashed line per Detail A.
4. See Figure 4-25 for " H", touchdown/position, Overall Length and Weight Limitation box dimensions.

**Figure 4–23. Paved TLOF/Paved FATO – Paved TLOF/Unpaved FATO – Marking: Hospital**




Notes:

1. Mark the perimeter of the TLOF and FATO.
2. Define the perimeter of an unpaved TLOF with flush in-ground markers per Detail A.
3. Define the perimeter of an an unpaved FATO with flush in-ground markers per Detail B.
4. See Figure 4-25 for " H", touchdown/position, overall length and weight limitation box dimensions.

**Figure 4–24. Unpaved TLOF/Unpaved FATO – Marking: Hospital**

**(3) TLOF size and weight limitations.** Mark the TLOF to indicate the length and weight of the largest helicopter it will accommodate, as shown in Figure 4–25. Place these markings in a box in the lower right-hand corner of the TLOF, or on the right-hand side of the "H" of a circular TLOF, when viewed from the preferred approach direction. The box is 5 feet (1.5 m) square. The numbers are 18" (46 cm) high. If necessary, interrupt the TDPC marking with this marking. (See Figure C–2.) The numbers are black with a white background. This marking is optional at a TLOF with a turf surface.

**(a) TLOF size limitation.** This number is the length (D) of the largest helicopter the TLOF will accommodate, as shown in Figure 4–25. The marking consists of the letter "D" followed by the dimension in feet. Do not use metric equivalents used for this purpose. Center this marking in the lower section of the TLOF size/weight limitation box.

**(b) TLOF weight limitations.** If a TLOF has limited weight-carrying capability, mark it with the maximum takeoff weight of the design helicopter, in units of thousands of pounds, as shown in Figure 4–25. Do not use metric equivalents for this purpose. Center this marking in the upper section of a TLOF size/weight limitation box. If the TLOF does not have a weight limit, add a diagonal line extending from the lower left hand corner to the upper right hand corner to the upper section of the TLOF size/weight limitation box.

**c. Extended pavement/structure markings.** As an option at hospital heliports, increase the pavement or structure without a corresponding increase in the length and width or diameter of the FATO to accommodate pedestrians and/or support operations. Whether or not this increased area is part of the LBA, mark the pavement or structure outside the TLOF with 12-inch-wide (30 cm) diagonal black and white stripes. See Figure 4–26 for marking details.

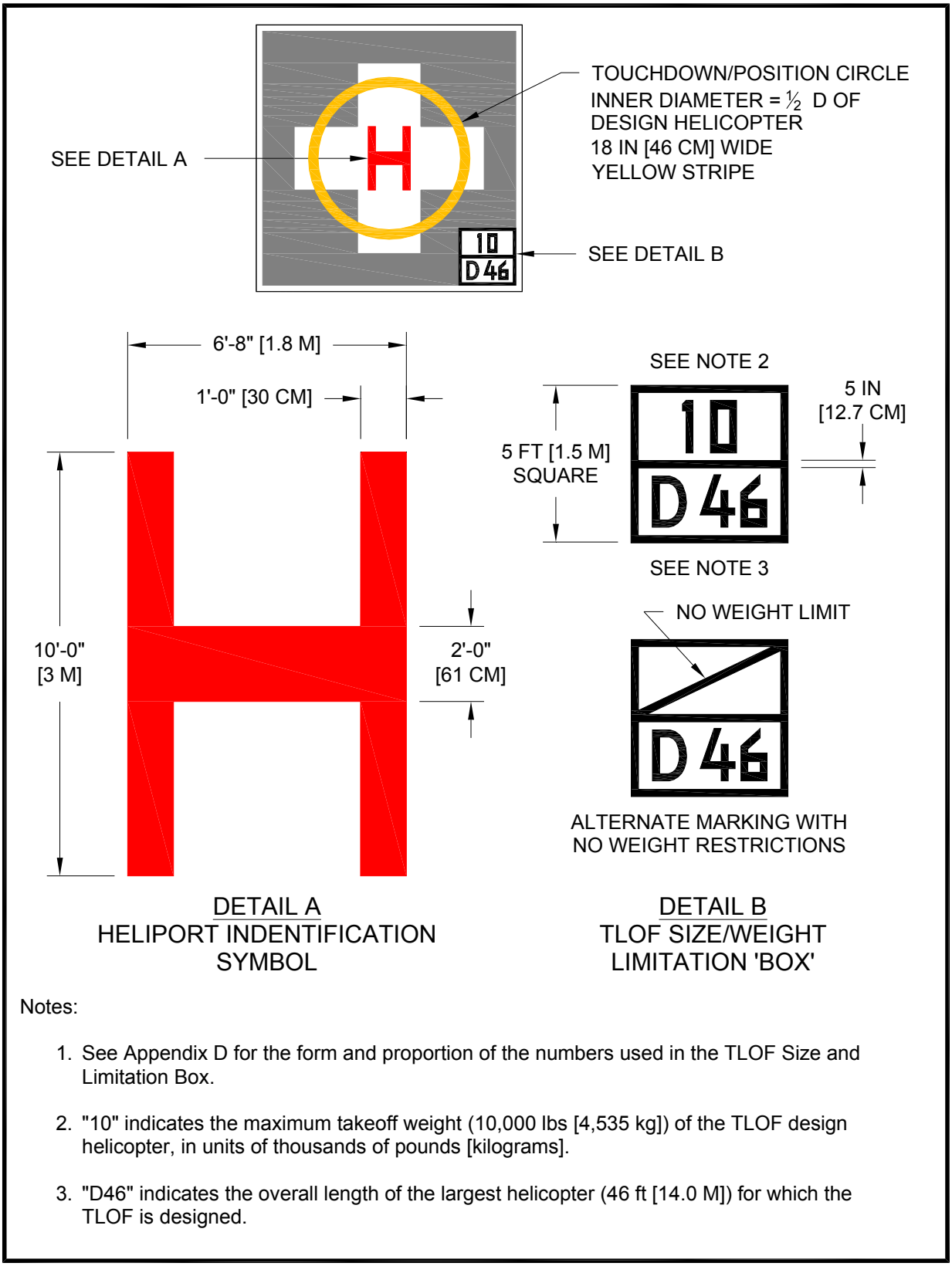
**d. FATO markings.**

**(1) FATO perimeter marking.** Define the perimeter of a load-bearing FATO with markers and/or lines. Do not mark the FATO perimeter if any portion of the FATO is not a load-bearing surface. In such cases, mark the TLOF perimeter (see paragraph 414.)

**(a) Paved FATOs.** Define the perimeter of a paved load-bearing FATO with a 12-inch-wide (30 cm) dashed white line. Use marking segments approximately 5 feet (1.5 m) in length, and with end-to-end spacing of approximately 5 feet (1.5 m) to define the corners of the FATO and the perimeter. See Figure 4–23.

**(b) Unpaved FATOs.** Define the perimeter of an unpaved load-bearing FATO with 12-inch-wide (30 cm), flush, in-ground markers. Use marking segments approximately 5 feet (1.5 m) in length, and with end-to-end spacing of approximately 5 feet (1.5 m) to define the corners of the FATO and the perimeter. See Figure 4–23 and Figure 4–24.

**e. Flight path alignment guidance marking**. An optional flight path alignment guidance marking consists of one or more arrows to indicate the preferred approach/departure direction(s). Place it on the TLOF, FATO and/or safety area surface as shown in Figure 4–10. The shaft of the arrow(s) is 18 inches (50 cm) in width and at least 10 feet (3 m) in length. When combined with a flight path alignment guidance lighting system described in paragraph 415, it takes the form shown in Figure 4–10, which includes scheme for marking the arrowheads. Use a color that provides good contrast against the background color of the surface on which they are marked. An arrow pointing toward the center of the TLOF depicts an approach direction. An arrow pointing away from the center of the TLOF depicts a departure direction. In the case of a flight path limited to a single approach direction or a single takeoff direction, the arrow marking is unidirectional. In the case of a heliport with only a bidirectional approach/takeoff flight path available, the arrow marking is bidirectional.




Notes:

1. See Appendix D for the form and proportion of the numbers used in the TLOF Size and Limitation Box.
2. "10" indicates the maximum takeoff weight (10,000 lbs [4,535 kg]) of the TLOF design helicopter, in units of thousands of pounds [kilograms].
3. "D46" indicates the overall length of the largest helicopter (46 ft [14.0 M]) for which the TLOF is designed.

**Figure 4–25. TLOF Size and Weight Limitations: Hospital**




Notes:

1. Extended pavement/structure markings begin flush with TLOF edge markings and end at the edge of the extended pavement/structure.

2. Extended pavement/structure markings are 12 in [30 cm] wide black and white stripes on a 45° angle.

**Figure 4–26. Extended Pavement or Structure Marking: Hospital**

**f. Taxi route and taxiway markings.**

**(1) Paved taxiway markings.** Mark the centerline of a paved taxiway with a continuous 6-inch (15 cm) yellow line. If necessary to increase conspicuity, mark both edges of the paved portion of the taxiway with two continuous 6- inch (15 cm) wide yellow lines spaced 6 inches (15 cm) apart. Figure 4–12 illustrates taxiway centerline and edge markings.

**(2) Unpaved taxiway markings.** Use either raised or in-ground flush edge markers to provide strong visual cues to pilots. Space them longitudinally at approximately 15-foot (5 m) intervals on straight segments and at approximately 10-foot (3 m) intervals on curved segments. Figure 4–13 and Figure 4–14 illustrate taxiway edge markings.

**(a)** Raised-edge markers are blue, 4 inches (10 cm) in diameter, and 10 inches (25 cm) high, as illustrated in Figure 4–13.

**(b)** In-ground, flush edge markers are yellow, 12 inches (30 cm) wide, and approximately 5 feet (1.5 m) long.

**(3) Raised edge markers in grassy areas.** Raised edge markers are sometimes obscured by tall grass. Address this issue with 12-inch (30 cm) diameter concrete pads or solid material disks around the poles supporting the raised markers.

**(4) Taxiway to parking position transition requirements.** For paved taxiways and parking areas, taxiway centerline markings continue into parking positions and become the parking position centerlines.

**g. Parking position markings.** If a hospital heliport has a parking position, the following standards apply.

**(1) Paved parking position identifications.** Mark parking position identifications (numbers or letters) if there is more than one parking position. These markings are yellow characters 36 inches (91 cm) high. See Figure 4–20 and Figure C–1.

**(2) Rotor diameter circle.** Define the circle of the RD of the largest helicopter that will park at that position with a 6-inch (15 cm) wide, solid yellow line with an outside diameter of RD. In paved areas, this is a painted line (See Figure 4–20). In unpaved areas, use a series of flush markers, 6 inches (15 cm) in width, a maximum of 5 feet (1.5 m) in length, and with end-to-end spacing of approximately 5 feet (1.5 m).

**h. Touchdown/positioning circle (TDPC) marking.** An optional TDPC marking provides guidance to allow a pilot to touch down in a specific position on paved surfaces. When the pilot's seat is over the marking, the undercarriage will be inside the LBA, and all parts of the helicopter will be clear of any obstacle by a safe margin. A TDPC marking is a yellow circle with an inner diameter of ½ D and a line width of 18 in (46 cm). Locate a TDPC marking in the center of a parking area. Use a TDPC marking for "turn-around" parking areas. See Figure 4–20 and Figure 4–18.

**i. Maximum length marking.** On paved surfaces, indicate the D of the largest helicopter that the position is designed to accommodate (for example, 40) with this marking. This marking consists of yellow characters at least 36 inches (91 cm) high. See Figure 4–20 and Figure C–1.

**j. Parking position weight limit.** If a paved parking position has a weight limitation, mark it in units of 1,000 lbs as illustrated in Figure 4–20. (A 4 indicates a weight-carrying capability of up to 4,000 lbs. Do not use metric equivalents for this purpose.) This marking consists of yellow characters 36 inches (91 cm) high. Place a bar under the number if necessary to minimize the possibility of being misread. See Figure 4–18 and Figure C–1.

**k. Shoulder line markings.** Use optional shoulder line markings for paved parking areas (See Figure 4–15) to ensure safe rotor clearance. Locate a 6-inch (15 cm) wide solid yellow shoulder line,

perpendicular to the centerline and extending to the RD marking, so it is under the pilot's shoulder such that the main rotor of the largest helicopter for which the position is designed will be entirely within the rotor diameter parking circle (See Figure 4–20.) Use 0.25 D from the center of parking area to define the location of shoulder line. Use a shoulder line marking for "taxi through" and "back-out" parking areas.

**l. Walkways.** Figure 4–20 illustrates one marking scheme.

**m. Closed heliport.** Obliterate all markings of a permanently closed heliport, FATO, or TLOF. If it is impractical to obliterate markings, place a yellow "X" over the "H", as illustrated in Figure 4–27. Use a yellow "X" large enough to ensure early pilot recognition that the heliport is closed. Remove the wind cone(s) and other visual indications of an active heliport.

**n. Marking sizes.** See Appendix C for guidance on the proportions of painted numbers.

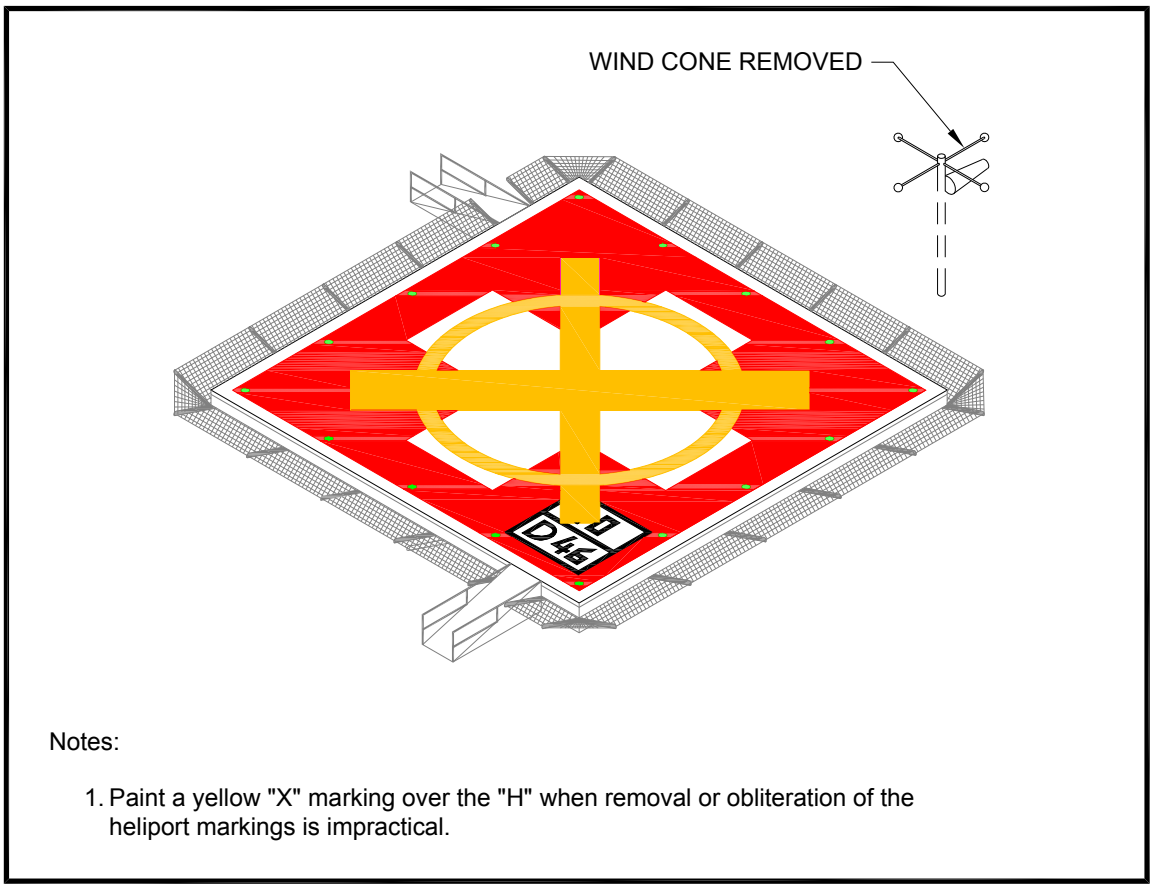



**Figure 4–27. Marking a Closed Heliport: Hospital**

**415. Heliport lighting.** If the heliport operator intends for the facility to support night operations, light the heliport with FATO and/or TLOF perimeter lights as described below. Design flush light fixtures and installation methods to support point loads of the design helicopter transmitted through a skid or wheel.

**a. TLOF perimeter lights.**

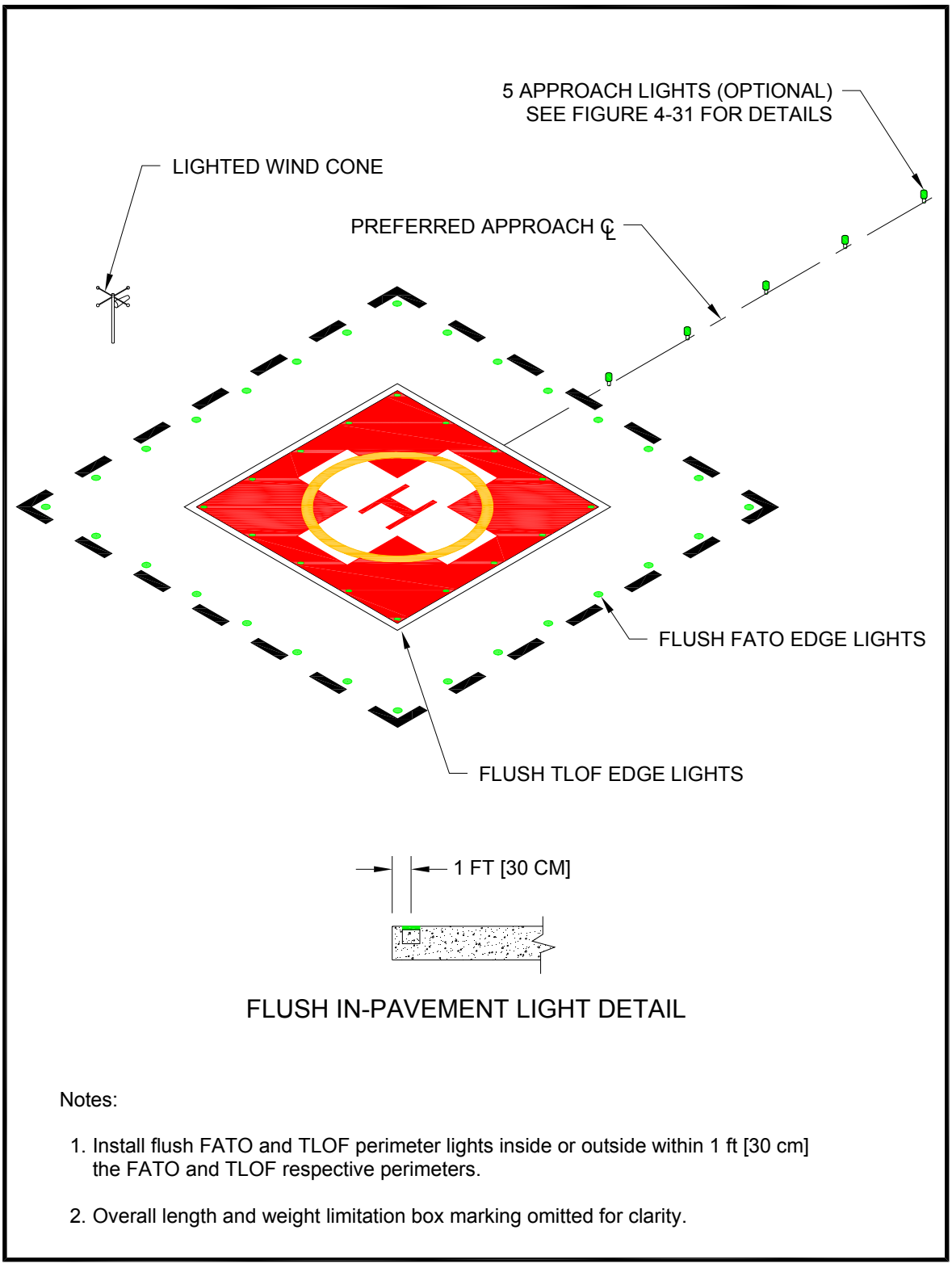
**(1) Ground level TLOF.** Use green lights meeting the requirements of FAA Airports Engineering Brief 87, Heliport Perimeter Light for Visual Meteorological Conditions (VMC), to define the TLOF perimeter. If only the TLOF is load bearing, use flush lights or, as a less desirable option, raised green omnidirectional lights. Use a minimum of three light fixtures per side of a square or rectangular TLOF. Locate a light at each corner, with additional lights uniformly spaced between the

corner lights. Using an odd number of lights on each side will place lights along the centerline of the approach. To define a circular TLOF, use an even number of lights, with a minimum of eight, uniformly spaced. Space the lights at a maximum of 25 feet (7.6 m). Locate flush lights within 1 foot (30 cm) (inside or outside) of the TLOF perimeter. Locate raised lights outside and within 10 feet (3 m) of the edge of the TLOF. Make sure raised lights do not penetrate a horizontal plane at the TLOF elevation by more than 2 inches (5 cm). Figure 4–28 and Figure 4–30 illustrate these lights.

