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MILITARY HANDBOOK

OUTDOOR SPORTS AND RECREATIONAL FACILITIES



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ABSTRACT

This military handbook provides the planning and guidance necessary for the construction of outdoor sports facilities. It is intended for use by experienced architects and engineers. This handbook covers those sports commonly played for competition and/or recreation by Navy and civilian personnel.

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FOREWORD

This military handbook is one of a series developed from an evaluation of facilities in the shore establishment, from surveys of the availability of new materials and construction methods, and from selection of the best design practices of the Naval Facilities Engineering Command (NAVFACENGOM), and other Government agencies, and the private sector. This handbook uses, to the maximum extent feasible, national professional society, association, and institute standards in accordance with NAVFACENGCOM policy. Deviations from these criteria in the planning, engineering, design, and construction of Naval shore facilities, cannot be made without prior approval of NAVFACENGCOM HQ Code 04.

Design cannot remain static any more than can the functions it serves or the technologies it uses. Accordingly, recommendations for improvement of this handbook are encouraged from within the Navy, Government agencies, and from the private sector and should be furnished on the form DD 1426 provided to: Commanding Officer, Pacific Division (Code 406C), Naval Facilities Engineering Command, Pearl Harbor, HI 96869.

THIS HANDBOOK SHALL NOT BE USED AS A REFERENCE DOCUMENT FOR PROCUREMENT OF FACILITIES CONSTRUCTION. IT IS TO BE USED IN THE PURCHASE OF FACILITIES ENGINEERING STUDIES AND DESIGN (FINAL PLANS, SPECIFICATIONS, AND COST ESTIMATES). DO NOT REFERENCE IT IN MILITARY OR FEDERAL SPECIFICATIONS OR OTHER PROCUREMENT DOCUMENTS.

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CRITERIA MANUALS

<u>Criteria Manual</u>	<u>Title</u>	<u>PA</u>
DM-37.1	Swimming Pools (Interim)	CHESDIV
MIL-HDBK-1037/2	Child Development Centers	PACDIV
MIL-HDBK-1037/3	Outdoor Sports & Recreational Facilities	PACDIV
MIL-HDBK-1037/4	Brigs and Detention Facilities (Interim)	HDQTRS
DM-37.5	Family Service Centers	PACDIV
DM-37.06	Chapels and Religious Educational Facilities	PACDIV
MIL-HDBK-1037/7	Officers, Non-Commissioned Officers Dining Facilities; Open Enlisted Dining Facilities	CHESDIV

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OUTDOOR SPORTS
AND RECREATIONAL FACILITIES

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Section 1: INTRODUCTION

1.1 Purpose. This handbook contains site planning information pertaining to outdoor sports facilities. Some design information and details are included as planning aids and general guidance.

1.2 Scope. Sections 2 through 8 provide detailed information for most recreational activities commonly played at military installations. Each sport has an outline text page of site planning and design criteria. The typical criteria categories are: Source of Information; Recommended Area; Size and Dimension; Orientation; Surface and Drainage; and Special Considerations. It also provides corresponding details and site layout diagrams.

1.3 Application. Layouts and construction details in this handbook are based on the published rules for the sport and will serve as guidance material. Design professionals will prepare actual construction drawings through selection of the appropriate layouts and details and site adaptation with proper grading and drainage to fit local conditions. Changes in playing rules may affect the dimensions and shapes of outdoor sports facilities. Therefore, the latest official rules of the governing body for each sport will be verified with the project drawings prepared in conformance with those rules.

1.4 Planning and Design Considerations. Some general planning and design considerations are given in paras. 1.4.1 through 1.4.4 to complement the specific information found in this handbook for each sport. Additional minor construction details are shown in Figures 62a through 66.

1.4.1 Lighting Requirements. When lighting is required for extending the playing time of a sports facility, it must be justifiable in view of the Government Energy Reduction Program. Refer to the Illuminating Engineering Society (IES) publication, Recommended Practice for Sports Lighting, and pending illumination levels given in the rules and regulations of the various classes of sports.

1.4.2 Support Facilities. The availability of support facilities may influence the site planning and design of the facilities given in this handbook.

1.4.2.1 Bleachers. The number of seats and location will depend on the particular sport and service requirements. The structure may be portable.

1.4.2.2 Storage Facilities. The equipment required for the support of a sport activity shall be housed near the playing area. This unit may also house pertinent maintenance equipment.

1.4.2.3 Handicapped. All facilities shall be designed to meet the needs of the handicapped, especially spectators, in accordance with Federal Standard FED-STD-795, Uniform Federal Accessibility Standards.

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1.4.3 Soil Conditions. Soils affect site planning, design and maintenance of sports facilities for that area. Soils information and technical advice is available from local representatives of U.S. Army Corps of Engineers or U.S. Navy Engineering Field Divisions.

a) For sports played on natural turf surfaces, obtaining the best possible playing surface requires that special consideration be given to the nutrient qualities of the topsoil and irrigation as well as to the drainage characteristics of the subsoils.

b) For sports requiring a paved surface of concrete, bituminous or other hard material, the subbase for the paving type required will be of inorganic material, well drained, and of sufficient depth to prevent frost heave.

c) For any structures such as the one-, three-, and four-wall handball walls, the bearing capacity of the soils must be determined before the structures can be properly designed. The facility may have to be built on another site if the soil bearing capacity at the first site is too low.

1.4.4 Metric Dimensions. Some sports facilities shown are dimensioned in metric units. Metric units are used when the governing body of the sport has specified metric units in the rules and regulations. Many sports organizations do not yet recognize the metric system in their official rules and regulations and therefore, their playing areas are dimensioned in English units.

1.5 Cancellation. This handbook, MIL-HDBK-1037/3, cancels and supersedes NAVFAC DM-37.3, Outdoor Sports and Recreational Facilities, August 1976, and NAVFAC P-457, Planning and Design of Outdoor Sports Facilities, October 1975.

1.6 Referenced Organizations. The list of references provides names and addresses of organizations whose rules, regulations, layout designs, and construction details were used in the development of this handbook. Consult these organizations for additional information as required.

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Section 2: OUTDOOR SPORTS FACILITIES

2.1 Sports Courts

2.1.1 Badminton. Badminton courts (see Figure 1) shall meet the following criteria.

- a) Source of Information: American Badminton Association (ABA).
- b) Recommended Area: Ground space shall be 1,620 ft² (150.5 m²) minimum to edge of pavement.
- c) Size and Dimension: Single court shall be 17 x 44 ft (5.18 x 13.41 m), doubles court shall be 20 x 44 ft (6.1 x 13.4 m) with a 6-ft (1.83 m) minimum unobstructed area on all sides.
- d) Orientation: The preferred orientation is for the long axis to be north-south.
- e) Surface and Drainage: Surface and drainage shall meet the following criteria:

(1) The surface shall be concrete or bituminous material with optional protective colorcoating for permanent installation. Turf may be used for general recreation use with surface drainage as described in the paragraph below except a slope of 2 percent (minimum) and adequate underdrainage will be used.

(2) Drainage shall be end-to-end, side-to-side or corner-to-corner diagonally at a minimum slope of 1 in. (25.4 mm) in 10 ft (2.05 m) (0.8 percent).

2.1.2 Basketball (American). Basketball courts (see Figures 3a and 3b) shall meet the following criteria.

- a) Source of Information: American Basketball Association, USA (ABAUSA).
- b) Recommended Area: The ground space shall be 0.11 acre (0.045 ha) minimum to 0.13 acre (0.054 ha) maximum, including unobstructed space.
- c) Size and Dimension: The playing court shall be 14 x 26 m (45 ft-11 1/4 in. x 85 ft-3 1/2 in.) with an unobstructed space of 3.28 ft (1 m) minimum to 6.56 ft (2 m) recommended on all sides.
- d) Orientation: The preferred orientation is for the long axis to be north-south.
- e) Surface and Drainage: Surface and drainage shall meet the following criteria.

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(1) The surface shall be concrete or bituminous material with optional protective colorcoating.

(2) Drainage shall be end-to-end, side-to-side or corner-to-corner diagonally at a minimum slope of 1 in. (25.4 mm) in 10 ft (0.8 percent).

2.1.3 Basketball (Collegiate). Basketball courts (see Figure 3a and 3b) shall meet the following criteria.

a) Source of Information: National Collegiate Athletic Association (NCAA).

b) Recommended Area:

(1) For high school the ground space shall be 5,040 ft² (468 m²) minimum to 7,280 ft² (676 m²) maximum.

(2) For colleges the ground space shall be 5,600 ft² (520 m²) minimum to 6,980 ft² (648 m²) maximum.

c) Size and Dimension:

(1) The recommended court size for high schools is 84 x 50 ft (25.6 x 15.2 m) with a 10-ft (3.05 m) unobstructed space on all sides 3-ft (0.9 m).

(2) The recommended court size for colleges is 94 ft (28.6 m) x 50 ft with a 10-ft unobstructed space on all sides (3-ft minimum).

d) Orientation: The preferred orientation is for the long axis to be north-south.

e) Surface and Drainage: Surface and drainage shall meet the following criteria.

(1) Surface shall be concrete or bituminous material with optional protective colorcoating.

(2) Drainage shall be end-to-end, side-to-side or corner-to-corner diagonally at a minimum slope of 1 in. in 10 ft (0.8 percent).

2.1.4 Biddy Basketball. The Biddy Basketball court (see Figure 4) shall meet the following criteria.

a) Source of Information: Biddy Basketball Association, Inc.

b) Recommended Area: The ground space shall be 4,680 ft² (435 m²) to 5,040 ft² (468 m²) including clear space.

c) Size and Dimension: The playing court shall be 46 to 50 ft (14 to 15.2 m) wide and 84 ft (25.6 m) long with an unobstructed space of at least 3 ft recommended on all sides.

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d) Orientation: The preferred orientation is for the long axis to be north-south.

e) Surface and Drainage: The surface and drainage shall meet the following criteria.

(1) The surface shall be concrete or bituminous materials with optional protective colorcoating.

(2) Drainage shall be end-to-end, side-to-side or corner-to-corner diagonally at a minimum slope of 1 in. in 10 ft (0.8 percent).

2.1.5 Goal-Hi Basketball. Goal-hi basketball courts (see Figure 5) shall meet the following criteria.

a) Source of Information: AMF Voit Corporation.

b) Recommended Area: The ground space shall be 1,256 ft² (117 m²) minimum; 2,827 ft² (263 m²) maximum.

c) Size and Dimension: The playing court shall be an outer court circle with a radius of 20 ft (6.1 m) minimum and 30 ft (9.1 m) maximum, surrounding a concentric inner court circle with a radius of 10 ft (3.05 m) minimum and 15 ft (4.6 m) maximum.

d) Orientation: Optional.

e) Surface and Drainage: The surface and drainage shall meet the following criteria.

(1) A resilient synthetic surface shall be preferred for safety and comfort. However, concrete or bituminous surface may be used for minimum maintenance.

(2) The minimum slope shall be 1 in. in 10 ft (0.8 percent) for drainage in any direction.

2.1.6 Boccie. The boccie court (see Figure 6) shall meet the following criteria.

a) Source of Information: General Sportcraft Company, Ltd.

b) Recommended Area: The ground space shall be 1,824 ft² (169 m²) to 2,805 ft² (261 m²).

c) Size and Dimension: The overall court dimensions shall range from 13 to 19.5 ft (3.96 to 5.94 m) wide x 78 ft to 92 ft (23.7 to 28.04 m) long. An additional space of at least 3 ft (0.9 m) on each side and 9 ft (2.7 m) on each end is recommended.

d) Orientation: The preferred orientation is for the long axis to be north-south. It may be adjusted to suit local topographic conditions.

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e) **Surface and Drainage:** Surface and drainage shall meet the following criteria.

(1) The preferred surface is turf, although a mixture of sand and clay may be used.

(2) Drainage may be in any direction at a recommended slope of 1 percent for turf and level for sand-clay with subdrainage.

f) **Special Considerations:** An optional low wooden barrier may be provided at each end and/or side of court.

2.1.7 **Croquet.** The croquet playing areas (see Figure 7) shall meet the following criteria.

a) **Source of Information:** National Croquet Association, Inc. (NCA).

b) **Recommended Area:** The ground space shall be 3,000 ft² (278.8 m² acre).

c) **Size and Dimension:** The playing area shall be 35 ft (10.7 m) x 70 ft (21.3 m) plus 2.5 ft (0.76 m) minimum on each end and side.

d) **Orientation:** Orientation may be adjusted to suit local topographic conditions.

e) **Surface and Drainage:** The playing surface shall be turf, closely cropped and rolled, with a maximum 2 percent slope (preferably level) and adequate subdrainage.

2.1.8 **One-Wall Handball.** The one-wall handball court (see Figure 8) shall meet the following criteria.

a) **Source of Information:** United States Handball Association (USHA).

b) **Recommended Area:** The ground space shall be 1,665 ft² (155 m²) plus walls and footings.

c) **Size and Dimension:** The playing court shall be 20 ft (6.09 m) wide x 34 ft (10.36 m) long plus a required 11 ft (3.35 m) minimum width of surfaced area to the rear and a recommended 8.5 ft (minimum) width on each side. Courts in battery shall have a minimum of 6 ft (1.83 m) between courts.

d) **Orientation:** The preferred orientation is for the long axis to be north-south with the wall at the north end.

e) **Surface and Drainage:** The floor surface shall be smooth concrete with a minimum slope of 1 in. (25.4 mm) in 10 ft (0.8 percent) from the wall to the rear of the court. The wall shall be of concrete with a very smooth finish, free of irregularities.

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f) **Special Considerations:** The court area shall be fenced with a 10-ft high (3.05 m) chain link fence which shall conform to NAVFAC Guide Specification NFGS-02444, Fence, Chain Link.

2.1.9 Three- and Four-Wall Handball. Three- and four-wall handball courts (see Figure 9) shall meet the following criteria.

a) **Source of Information:** U.S. Handball Association (USHA).

b) **Recommended Area:** The ground space for four-wall handball shall be 800 ft² (74.3 m²), plus walls and footing. Allow an additional 200 ft² (18.6 m²) for three-wall handball.

c) **Size and Dimension:** The playing court shall be 20 in. (508 mm) wide x 40 ft (12.2 m) long plus 10 ft (minimum) to the rear of the three-wall court. The overhead clearance shall be 20 ft (6.4 m) (minimum).

d) **Orientation:** The preferred orientation is for the long axis to be north-south with the front wall at the north end.

e) **Surface and Drainage:** The floor surface shall be smooth concrete preferably with a minimum slope of 1 in. in 10 ft (0.8 percent) from front to rear of the court. Walls shall be of concrete with a very smooth finish, free of irregularities.

f) **Special Considerations:**

(1) **Alternative Four-Wall Court.** The layout shall be the same as for three-wall with the exception of 12-ft (3.65 m) minimum high back wall at the rear of the court (long line) and necessary wall footings.

(2) **Drainage.** Special provisions shall be made for drainage and access provided through the back wall of four-wall courts.

(3) **Fencing.** An optional 10-ft (3.02 m) high chain link fence, conforming to NFGS-02444, may be provided at the rear of the pavement for three-wall courts.

2.1.10 Hopscotch. The hopscotch playing area (see Figure 10) shall meet the following criteria.

a) **Source of Information:** AMF Voit Corporation.

b) **Recommended Area:** The ground space shall be 62.5 ft² (5.8 m²).

c) **Size and Dimension:** The playing court shall be 5 ft (1.5 m) wide x 12.5 ft (3.8 m) long.

d) **Orientation:** Optional.

e) **Surface and Drainage:** The surface shall be of concrete or bituminous material with a lateral slope of 1 in. in 10 ft (0.8 percent) and a longitudinal slope of 1 in. in 10 ft (0.8 percent) minimum.

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2.1.11 Horseshoes. The horseshoe playing area (see Figure 11a) shall meet the following criteria.

a) Source of Information: National Horseshoe Pitchers' Association of America (NHPAA).

b) Recommended Area: The ground space shall be 1,540 ft² (143 m²), including clear space.

c) Size and Dimension: The playing court shall be 12 x 50 ft (3.66 x 15.24 m) plus a recommended 10-ft unobstructed area on each end and a 5-ft (1.52 m) wide (minimum) zone on each side.

d) Orientation: The recommended orientation is for the long axis to be north-south.

e) Surface and Drainage: The surface of the playing area, except for boxes and optional concrete walkways, shall be turf. The area shall be pitched to the side at a maximum slope of 2 percent. The elevation of the top of the steel pegs shall be equal.

f) Special Considerations: For safety, a 1-ft 10-in. (558 mm) high (minimum) backstop shall be constructed at the end of the box to intercept overthrown or bounding shoes.

2.1.12 Ice Hockey. The ice hockey playing area (see Figure 12) shall meet the following criteria.

a) Source of Information: Amateur Hockey Association of the United States (AHA).

b) Recommended Area: The ground space shall be 22,000 ft² (2044 m²), including support area.

c) Size and Dimension: The playing rink shall be 85 ft (25.9 m) wide x 200 ft (61 m) long, plus an additional 5,000 ft² (464.5 m²) of support area.

d) Orientation: The preferred orientation is for the long axis to be north-south.

e) Surface and Drainage: The ice surface shall be level over either sand-clay or bituminous surface. Provisions for drainage shall be made on the surface beneath the ice and around the rink.

f) Special Considerations: Unless situated in northern climates, provisions for artificial ice will be required.

2.1.13 Lawn Bowling. The lawn bowling playing area (see Figure 13) shall meet the following criteria.

a) Source of Information: American Lawn Bowls Association (ALBA).

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b) **Recommended Area:** The square green with six rinks shall be 15,376 ft² (1428.4 m²) minimum to 19,321 ft² (1795 m²) maximum.

c) **Size and Dimension:** The rink length ranges from 120 ft (36.6 m) minimum to 132 ft (40.2 m) maximum on each side. An additional width of 2 ft (0.61 m) minimum to 3.5 ft (1.07 m) maximum shall be required on all sides for ditch and backslope. The rink width ranges from 14 ft (4.27 m) minimum to 19 ft (5.79 m) maximum.

d) **Orientation:** Optional.

e) **Surface and Drainage:** Surface and drainage shall meet the following criteria.

(1) The surface shall be closely cropped bent grass or sand-clay. If grass surface is to be used, contact ALBA for specific information about construction and maintenance.

(2) The entire green shall be level, with adequate subdrainage.

f) **Special Considerations:** Ditch depth ranges from 2 in. (50.8 mm) (minimum) to 8 in. (maximum) below surface of green; width ranges from 8 in. (203.2 mm) minimum to 15 in. (388 mm) maximum.

2.1.14 **Roque.** The roque playing area (see Figure 14) shall be as follows.

a) **Source of Information:** The American Roque League Incorporated (ARL).

b) **Recommended Area:** The ground space shall be 1,800 ft² (minimum) (167.2 m²), plus curb.

c) **Size and Dimension:** The playing court shall be 30 ft (9.1 m) wide x by 60 ft (18.3 m) long.

d) **Orientation:** The preferred orientation is for the long axis to be north-south.

e) **Surface and Drainage:** Surface and drainage shall meet the following criteria.

(1) The surface shall be level and of sand-clay mixture.

(2) Drainage shall be through perimeter system and/or through underdrains.

f) **Special Considerations.** A concrete curb shall be provided on all sides.

2.1.15 **Shuffleboard.** The shuffleboard playing area (see Figure 15) shall be as follows.

a) **Source of Information:** General Sportcraft Co., Ltd.

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b) **Recommended Area:** The ground space shall be 312 ft² (0.01 acre) minimum.

c) **Size and Dimension:** The playing court shall be 6 x 52 ft (1.82 x 15.8 m) plus a recommended 2 ft (minimum) on each side or 4 ft between courts in battery.

d) **Orientation:** The recommended orientation is for the long axis to be north-south.

e) **Surface and Drainage:** Surface and drainage shall be as follows:

(1) The surface shall be concrete with a burnished finish.

(2) The court surface shall be level with drainage away from the playing surface on all sides.

2.1.16 **Deck Tennis.** The deck tennis playing area (see Figure 16) shall be as follows.

a) **Source of Information.** General Sportcraft Company, Ltd.

b) **Recommended Area:** The ground space shall be 1,300 ft² (120.8 m²) including clear space.

c) **Size and Dimension:** The singles court shall be 12 x 40 ft (3.6 x 12.2 m) The doubles court shall be 18 ft x 40 ft. An additional paved area of 4 ft (1.22 m) minimum on sides and 5 ft (1.52 m) on ends is recommended for both.

d) **Orientation:** The preferred orientation is for the long axis to be north-south.

e) **Surface and Drainage:** Surface and drainage shall be as follows:

(1) The surface shall be concrete or bituminous material with optional protective coating.

(2) Drainage shall be end-to-end, side-to-side, or corner-to-corner diagonally at a minimum slope of 1 in. in 10 ft (0.8 percent).

f) **Special Considerations:** Fencing is recommended, on all sides of the court, of 10-ft (3.05 m) high chain link fence conforming to NFGS-02444.

2.1.17 **Paddle Tennis.** The paddle tennis playing area (see Figure 17) shall be as follows.

a) **Source of Information:** United States Paddle Tennis Association (USPTA).

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b) Recommended Area: The ground space shall be 3,200 ft² (297.3 m²) minimum to edge of pavement.

c) Size and Dimension: The playing court shall be 20 x 50 ft (6.1 x 15.24 m) plus a 15-ft (minimum) space on each end and a 10-ft (minimum) space on each side or between courts in battery.

d) Orientation: The preferred orientation is for the long axis to be north-south.

e) Surface and Drainage: Surface and drainage shall be as follows:

(1) The surface shall be concrete or bituminous material with optional protective colorcoating.

(2) Drainage shall be end-to-end, side-to-side or corner-to-corner diagonally at a minimum slope of 1 in. in 10 ft (0.8 percent).

f) Special Considerations: Fencing is recommended, on all sides of the court, of 10-ft high chain link fence which shall conform to NFGS-02444.

2.1.18 Platform Tennis. The platform tennis playing area (see Figure 18) shall be as follows.

a) Source of Information: American Platform Tennis Association (APTA).

b) Recommended Area: The ground space shall be 1,800 ft² (167 m²) to the playable perimeter fence.

c) Size and Dimension: The playing court shall be 20 x 44 ft (6.1 x 13.4 m) plus an 8 ft (2.44 m) space on each end and a 5 ft (1.5 m) space on each side.

d) Orientation: The preferred orientation is for the long axis to be north-south.

e) Surface and Drainage: Surface and drainage shall be as follows:

(1) The raised level platform shall be constructed of pressure treated wood or aluminum superstructure with carriage set on concrete piers to permit construction on slopes.

(2) Drainage shall be provided by a 1/4-in. (6.35 mm) space between 6-in. (152.4 mm) deck planks or channels. Snow removal shall be facilitated by hinged panels (snow gages) between posts around bottom of perimeter fence.

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f) Special Considerations:

(1) Tension fencing shall be provided on all sides of the court.

(2) Prefabricated pre-engineered courts are available from several manufacturers.

2.1.19 Tennis. The tennis playing area (see Figure 19) shall be as follows.

a) Source of Information: United States Tennis Association (USTA).

b) Recommended Area: The ground space shall be 7,200 ft² (668.9 m²) minimum.

c) Size and Dimension: The playing court shall be 36 x 78 ft (10.97 x 23.7 m) plus 12 ft (3.66 m) minimum clearance on both sides or between courts in battery and 21 ft (6.4 m) clearance on each end. The minimum distance between baselines of end-to-end courts shall be 42 ft (12.8 m).

d) Orientation of long axis is to be north-south.

e) Surface and Drainage: Surface and drainage shall be as follows:

(1) The surface may be concrete, or bituminous material with specialized protective colorcoating, or sand-clay.

(2) Drainage may be from end-to-end, side-to-side, or corner-to-corner diagonally at a minimum slope of 1 in. in 10 ft (0.8 percent) for pavement and level for sand-clay with subdrainage.

f) Special Considerations: Fencing is recommended, on all sides of the court, of 10-ft high (3.05 m) chain link fence which shall conform to NFGS-02444.

2.1.20 Tetherball. The tetherball playing area (see Figure 20) shall be as follows.

a) Source of Information: General Sportcraft Company, Ltd.

b) Recommended Area: The ground space shall be 314 ft² (29.17 m²) minimum to circumference of outer circle.

c) Size and Dimension: The playing court shall be a circle 20 ft (6.1 m) in diameter and the pole height shall be 10 ft.

d) Orientation: The recommended axis through playing zone is north-south.

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e) **Surface and Drainage.** Concrete or bituminous surface may be used for minimum maintenance, but a resilient synthetic surface or wood chips with adequate subdrainage shall be preferred for safety and comfort. The minimum slope shall be 1 in. in 10 ft (0.8 percent) for drainage in any direction.

2.1.21 **Volleyball.** The volleyball playing area (see Figures 21a and 21b) shall be as follows.

a) **Source of Information:** United States Volleyball Association (USVBA).

b) **Recommended Area:** The ground space shall be 3,935 ft² (365.56 m²).

c) **Size and Dimension:** The playing court shall be 29.5 x 59 ft (9 m x 17.98 m) plus 10-ft unobstructed space on all sides.

d) **Orientation:** The preferred orientation is for the long axis to be north-south.

e) **Surface and Drainage:** Recommended surface for intensive use shall be bituminous material or concrete, but sand-clay or turf may be used for informal play. Drainage shall be end-to-end, side-to-side or corner-to-corner at a minimum slope of 1 in. in 10 ft (0.8 percent).

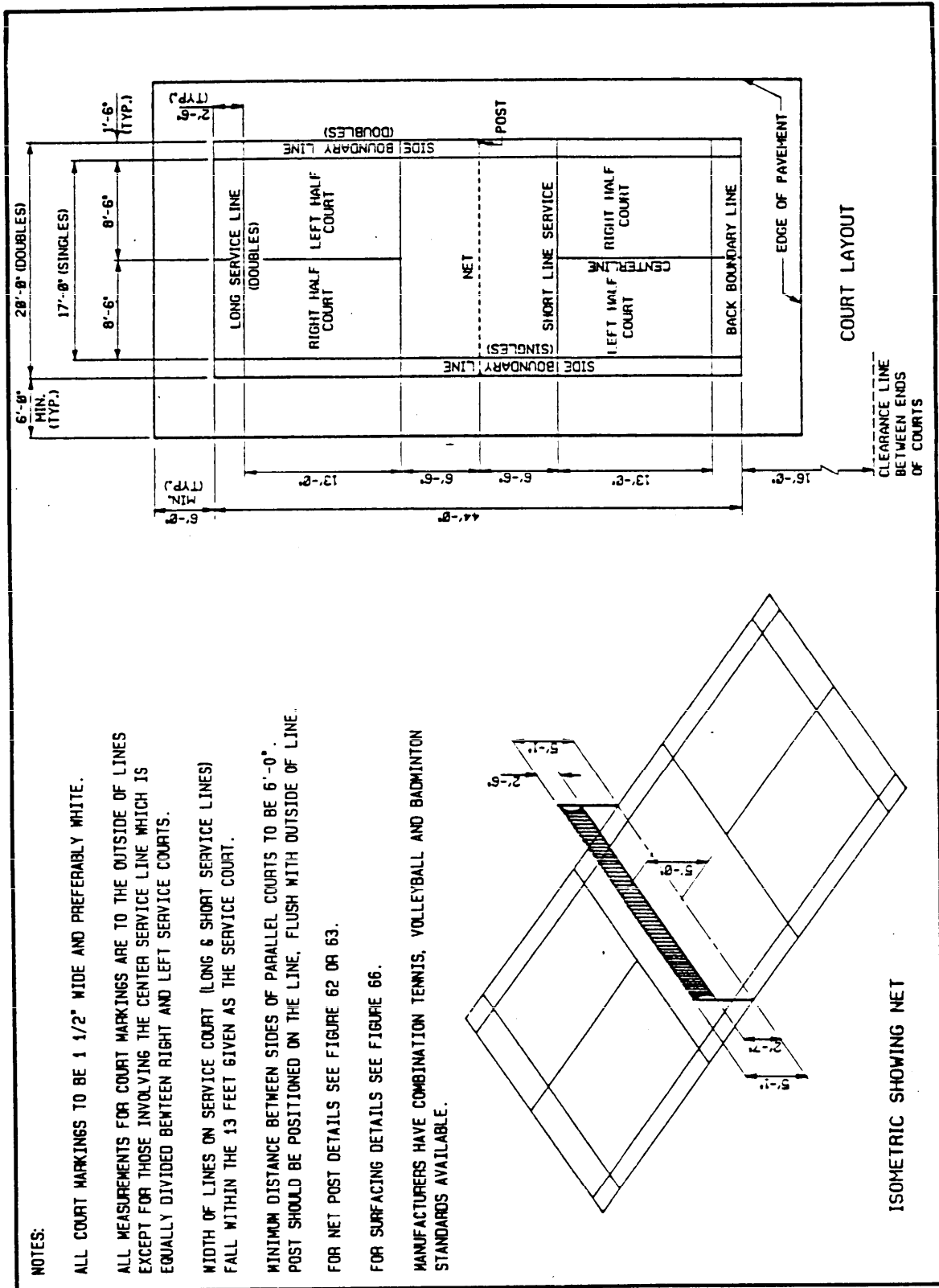


Figure 1
Badminton Courts

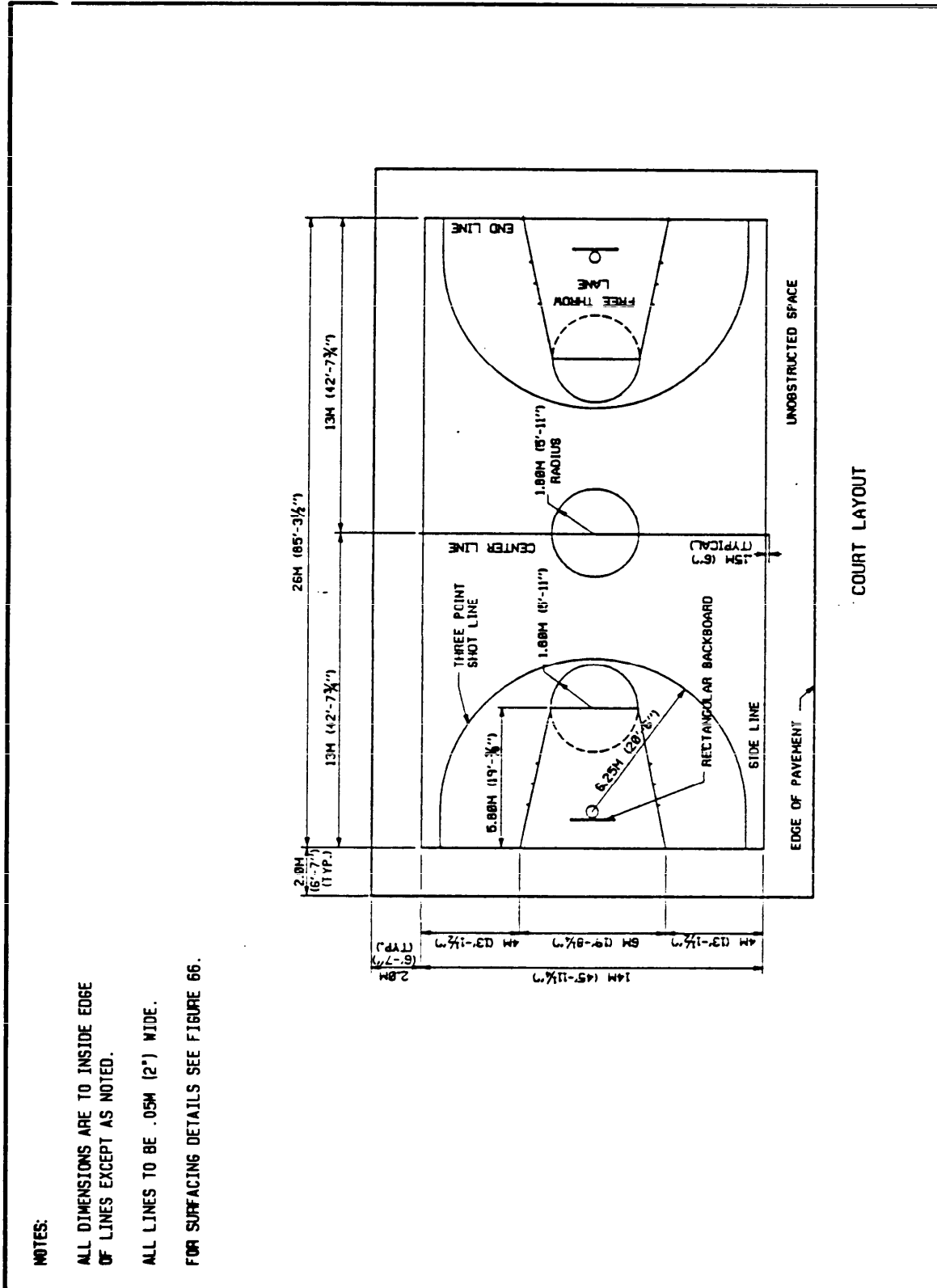


Figure 2a
Basketball (ABAUSA) -- Court Layout

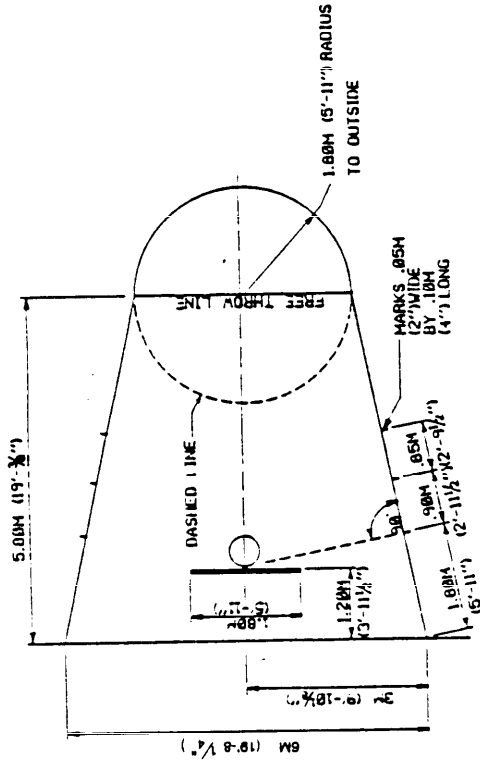
BACKBOARD NOTES:

BACKBOARD SHALL BE OF ANY RIGID WEATHER RESISTANT MATERIAL.