**(2) Elevated TLOF.** As an option, use raised, omnidirectional lights meeting the requirements of EB 87, located on the outside edge of the TLOF or the outer of the safety net, as shown in Figure 4–29. Lighting on the outer edge of the safety net provides better visual cues to pilots at a distance from the heliport since it outlines a larger area. Make sure raised lights do not penetrate a horizontal plane at the TLOF elevation by more than 2 inches (5 cm).

**b. Load-bearing FATO perimeter lights.** Use green lights meeting the requirements of EB 87 to define the perimeter of a load bearing FATO. Do not light the FATO perimeter if any portion of the FATO is not a load-bearing surface. Use a minimum of three flush or raised light fixtures per side of a square or rectangular FATO. Locate a light is located at each corner, with additional lights uniformly spaced between the corner lights. Using an odd number of lights on each side will place lights along the centerline of the approach. To define a circular FATO, use an even number of lights, with a minimum of eight, uniformly spaced. Space lights at a maximum of 25 feet (7.6 m). Locate flush lights within 1 foot (30 cm) (inside or outside) of the FATO perimeter (see Figure 4–28 and Figure 4–30). As an option, use a rectangular light pattern even if the TLOF is circular. At a distance during nighttime operations, a square or rectangular pattern of FATO perimeter lights provides the pilot with better visual alignment cues than a circular pattern, but a circular pattern may be more effective in an urban environment. In the case of an elevated FATO with a safety net, mount the perimeter lights in a similar manner as discussed in paragraph 415. Make sure raised FATO perimeter lights are no more than 8 inches (20 cm) high, and locate them 10 feet (3 m) from the FATO perimeter.

**c. Floodlights.** The FAA has not evaluated floodlights for effectiveness in visual acquisition of a heliport. However, if ambient light does not adequately illuminate markings for night operations, use floodlights to illuminate the TLOF, the FATO, and/or the parking area. If possible, mount these floodlights on adjacent buildings to eliminate the need for tall poles. Take care, however, to place floodlights clear of the TLOF, the FATO, the safety area, and the approach/departure surfaces, and transitional surfaces. Ensure floodlights and their associated hardware do not constitute an obstruction hazard. Aim floodlights down to provide adequate illumination on the surface. Make sure floodlights that might interfere with pilot vision during takeoff and landings are capable of being turned off by pilot control or at pilot request.




Notes:

1. Install flush FATO and TLOF perimeter lights inside or outside within 1 ft [30 cm] the FATO and TLOF respective perimeters.

2. Overall length and weight limitation box marking omitted for clarity.

**Figure 4–28. Flush TLOF/FATO Perimeter Lighting: Hospital**

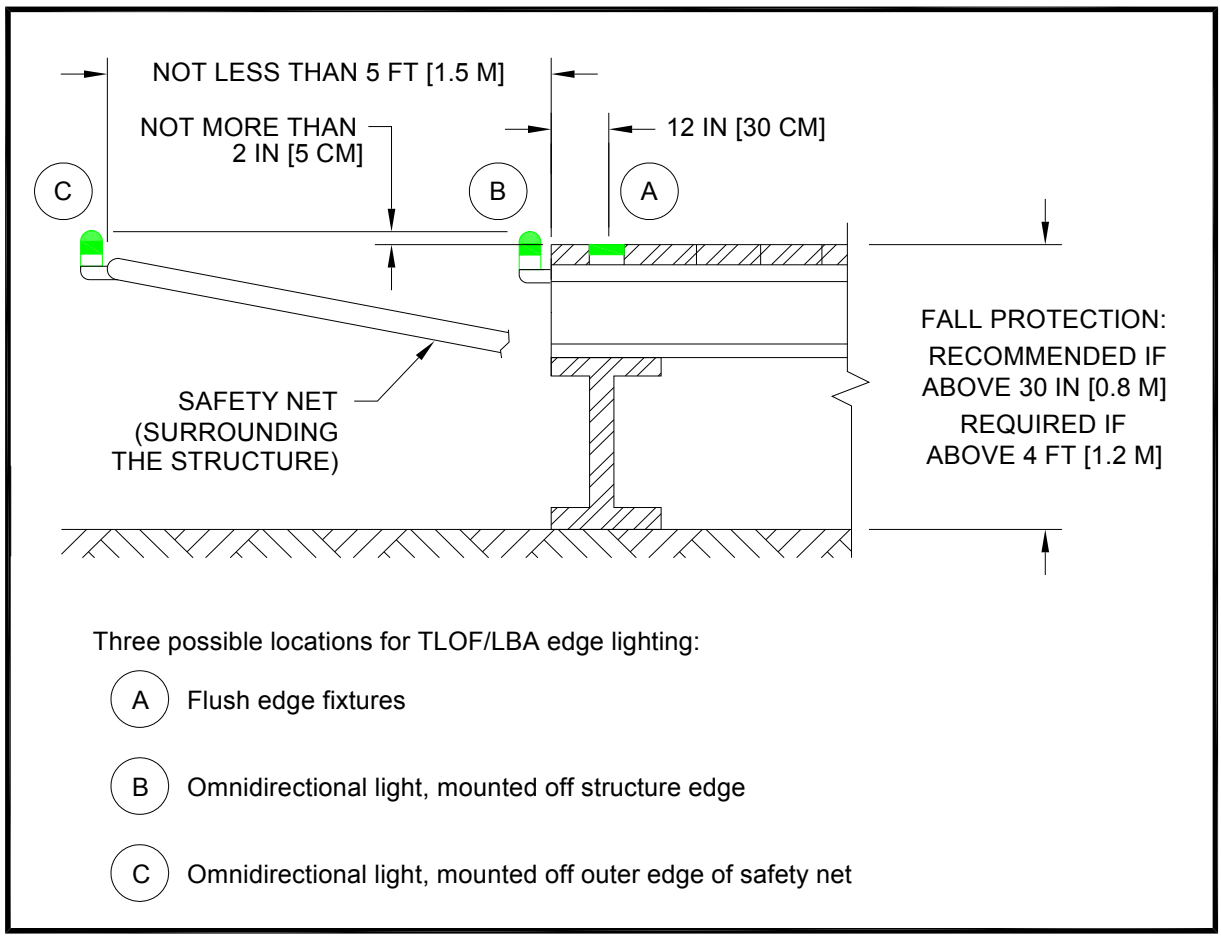
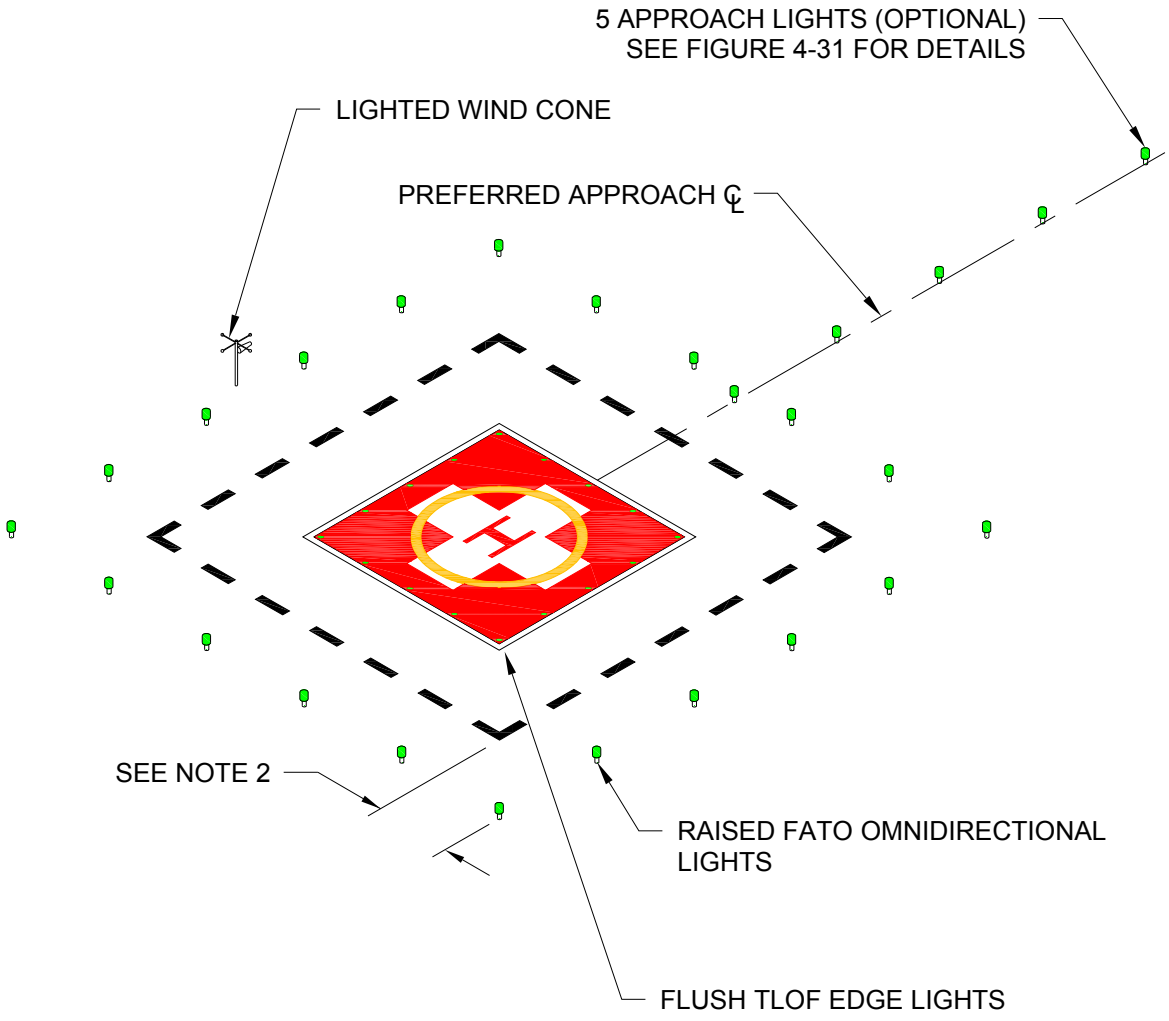



**Figure 4–29. Elevated TLOF, Safety Net and Lighting Heliport Partial Elevation: Hospital**




Notes:

1. Install flush TLOF perimeter lights inside or outside within 1 ft [30 cm] of the FATO and TLOF respective perimeters.

2. Install raised FATO lights 10 ft [3 m] outside the FATO perimeter.

3. Overall length and weight limitation box marking omitted for clarity.

**Figure 4–30. Flush TLOF and Raised FATO Perimeter Lighting: Hospital**

**d. Landing direction lights.** As an option when it is necessary to provide directional guidance, install landing direction lights. Landing direction lights are a configuration of five green omnidirectional lights meeting the standards of EB 87, on the centerline of the preferred approach/departure path. Space these lights at 15-foot (5 m) intervals beginning at a point not less than 20 feet (6 m) and not more than 60 feet (18 m) from the TLOF perimeter and extending outward in the direction of the preferred approach/departure path, as illustrated in Figure 4–31.

**e. Flight path alignment lights.** Flight path alignment lights meeting the requirements of EB 87 are optional. Place them in a straight line along the direction of approach and/or departure flight paths. If necessary, extend them across the TLOF, FATO, safety area or any suitable surface in the immediate vicinity of the FATO or safety area. Install three or more green lights spaced at 5 feet (1.5 m) to 10 feet (3.0 m). See Figure 4–10.

**f. Taxiway and taxi route lighting.**

**(1) Taxiway centerline lights.** Define taxiway centerlines with flush bidirectional green lights meeting the standards of AC 150/5345-46, Specification for Runway and Taxiway Light Fixtures, for type L-852A (straight segments) or L-852B (curved segments). Space these lights at maximum 50-foot (15 m) longitudinal intervals on straight segments and at maximum 25 foot (7.6 m) intervals on curved segments, with a minimum of four lights needed to define the curve. Uniformly offset taxiway centerline lights no more than two feet (0.6 m) if necessary to ease painting the taxiway centerline. As an option, use green retroreflective markers meeting requirements for Type I markers in AC 150/5345-39, Specification for L-853, Runway and Taxiway Retroreflective Markers in lieu of the L-852A or L-852B lighting fixtures.

**(2) Taxiway edge lights.** Use omnidirectional blue lights to light the edges of a taxiway. As an option, use blue retroreflective markers to identify the edges of the taxiway in lieu of lights. Make sure retroreflective markers are no more than 8 inches (20 cm) tall.

**(a) Straight segments.** Space lights at 50 feet (15.2 m) longitudinal intervals on straight segments.

**(b) Curved segments.** Curved taxiway edges require shorter spacing of edge lights. Determine the spacing based on the radius of the curve. The applicable spacing for curves is shown in AC 150/5340-30, Design and Installation Detail for Airport Visual Aids. Space the taxiway edge lights uniformly. Use at least three edge lights for curved edges of more than 30 degrees from point of tangency (PT) of the taxiway section to PT of the intersecting surface. For radii not listed in AC 150/5340-30, determine spacing by linear interpolation.

**(c) Paved taxiways.** Use flush lights meeting the standards of AC 150/5345-46 for type L-852T.

**(d) Unpaved taxiways.** Use raised lights meeting the standards of AC 150/5345-46 for type L-861T. Use a maximum lateral spacing for the lights or reflectors equal to the RD of the design helicopter, but not more than 35 feet (10.7 m).

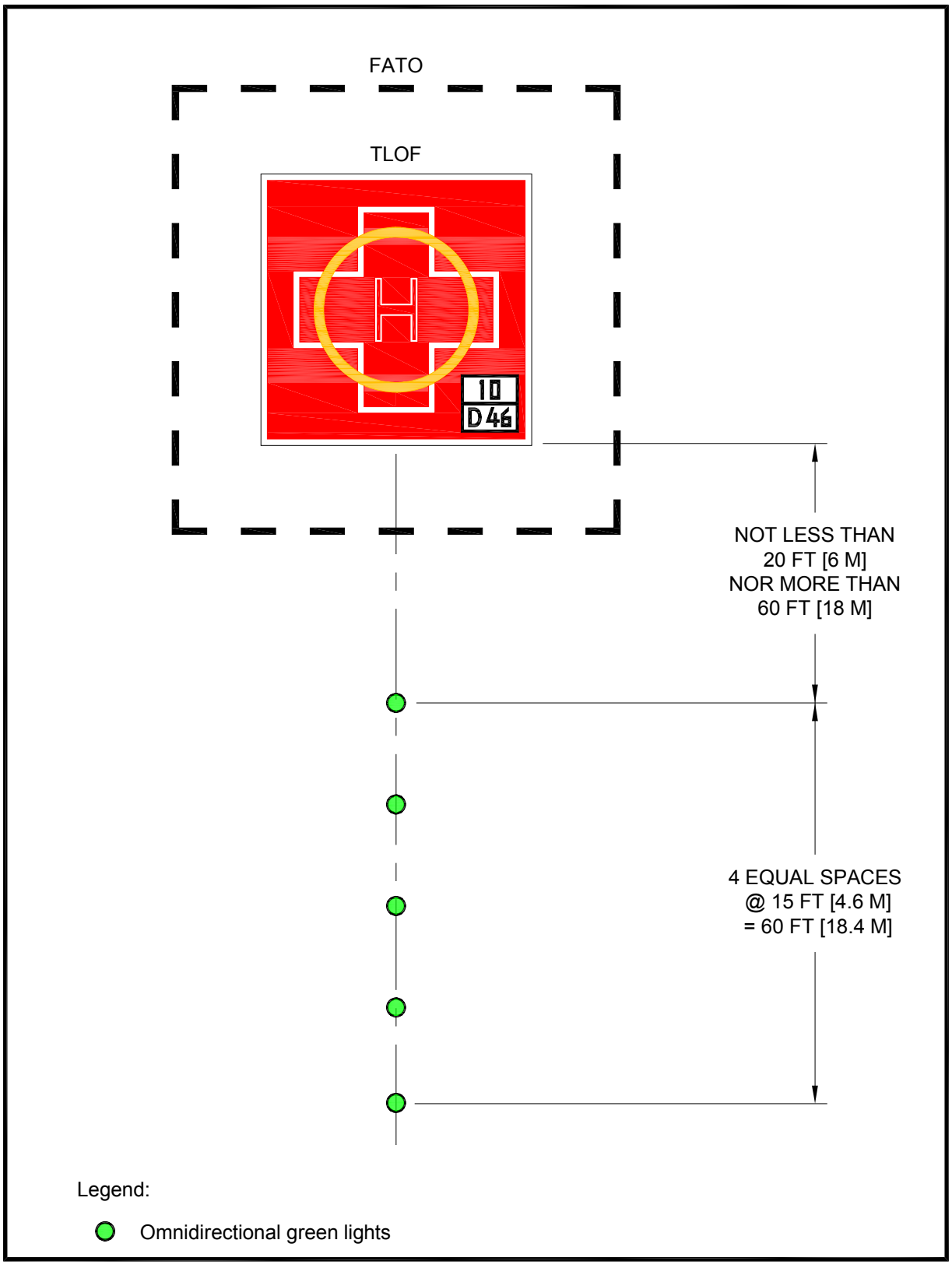



**Figure 4–31. Landing Direction Lights: Hospital**

**g. Heliport identification beacon.** A heliport identification beacon is optional equipment. It is the most effective means to aid the pilot in visually locating the heliport. Locate the beacon, flashing white/green/yellow at the rate of 30 to 45 flashes per minute, on or close to the heliport. Find guidance on heliport beacons in AC 150/5345-12, Specification for Airport and Heliport Beacon. As an option, allow the beacon to be pilot controllable, so it is "on" only when needed.

**416. Marking and lighting of difficult-to-see objects.** It is often difficult for pilot to see unmarked wires, antennas, poles, cell towers, and similar objects, even in the best daylight weather, in time to take evasive action. While pilots can avoid such objects during en route operations by flying well above them, approaches and departures require operations near the ground where obstacles may be a factor. This paragraph discusses the marking and lighting of objects near, but outside and below the approach/departure surface. Find guidance on marking and lighting objects in AC 70/7460-1, Obstruction Marking and Lighting.

**a. Airspace.** If difficult-to-see objects penetrate the object identification surfaces illustrated in Figure 4–32 and Figure 4–33, mark these objects to make them more conspicuous. If a heliport supports operations between dusk and dawn, light these difficult-to-see objects. Guidance on marking and lighting objects is contained in AC 70/7460-1. The object identification surfaces in Figure 4–32 and Figure 4–33 can also be described as follows:

**(1)** In all directions from the safety area, except under the approach/departure paths, the object identification surface starts at the safety area perimeter and extends out horizontally for a distance of 100 feet (30.5 m).

**(2)** Under the approach/departure surface, the object identification surface starts from the outside edge of the FATO and extends horizontally out along the approach path for a distance of 800 feet (244 m). From this point, the object identification surface extends out along the approach path for an additional distance of 3,200 feet (975 m) while rising on an 8:1 slope (8 units horizontal in 1 unit vertical). From the point 800 feet (244 m) from the FATO perimeter, the object identification surface is 100 feet (30.5 m) beneath the approach/departure surface.

**(3)** The width of the safety surface increases as a function of distance from the safety area. From the safety area perimeter, the object identification surface extends laterally to a point 100 feet (30.5 m) outside the safety area perimeter. At the upper end of the surface, the object identification surface extends laterally 200 feet (61 m) on either side of the approach/departure path.

**b. Shielding of objects.** Title 14 CFR part 77.9, Construction or alteration requiring notice, provides that if there are a number of objects close together, it may not be necessary to mark all of them if they are shielded. To meet the shielding guidelines part 77 requires that an object "be shielded by existing structures of a permanent and substantial nature or by natural terrain or topographic features of equal or greater height, and will be located in the congested area of a city, town, or settlement where the shielded structure will not adversely affect safety in air navigation."

**c. Equipment/object marking.** Make heliport maintenance and servicing equipment, as well as other objects used in the airside operational areas, conspicuous with paint, reflective paint, reflective tape, or other reflective markings. Find additional guidance in AC 150/5210-5, Painting, Marking, and Lighting of Vehicles Used on an Airport.

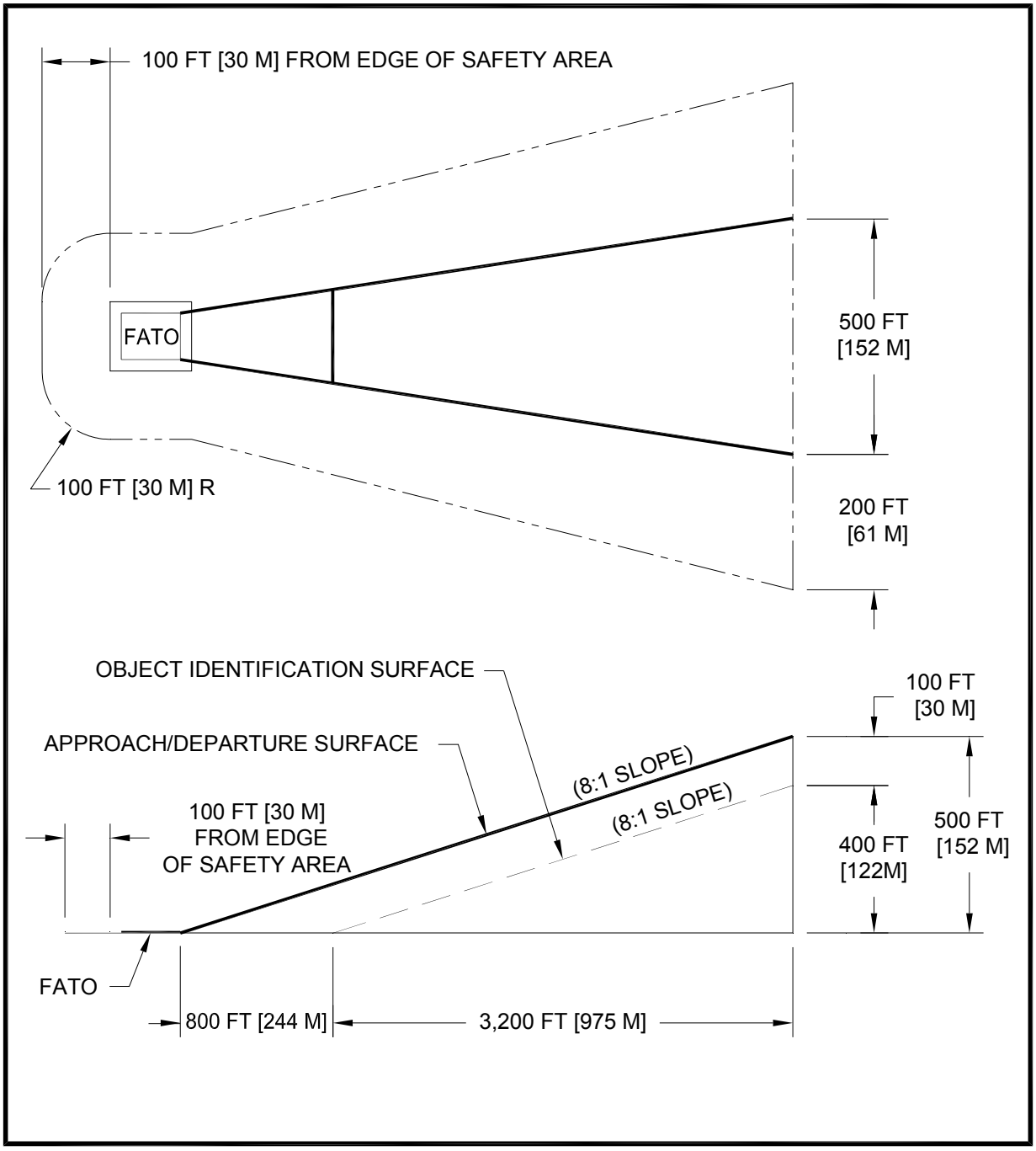



**Figure 4–32. Airspace Where Marking and Lighting are Recommended: Hospital**

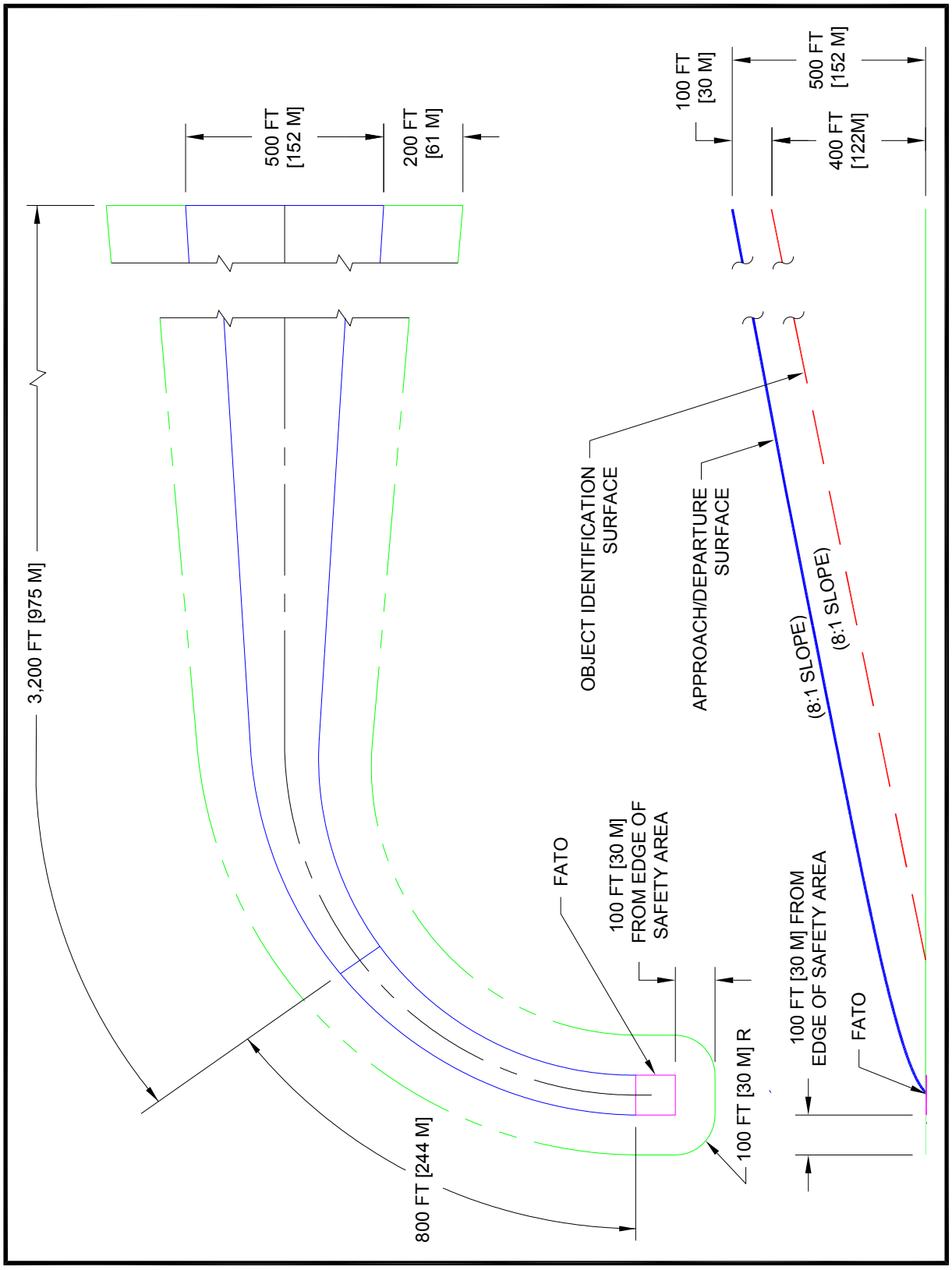



**Figure 4–33. Airspace Where Marking and Lighting are Recommended: Curved Approach: Hospital**

**417. Safety considerations.** Consider the safety enhancements discussed below in the design of a heliport. Address other areas such as the effects of rotor downwash based on site conditions and the design helicopter.

**a. Security.** Provide a means to keep the operational areas of a hospital heliport clear of people, animals, and vehicles. Use a method to control access depending upon the helicopter location and types of potential intruders.

**(1) Safety barrier.** At ground-level hospital heliports, erect a safety barrier around the helicopter operational areas in the form of a fence or a wall. Construct the barrier no closer to the operation areas than the outer perimeter of the safety area. Make sure the barrier does not penetrate any approach/departure (primary or transitional) surface. If necessary in the vicinity of the approach/departure paths, install the barrier well outside the outer perimeter of the safety area.

**(2)** Make sure any barrier is high enough to present a positive deterrent to persons inadvertently entering an operational area and yet low enough to be non-hazardous to helicopter operations.

**(3) Access.** Control access to airside areas in a manner commensurate with the barrier (for example, build fences with locked gates). Display a cautionary sign similar to that illustrated in Figure 4–34 on gates and doors. As an option at hospital heliport, secure operational areas via the use of security guards and a mixture of fixed and movable barriers.

**b. Rescue and fire-fighting services.** Heliports are subject to state and local rescue and fire-fighting regulations. Provide a fire hose cabinet or extinguisher at each access gate/door and each fueling location. Locate fire hose cabinets, fire extinguishers, and other fire-fighting equipment near, but below the level of, the TLOF. Find additional information in various NFPA publications. For more reference material, see Appendix D.

**c. Communications.** Use a Common Traffic Advisory Frequency (CTAF) radio to provide arriving helicopters with heliport and traffic advisory information but do not use this radio to control air traffic. Contact the Federal Communications Commission (FCC) for information on CTAF licensing.

**d. Weather information.** An automated weather observing system (AWOS) measures and automatically broadcasts current weather conditions at the heliport site. When installing an AWOS, locate it at least 100 feet (30 m) and not more than 700 feet (213 m) from the TLOF and such that its instruments will not be affected by rotor wash from helicopter operations. Find guidance on AWOS systems in AC 150/5220-16, Automated Weather Observing Systems (AWOS) for Non-Federal Applications, and FAA Order 6560.20, Siting Criteria for Automated Weather Observing Systems (AWOS). Other weather observing systems will have different siting criteria.

**e. Winter operations.** Swirling snow raised by a helicopter's rotor wash can cause the pilot to lose sight of the intended landing point and/or hide objects that need to be avoided. Design the heliport to accommodate the methods and equipment used for snow removal. Design the heliport to allow the snow to be removed sufficiently so it will not present an obstruction hazard to the tail rotor, main rotor, or undercarriage. Find guidance on winter operations in AC 150/5200-30, Airport Winter Safety and Operations.




**Figure 4–34. Caution Sign: Hospital**

**418. Visual glideslope indicators (VGSI).** A VGSI provides pilots with visual vertical course and descent cues. Install the VGSI such that the lowest on-course visual signal provides a minimum of 1 degree of clearance over any object that lies within 10 degrees of the approach course centerline.

**a. Siting.** The optimum location of a VGSI is on the extended centerline of the approach path at a distance that brings the helicopter to a hover with the undercarriage between 3 and 8 feet (0.9 to 2.5 m) above the TLOF. Figure 4–35 illustrates VGSI clearance criteria. To properly locate the VGSI, estimate the vertical distance from the undercarriage to the pilot's eye.

**b. Control of the VGSI.** As an option, allow the VGSI to be pilot controllable such that it is "on" only when required.

**c. VGSI needed.** A VGSI is an optional feature. However, provide a VGSI if one or more of the following conditions exist, especially at night:

**(1)** Obstacle clearance, noise abatement, or traffic control procedures require a particular slope to be flown.

**(2)** The environment of the heliport provides few visual surface cues.

**d. Additional guidance.** AC 150/5345-52, Generic Visual Glideslope Indicators (GVGI), and AC 150/5345-28, Precision Approach Path Indicator (PAPI) Systems, provide additional guidance.

**419. Zoning and compatible land use.** Where state and local statutes permit, the FAA encourages a hospital heliport operator to promote the adoption of the following zoning measures to ensure the heliport will continue to be available and to protect the investment in the facility.

**a. Zoning to limit building/object heights.** Find general guidance on drafting an ordinance that would limit building and object heights in AC 150/5190-4, A Model Zoning Ordinance to Limit Height of Objects Around Airports. Substitute the heliport surfaces for the airport surfaces in the model ordinance.

**b. Zoning for compatible land use.** The FAA encourages public agencies to enact zoning ordinances to control the use of property within the HPZ and the approach/departure path environment, restricting activities to those compatible with helicopter operations.

**e. Air rights and property easements.** Use air rights and property easements as options to prevent the encroachment of obstacles in the vicinity of a heliport.

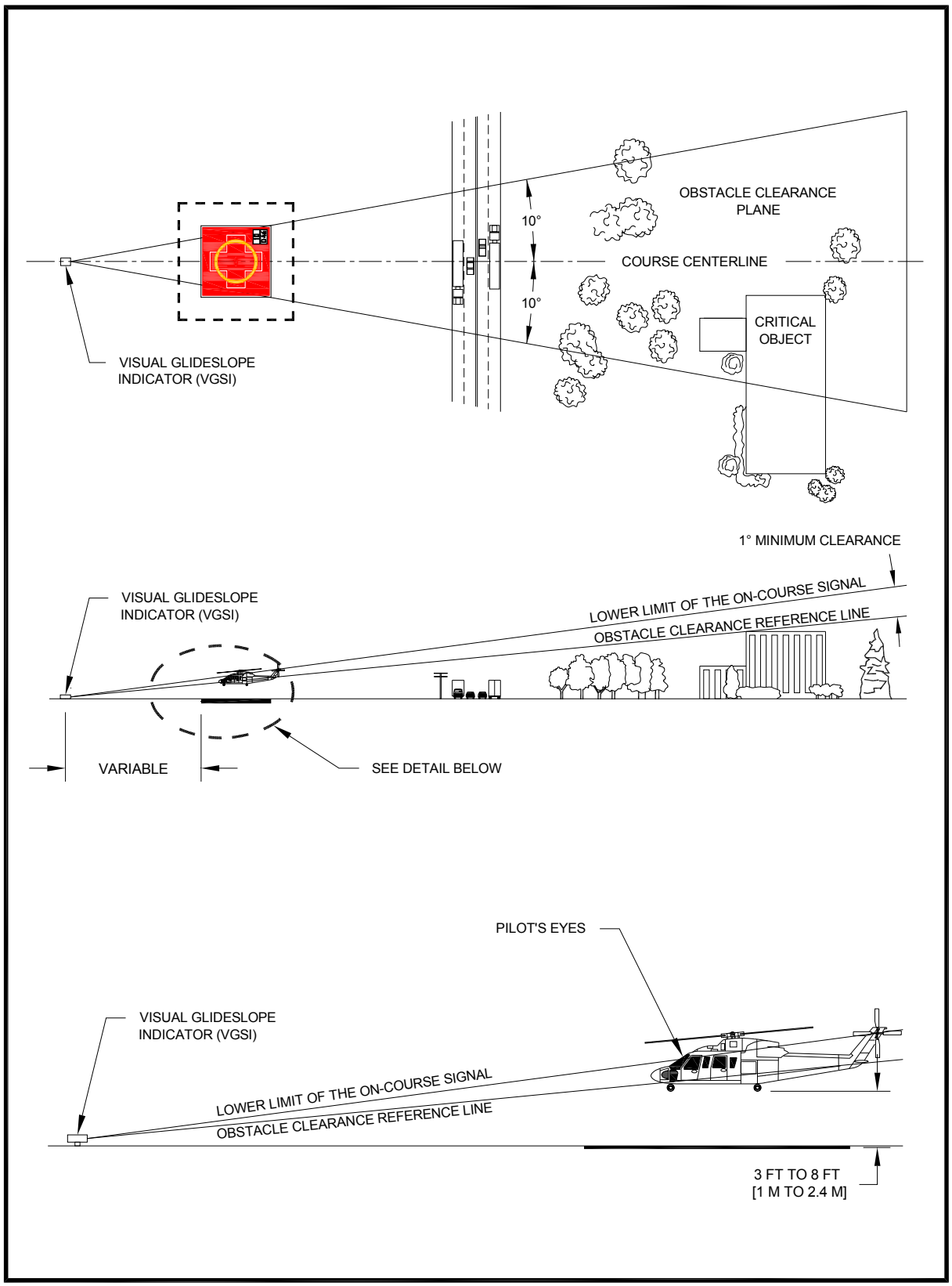



**Figure 4–35. Visual Glideslope Indicator Siting and Clearance Criteria: Hospital**

# Chapter 5. Helicopter Facilities on Airports

**501. General.** Helicopters are able to operate on most airports without unduly interfering with airplane traffic. If necessary, provide separate facilities and approach/departure procedures when the volume of airplane and/or helicopter traffic affects operations. At airports with interconnecting passenger traffic, provide gates at the terminal for helicopter boarding. People who use a helicopter to go to an airport generally require convenient access to the airport terminal and the services provided to airplane passengers. Identify the location of the exclusive-use helicopter facilities, TLOFs, FATOs, safety areas, approach/departure paths, and helicopter taxi routes and taxiways on the airport layout plan (ALP). This chapter addresses design considerations for providing separate helicopter facilities on airports. Figure 5–1 shows an example of a heliport located on an airport. Other potential heliport locations are on the roofs of passenger terminals or parking garages serving passenger terminals.

**502. Applicability.** The standards in this chapter apply to projects funded under the Airport Improvement Program (AIP) or Passenger Facility Charge (PFC) program. For other projects/heliports, these standards are the FAA's recommendations for designing all heliports on airports. The design standards in this chapter assume there will never be more than one helicopter within the final approach and takeoff area (FATO) and the associated safety area. If there is a need for more than one touchdown and lift-off area (TLOF) at a heliport, locate each TLOF within its own FATO and within its own safety area. Unless otherwise noted, the standards in Chapter 2 apply to helicopter facilities serving general aviation operations and the standards in Chapter 3 apply to helicopter facilities serving transport operations.

**503. Touchdown and liftoff area (TLOF).** Locate the TLOF to provide ready access to the airport terminal or to the helicopter user's origin or destination.

**504. Final approach and takeoff area (FATO).** Table 5-1 provides standards for the distance between the centerline of an approach to a runway and the centerline of an approach to a FATO for simultaneous, same direction, VFR operations.