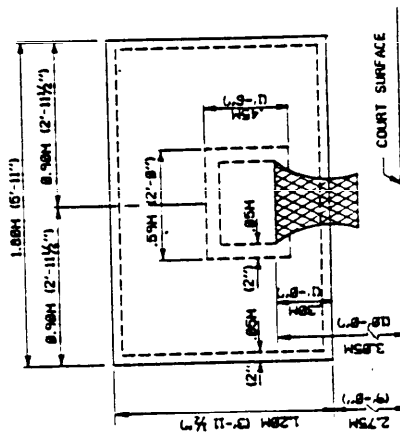
THE FRONT SHALL BE FLAT AND PAINTED WHITE UNLESS IT IS TRANSPARENT.

IF THE BACKBOARD IS TRANSPARENT, IT SHALL BE MARKED WITH A .05M WIDE WHITE LINE AROUND THE BORDER AND A .45 X .59 M TARGET AREA BOUNDED WITH A .05M WIDE WHITE LINE (INDICATED BY A DASHED LINE ON THE DRAWINGS.)

FOR DETAILS OF BACKBOARD STANDARDS SEE FIGURE 64.

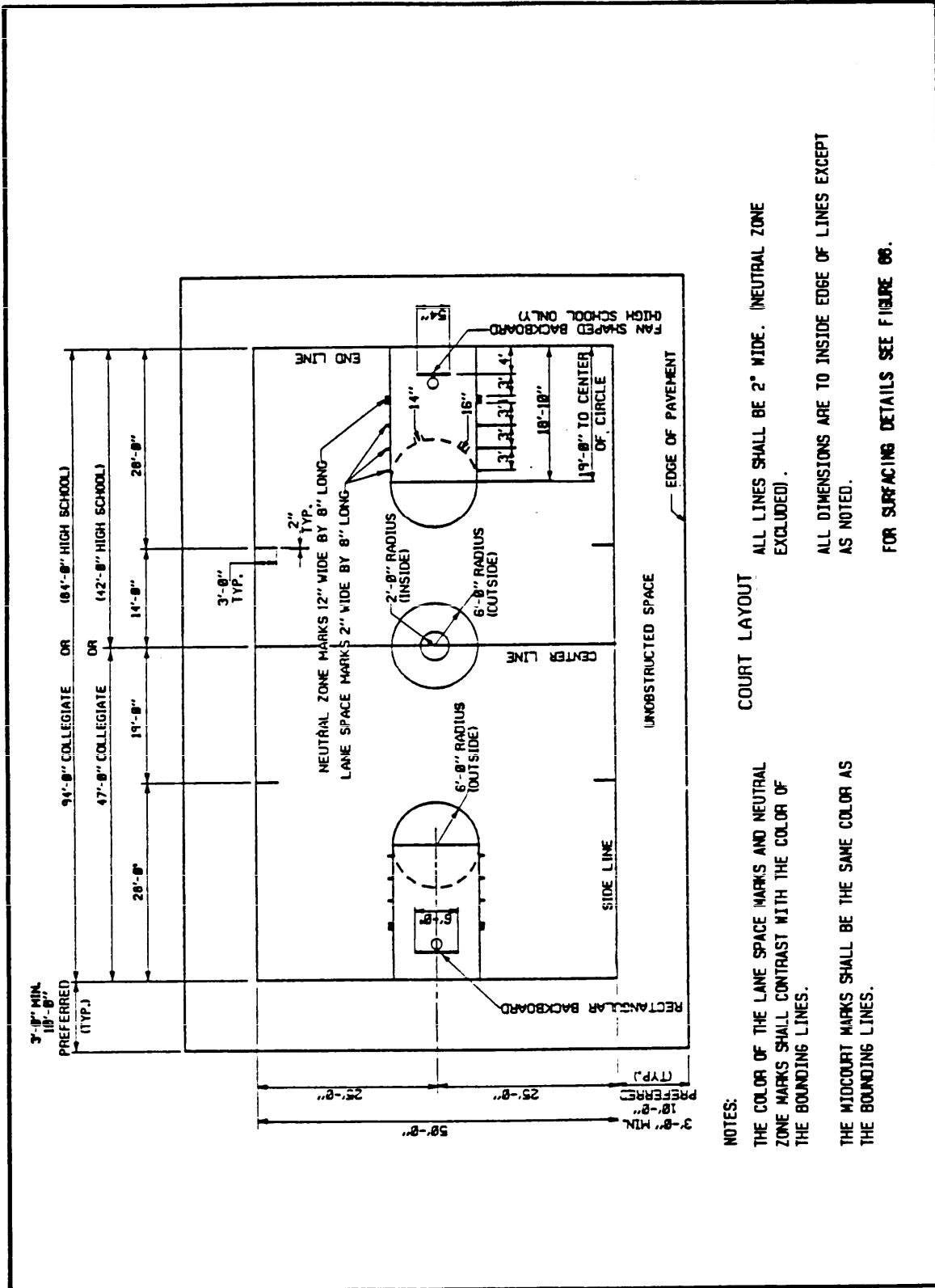


DETAIL - FREE THROW LANE



RECTANGULAR BACKBOARD

Figure 2b
Basketball (ABAUSA) -- Backboard and Free Throw Lane



COURT LAYOUT

ALL LINES SHALL BE 2" WIDE. (NEUTRAL ZONE EXCLUDED).

ALL DIMENSIONS ARE TO INSIDE EDGE OF LINES EXCEPT AS NOTED.

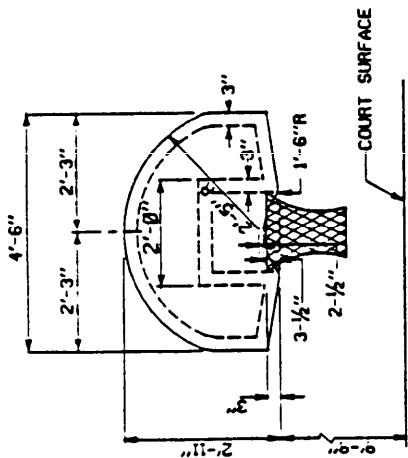
FOR SURFACING DETAILS SEE FIGURE 06.

NOTES:

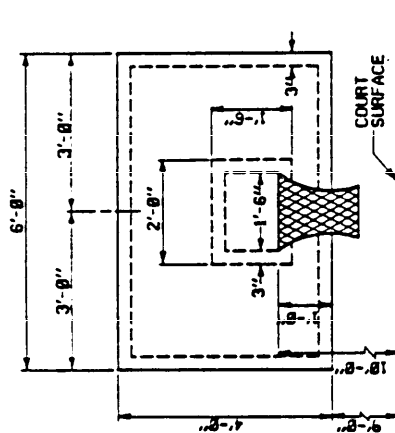
THE COLOR OF THE LANE SPACE MARKS AND NEUTRAL ZONE MARKS SHALL CONTRAST WITH THE COLOR OF THE BOUNDING LINES.

THE MIDCOURT MARKS SHALL BE THE SAME COLOR AS THE BOUNDING LINES.

Figure 3a
Basketball (NCAA) -- Court Layout



FAN SHAPED BACKBOARD



RECTANGULAR BACKBOARD

BACKBOARD NOTES:

BACKBOARD SHALL BE OF ANY RIGID WEATHER RESISTANT MATERIAL

THE FRONT SURFACE SHALL BE FLAT AND PAINTED WHITE UNLESS IT IS TRANSPARENT.

IF THE BACKBOARD IS TRANSPARENT, IT SHALL BE MARKED WITH A 3" WIDE WHITE LINE AROUND THE BORDER AND AN 18"x24" TARGET AREA BOUNDED WITH A 3" WIDE WHITE LINE. (INDICATED BY A DASHED LINE ON THE DRAWINGS.)

FOR BACKBOARD STANDARD DETAILS SEE FIGURE 64.