**Table 5-1. Recommended Distance between FATO Center to Runway Centerline for VFR Operations**

| Airplane Size | Small Helicopter 7,000 lbs or less | Medium Helicopter 7,001 to 12,500 lbs | Large Helicopter over 12,500 lbs |
|---|---|---|---|
| Small Airplane 12,500 lbs or less | 300 feet (91 m) | 500 feet (152 m) | 700 feet (213 m) |
| Large Airplane 12,500 lbs to 300,000 lbs | 500 feet (152 m) | 500 feet (152 m) | 700 feet (213 m) |
| Heavy Airplane Over 300,000 lbs | 700 feet (213 m) | 700 feet (213 m) | 700 feet (213 m) |

**505. Safety area.** Apply the safety area dimensions and clearances described in Chapter 2 to facilities being developed on an airport for general aviation helicopter use. Apply safety area dimensions and clearances in Chapter 3 to facilities being developed on an airport for transport helicopter use.

**506. VFR approach/departure paths.** To the extent practical, design helicopter approach/departure paths to be independent of approaches to and departures from active runways.

**507. Heliport protection zone (HPZ).** Establish an HPZ where it is practicable for the airport owner to acquire and plan the land uses within the HPZ. Where this is not practicable, the HPZ standards have recommendation status for that portion of the HPZ the airport owner does not control.

**508. Taxiways and taxi routes.** When developing exclusive helicopter taxiways or taxi routes at an airport, locate them to minimize interaction with airplane operations.

**509. Helicopter parking.** Locate helicopter parking positions as close to the intended destination or origination of the passengers as conditions and safety permit.

**510. Security.** Unless screening was carried out at the helicopter passengers' departure location, Transportation Security Administration regulations may require that a screening area and/or screening be provided before passengers enter the airport's secured areas. If necessary, establish multiple helicopter parking positions and/or locations in the terminal area to service helicopter passenger screening and/or cargo interconnecting needs. Find information about passenger at the Transportation Security Administration web site http://www.tsa.gov/public/.

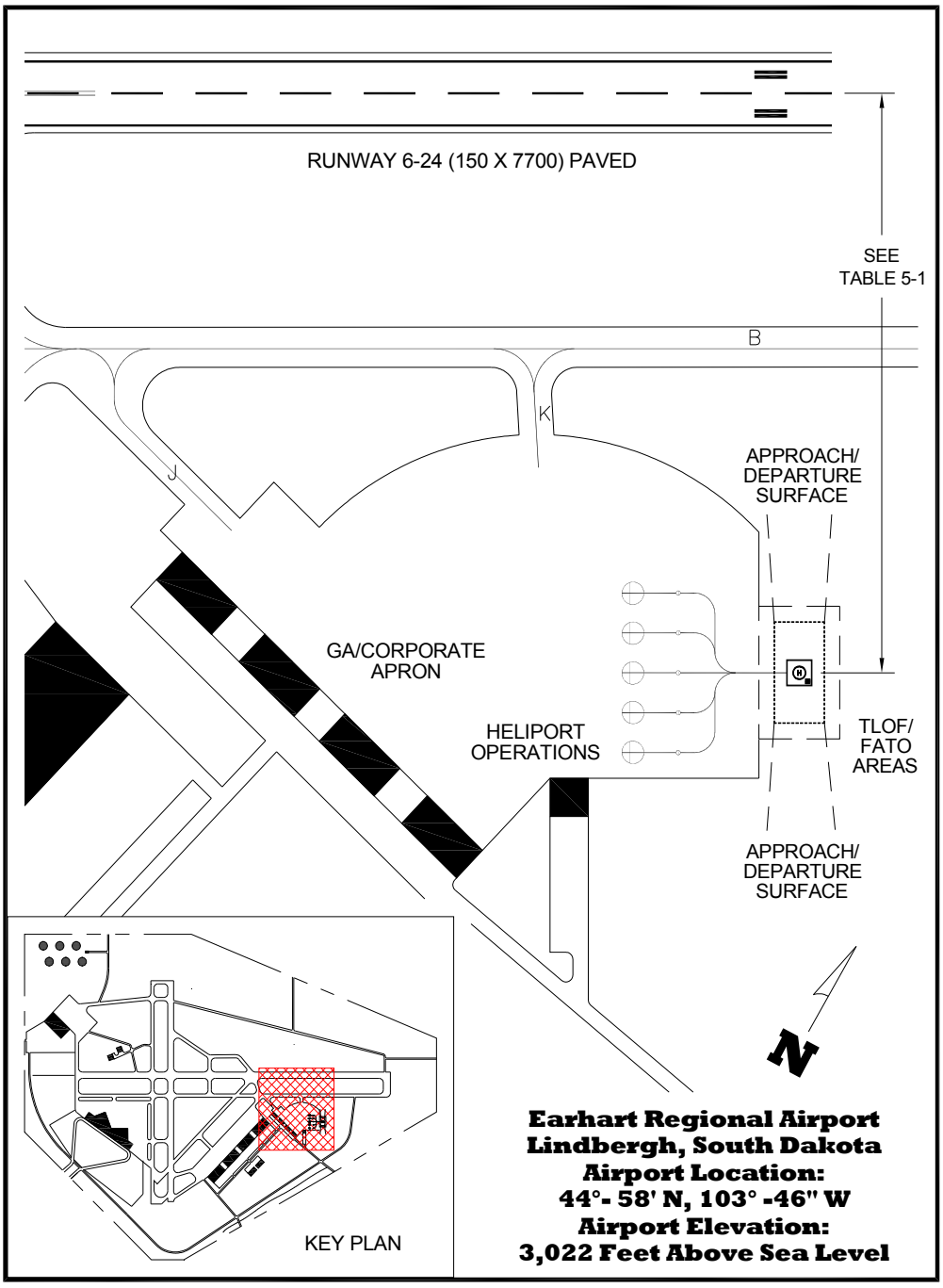



**Figure 5–1. Heliport Located on an Airport: On Airport**

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# Chapter 6. Instrument Operations

**601. General.** Instrument approach/departure/missed approach procedures permit helicopter operations to continue during periods of low cloud ceilings and reduced visibility. The FAA establishes Instrument approach procedures in accordance with FAA 8260 series Orders published by FAA Flight Procedures Standards Branch. When a heliport does not meet the criteria of this AC, or FAA 8260 Series Orders, the FAA publishes the helicopter instrument approach procedure as a SPECIAL procedure, with annotations that special aircrew qualifications, pilot training and aircraft equipment are required to fly the specific procedure(s).

**602. Planning.** This chapter addresses issues that heliport owners consider before requesting the development of instrument approach/departure/missed approach procedures. The standards and recommendations in this AC are not intended to be sufficient to design an instrument procedure. Initiate early contact with the appropriate FAA Flight Standards Office to establish instrument procedures.

**603. Airspace.** Those who design instrument approach/departure/missed approach procedures have some flexibility in the design of such procedures. For this and other reasons, the airspace required to support helicopter instrument approach/departure operations is complex, and it does not lend itself to simple descriptions, even using figures. Refer to the latest revision of FAA 8260-series orders for more detailed information on criteria for developing helicopter instrument approach/departure/missed approach procedures.

**604. Final approach reference area (FARA).** For precision instrument procedures only, a certificated helicopter precision approach procedure terminates with the helicopter coming to a hover or touching down within a 150-foot-wide (45 m) by at least 150-foot long (45 m) FARA. The FARA is located at the far end of a 300-foot-wide by 1,225-foot- long (91 m by 373 m) FATO required for a precision instrument procedure. For the purposes of requirements for LBA and lighting, substitute the FARA for the FATO. Figure 6–1 illustrates the FARA/FATO relationship.

**605. Improved lighting system.** Installing the lighting systems described below may result in lower visibility minimums. See Figure 6–2 and Figure 6–3.

**a. FATO perimeter lighting enhancement.** Insert an additional raised, green light meeting the standards of FAA Airports Engineering Brief 87, Heliport Perimeter Light for Visual Meteorological Conditions (VMC), between each light in the front and rear rows of the raised perimeter lights to enhance the definition of the FATO.

**b. Heliport instrument lighting system.** The HILS consists of 24 unidirectional PAR 56, 200-watt white lights that extend the FATO perimeter lights. The system extends both the right and left edge lights as “edge bars” and both the front and rear edge lights as “wing bars,” as shown in Figure 6–2.

**(1) Edge bars.** Place edge bar lights at 50-foot (15.2 m) intervals, measured from the front and rear row of the FATO perimeter lights.

**(2) Wing bars.** Space wing bar lights at 15-foot (4.57 m) intervals, measured from the line of FATO perimeter (side) lights.

**(3) Optional TLOF lights.** A line of seven white flush lights meeting the standards of EB 87 is optional. Space them at 5-foot (1.5 m) intervals in the TLOF pavement. Align these lights on the centerline of the approach course to provide close-in directional guidance and improve TLOF surface definition. These lights are illustrated in Figure 6–2.

**c. Heliport approach lighting System (HALS).** The HALS, depicted in Figure 6–3 is a distinctive approach lighting configuration designed to prevent it from being mistaken for an airport runway approach lighting system.

**606. Obstacle evaluation surfaces.** The instrument procedure developer considers the specific heliport location, its physical characteristics, the terrain, surrounding obstructions, and so on, in designing the helicopter instrument approach procedure. Upon development of the instrument procedure, protect its underlying obstacle evaluation surfaces from penetrations. See paragraph 221. Also see paragraphs 201.e, 301.e, and 401.e.

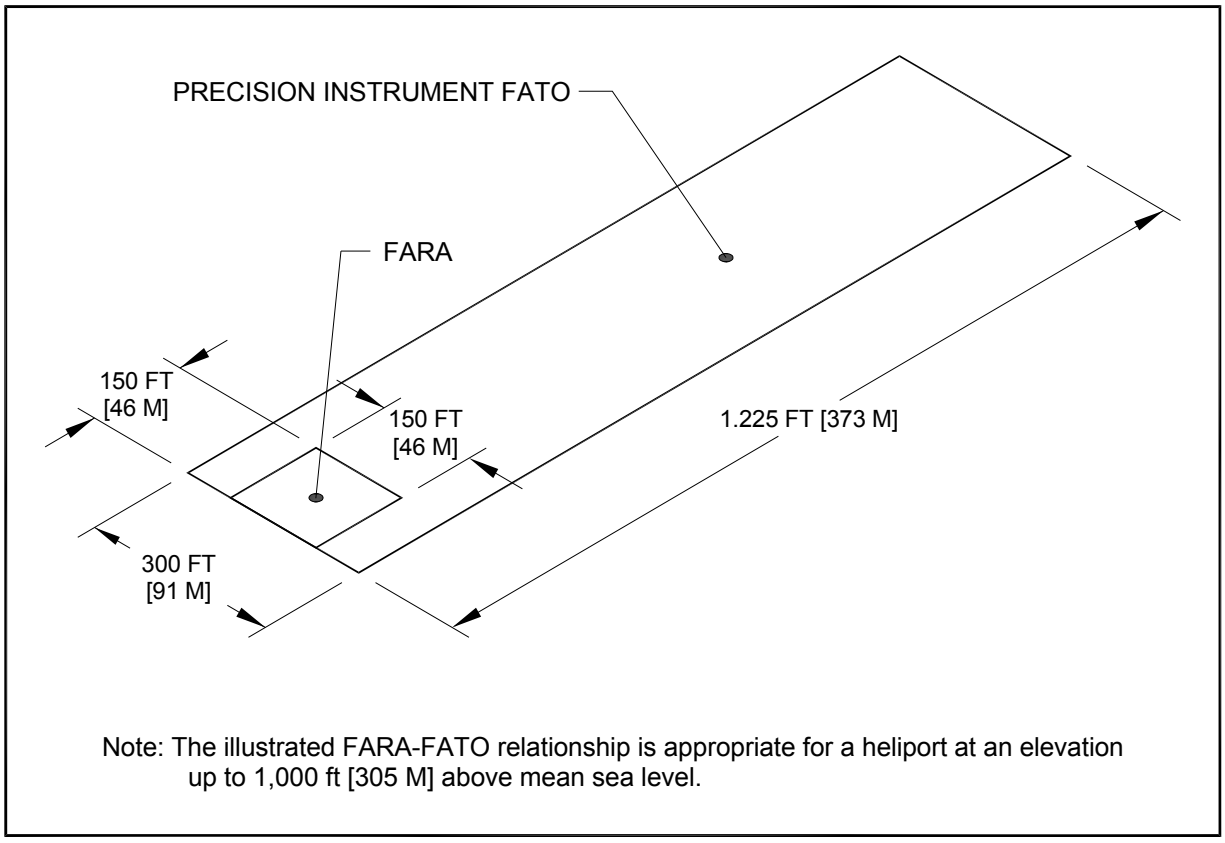



**Figure 6–1. FARA/FATO Relationship: Precision**

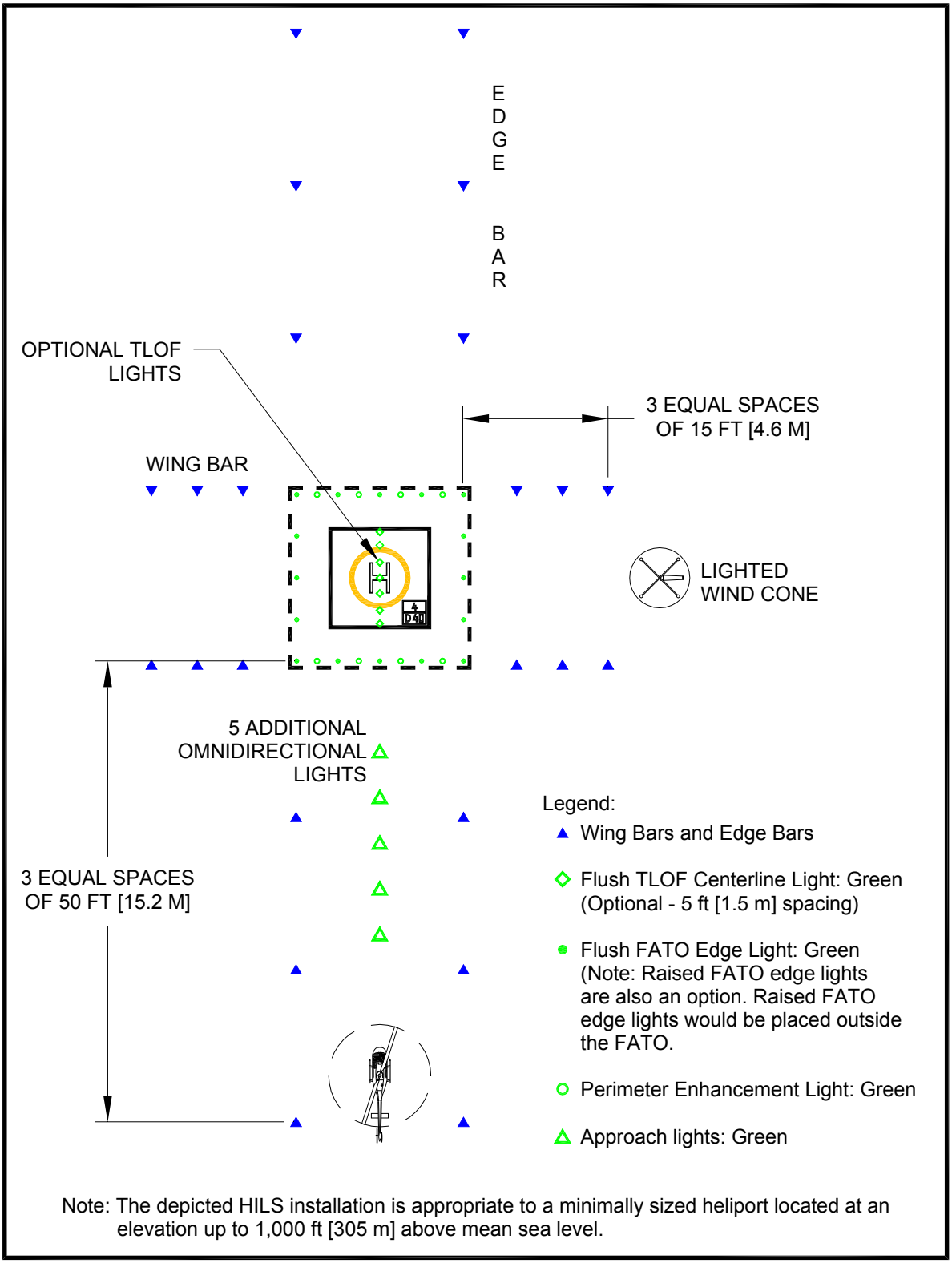



**Figure 6–2. Heliport Instrument Lighting System (HILS): Non-precision**

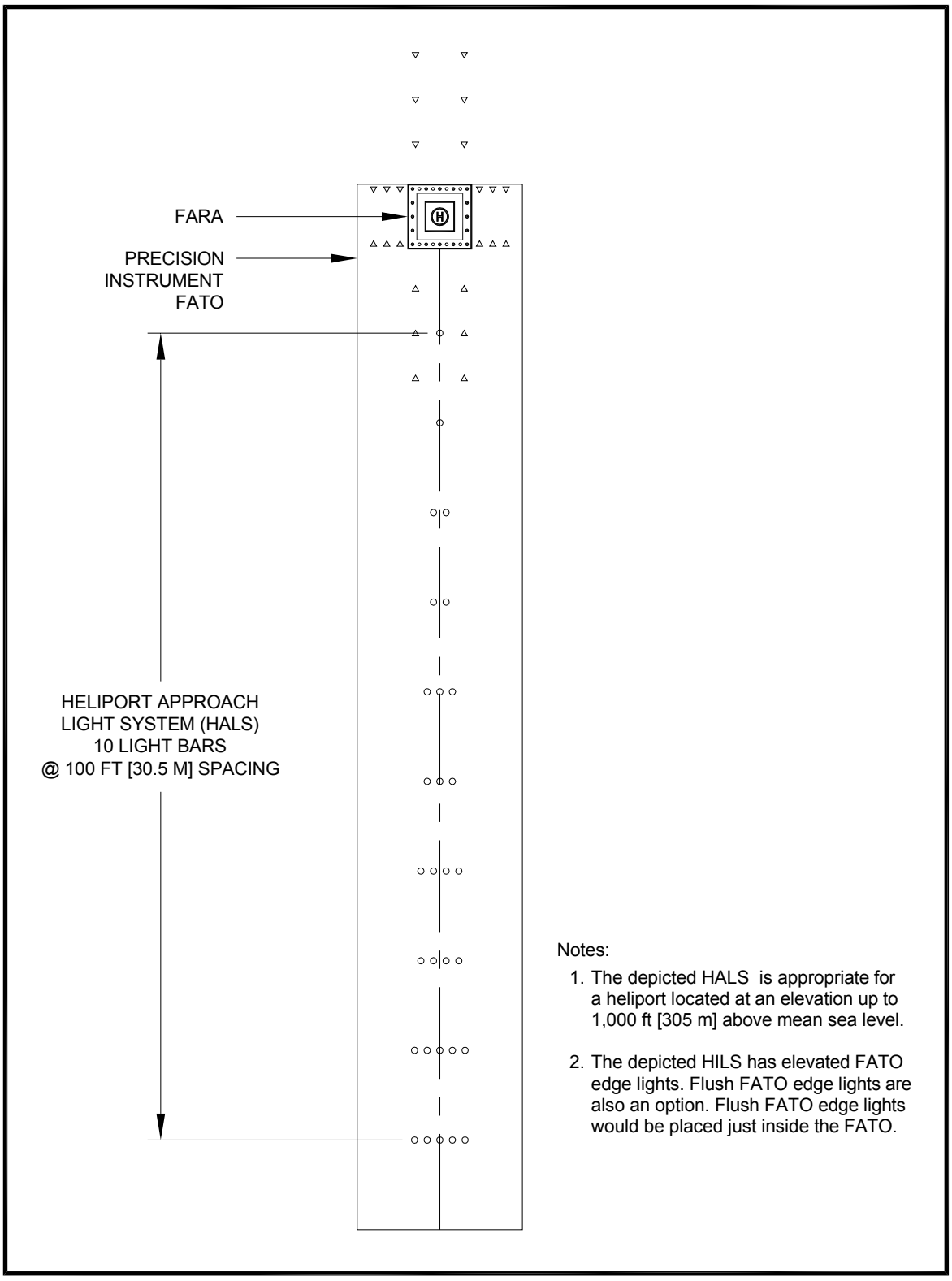



**Figure 6–3. Heliport Approach Lighting System**

# Chapter 7. Heliport Gradients and Pavement Design

**701. General.** This chapter provides guidance on designing heliport pavements, including design loads, and addresses soil stabilization as a method of treating non paved operational surfaces. Provide a present a reasonably smooth, uniformly graded surface for operational surfaces such as the TLOF, FATO, safety areas, parking areas, taxi routes, and taxiways. Design the surfaces of a heliport to provide positive drainage.