Figure 3b
Basketball (NCAA) -- Backboards

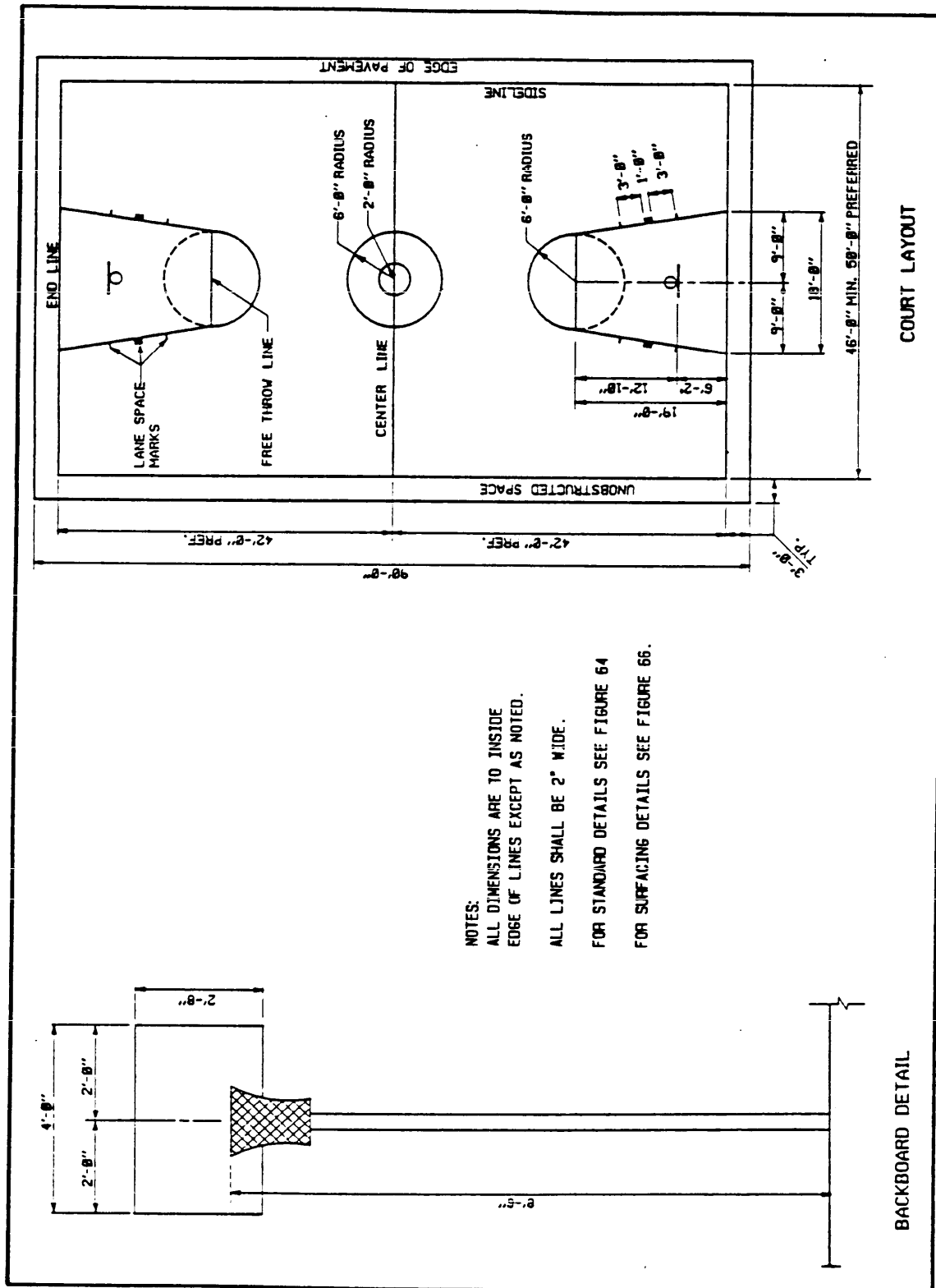


Figure 4
 Bidy Basketball Court

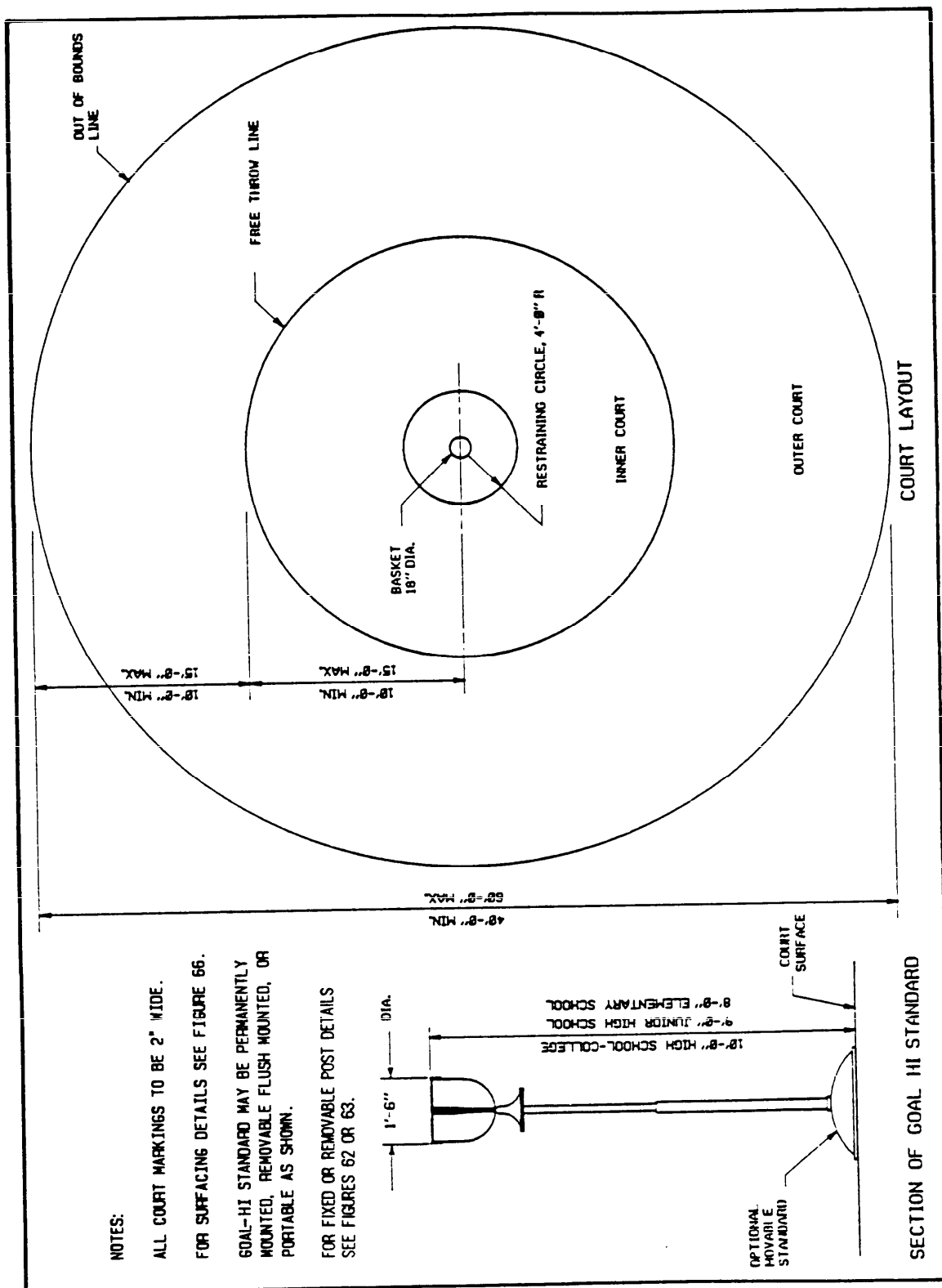


Figure 5
Goal-Hi Basketball Court

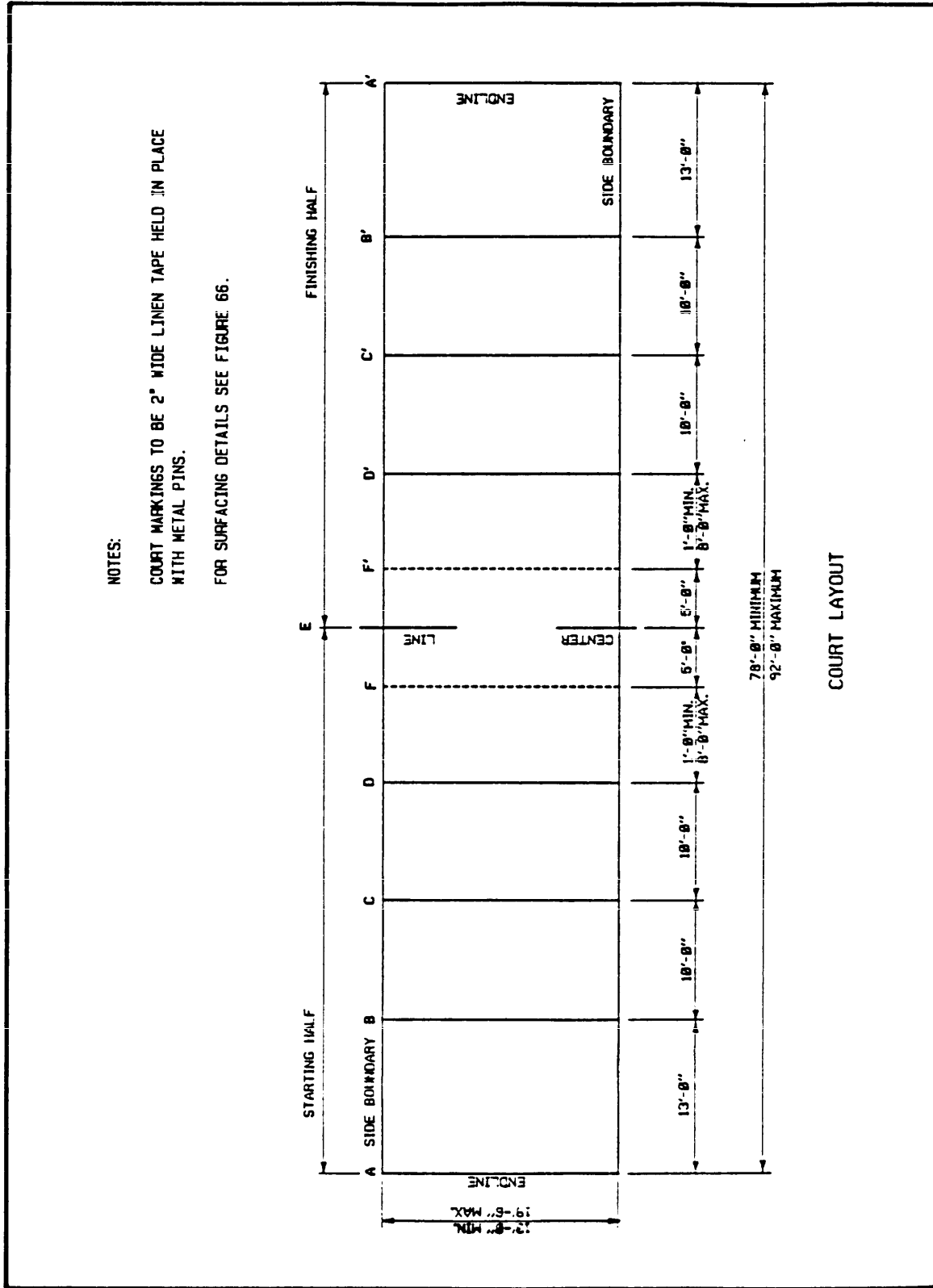


Figure 6
 Bocchie Court

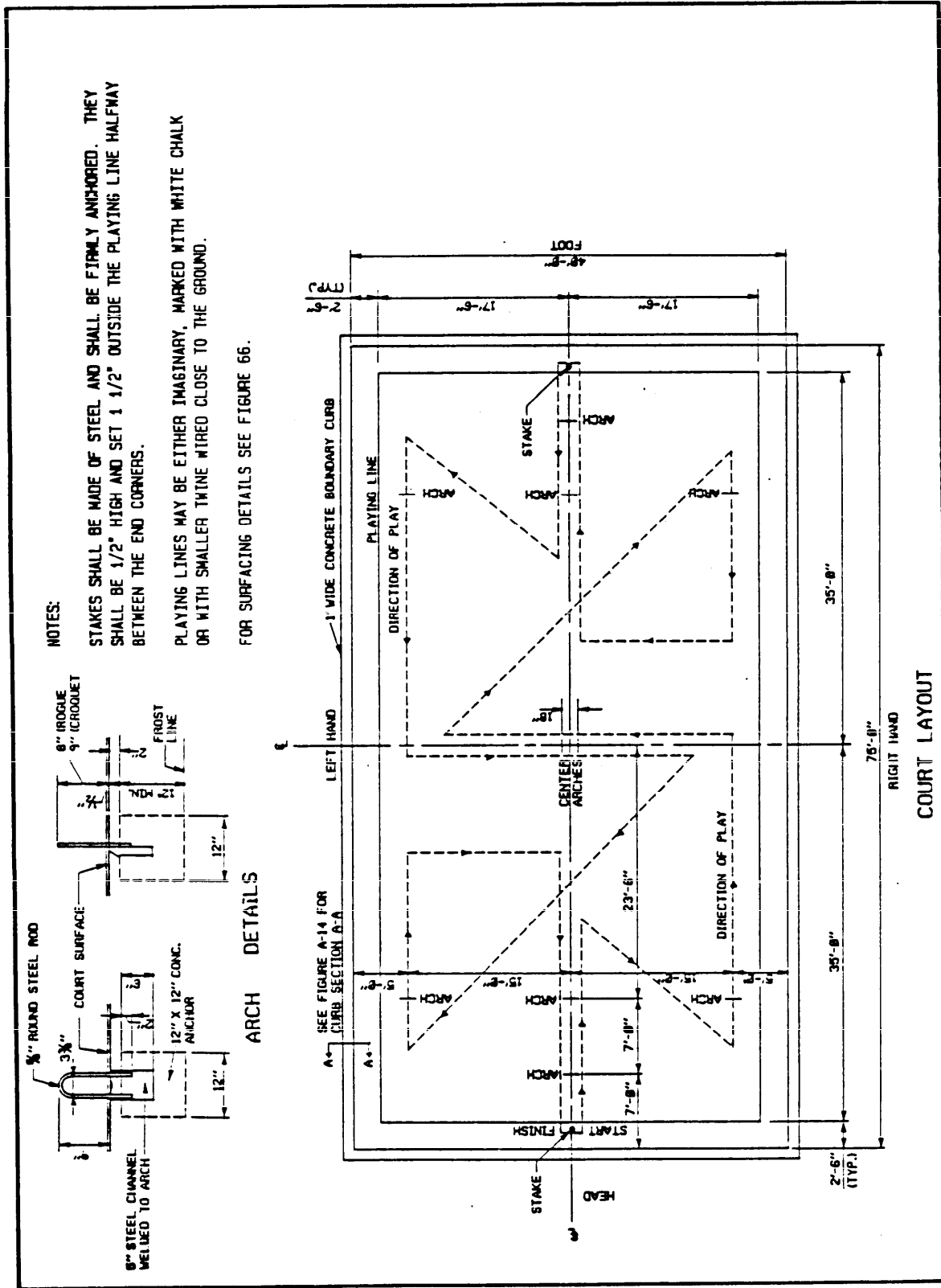


Figure 7
Croquet Court

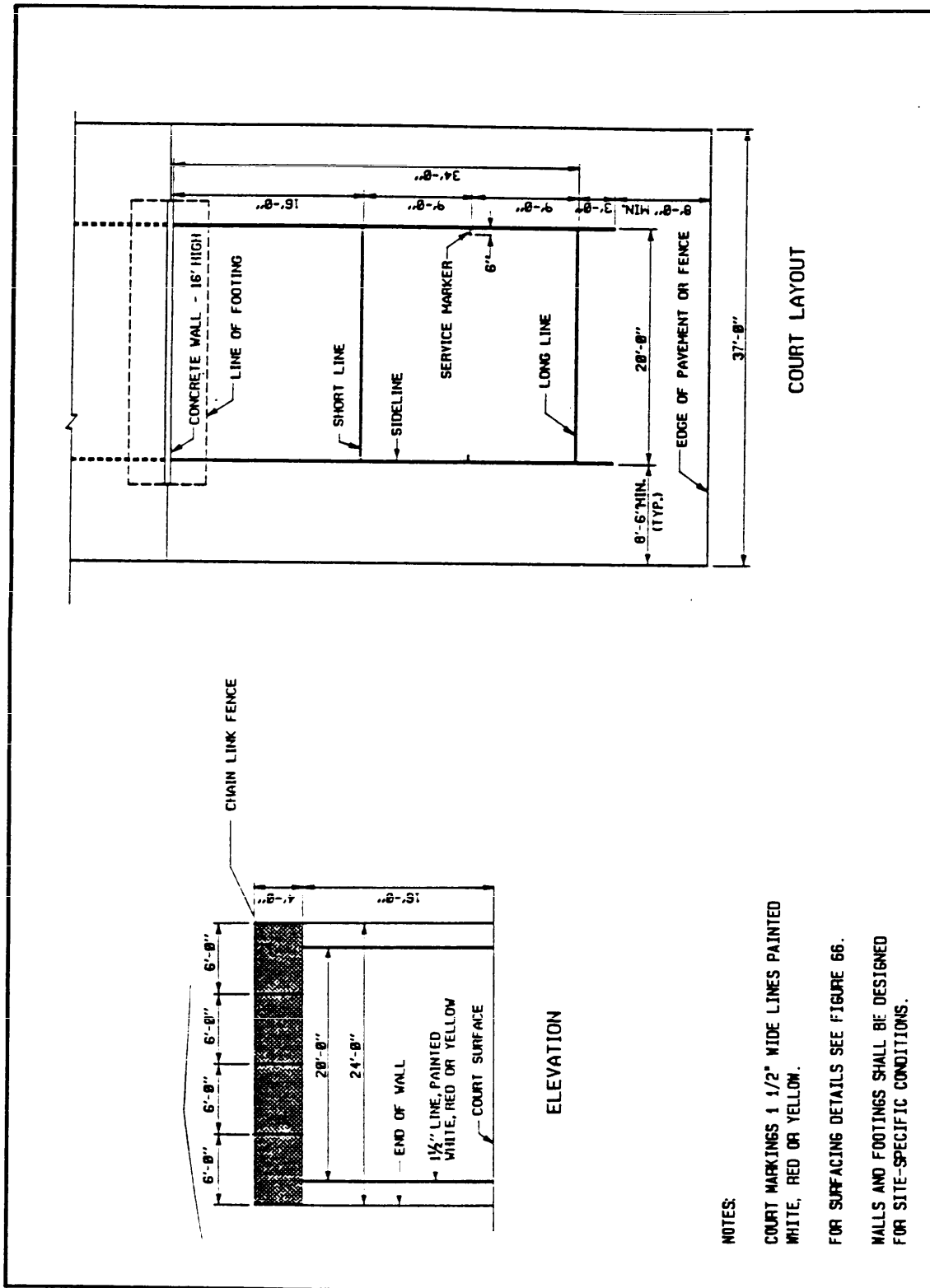


Figure 8
One-Wall Handball Court

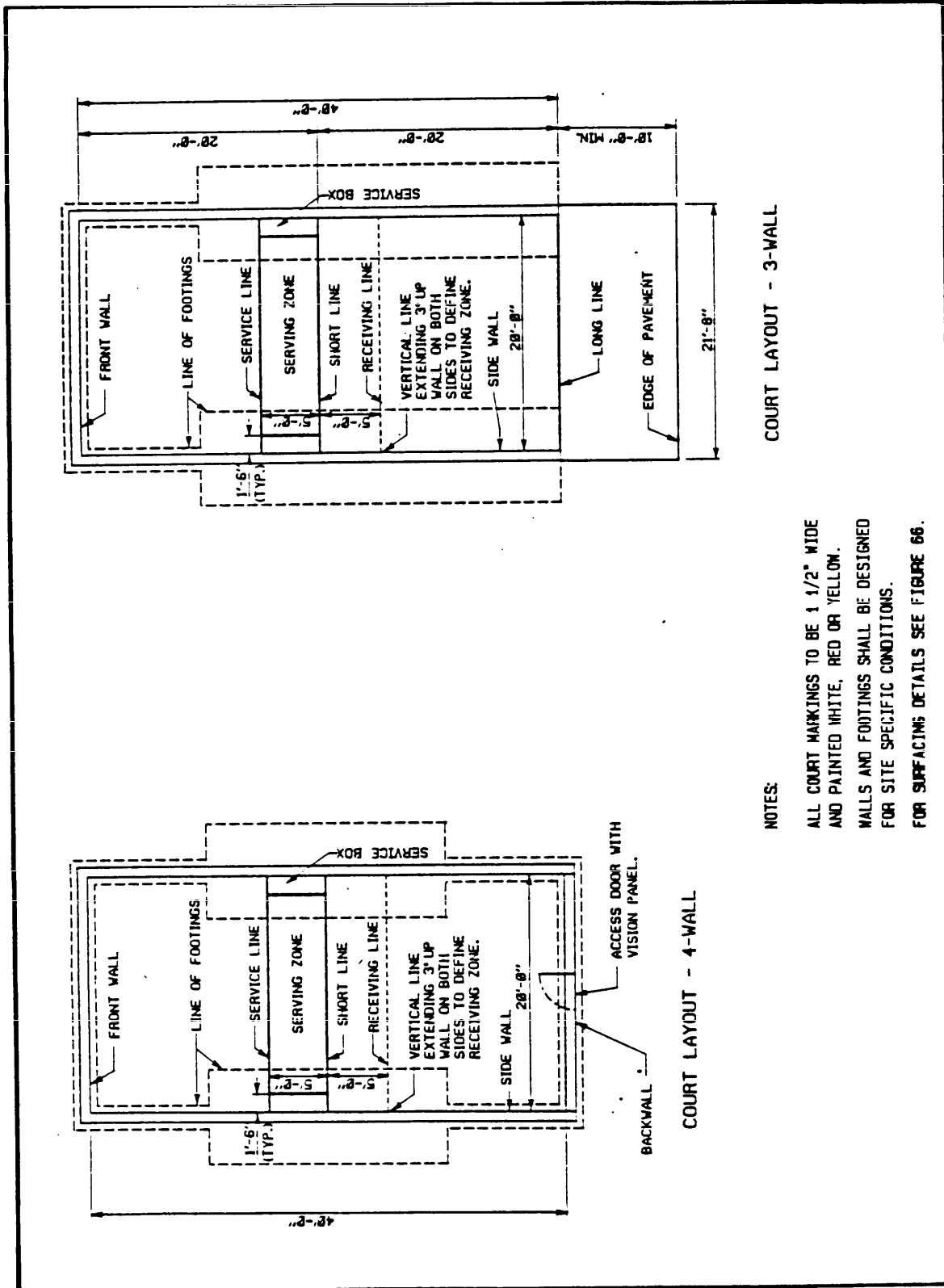
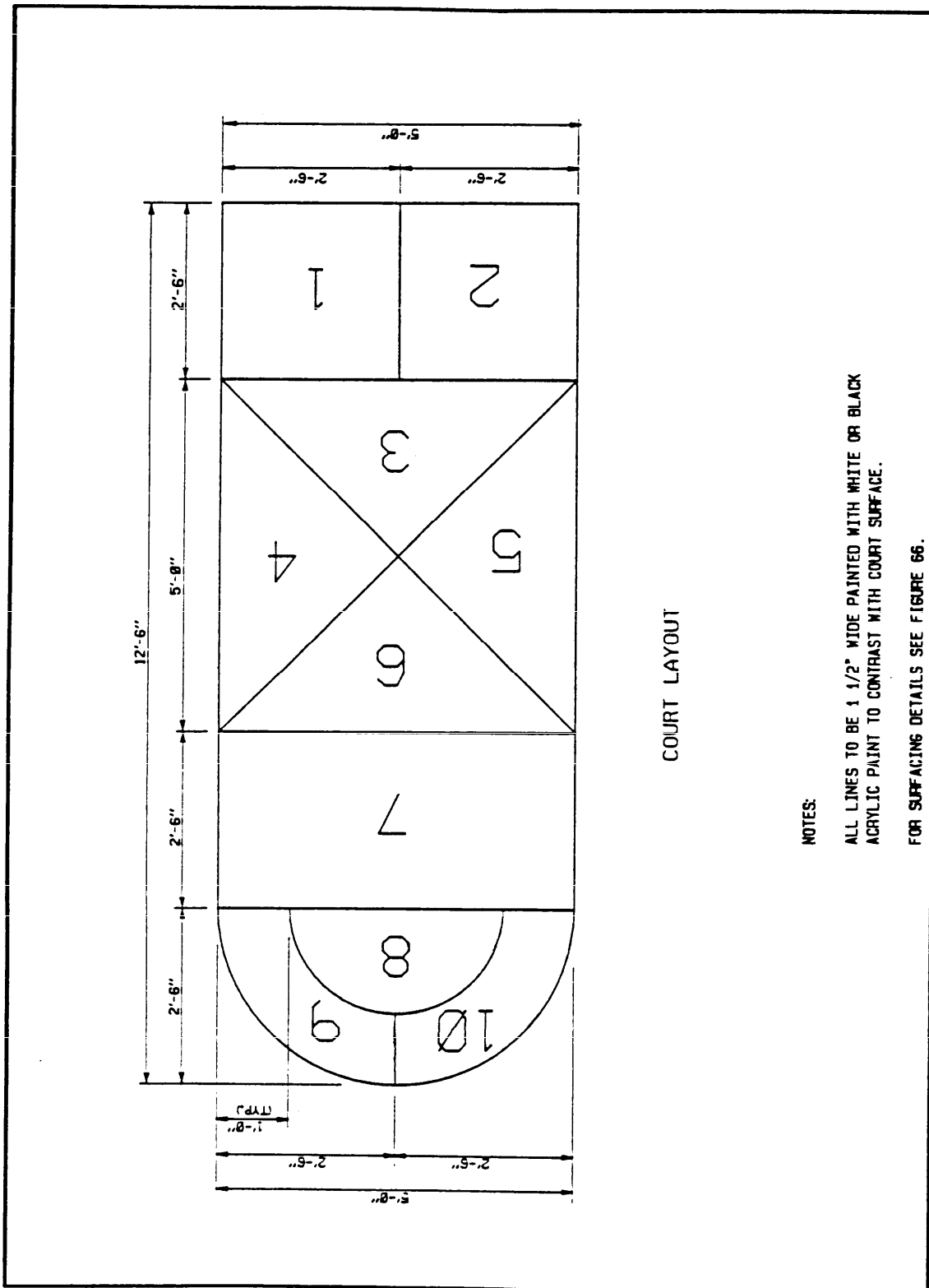


Figure 9
Three- and Four-Wall Handball Court



COURT LAYOUT

NOTES:

ALL LINES TO BE 1 1/2" WIDE PAINTED WITH WHITE OR BLACK ACRYLIC PAINT TO CONTRAST WITH COURT SURFACE.