**702. TLOF gradients.**

**a. General aviation heliport.** To ensure drainage, design the TLOF to have a gradient between 0.5 percent and 2 percent.

**b. Transport heliport.** To ensure drainage, design the TLOF to have a longitudinal gradient between 0.5 and 1 percent and a transverse gradient between 0.5 and 1.5 percent.

**c. Hospital heliport.** To ensure drainage, design the TLOF to have a gradient between 0.5 and 1 percent and 2 percent.

**703. FATO gradients.**

**a. Load bearing FATO.** Design a load bearing FATO to have a gradient between 0.5 percent and 5 percent. Design the gradient to be not more than 2 percent in any areas where a helicopter is expected to land. To ensure TLOF drainage, design gradients of rapid runoff shoulders to be between 3 and 5 percent. These standards are illustrated in Figure 7–1 below for a concrete TLOF and stabilized turf FATO.

**b. Non-load bearing FATO.** When the FATO is non-load bearing and/or not intended for use by the helicopter, there are no specific requirements for the gradient of the surface. In this case, design the gradient to be 5 percent or more to ensure adequate drainage away from the area of the TLOF. However, stabilize non-load bearing surfaces. See paragraph 707.

**704. Safety area gradients.** Design the surface of the safety area to be no steeper than a downward slope of 2:1 (2 units horizontal in 1 unit vertical). In addition, make sure the surface of the safety area is not higher than the FATO edge.

**705. Parking area gradients.** Design all helicopter parking area grades to not exceed 2 percent.

**706. Taxiway and taxi route gradients.** Design taxiway longitudinal gradients to not exceed 2 percent. Design transverse gradients to be between 0.5 percent and 2 percent.

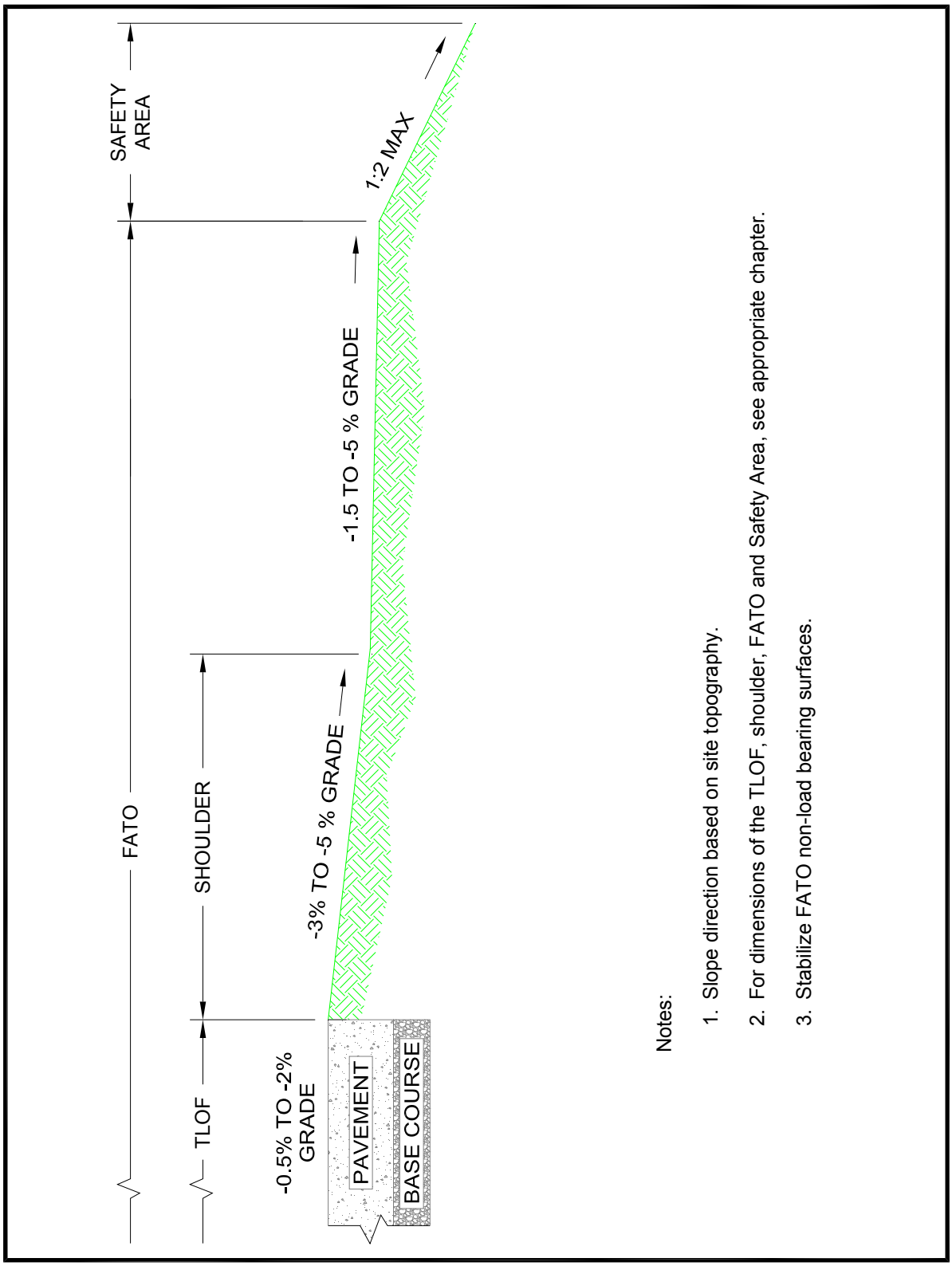



**Figure 7–1. Heliport Grades and Rapid Runoff Shoulder: Gradients and Pavement**

**707. Design loads.** Design and construct the TLOF and any load-bearing surfaces to support the weight of the design helicopter and any ground support vehicles. Loads are applied through the contact area of the tires for wheel-equipped helicopters or the contact area of the skid for skid equipped helicopters. Find lists of Helicopter weights, landing gear configurations, and dimensional data in Appendix B.

**a. Static loads.** For design purposes, the design static load is equal to the helicopter's maximum takeoff weight applied through the total contact area of the wheels or skids. Contact manufacturers to obtain the contact area for the specific helicopters of interest.

**b. Dynamic loads.** A dynamic load of 0.2 second or less duration may occur during a hard landing. For design purposes, assume dynamic loads at 150 percent of the takeoff weight of the design helicopter. When specific loading data is not available, assume 75 percent of the weight of the design helicopter to be applied equally through the contact area of the rear two rear wheels (or the pair rear wheels of a dual-wheel configuration) of a wheel-equipped helicopter. For a skid equipped helicopter assume 75 percent of the weight of the design helicopter to be applied equally through the aft contact areas of the two skids of a skid-equipped helicopter. (See Figure 7–2.) Contact manufacturers to obtain the aft contact area for specific helicopters of interest.

**c. Rotor loads.** Rotor downwash loads are approximately equal to the weight of the helicopter distributed uniformly over the disk area of the rotor. Tests have established that rotor downwash loads are generally less than the loads specified in building codes for snow, rain, or wind loads typically used in structural design calculations.

**708. Pavement design and soil stabilization.** Pavements distribute helicopters' weight over a larger area of the subsurface as well as provide a water-impervious, skid-resistant wearing surface. Pave TLOFs, FATOs, taxiways, and parking aprons to improve their load carrying ability, minimize the erosive effects of rotor wash, and facilitate surface runoff. Stabilize unpaved portions of the FATO and taxi routes subjected to rotor wash. In some instances, loads imposed by ground support vehicles may exceed those of the largest helicopter expected to use the facility. Find guidance on pavement design and on stabilizing soils in AC 150/5320-6, Airport Pavement Design and Evaluation, and AC 150/5370-10, Standards for Specifying Construction of Airports. These ACs are available at the Airports web site (http://www.faa.gov/airports).

**a. Pavements.** In most instances, a 6-inch thick (15 cm) portland cement concrete (PCC) pavement is capable of supporting operations by helicopters weighing up to 20,000 pounds (9,070 kg). Use thicker pavements for heavier helicopters or where the quality of the subsurface soil is questionable. If feasible, use PCC pavement for all surfaces used by helicopters.

**b. Stabilizing soils.** Use appropriate methods of soil stabilization to meet different site requirements. Consider helicopter weight, ground support vehicle weight, operational frequency, soil analysis, and climatic conditions in selecting the method(s) and extent of surface stabilization.

**(1) Turf.** A well-drained and well-established turf that presents a smooth, dense surface is usually the most cost-effective surface stabilization available. In some combinations of climates and weather conditions, turf surfaces are capable of supporting the weight of many of the smaller helicopters for low frequency use by private and corporate operators during much of the year. Turf surfaces also provide reasonable protection against wind, rotor wash, or water erosion. Climatic and soil conditions dictate the appropriate grass species to use at the site. Find guidance on turf establishment in AC 150/5370-10.

**(2) Aggregate turf.** Where heliports are located on soils that have poor load-carrying capabilities when wet, consider overcoming this deficiency by mixing selected granular materials into the upper 12 inches (30 cm) of the soil. Suitable granular materials for this purpose are crushed stone, pit-run

gravel, coarse sand, or oyster shells. Use a sufficient ratio of aggregate to soil to improve the stability of the soil yet retain the soil's ability to support grass. For additional guidance, see Item 217 of AC 150/5370-10.

**c. Formed masonry shapes.** Precast masonry shapes vary in size and shape-from a brick paver to an open block. Lay pavers on a prepared bed to present a solid surface. Embed precast blocks in the soil with grass growing in the natural openings. Architectural catalogs identify different masonry shapes that are commercially available for this purpose.

**d. Pierced metal panels.** Lay perforated metal panels that allow grass to grow through the openings on the ground to provide a hard surface for helicopter operations. Engineering catalogs identify commercially available panels.

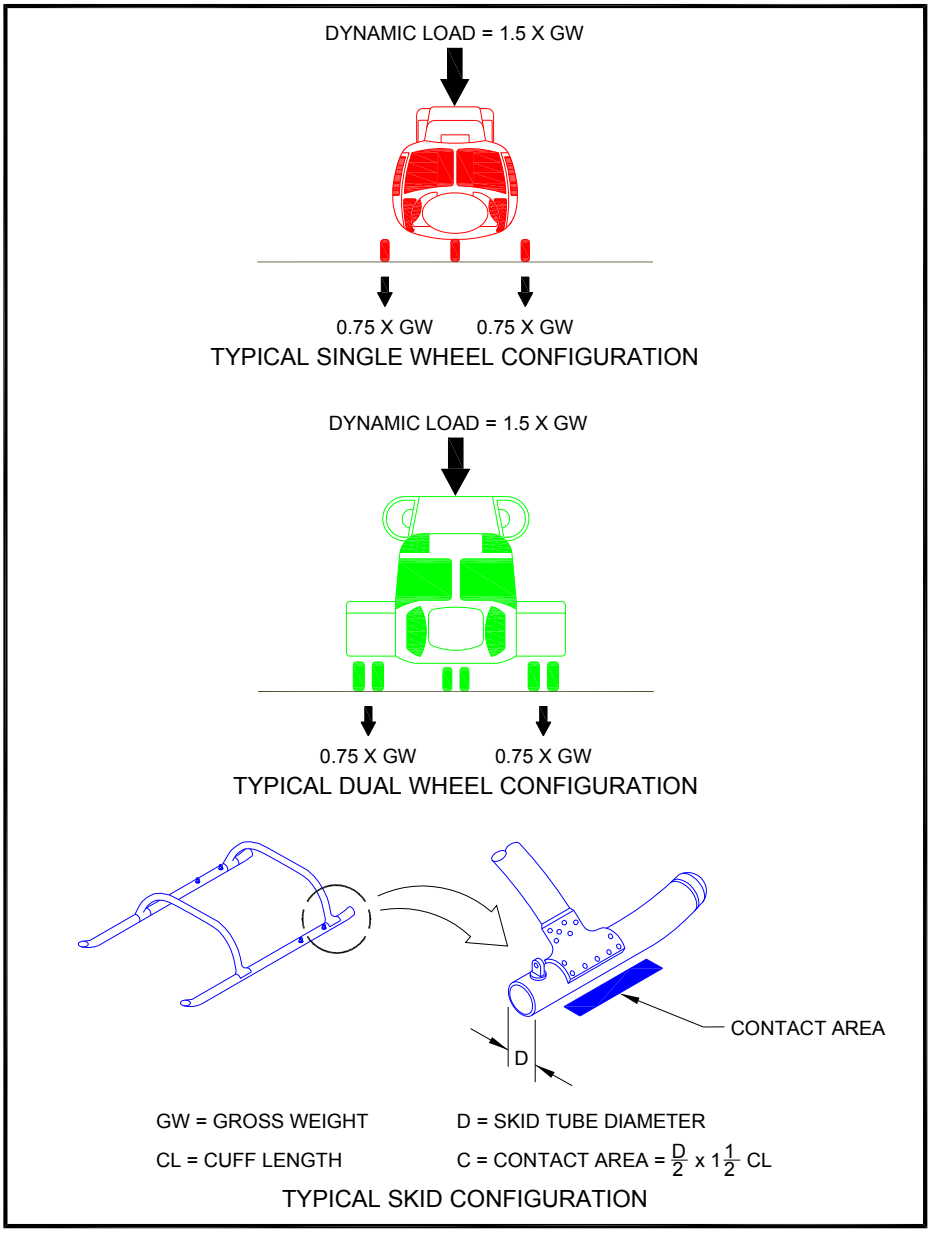



**Figure 7–2. Helicopter Landing Gear Loading: Gradients and Pavement**

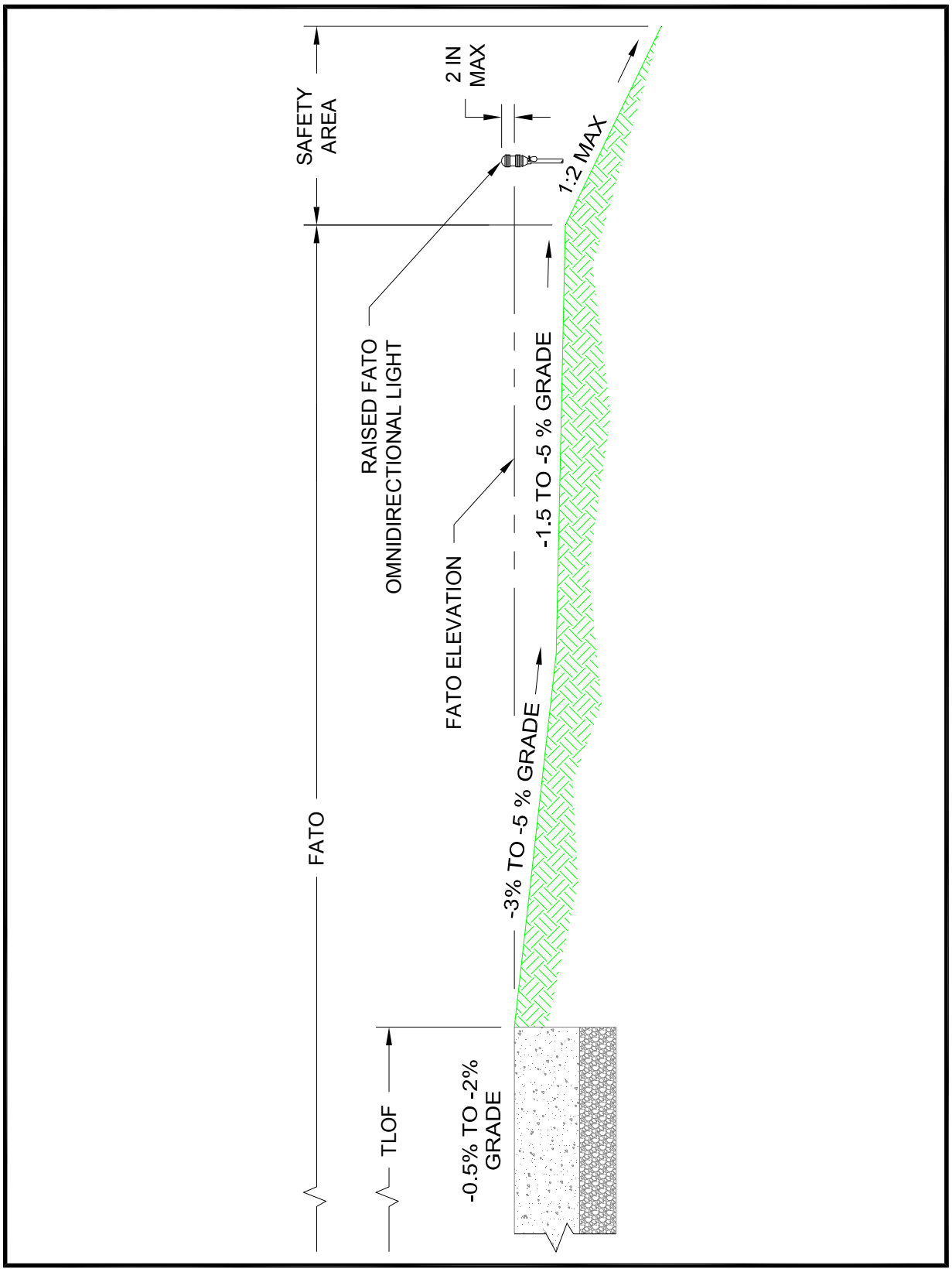



**Figure 7–3. FATO Elevation**

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# Appendix A. Emergency Helicopter Landing Facilities (EHLF)

**A-1. General**. Preplanning emergency landing areas will result in safer and more effective air-support operations. These facilities comprise rooftop emergency facilities and medical emergency sites. Use the following as a guide for developing emergency helicopter landing facilities (EHLF).

**A-2. Notification and coordination.** In addition to any requirements to provide notice under part 157, advise the local Terminal Approach Radar Control or the local Air Traffic Control facility manager in writing of the EHLF.

**A-3. Rooftop emergency facilities.** Review local building codes to determine if they require structures over a specified height to provide a clear area on the roof capable of accommodating a helicopter to facilitate fire fighting or emergency evacuation operations.

**a. Building code requirements.** State and local building code requirements apply to rooftop facilities. Develop the landing surface to the local fire department requirements based on the size and weight of the helicopter(s) expected to engage in fire or rescue operations (see Figure A-1). Find additional information in various National Fire Protection Association (NFPA) publications. For more reference material, see Appendix D.

**b. TLOF.**

**(1) Size.** Design the TLOF to be square, rectangular or circular in configuration and centered within the EHLF. Design the length and width or diameter to be at least 40 feet (12.2 m)

**(2) Weight capacity.** Design the TLOF to accept a 13,500-pound gross weight (GW) helicopter plus an impact load of 1.5 times GW.

**(3) Access.** Provide two pedestrian access points to the TLOF at least 90 degrees apart with a minimum of 60 feet (18 m) TLOF perimeter separation.

**(4) Drainage.** Design the surface so drainage flows away from pedestrian access points, with a maximum slope of 1.5 percent.

**c. FATO.** Design the FATO to be at the same level as the TLOF.

**(1) Size.** Design the FATO to extend a distance of at least 45 feet (13.7 m) in all directions from the center of the EHLF. For safe operation, provide clearance of one third of the rotor diameter (RD) of the largest helicopter expected but not less than 20 feet (6.1 m)between the helicopter's main and tail rotor blades and any object that could be struck by these blades.

**(2) Obstructions.** As an option, design the FATO to be an imaginary surface outside the TLOF and extending beyond the structure edge. Design the FATO to be unobstructed and without penetration of obstacles such as parapets, window washing equipment, penthouses, handrails, antennas, vents, etc.

**d. Safety area.** Provide a clear, unobstructed area, a minimum of 12 feet (3.7 m) wide, on all sides, outside and adjacent to the FATO.

**e. Safety net.** If the platform is elevated 4 feet (1.2 m) or more above its surroundings, Title 29 CFR Part 1910.23 Guarding Floor and Wall Openings and Holes, requires the provision of fall protection. The FAA recommends such protection for all platforms elevated 30 inches (76 cm) or more. However, do not use permanent railings or fences, since they would be safety hazards during helicopter operations. As an option, install a safety net, meeting state and local regulations but not less than 5 feet (1.5 m) wide. Design the safety net to have a load carrying capability of 25 lbs/sq ft (122 kg/sq m). Make sure the net does not project above the level of the TLOF. Fasten both the inside and outside edges of the safety net to a solid structure. Construct nets of materials that are resistant to environmental effects.

**f. Markings.**

**(1) TLOF perimeter.** Define the limits of the touchdown pad with a solid 12-inch (30 cm) wide red or orange line as illustrated in Figure A-1.

**(2) Touchdown/positioning circle (TDPC) marking.** Center a 12-inch wide red or orange circular marking, 30 feet (9.1 m) in diameter, within the TLOF. Use a contrasting color for the background within the circle.

**(3) Weight capacity.** Mark the TLOF with the maximum takeoff weight of the design helicopter, in units of thousands of pounds (for example, a number "9," indicating 9,000 lbs GW), with each numeral ten feet in length, centered within the TLOF.

**(4) Markings for pedestrians.** Clearly mark rooftop access paths, EHLF access paths, and assembly zone(s) with surface paint and instructional signage.

**g. Access.**

**(1) Stairs.** Provide a minimum of two rooftop access stairs, with no less than 150 degrees separation, connecting to the top floor of the structure, with at least one providing access to the structure's emergency staircase.

**(2) Doors.** Keep penthouse and stairwell rooftop access doors unlocked at all times to provide access to the EHLF. As an option, equip doors with "panic bar" hardware and/or alarm them.

**h. Wind cone.** Locate a wind cone assembly with an orange wind cone within the line of sight from the EHLF and outside the approach/departure path(s).

**i. Lighting.** Shield ambient rooftop lighting to avoid affecting the pilot's vision.

**A-4. Medical emergency sites.** Medical emergency sites are clear and level areas near the scene of an accident or incident that the local emergency response team designates as the place where the helicopter air ambulance is directed to land in order to transport an injured person to a hospital. Provide such sites in various locations within a jurisdiction to support fast response to medical emergencies and accidents. Pre-designating medical emergency sites provides the opportunity to inspect potential sites in advance and to select sites that have adequate clear approach/departure airspace and adequate clear ground space.

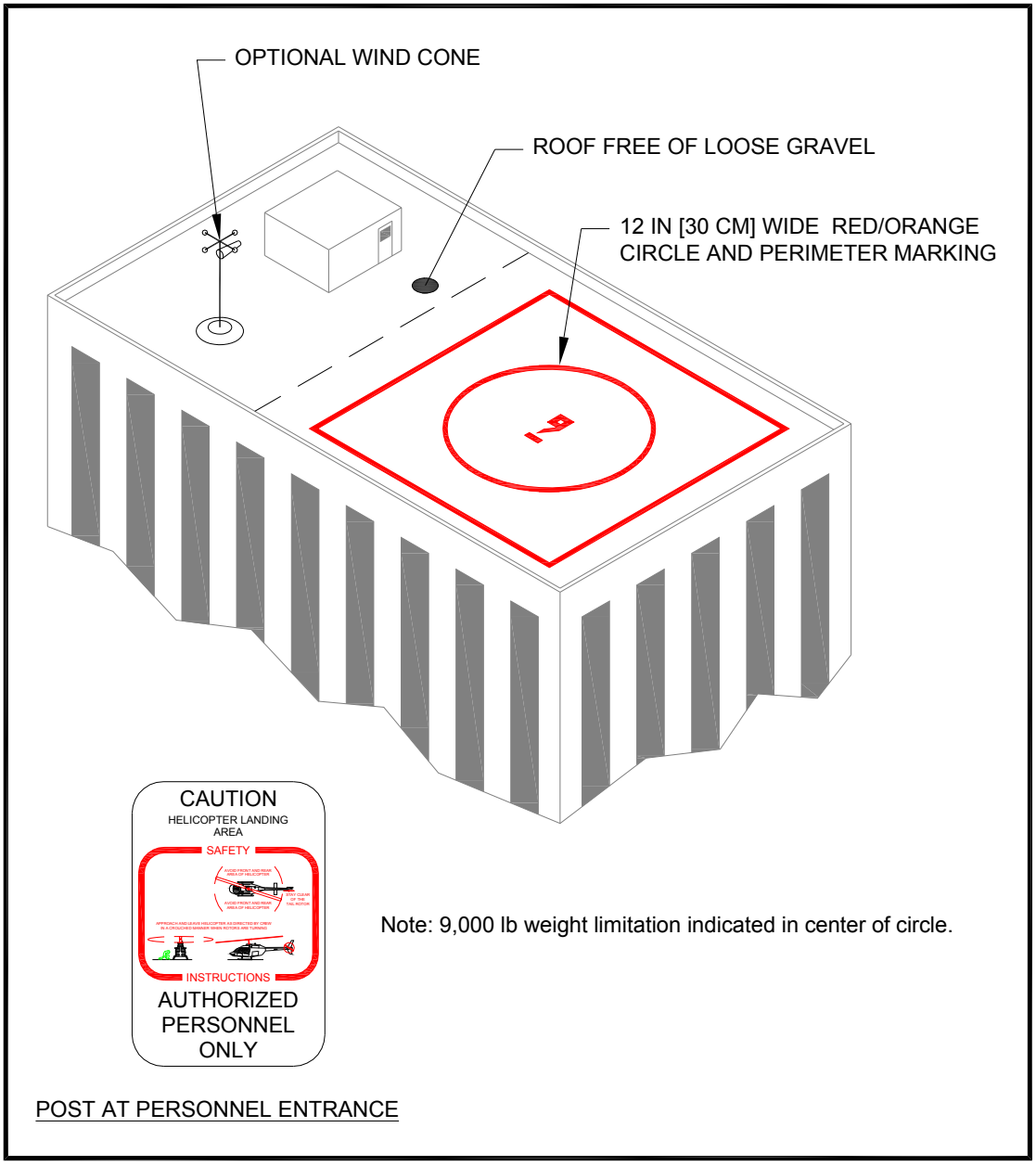



**Figure A-1. Rooftop Emergency Landing Facility**

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# Appendix B. Helicopter Data

This appendix contains selected helicopter data needed by a heliport designer. These data represent the most critical weight, dimensional, or other data entry for that helicopter model, recognizing that specific versions of the model may weigh less, be smaller in some feature, carry fewer passengers, etc.

Various helicopter manufacturers have provided this information, but confirm data by contacting the manufacturer(s) of the specific helicopter(s) of interest.

**Legend**

| | |
|---|---|
| A | Manufacturer name and helicopter model |
| B | Maximum takeoff weight in pounds. |
| D | Overall length in feet. (Rotors at their maximum extension.) |
| H | Overall height in feet. (Usually at tail rotor.) |
| RD | Rotor diameter in feet. |
| E | Number of blades. |
| F | Rotor plane clearance in feet. |
| TR | Distance from rotor hub to tip of tail rotor in feet. |
| I | Tail rotor diameter (in feet). |
| J | Number of tail rotor blades. |
| K | Tail rotor ground clearance in feet. |
| L | Type of undercarriage. |
| UCL | Undercarriage length in feet. |
| UCW | Undercarriage width in feet. (The distance between the outside edges of the tires or the skids.) |
| M | Number and type of engines |
| N | Number of crew and passengers. |

| Manufacturer/ Model | Max Takeoff Weight | Overall Length (ft) | Overall Height (ft) | Main Rotor | | | | Tail Rotor | | | Undercarriage | | | Number of Engines/ Type | Crew Number/ Pax Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Diameter (ft) | Number of Blades | Ground Clearance (ft) | Tail Rtr Circle Radius (ft) | Diameter (ft) | Number of Blades | Ground Clearance (ft) | Type | Length (ft) | Width (ft) | | |
| A | B | D | H | RD | E | F | TR | I | J | K | L | UCL | UCW | M | N |
| **AgustaWestland** | | | | | | | | | | | | | | | |
| A-109A | 5,732 | 42.8 | 11.2 | 36.1 | 4 | 10 | 25 | 6.7 | 2 | 2.3 | wheel | 11.6 | 7.5 | 2-T | 1-2& 6-7 |
| A-119 Koala | 5,997 | 42.7 | 12.4 | 36.6 | 4 | 8.3 | 25.5 | 6.4 | 2 | 4.2 | skid | 13.4 | 5.5 | 1-T | 1&6-7 |
| AW-109E Power | 6,283 | 42.8 | 11.5 | 36.1 | 4 | 8 | | 6.4 | 2 | 3 | wheel | 11.5 | 7.1 | 2-T | 1&7 |
| AW-109S Grand | 7,000 | 42.5 | 11.2 | 35.5 | 4 | 8 | | 6.4 | 2 | 3.3 | wheel | 12.3 | 7.1 | 2-T | 1-2& 6-7 |
| AW-119 Ke | 6,283 | 42.4 | 11.8 | 35.5 | 4 | 9.3 | | 6.4 | 2 | 3.8 | skid | 11.1 | 7 | 1-T | 1&6-7 |
| AW-139 | 14,991 | 54.7 | 16.4 | 42.6 | 5 | 12.9 | | 8.9 | 4 | 7.5 | wheel | 14.2 | 10 | 2-T | 1-2& 15 |
| AW-101 | 34,392 | 74.8 | 21.7 | 61 | 5 | 15.4 | 45 | 13.1 | | 8.4 | wheel | 23 | 14.8 | 3-T | 3&30 |
| Westland WG30 | 12,800 | 52.2 | 15.5 | 43.7 | 4 | 12.5 | 31 | 8 | 4 | 7.5 | wheel | 17.9 | 10.1 | 2+T | 2&19 |
| **Bell Helicopter** | | | | | | | | | | | | | | | |
| 47G | 2,950 | 43.6 | 9.3 | 37.1 | 2 | 5 | 25 | 6.1 | 2 | 3.5 | skid | 9.9 | 7.5 | 1-P | 1&2-3 |
| 205B, UH-1H, Huey II, 210 | 10,500 | 57.8 | 14.5 | 48 | 2 | 7.3 | 33.1 | 8.5 | 2 | 5.9 | skid | 12.1 | 8.8 | 1-T | 1&14 |
| 206B-1,2,3 | 3,350 | 39.2 | 10.8 | 33.4 | 2 | 6 | 22.5 | 5.2 | 2 | 2.1 | skid | 8.1 | 6.7 | 1-T | 1&4 |
| 206L-1,3,4 | 4,450 | 42.4 | 10.9 | 37 | 2 | 6.4 | 24 | 5.4 | 2 | 3.5 | skid | 9.9 | 7.7 | 1-T | 1&6 |
| 212 | 11,200 | 57.3 | 14.9 | 48.2 | 2 | 7.5 | 22.2 | 8.5 | 2 | 6.1 | skid | 12.1 | 8.8 | 2-T | 1&14 |
| 214ST | 17,500 | 62.2 | 15.9 | 52 | 2 | 6.5 | 37 | 9.7 | 2 | 3.5 | wheel/ skid | 12.1 | 8.6 | 2-T | 2& 16-17 |
| 222B, UT | 8,250 | 50.3 | 12.2 | 42 | 2 | 9.2 | 29.2 | 6.9 | 2 | 2.7 | wheel/ skid | 12.2 | 7.8 | 2-T | 1&9 |
| 230 | 8,400 | 50.3 | 11.7 | 42 | 2 | 9.2 | 29.2 | 6.9 | 2 | 2.7 | wheel/ skid | 12.2 | 7.8 | 2-T | 1&9 |
| 407 | 5,250 | 41.4 | 10.2 | 35 | 4 | 7.8 | 24.3 | 5.4 | 2 | 3.2 | skid | 9.9 | 8.1 | 1-T | 1&6 |
| 412EP, SP, HP | 11,900 | 56.2 | 14.9 | 46 | 4 | 11.5 | 34 | 8.6 | 2 | 4.8 | skid | 12.1 | 9.5 | 2-T | 1&14 |
| 427VFR | 6,550 | 42.6 | 10.5 | 37 | 4 | 6.4 | 24.1 | 5.7 | 2 | 3.3 | skid | 10 | 8.3 | 2-T | 1&7 |
| 429 | 7,000 | 43 | 13.3 | 36 | 4 | 8.5 | | 5.4 | 2 | 3.5 | skid | 9.9 | 8.8 | 2-T | 1&7 |
| 430 | 9,300 | 50.3 | 13.3 | 42 | 4 | 8.2 | 29.2 | 6.9 | 2 | 3.7 | wheel/ skid | 12.4 | 9.2 | 2-T | 1&9 |

| Manufacturer/ Model | Max Takeoff Weight | Overall Length (ft) | Overall Height (ft) | Main Rotor | | | | Tail Rotor | | | Undercarriage | | | Number of Engines/ Type | Crew Number/ Pax Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Diameter (ft) | Number of Blades | Ground Clearance (ft) | Tail Rtr Circle Radius (ft) | Diameter (ft) | Number of Blades | Ground Clearance (ft) | Type | Length (ft) | Width (ft) | | |
| A | B | D | H | RD | E | F | TR | I | J | K | L | UCL | UCW | M | N |
| **Boeing** | | | | | | | | | | | | | | | |
| 107/CH-46E | 24,300 | 84.3 | 16.7 | 51 | 3 | 15 | 59 | 51 | 3 | 17 | wheel | 24.9 | 14.5 | 2-T | 3&25 |
| 234/CH-47F/G | 54,000 | 99 | 19 | 60 | 3 | 11 | 69 | 60 | 3 | 19 | wheel | 22.5 | 10.5 | 2-T | 3&44 |
| **Brantly/ Hynes** | | | | | | | | | | | | | | | |
| B-2B | 1,670 | 28.1 | 6.9 | 23.8 | 3 | 4.8 | 16 | 4.3 | 2 | 3 | skid | 7.5 | 6.8 | 1-P | 1&1 |
| 305 | 2,900 | 32.9 | 8.1 | 28.7 | 3 | 8 | 19 | 4.3 | 2 | 3 | wheel/ skid | 6.2 | 6.8 | 1-P | 1&4 |
| **Enstrom** | | | | | | | | | | | | | | | |
| F-28F/ 280FX | 2,600 | 29.3 | 9 | 32 | 3 | 6 | 20.6 | 4.7 | 2 | 3.1 | skid | 8 | 7.3 | 1-P | 1&2 |
| 480B/ TH-28 | 3,000 | 30.1 | 9.7 | 32 | 3 | 6.5 | 21.2 | 5 | 2 | 3.6 | skid | 9.2 | 8 | 1-T | 1&4 |
| **Erickson** | | | | | | | | | | | | | | | |
| S-64E/F Air Crane | 42,000 - 47,000 | 88.5 | 25.4 | 72 | 6 | 15.7 | 53 | 16 | 4 | 9.4 | wheel | 24.4 | 19.9 | 2-T | 3&0 |
| **Eurocopter** | | | | | | | | | | | | | | | |
| SA-315 Lama | 5,070 | 42.3 | 10.2 | 36.2 | 3 | 10.1 | 20 | 6.3 | 3 | 3.2 | skid | 10.8 | 7.8 | 1-T | 1&4 |
| SA-316/319 Alouette | 4,850 | 33.4 | 9.7 | 36.1 | 3 | 9.8 | 27.7 | 6.3 | 3 | 2.8 | wheel | 11.5 | 8.5 | 1-T | 1&4 |
| SA-330 Puma | 16,315 | 59.6 | 16.9 | 49.5 | 4 | 14.4 | 35 | 10 | 5 | 6 | wheel | 13.3 | 9.8 | 2-T | 2&20 |
| SA/AS-332, Super Puma | 20,172 | 61.3 | 16.3 | 53.1 | 4 | 14.6 | 36 | 10 | 5 | 7.1 | wheel | 17.3 | 9.8 | 2-T | 2&24 |
| SA-341/342 Gazelle | 4,100 | 39.3 | 10.2 | 34.5 | 3 | 8.9 | 23 | Fenstron | | 2.4 | skid | 6.4 | 6.6 | 1-T | 1&4 |
| AS-350 A Star | 4,960 | 42.5 | 11 | 35.1 | 3 | 10.6 | 25 | 6.1 | 2 | 2.3 | skid | 4.7 | 7.5 | 1-T | 1&6 |
| AS-355 Twin Star | 5,732 | 42.5 | 9.9 | 35.9 | 3 | 10.3 | 25 | 6.1 | 2 | 2.3 | skid | 9.6 | 7.1 | 2-T | 1&6 |
| AS-360 Dauphin | 6,600 | 43.3 | 11.5 | 37.7 | 4 | 10.7 | 25 | Fenstron | | 2.6 | wheel | 23.7 | 6.4 | 1-T | 1&13 |
| AS-365 Dauphin/H-65 Dolphin | 9,480 | 45.1 | 13.3 | 39.2 | 4 | 11.4 | 24 | Fenstron | | 2.6 | wheel | 11.9 | 6.2 | 2-T | 1&11 |
| BO-105 | 5,732 | 38.9 | 11.5 | 32.3 | 4 | 9.8 | 23 | 6.2 | 2 | 6.1 | skid | 8.3 | 8.2 | 2-T | 1&5 |
| BK-117 | 7,385 | 42.7 | 12.6 | 36.1 | 4 | 11 | 25 | 6.4 | 2 | 6.3 | skid | 11.6 | 8.2 | 2-T | 1&10 |