FOR SURFACING DETAILS SEE FIGURE 66.

Figure 10
Hopscotch Court

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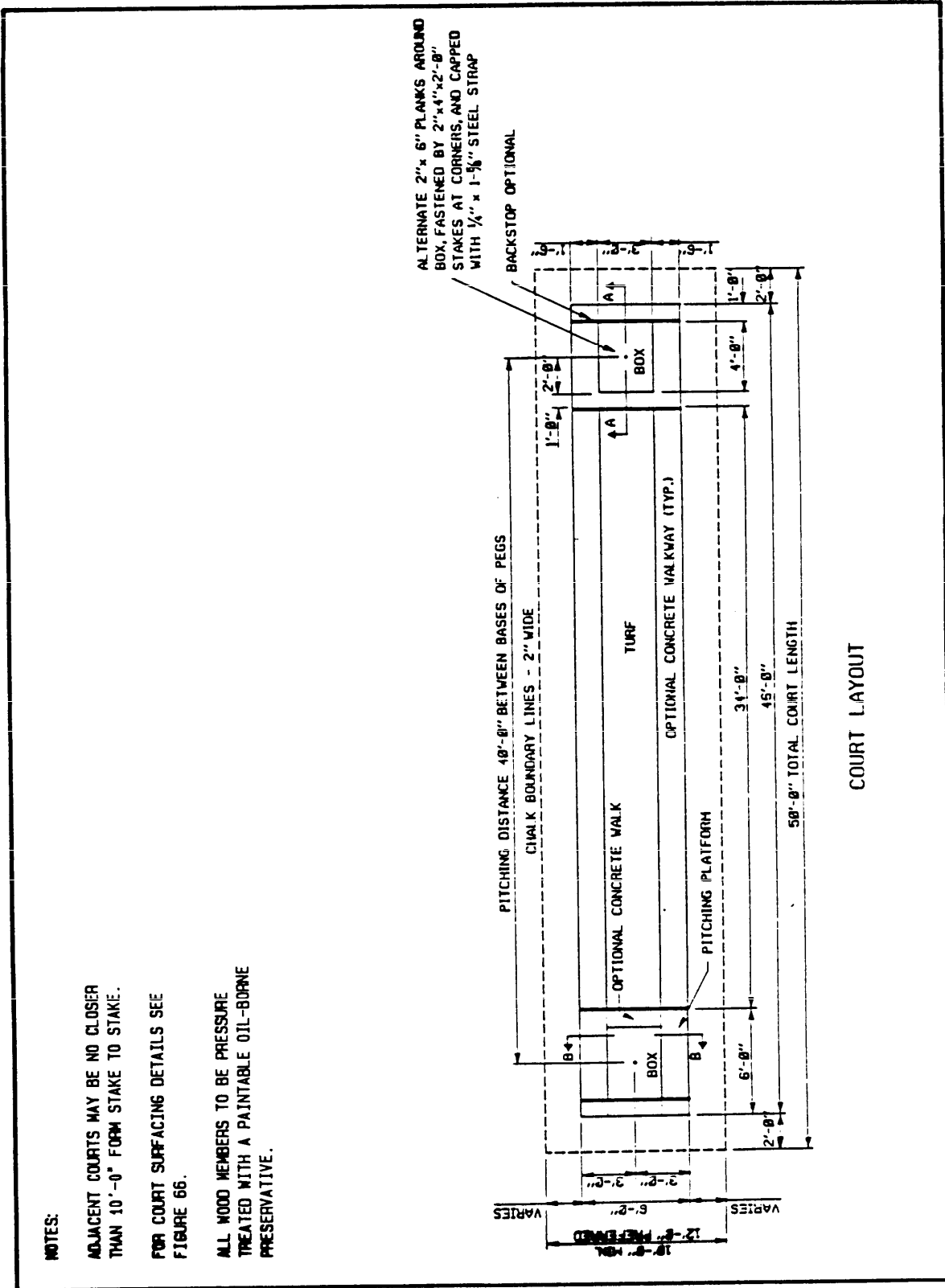