| Manufacturer/ Model | Max Takeoff Weight | Overall Length (ft) | Overall Height (ft) | Main Rotor | | | | Tail Rotor | | | Undercarriage | | | Number of Engines/ Type | Crew Number/ Pax Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Diameter (ft) | Number of Blades | Ground Clearance (ft) | Tail Rtr Circle Radius (ft) | Diameter (ft) | Number of Blades | Ground Clearance (ft) | Type | Length (ft) | Width (ft) | | |
| A | B | D | H | RD | E | F | TR | I | J | K | L | UCL | UCW | M | N |
| EC-120 | 3,780 | 37.8 | 11.2 | 32.8 | 3 | 10.1 | 24.6 | Fenstron | | 2.1 | skid | 9.4 | 6.8 | 1-T | 1&4 |
| EC-130 | 5,291 | 41.5 | 11.8 | 35.1 | 3 | 11 | 23.7 | Fenstron | | 5.3 | skid | 10.5 | 7.9 | 1-T | 1&7 |
| EC-135 | 6,250 | 40 | 11.5 | 33.5 | 4 | 11 | 22.8 | Fenstron | | 5.6 | skid | 10.5 | 6.6 | 2-T | 1&6 |
| EC-145/ UH-72A | 7,904 | 42.7 | 13 | 36.1 | 4 | 11.3 | 28 | 6.4 | 2 | 10.7 | skid | 9.5 | 7.9 | 2-T | 1&8 |
| EC-155 | 10,692 | 46.9 | 14.27 | 41.3 | 5 | 12 | 23 | Fenstron | | 3.1 | wheel | 12.8 | 6.2 | 2-T | 2&12 |
| EC-225 | 24,332 | 64 | 16.3 | 53.1 | 5 | 15.1 | 38 | 10.3 | 4 | 3.5 | wheel | 17.2 | 9.8 | 2-T | 2&24 |
| **Kaman** | | | | | | | | | | | | | | | |
| K-Max/ K1200 | 7,000 | 52 | 21 | 48.2 | 4 | 10.7 | 28 | n | a | n/a | wheel | 15.3 | 11.3 | 1-T | 1&0 |
| SH-2G Seasprite | 14,200 | 52.5 | 15.1 | 44 | 4 | | | 8.1 | 4 | | wheel | | | 2-T | 3&8 |
| **MD Helicopters** | | | | | | | | | | | | | | | |
| 500E | 3,000 | 30.8 | 8.4 | 26.4 | 5 | 8.2 | | 4.6 | 2 | 2 | skid | 8.1 | 6.3 | 1-T | 1&4 |
| 530F | 3,100 | 32.1 | 8.1 | 27.4 | 5 | 8 | 19 | 4.8 | 2 | 1.3 | skid | 8.1 | 6.4 | 1-T | 1&4 |
| 520N | 3,350 | 32.1 | 9.7 | 27.4 | 5 | 9.2 | 17 | NOTAR | | n/a | skid | 8.1 | 6.3 | 1-T | 1&4 |
| 600N | 4,100 | 36.9 | 9.8 | 27.5 | 6 | 9.2 | | NOTAR | | n/a | skid | 10.1 | 8.8 | 1-T | 1&7 |
| Explorer/ 902 | 6,500 | 38.8 | 12 | 33.8 | 5 | 12 | 23 | NOTAR | | n/a | skid | 7.3 | 7.3 | 2-T | 1-2& 6-7 |
| **Robinson** | | | | | | | | | | | | | | | |
| R-22 Beta | 1,370 | 28.8 | 8.9 | 25.2 | 2 | 8.8 | 16 | 3.5 | 2 | 4.1 | skid | 4.2 | 6.3 | 1-P | 1&1 |
| R-44 Raven | 2,500 | 38.3 | 10.8 | 33 | 2 | 10.5 | 22 | 4.8 | 2 | 3.8 | skid | 4.2 | 7.2 | 1-P | 1&3 |
| R-66 Turbine | 2,700 | 38.3 | 11.4 | 33 | 2 | 10.5 | | 5 | 2 | 3.6 | skid | 4.2 | 7.5 | 1-T | 1&4 |
| **Fairchild-Hiller/ Rogerson-Hiller** | | | | | | | | | | | | | | | |
| 360/UH-12/OH-23 | 3,100 | 40.8 | 10.2 | 35.4 | 2 | 10.1 | 23 | 6 | 2 | 4 | skid | 8.3 | 7.5 | 1-P | 1&3 |
| FH/RH-1100 | 3,500 | 41.3 | 9.2 | 35.3 | 2 | 9.5 | 24 | 6 | 2 | 3 | skid | 7.9 | 7.2 | 1-T | 1&4 |

| Manufacturer/ Model | Max Takeoff Weight | Overall Length (ft) | Overall Height (ft) | Main Rotor | | | | Tail Rotor | | | Undercarriage | | | Number of Engines/ Type | Crew Number/ Pax Number |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Diameter (ft) | Number of Blades | Ground Clearance (ft) | Tail Rtr Circle Radius (ft) | Diameter (ft) | Number of Blades | Ground Clearance (ft) | Type | Length (ft) | Width (ft) | | |
| A | B | D | H | RD | E | F | TR | I | J | K | L | UCL | UCW | M | N |
| **Sikorsky/ Schweizer** | | | | | | | | | | | | | | | |
| HU-269A/A-1/B, TH55A | 1,850 | 29 | 9 | 26 | 3 | 8.8 | 15 | 3.8 | 2 | 2.5 | skid | 8.3 | 6.5 | 1-P | 1&1 |
| 300C | 2,050 | 30.8 | 8.7 | 26.8 | 3 | 8.7 | 15.3 | 4.3 | 2 | 2.8 | skid | 8.3 | 6.5 | 1-P | 1&2 |
| 300CB/CBi | 1,750 | 30.8 | 8.7 | 26.8 | 3 | 8.7 | 15.3 | 4.3 | 2 | 2.8 | skid | 8.3 | 6.5 | 1-P | 1&1 |
| 330/330SP/ 333 | 2,550 | 31.2 | 11 | 27.5 | 3 | 9.2 | 15.3 | 4.3 | 2 | 3.2 | skid | 8.3 | 6.5 | 1-T | 1&2-3 |
| S-434 | 2,900 | 31.2 | 11 | 27.5 | 4 | 9.2 | 15.3 | 4.3 | 2 | 3.2 | skid | 8.3 | 6.5 | 1-T | 1&2-3 |
| S-55/H19 | 7,900 | 62.6 | 13.1 | 53 | 3 | | | 8.2 | 2 | | wheel | | | 1-T | 2&12 |
| S-58/H34 | 14,600 | 65.8 | 15.9 | 56 | 4 | 11.4 | 38 | 9.5 | 4 | 6.4 | wheel | 28.3 | 14 | 2-T | 2&16 |
| S-61/H-3 | 22,000 | 72.8 | 19 | 62 | 5 | 12.3 | 40 | 10.3 | 5 | 8.6 | wheel | 23.5 | 14 | 2-T | 3&28 |
| S-76A/B/C/D | 11,700 | 52.5 | 14.6 | 44 | 4 | 8.2 | 30.5 | 8 | 4 | 6.5 | wheel | 16.4 | 8 | 2-T | 2&12 |
| S-92 | 26,500 | 68.5 | 17.9 | 56.3 | 4 | 9.8 | 39.9 | 11 | 4 | 6.9 | wheel | 20.3 | 10.4 | 2-T | 2&19 |
| S-70i/UH-60L Blackhawk | 22,000 | 64.8 | 16.8 | 53.8 | 4 | 7.7 | 38 | 11 | 4 | 6.6 | wheel | 29 | 9.7 | 2-T | 3&12 |
| CH-53K | 74,000 | 99.5 | 27.8 | 79 | 7 | 17 | 59.6 | 20 | 4 | 9.5 | wheel | 27.3 | 13 | 3-T | 3&55 |

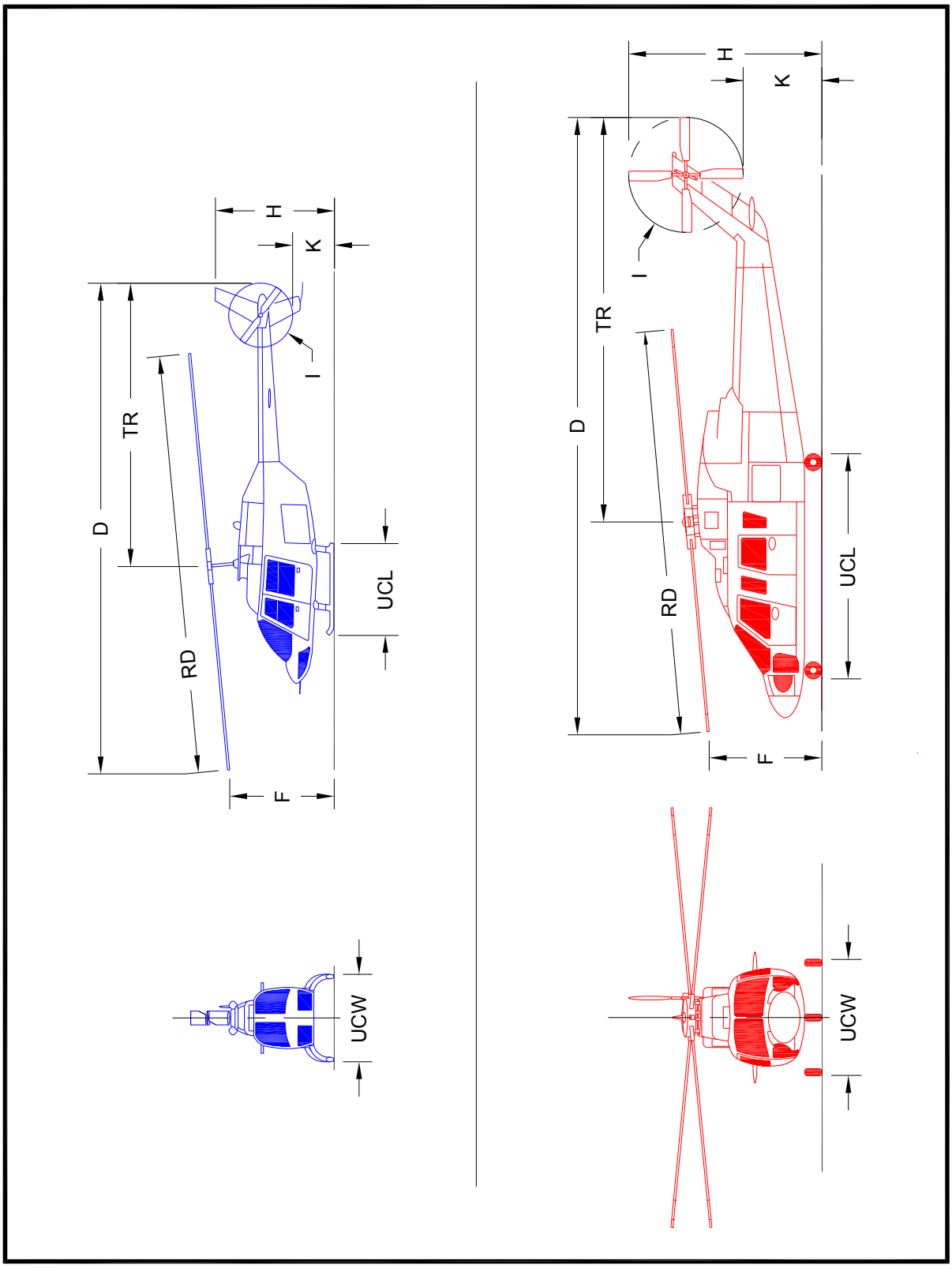



**Figure B–1. Helicopter Dimensions**

## Appendix C. Dimensions for Marking Size and Weight Limitations

The form and proportion of numbers for marking TLOF and parking area size and weight limitations are shown below.

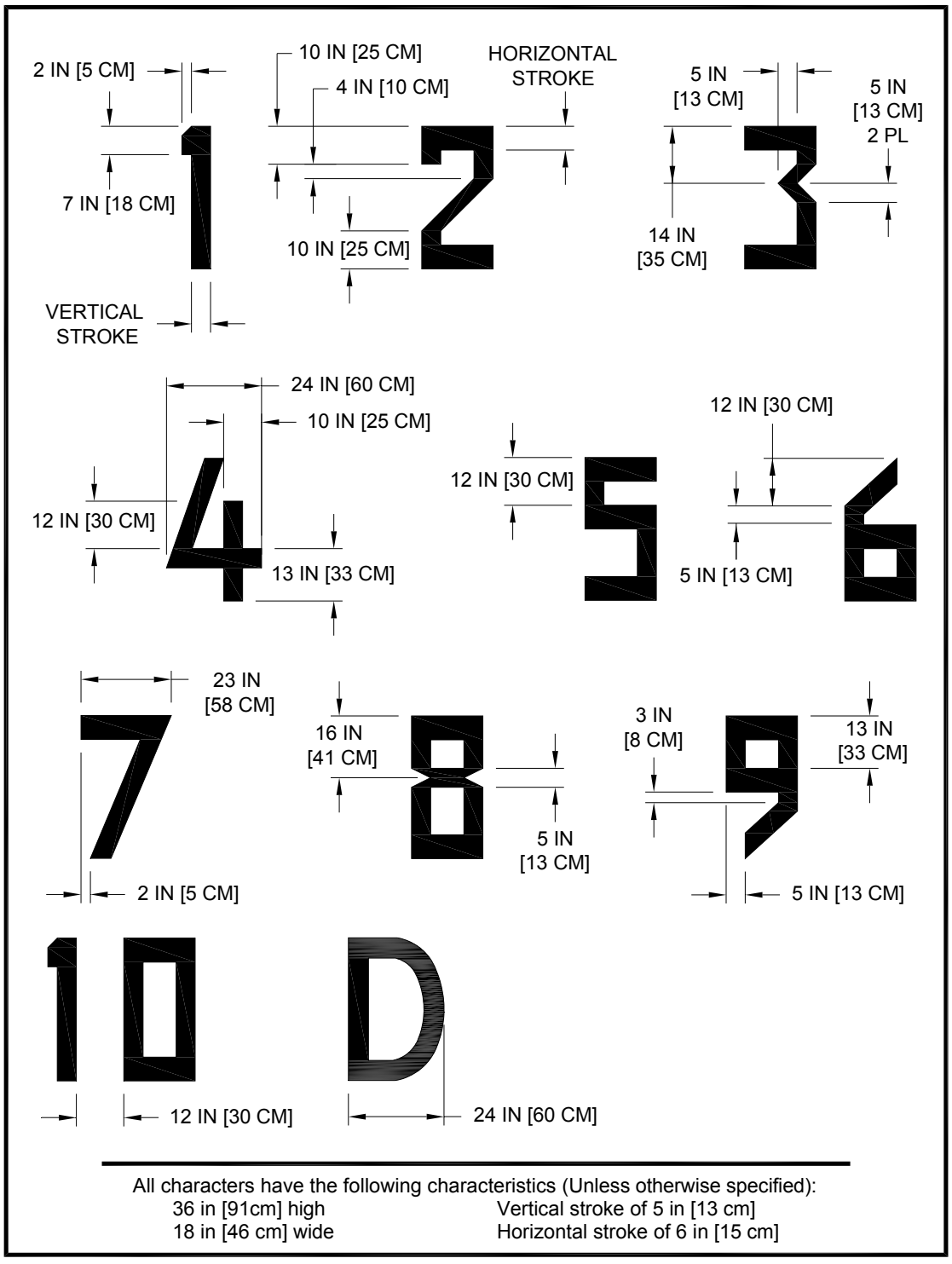



**Figure C–1. Form and Proportions of 36 Inch (91 cm) Numbers for Marking Size and Weight Limitations**

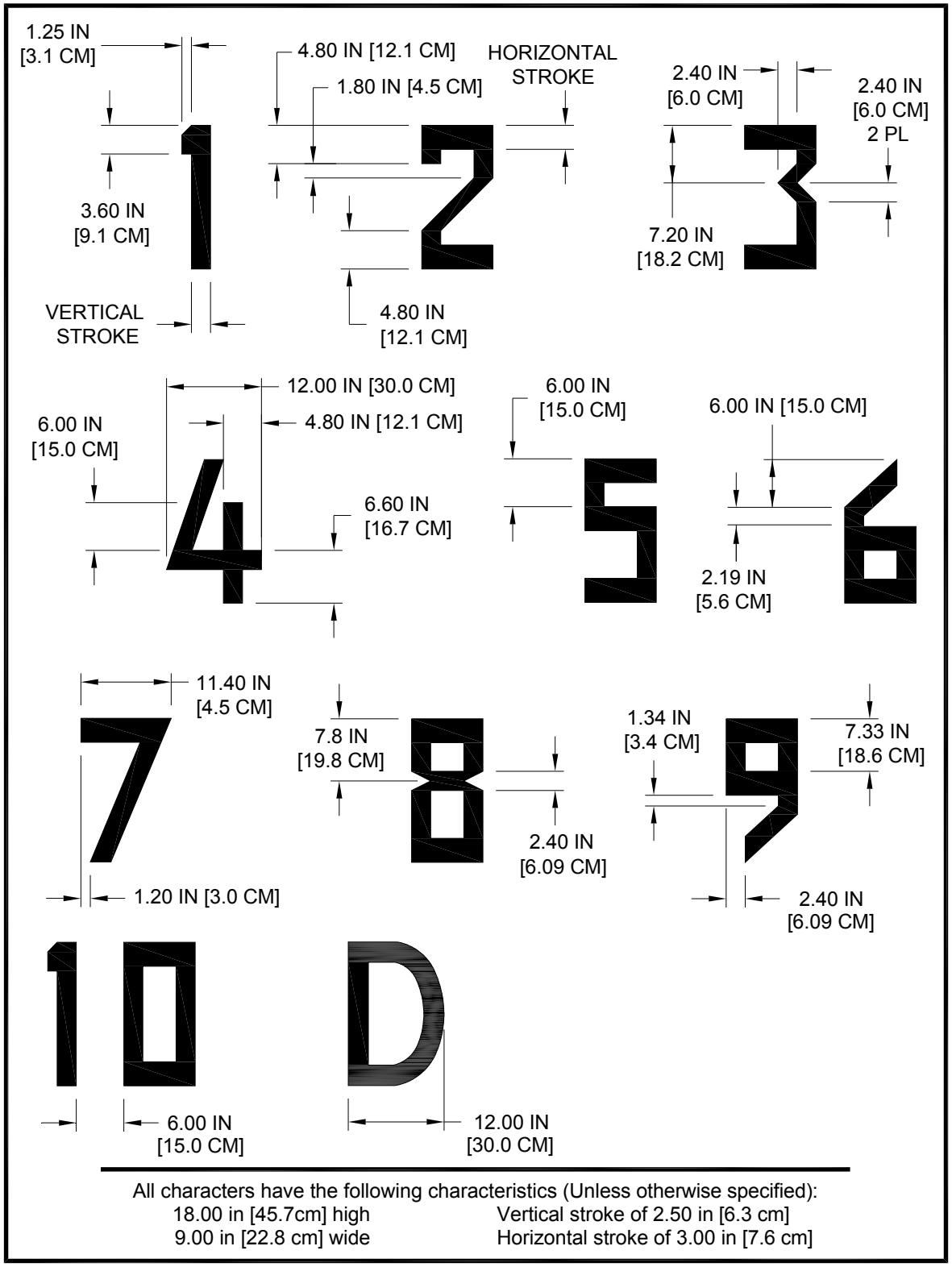



**Figure C–2. Form and Proportions of 18 Inch (45.7 cm) Numbers for Marking Size and Weight Limitation**

## Appendix D. Associated Publications and Resources

The following is a listing of related documents.

Current Advisory Circulars are available from the FAA web site http://www.faa.gov/regulations_policies/advisory_circulars/.

Current Electronic Code of Federal Regulations (e-CFRs) are available from the Government Printing Office web site http://www.gpoaccess.gov/ecfr/.

Airport Advisory Circulars are available at the Airports web site http://faa.gov/airports/resources/advisory_circulars/.