Figure 11a
 Horseshoes Court -- Layout

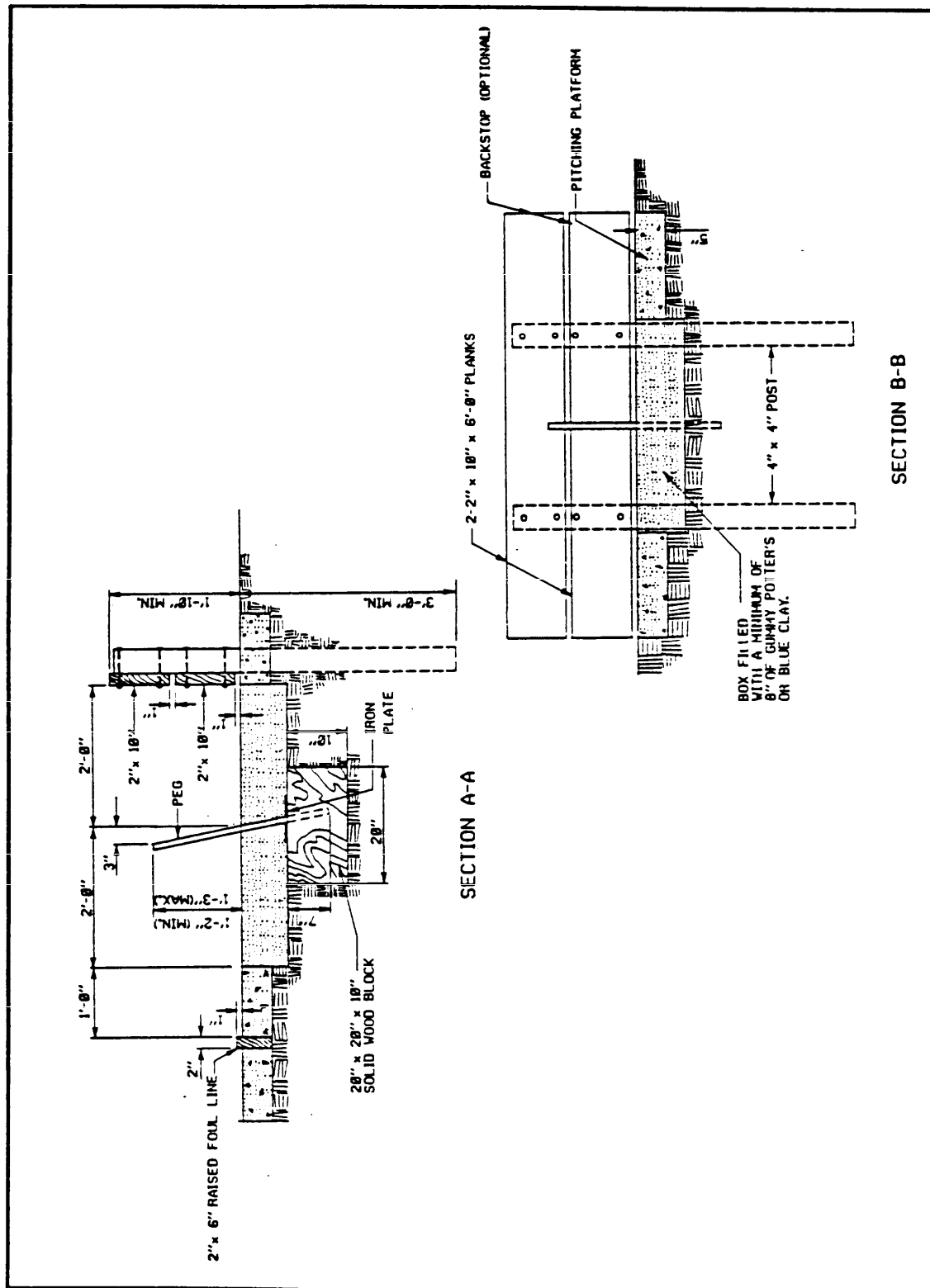


Figure 11b
Horseshoes Court -- Construction Details

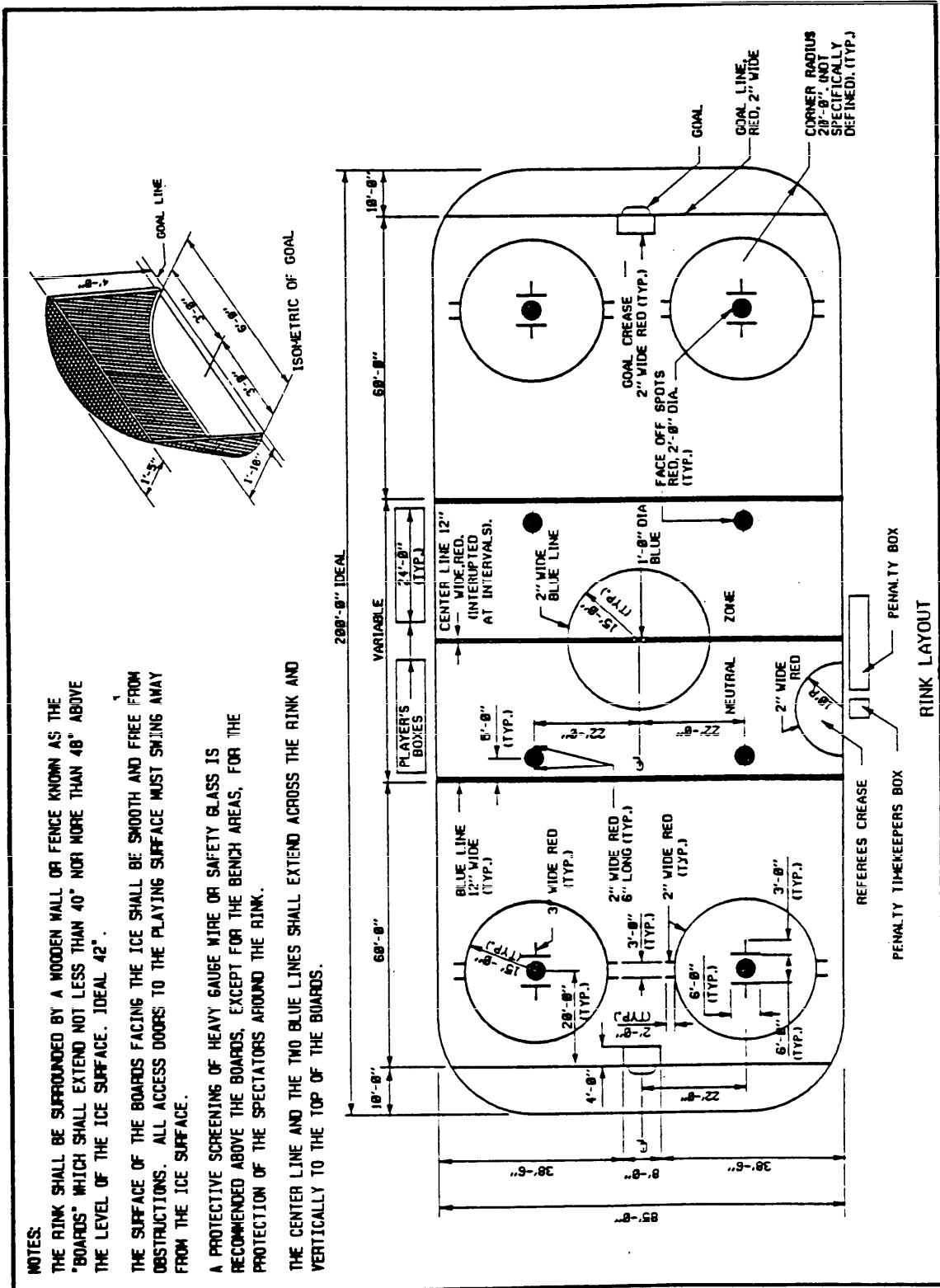


Figure 12
Ice Hockey Rink

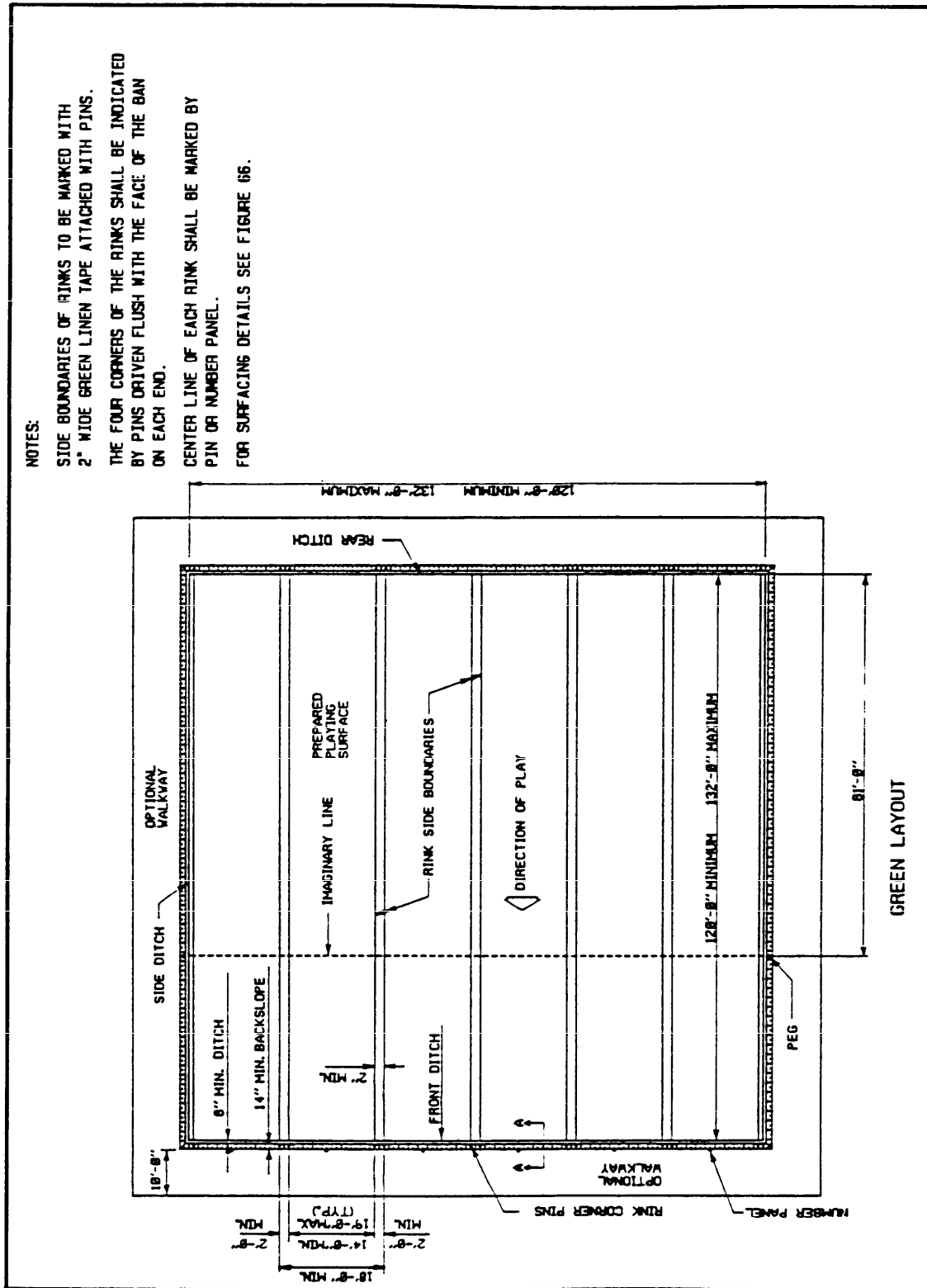


Figure 13a
Lawn Bowling Green -- Layout

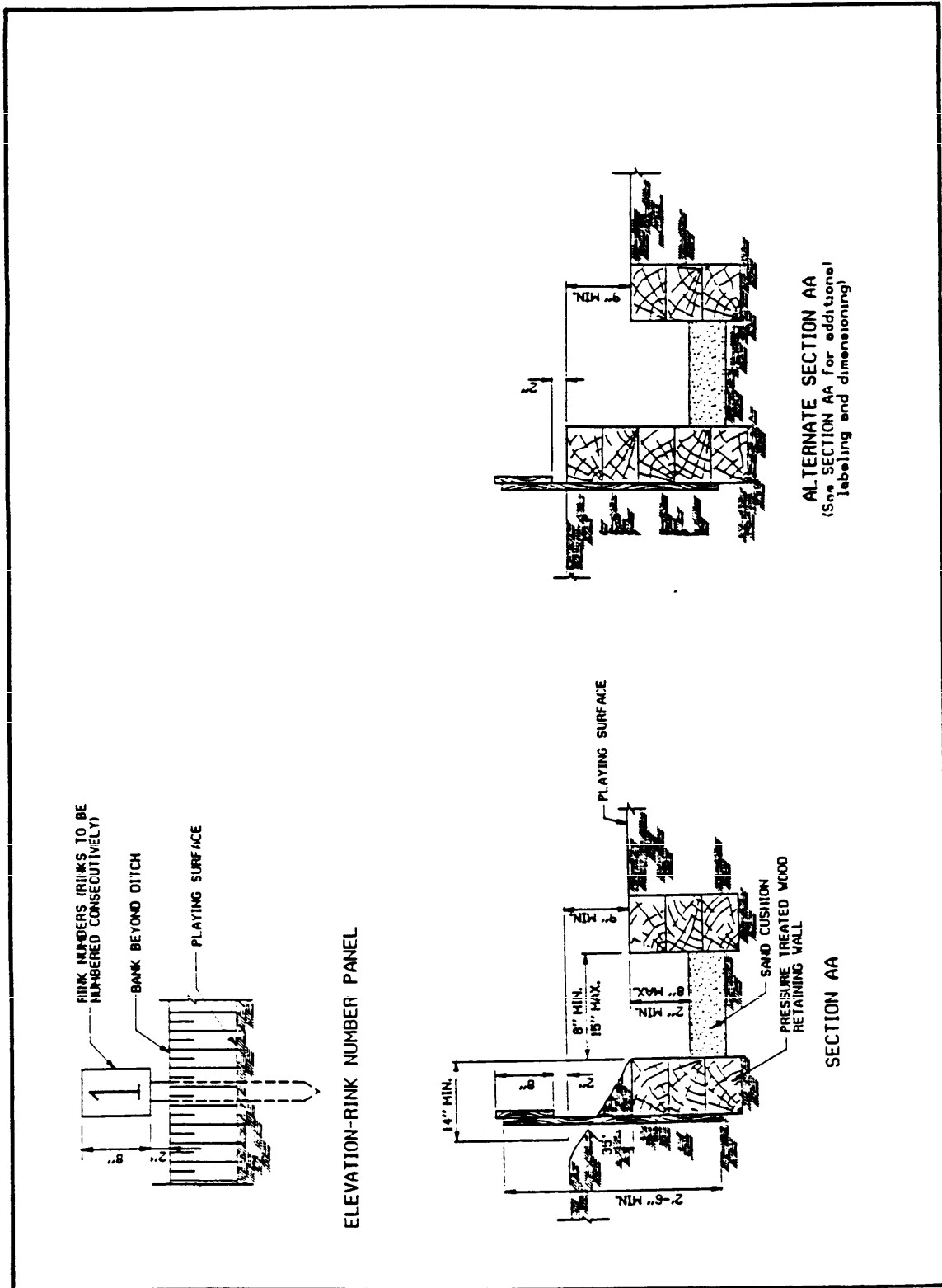


Figure 13b
Lawn Bowling Green -- Construction Details

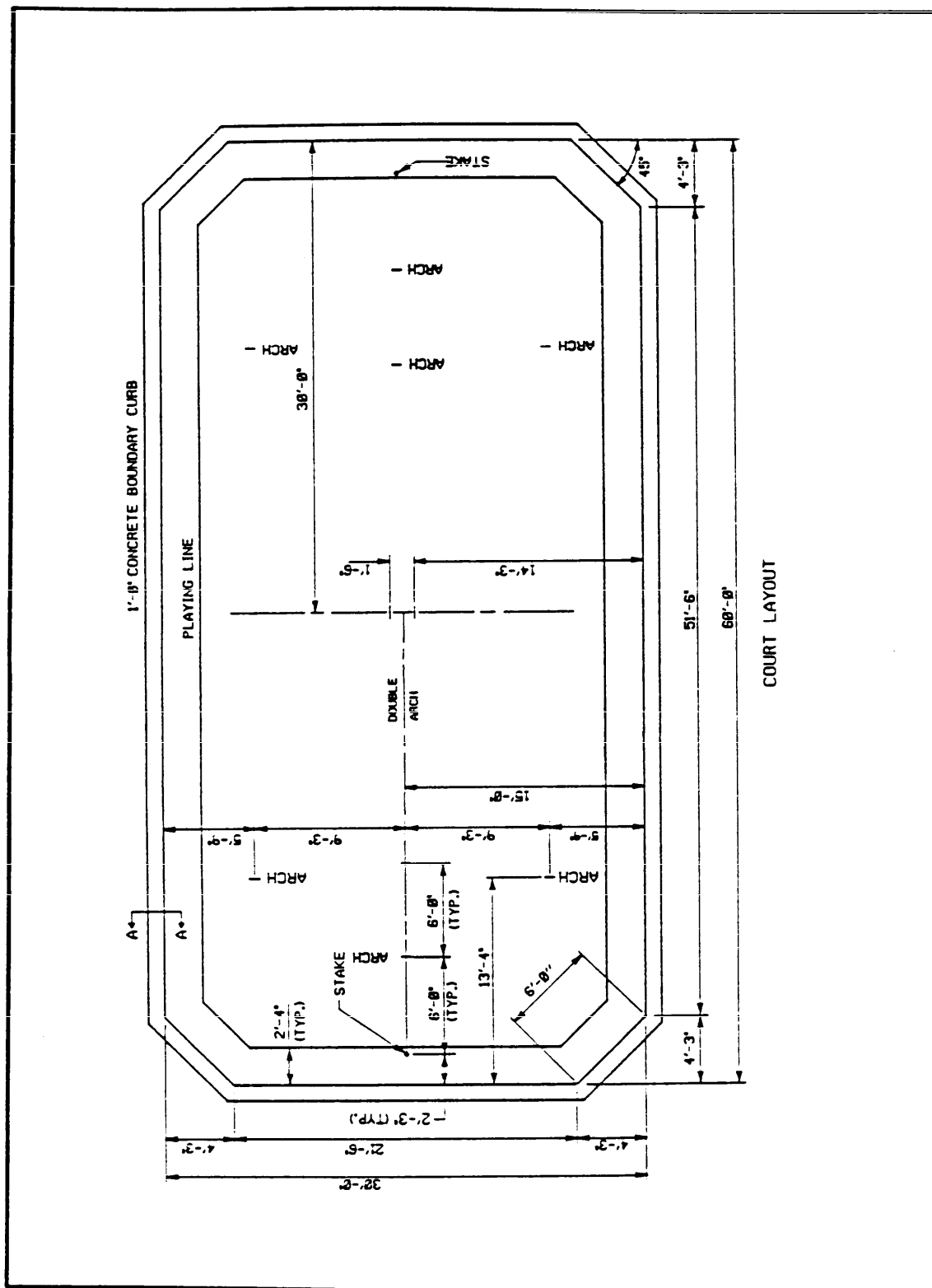


Figure 14a
 Roque Court -- Layout

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NOTES:

PLAYING LINES ARE MARKED BY A LIGHT DEPRESSION IN PLAYING SURFACE WITHOUT RAISING ADJACENT SOIL.

STAKES ARE 3/4" DIA. STEEL, SET RIGIDLY IN THE GROUND AND EXTENDING 2" ABOVE THE SURFACE.

SEE DETAIL ON FIGURE 7 FOR ARCH DETAILS.

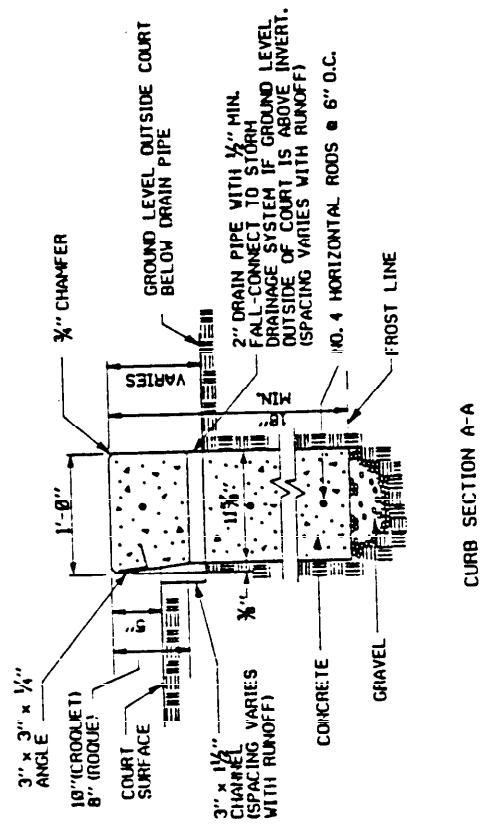


Figure 14b
Roque Court -- Construction Details

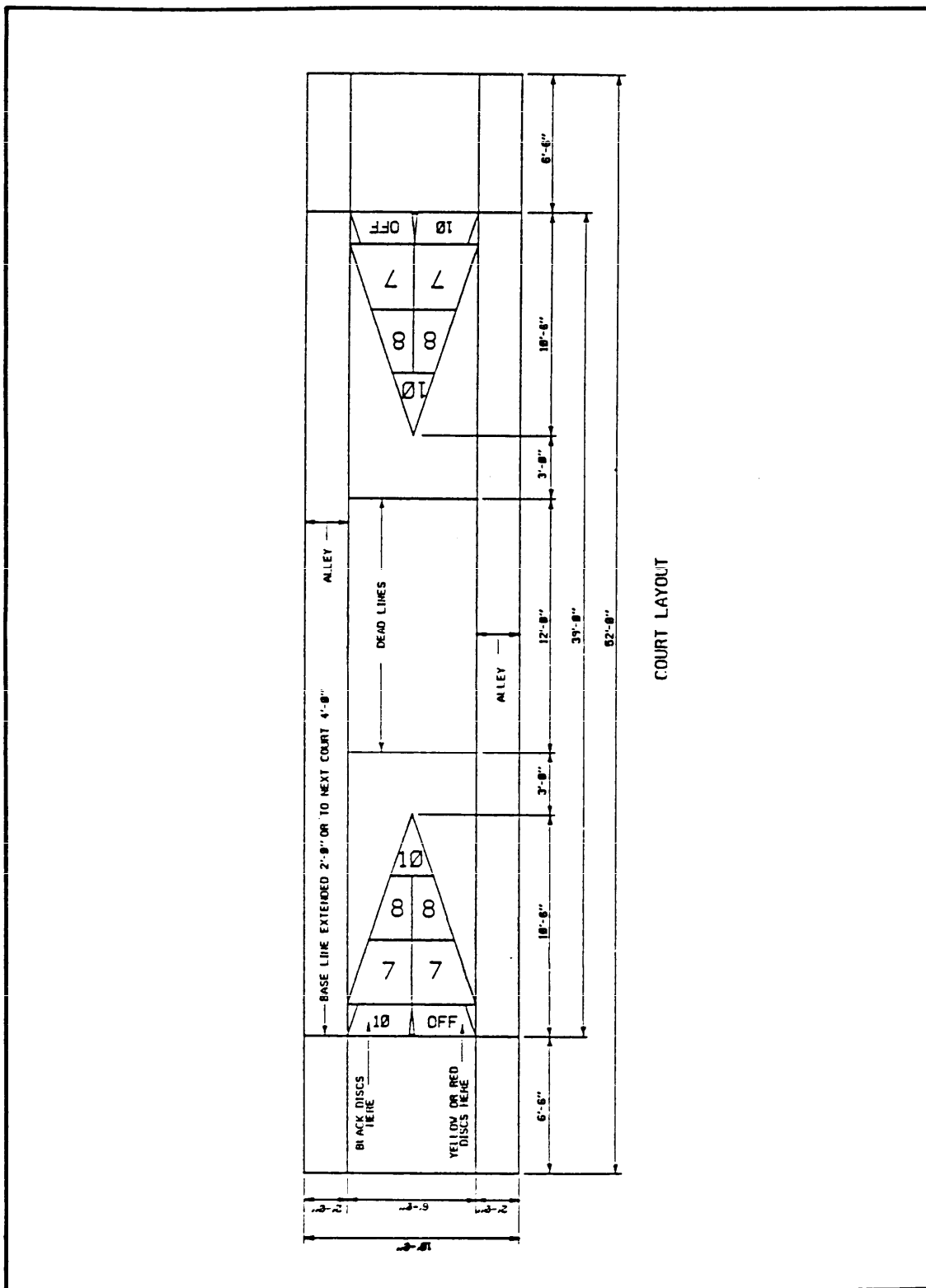


Figure 15a
Shuffleboard Court -- Layout

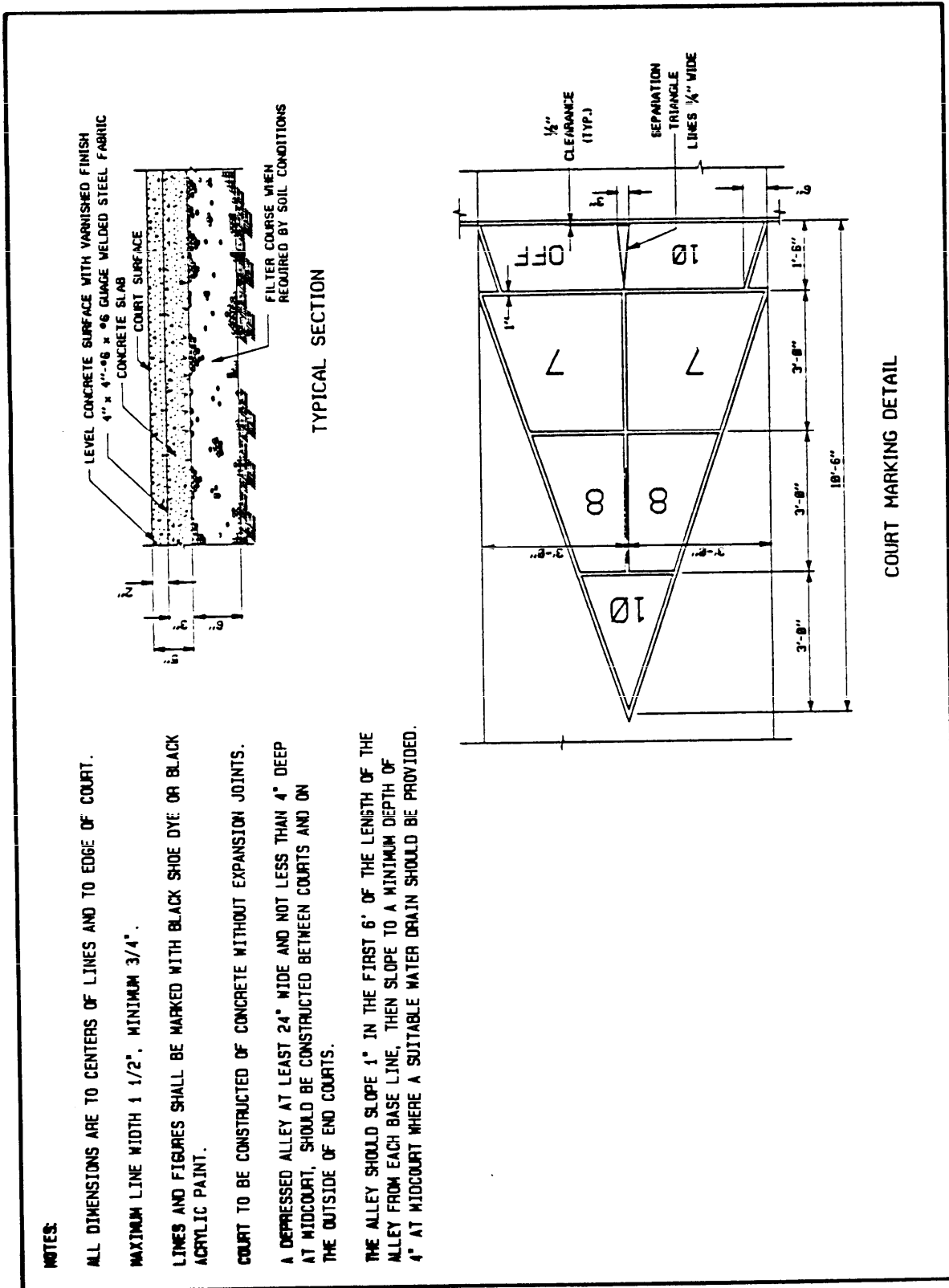
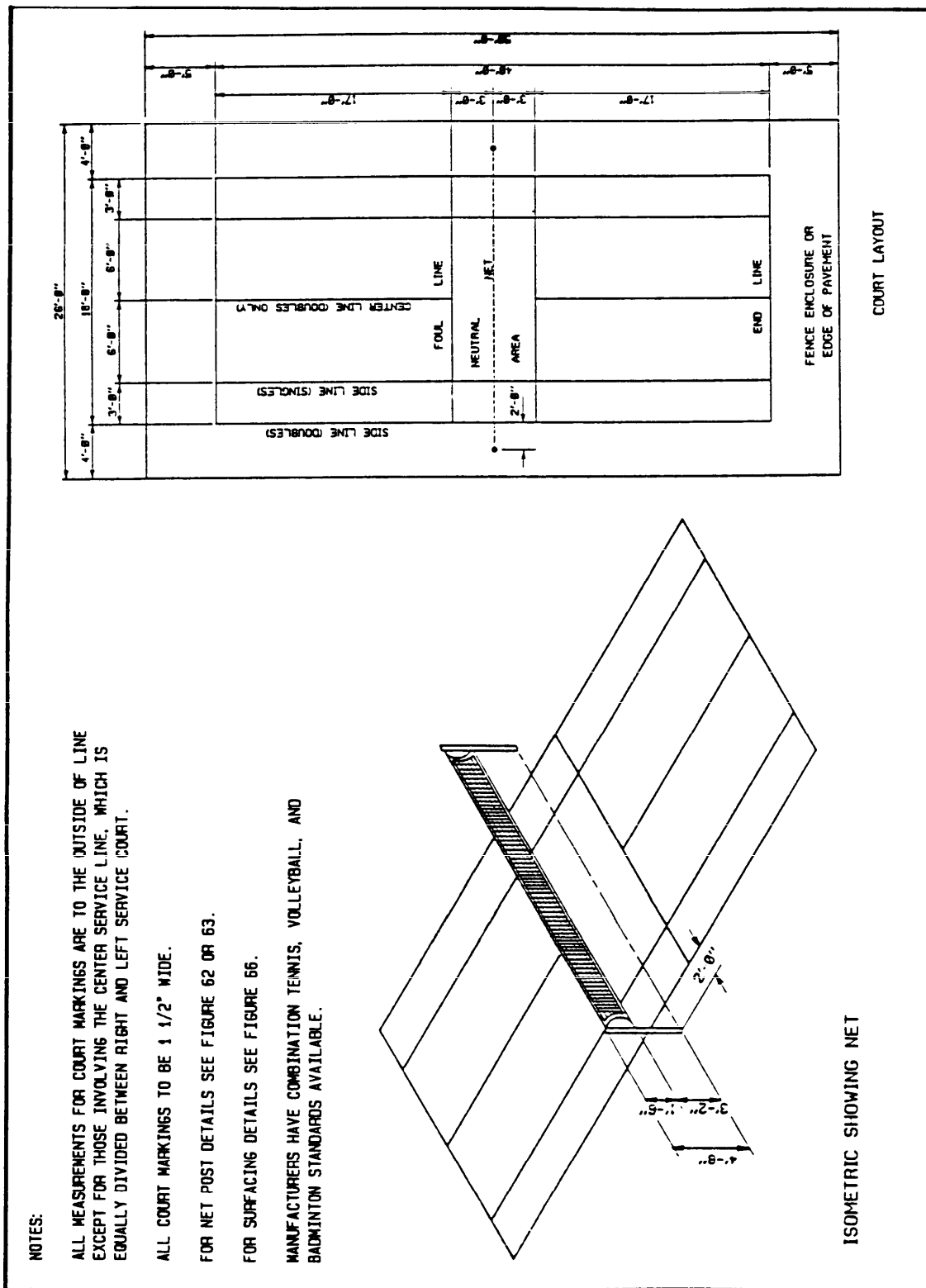


Figure 15b
 Shuffleboard Court -- Construction Details



NOTES:

ALL MEASUREMENTS FOR COURT MARKINGS ARE TO THE OUTSIDE OF LINE EXCEPT FOR THOSE INVOLVING THE CENTER SERVICE LINE, WHICH IS EQUALLY DIVIDED BETWEEN RIGHT AND LEFT SERVICE COURT.

ALL COURT MARKINGS TO BE 1 1/2" WIDE.

FOR NET POST DETAILS SEE FIGURE 62 OR 63.

FOR SURFACING DETAILS SEE FIGURE 66.

MANUFACTURERS HAVE COMBINATION TENNIS, VOLLEYBALL, AND BADMINTON STANDARDS AVAILABLE.

Figure 16
Deck Tennis Court

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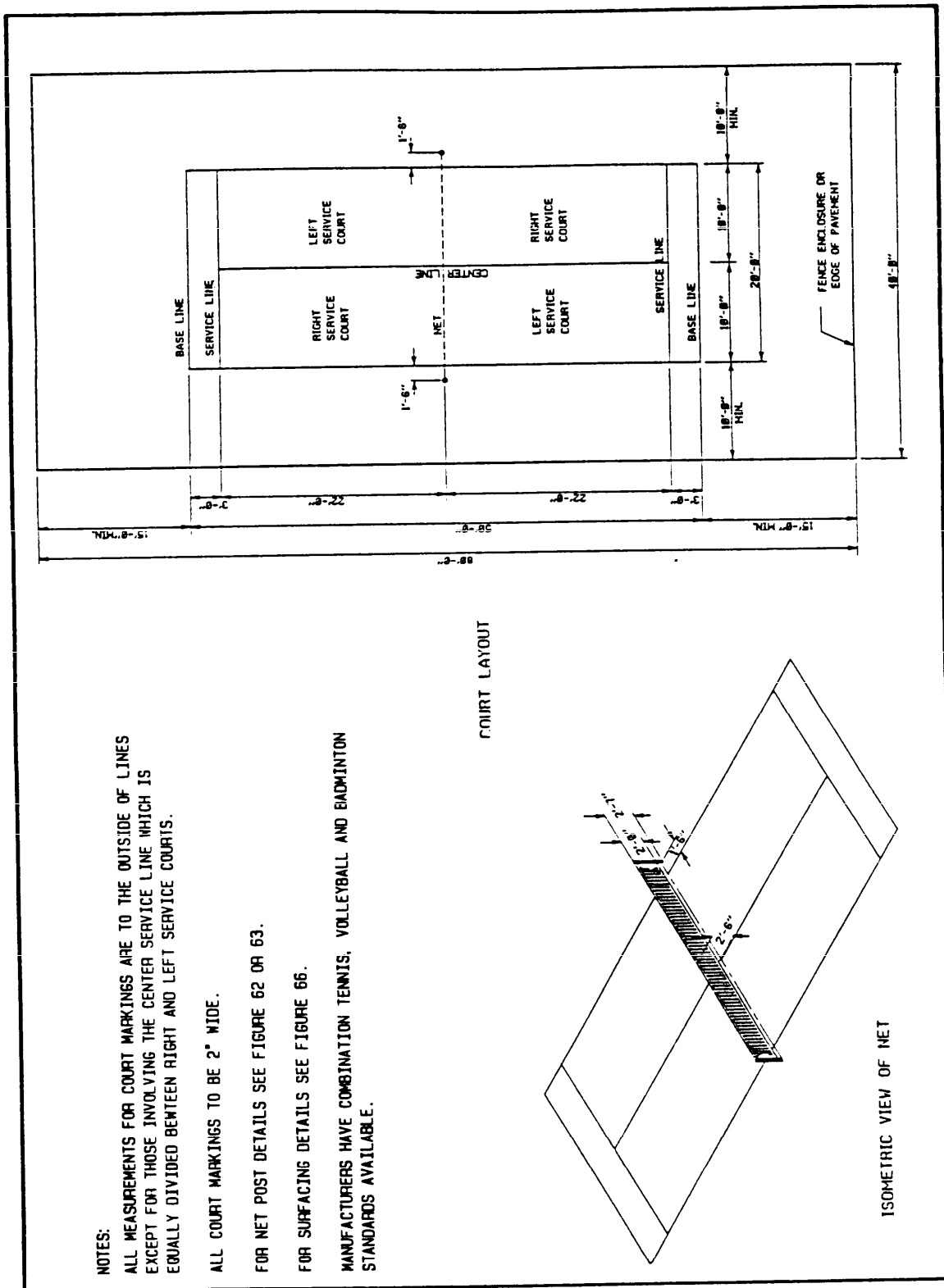