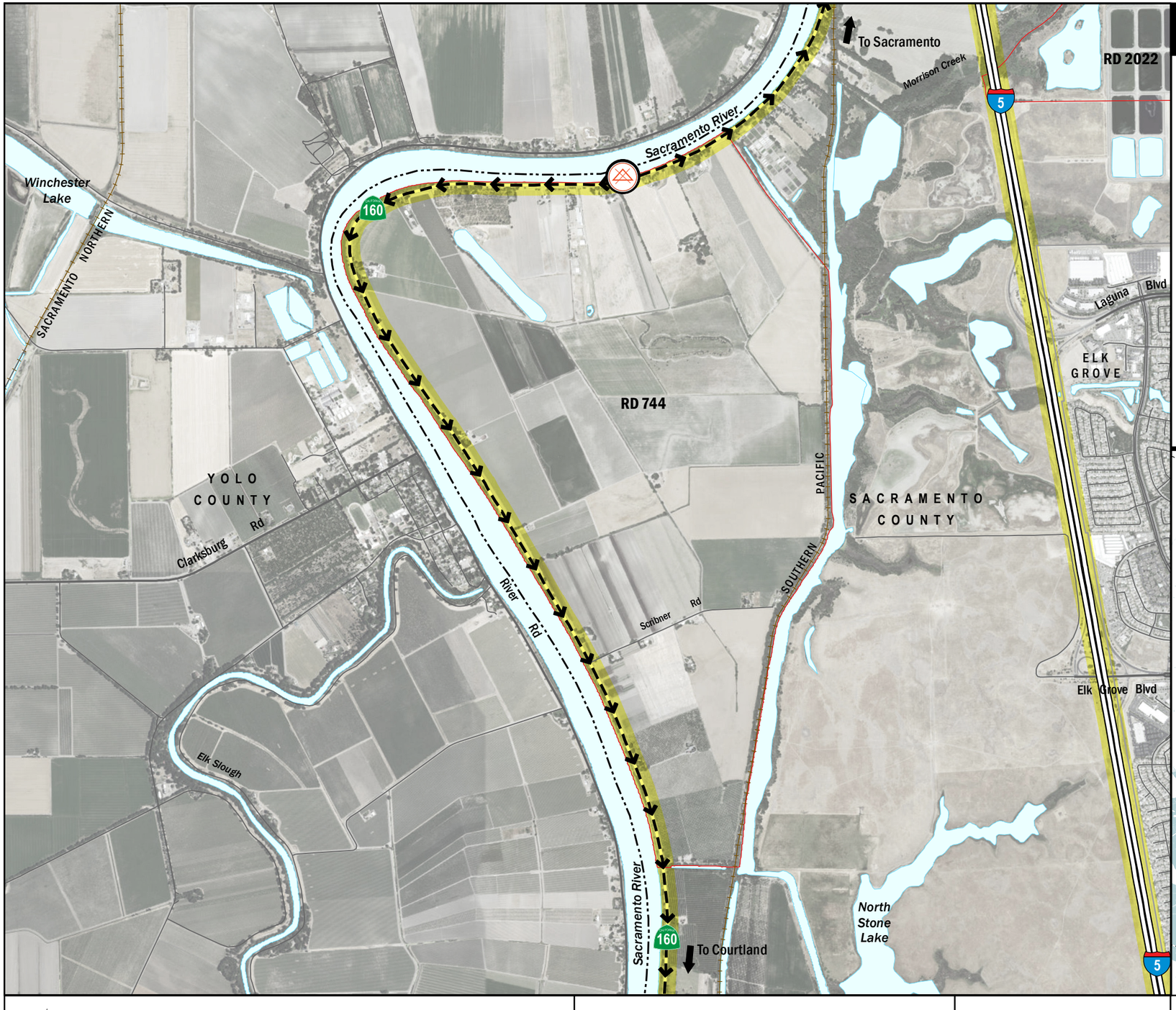
Technical reports are available at the National Technical Information Service (NTIS) web site http://www.ntis.gov/.

To find state and regional aviation offices, see http://www.faa.gov/airports/resources/state_aviation/.

For information about grant assurances, see http:/www.faa.gov/airports/aip/grant_assurances.

1. 14 CFR Part 27, Airworthiness Standards: Normal Category Rotorcraft.
2. 14 CFR Part 29, Airworthiness Standards: Transport Category Rotorcraft.
3. 14 CFR Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace.
4. 14 CFR Part 91, General Operating and Flight Rules.
5. 14 CFR Part 121, Air Carrier Certification.
6. 14 CFR Part 135, Operating Requirements: Commuter and on demand operations and rules governing persons on board such aircraft.
7. 14 CFR Part 139, Certification of Airports.
8. 14 CFR Part 151, Federal Aid to Airports.
9. 14 CFR Part 152, Airport Aid Program.
10. 14 CFR Part 157, Notice of Construction, Alteration, Activation, and Deactivation of Airports.
11. AC 70/7460-1, Obstruction Marking and Lighting.
12. AC 150/5190-4, A Model Zoning Ordinance to Limit Height of Objects Around Airports.
13. AC 150/5200-30, Airport Winter Safety and Operations.
14. AC 150/5220-16, Automated Weather Observing Systems (AWOS) for Non-Federal Applications.
15. AC 150/5230-4, Aircraft Fuel Storage, Handling, and Dispensing on Airports.
16. AC 150/5300-18, General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards.
17. AC 150/5320-6, Airport Pavement Design and Evaluation.
18. AC 150/5340-30, Design and Installation Details for Airport Visual Aids.
19. AC 150/5345-12, Specification for Airport and Heliport Beacons.
20. AC 150/5345-27, Specification for Wind Cone Assemblies.
21. AC 150/5345-28, Precision Approach Path Indicator Systems (PAPI).

22. AC 150/5345-39, FAA Specification L-853, Runway and Taxiway Retroreflective Markers.
23. AC 150/5345-46, Specification for Runway and Taxiway Light Fixtures.
24. AC 150/5345-52, Generic Visual Glideslope Indicators (GVGI).
25. AC 150/5360-9, Planning and Design of Airport Terminal Facilities at Non-Hub Locations.
26. AC 150/5360-14, Access to Airports by Individuals with Disabilities.
27. AC 150/5370-10, Standards for Specifying Construction of Airports.
28. FAA 8260-series orders, various on flight procedures, airspace, others.
    a. FAA Order 8260.3B, U. S. Standard for Terminal Instrument Procedures (TERPS).
    b. FAA Order 8260.54A, U.S. Standard for Area Navigation (RNAV).
    c. FAA Order 8260.72, Performance Based Navigation (PBN) Fly-By (FB)/Radius-to-Fix (RF) Turn Maximum Design Bank Angle Limits
29. FAA Grant Assurance No. 34, Policies, Standards, and Specifications.
30. FAA Order 1050.1 Policies and Procedures for Considering Environmental Impacts.
31. FAA Order 5050.4, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects.
32. FAA Order JO 7400.2, Procedures for Handling Airspace Matters.
33. FAA Passenger Facility Charge (PFC) Assurance No. 9, Standards and Specifications
34. FAA Technical Report FAA/RD-84/25, Evaluating Wind Flow Around Buildings on Heliport Placement, National Technical Information Service (NTIS) accession number AD-A153512.
35. FAA Technical Report FAA/RD-92/15, Potential Hazards of Magnetic Resonance Imagers to Emergency Medical Service Helicopter Services, National Technical Information Service (NTIS) accession number AD-A278877.
36. ICAO Annex 14, Vol. II – Heliports.
37. National Fire Protection Association (NFPA) 403, Standard for Aircraft Rescue and Fire-Fighting Services.
38. National Fire Protection Association (NFPA) 407, Standard for Aircraft Fuel Servicing.
39. National Fire Protection Association (NFPA) 418, Standard for Heliports.
40. Roadmap for Performance Based Navigation (PBN).




# LEGEND

Hypothetical Levee Failure

## TRANSPORTATION

EVACUATION ROUTES

Interstate | Highway | Highway On Levee | Levee Road | Local Road

Interstate | Highway | Major Road | Local Road

Interstate Shield Label

State Highway Shield Label

County Highway Shield Label

## INFRASTRUCTURE

Bridge Over Waterway

Ferry

Fire Station

Hospital

Police Station

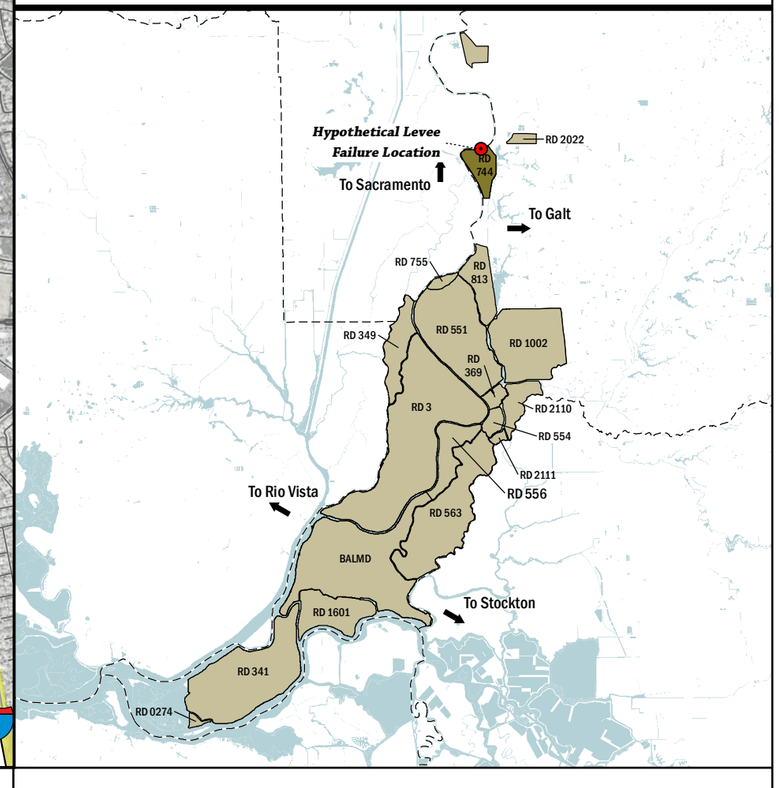
School

## JURISDICTIONS

City Boundary

County Boundary

RD Boundary




N

0 250 500 1,000 METERS

0 0.25 0.5 1 MILES

1" = 2000 ft

1:24,000

Delta Flood Emergency Safety Plan
Sacramento County, California

RD 744

GEI Consultants

Dynamic Planning + Science

EVACUATION ROUTES FOR RD 744
HYPOTHETICAL LEVEE FAILURE AT SACRAMENTO RIVER

May 2017

Figure D1C

THE WILDLIFE SOCIETY
Leaders in Wildlife Science, Management and Conservation
POLICY BRIEF

# Bald and Golden Eagle Protection Act

The bald eagle (*Haliaeetus leucocephalus*), became the national bird of the United States in 1782 when an estimated 100,000 nesting birds inhabited the continental U.S. By the mid-1900s, bald eagle populations plummeted throughout much of the nation. This led Congress to pass the Bald Eagle Protection Act in 1940 to protect this "symbol of American ideals of freedom" from extinction. The Act was later amended to The Bald and Golden Eagle Protection Act (Eagle Act) in 1962 to address diminishing populations of the golden eagle *(Aquila chrysaetos*) as well as to protect bald eagles that were being killed by people mistaking them for golden eagles—bald eagles do not develop their distinctive white head until they reach about four years of age.[1]

## Methods

The Eagle Act—enforced through regulations written by the U.S. Fish and Wildlife Service (USFWS)—prohibits the "taking" of bald and golden eagles, including their parts, nests, or eggs.[1] To take is defined as to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb" any bald or golden eagle, whether "alive or dead...unless authorized by permit."[1] USFWS may issue permits for scientific, educational, Native American religious purposes, falconry (golden eagles only), and some non-purposeful (incidental) take of eagles. The USFWS Office of Law Enforcement also operates the National Eagle Repository, a facility that receives confiscated bald and golden eagles, parts, and feathers for evaluation, storage, and/or distribution to Native Americans who are enrolled members of federally recognized tribes.[2]

Under the Eagle Act, USFWS may enter into cooperative agreements with state fish and wildlife agencies to enforce provisions of the Act. USFWS also issues annual bald and golden eagle status reports, compiling information from the most current research. These reports document estimated national and regional population sizes, demographic rates, population trajectories, and the effects of anthropogenic take.[3]

## Results

Provisions in the Eagle Act, Migratory Bird Treaty Act (MBTA), and Endangered Species Act (ESA) have enabled the bald eagle population to rebound in the lower 48 states from 487 nesting pairs in 1963 (Figure 1) to at least 9,789 pairs in 2007.[4]

Golden eagles also now maintain a stable population. USFWS estimates that there are now over 30,000 golden eagles in the western U.S.[5]

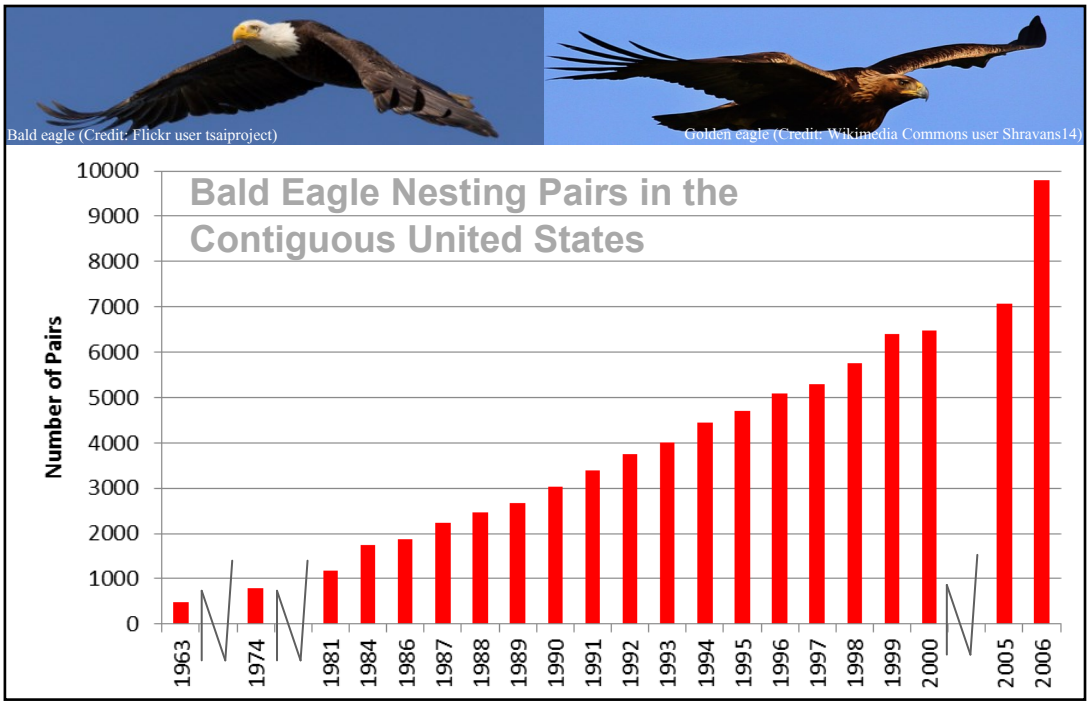



Figure 1. The number of nesting pairs of Bald Eagles in the lower 48 states from 1963 to 2006. After 2000, most states stopped conducting annual surveys of bald eagle numbers as the surveys were no longer deemed necessary. (Source: USFWS)

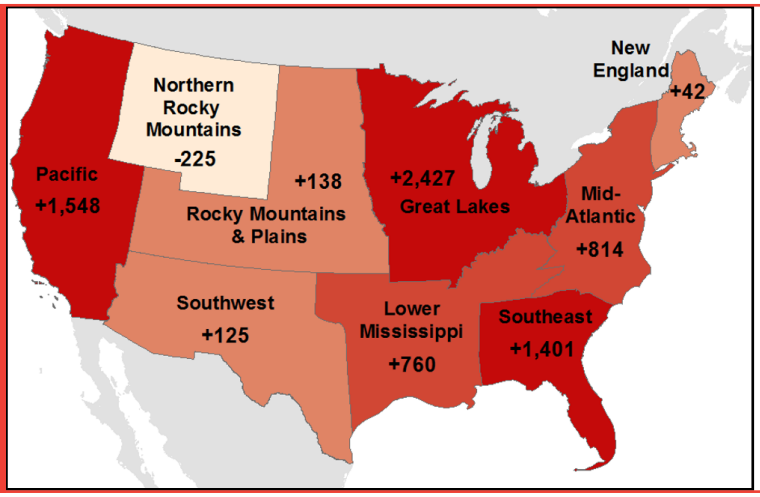
## Discussion

After nearly vanishing from the contiguous U.S., and being listed as an endangered species throughout much of their range in 1978, the bald eagle has made a remarkable recovery that has resulted in their removal from ESA on June 28, 2007.[4] Despite being delisted from ESA, the bald eagle (and golden eagle) continue to receive protection through the Eagle Act and MBTA. Though the Eagle Act was largely modelled after MBTA, there are several differences between the two statutes. The Eagle Act utilizes a broader definition of take and has more severe penalties than MBTA, but unlike the Eagle Act, MBTA can be applied through strict liability to actions committed without intent.

## Implications for Wildlife Professionals

The annual development of the USFWS bald and golden eagle status report—which utilizes the monitoring efforts of both state and federal wildlife professionals—aids in the development of regulations and informs eagle management decisions. This empowers and enables wildlife professionals to cultivate conditions, based in science, that aid in the conservation of these species throughout their historic range.

# Bald and Golden Eagle Protection Act: Features




## Eagle Management Units[3,6]

Eagle management units (EMUs) are defined as "a geographically bounded region within which permitted take is regulated to meet the management goal of maintaining stable or increasing breeding populations of bald or golden eagles." EMUs are a functional way for USFWS to track and manage eagle populations. In 2016 EMUs were realigned to better reflect regional populations and migratory patterns for both species. Bald eagles now have 6 EMUs across the Atlantic, Mississippi, Central, and Pacific flyways: with the Pacific flyway split into three management units. Golden eagles now have three EMUs located in the Pacific, Central, and combined Mississippi/Atlantic flyways.

Changes in nesting pair estimates in former bald eagle EMUs from 2007 to 2009 (Credit: USFWS)

## Eagle Permit Regulations[3,6]

In 2016, USFWS revised regulations under the Eagle Act for the first time since 2009. USFWS hopes the new Eagle Rule will provide greater clarity and improved implementation of eagle permits as a way to increase compliance and accountability regarding eagle take. Under the new rule, "nonpurposeful take permits" are now called "incidental take permits" and the maximum permit length has been extended from 5 years to 30 years. The 30-year cap is not an automatic designation, but allows for lengthier projects to maintain permits for the duration of the activity. USFWS requires that permitted projects consult with the Service every five years to ensure compliance with the permit and all eagle management requirements. Permits may be revoked if a project is found to be out of compliance.



Bald Eagle (Credit: Kent and Nyetta, Flickr)



## Operation Rolling Thunder[7]

Operation Rolling Thunder was a two-year covert investigation by USFWS agents into unlawful trafficking of migratory birds in Montana and South Dakota. The investigation documented 43 transactions of protected migratory birds, primarily bald and golden eagles, in violation of the Bald and Golden Eagle Protection Act, the Migratory Bird Treaty Act, and the Lacey Act from 2008 to 2011. The unlawful transactions included the purchase of multiple whole carcass bald and golden eagles in interstate commerce. In total, the operation was able to purchase feathers, other bird parts like wings and claws, and complete birds, which involved at least 80 eagles. Ten of the eleven defendants from the operation were sentenced for violating the Eagle Act; the other defendant was found in violation of MBTA.

Golden eagle (Credit: Tony Hisgett, Flickr)


1. USFWS. 2012. The Bald and Golden Eagle Protection Act. <http://www.fws.gov/midwest/MidwestBird/EaglePermits/bagepa.html> Accessed 28 Aug 2014.
2. USFWS. 2014. National Eagle Repository – About Us. < http://www.fws.gov/eaglerepository/about.php> Accessed 2 Sept 2014.
3. USFWS. 2016. Eagle Management. <https://www.fws.gov/birds/management/managed-species/eagle-management.php> Accessed 13 April 2017.
4. USFWS. 2007. Bald Eagle Fact Sheet. <https://www.fws.gov/migratorybirds/pdf/management/bald-eagle-fact-sheet.pdf>
5. USFWS. 2011. Golden Eagles Status Fact Sheet. <https://www.fws.gov/migratorybirds/pdf/management/golden-eagle-fact-sheet.pdf>
6. USFWS. 2016. Final Rule: Eagle Permits; Revisions to Regulations for Eagle Incidental Take and Take of Eagle Nests <https://www.gpo.gov/fdsys/pkg/FR-2016-12-16/pdf/2016-29908.pdf> Accessed 13 April 2017.
7. United States District Attorney's Office, District of South Dakota. 2013. <http://www.justice.gov/usao/sd/pressreleases/SF-2013-02-11-Oprollingthunderl.html>. Accessed 14 Oct 2014.




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**Updated:** July 2017