Figure 17
 Paddle Tennis Court

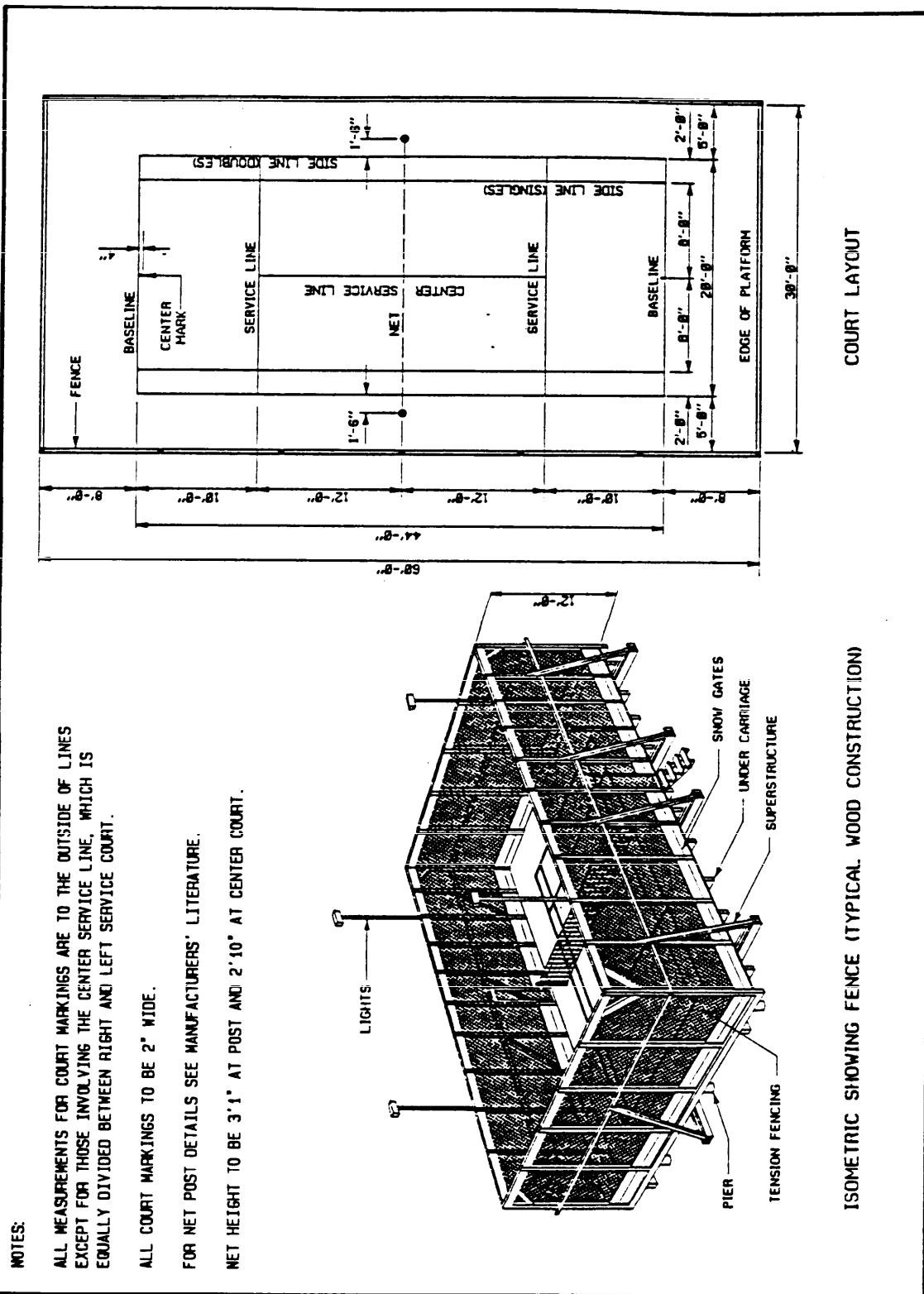


Figure 18
Platform Tennis Court

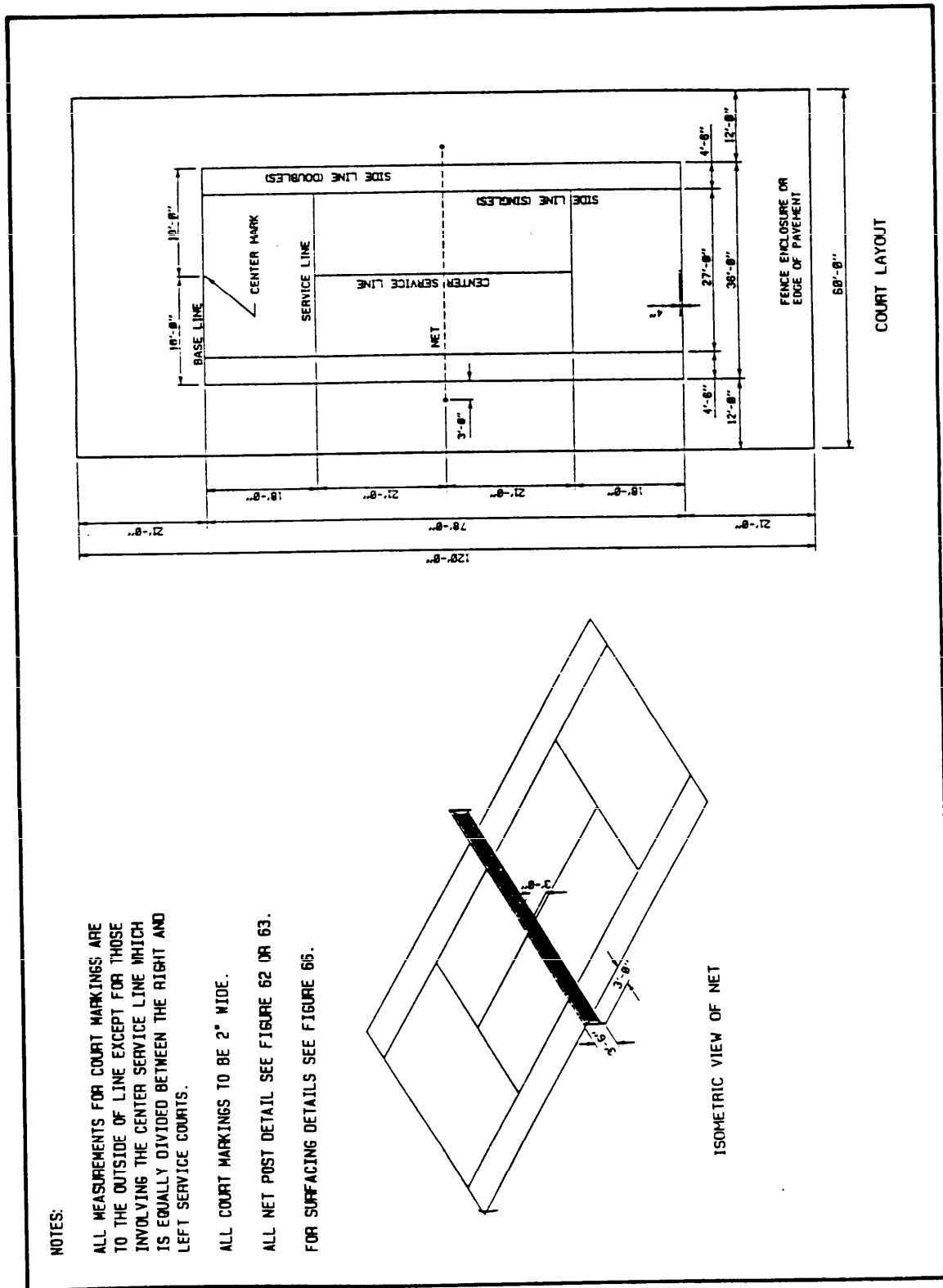


Figure 19
Tennis Court

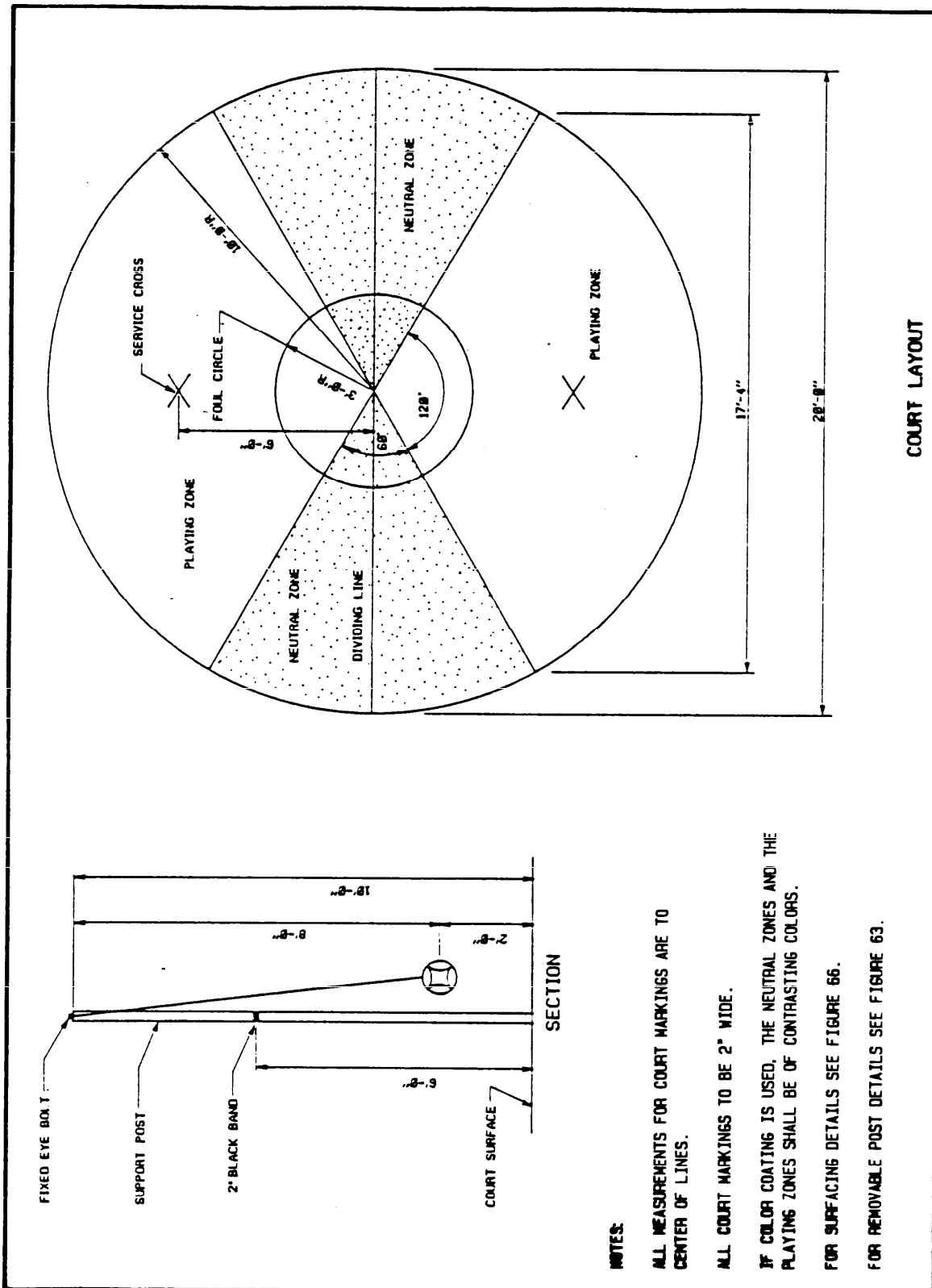
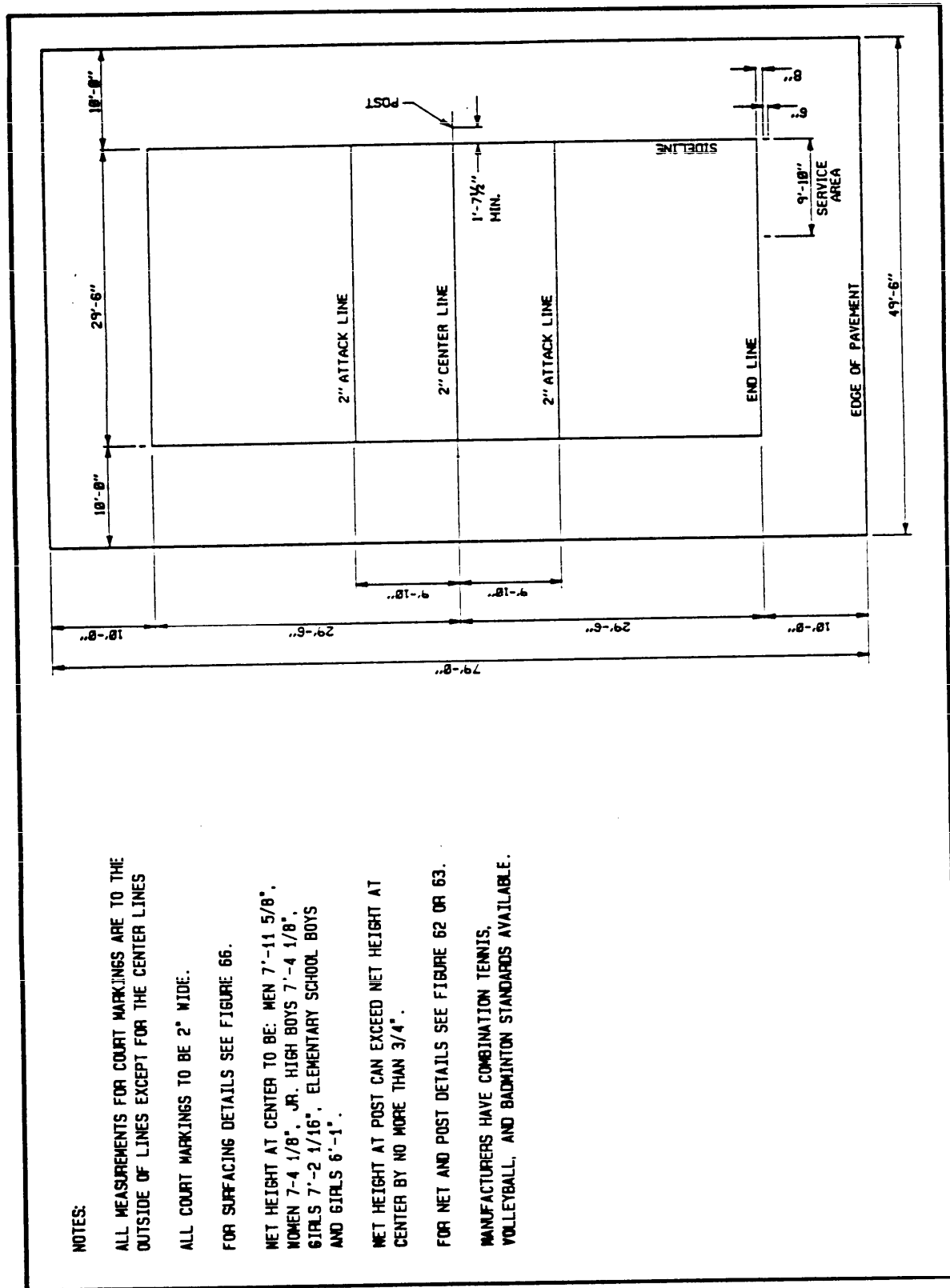


Figure 20
Tetherball Court

MIL-HDBK-1037/3



NOTES:

ALL MEASUREMENTS FOR COURT MARKINGS ARE TO THE OUTSIDE OF LINES EXCEPT FOR THE CENTER LINES

ALL COURT MARKINGS TO BE 2" WIDE.

FOR SURFACING DETAILS SEE FIGURE 66.

NET HEIGHT AT CENTER TO BE: MEN 7'-11 5/8", WOMEN 7'-4 1/8", JR. HIGH BOYS 7'-4 1/8", GIRLS 7'-2 1/16", ELEMENTARY SCHOOL BOYS AND GIRLS 6'-1".

NET HEIGHT AT POST CAN EXCEED NET HEIGHT AT CENTER BY NO MORE THAN 3/4".

FOR NET AND POST DETAILS SEE FIGURE 62 OR 63.

MANUFACTURERS HAVE COMBINATION TENNIS, VOLLEYBALL, AND BADMINTON STANDARDS AVAILABLE.

Figure 21a
Volleyball Court -- Dimensions

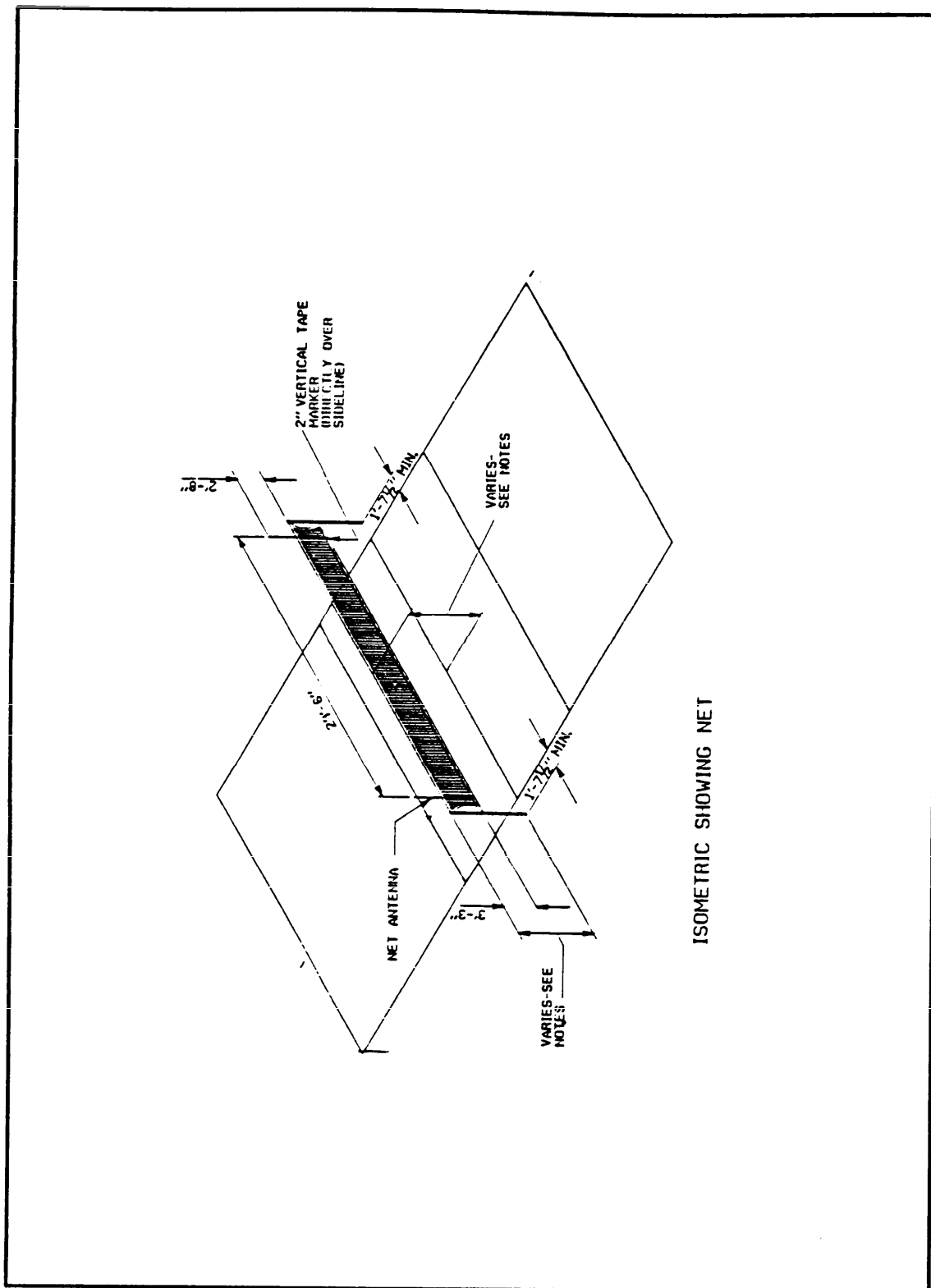


Figure 21b
Volleyball Court -- Layout and Net

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Section 3: SPORTS FIELDS

3.1 Official Baseball. The official baseball (including Babe Ruth and Senior League) playing area (see Figure 22) shall be as follows.

a) Source of Information: The Official Playing Rules Committee, 1974, Babe Ruth Baseball, Senior League Baseball, Little League Baseball, Inc.

b) Recommended Area: The minimum ground space shall be 3 to 3.5 acres (1.21 to 1.42 ha).

c) Size and Dimensions: The baselines shall be 90 ft (27.4 m), the pitching distance 60.5 ft (18.4 m) and the pitchers mound 10 in. (254 mm) above the level of homeplate. The distance down the foul lines shall be 325 ft (99.06 m) minimum, or preferably 350 ft (106.68 m). The outfield distance to center field shall be 400 ft (121.92 m). For Senior League Baseball the recommended distance from plate to outfield fence at all points shall be greater than or equal to 300 ft (91.4 m). All distances are measured from homeplate.

d) Orientation: The optimum orientation is to locate homeplate so that the pitcher is throwing across the sun and the batter is not facing it. The line from homeplate through the pitchers mound to second base should run east-northeast.

e) Surface and Drainage: The surface shall be turf. The infield may be skinned, and shall be graded so that the baselines and homeplate are level.

f) Special Considerations: A backstop shall be provided at a minimum distance of 40 ft (12.19 m) or preferably 60 ft (18.29 m) behind homeplate.

3.2 Bronco League Baseball (9-12 years). The Bronco League playing area (see Figure 23) shall be as follows.

a) Source of Information: Pony Baseball (PB)

b) Recommended Area: The ground space shall be 1 acre (minimum).

c) Size and Dimension: Baselines shall be 70 ft (21.3 m), the pitching distance 48 ft (14.6 m) and the pitcher's plate shall be 6 in. (152.4 mm) above the level of homeplate. The distance down foul line shall be 200 ft (60.96 m). The outfield distance to pocket in center field shall be 250 ft.

d) Orientation: The optimum orientation shall be to locate homeplate so that the pitcher is throwing across the sun and the batter is not facing it. The line from homeplate through the pitcher's mound and second base shall run east-northeast.

e) Surface and Drainage: The surface shall be turf. Infield may be skinned, and shall be graded so that the baselines and homeplate are level.

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f) Special Considerations: A backstop shall be provided at the recommended distance of 30 ft (9.14 m) behind homeplate.

3.3 Pony League Baseball (13-14 years). The Pony League baseball playing area (see Figure 24) shall be as follows.

a) Source of Information: Pony Baseball (PB)

b) Recommended Area: The ground space shall be 2 acres (0.809 ha) minimum.

c) Size and Dimension: The baselines shall be 80 ft (24.38 m), pitching distance 54 ft (16.46 m), and the pitcher's plate shall be 8 in. (203.2 mm) above the level of homeplate. The distance down the foul line shall be 250 ft (76.2 m) and the outfield distance to pocket in center field shall be 300 ft (91.44 m).

d) Orientation: The optimum orientation shall be to locate homeplate so that the pitcher is throwing across the sun and the batter is not facing it. The line from homeplate through the pitcher's mound and second base shall run east-northeast.

e) Surface and Drainage: The surface shall be turf. The infield may be skinned, and shall be graded so that the baselines and homeplate are level.

f) Special Considerations: A backstop shall be provided at a recommended distance of 40 ft (12.19 m) behind homeplate.

3.4 Colt League Baseball (15-16 years). The Colt League baseball playing area (see Figure 25) shall be as follows.

a) Source of Information: Pony Baseball (PB)

b) Recommended Area: The ground space shall be 3 acres (1.21 ha) minimum.

c) Size and Dimension: The baselines shall be 90 ft (27.4 m), pitching distance 60 ft (18.29 m), and the pitcher's plate 10 in. (254 mm) above the level of homeplate. The distance down the foul line shall be 300 ft (91.44 m), and the outfield distance to pocket in center field shall be 350 ft (106.68 m).

d) Orientation: The optimum orientation shall be to locate homeplate so that the pitcher is throwing across the sun and the batter is not facing it. The line from homeplate through the pitcher's mound and second base shall run east-northeast.

e) Surface and Drainage: The surface shall be turf. The infield may be skinned, and shall be graded so that the baselines and homeplate are level.

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f) Special Considerations: A backstop shall be provided at a recommended distance of 50 ft (15.24 m) behind homeplate.

3.5 Little League Baseball (9-12 years). The Little League Baseball playing area (see Figure 26) shall be as follows.

a) Source of Information: Little League Baseball, Inc.

b) Recommended Area: The ground space shall be 1.2 acres (0.486 ha) minimum.

c) Size and Dimension: The baselines shall be 60 ft (18.29 m), pitching distance 46 ft (14.02 m) and the pitcher's plate shall be 6 in. (152.4 mm) above the level of homeplate. The distance down the foul line shall be 200 ft (61 m) and the outfield distance to pocket in center field shall be 200 to 250 ft (61 to 76.2 m) optional.

d) Orientation: The optimum orientation is to locate homeplate so that the pitcher is throwing across the sun and the batter is not facing it. The line from homeplate through the pitcher's mound and second base shall run east-northeast.

e) Surface and Drainage: The surface shall be turf. The infield may be skinned, and shall be graded so that the baselines and homeplate are level.

f) Special Considerations: A backstop shall be provided at a recommended minimum distance of 25 ft (7.5 m) behind homeplate.

3.6 Softball, 12-Inch (304.56 mm) Fast and Slow Pitch. The 12-inch softball playing area (see Figure 27) shall be as follows.

a) Source of Information: Amateur Softball Association of America (ASA).

b) Recommended Area: The ground space shall be 40,000 ft² (3716 m²) to 90,000 ft² (8361 m²).

c) Size and Dimension: Field size varies depending on player's age group (refer to table on Figure 27).

d) Orientation: The optimum orientation is to locate homeplate so that the pitcher is throwing across the sun and the batter is not facing it.

e) Surface and Drainage: The surface shall be turf. The infield may be skinned and shall be graded so that the baselines and homeplate are level.

f) Special Considerations: A backstop shall be located 25 ft (7.62 m) minimum behind homeplate.

3.7 Softball, 16-Inch (406 mm) Slow Pitch. The 16-inch, slow pitch, softball playing area (see Figure 28) shall be as follows.

MIL-HDBK-1037/3

a) Source of Information: Amateur Softball Association of America (ASA).

b) Recommended Area: The ground space shall be 50,625 ft² (4703.06 m²) to 75,625 ft² (7025.56 m²).

c) Size and Dimension: The baselines shall be 55 ft (16.76 m) for men and women. The pitching distance shall be 38 ft (11.58 m) for men and women. Playing field radius from homeplate between foul lines shall be 250 ft (76.2 m) for men, 200 ft (61 m) for women.

d) Orientation: The optimum orientation is to locate homeplate so that the pitcher is throwing across the sun and the batter is not facing it.

e) Surface and Drainage: The surface shall be turf. The infield may be skinned and shall be graded so that the baselines and homeplate are level.

f) Special Considerations: The backstop shall be located 25 ft (7.62 m) minimum behind homeplate.

3.8 11-Man Football (NCAA), Pop Warner Junior League Football. The 11-man football playing area (see Figure 29) shall be as follows.

a) Source of Information: National Collegiate Athletic Association (NCAA), Pop Warner Junior League Football.

b) Recommended Area: The ground space shall be 70,700 ft² (6568 m²) minimum.

c) Size and Dimension: The playing field shall be 160 ft (48.77 m) wide x 360 ft (109.7 m) long. Additional area required is 12 ft (3.66 m) minimum unobstructed space on all sides. The surface shall be turf.

d) Orientation: The preferred orientation shall be for the long axis to be northwest-southeast to suit the angle of the sun during the fall playing season, or north-south for longer periods.

e) Surface and Drainage: Surface and drainage shall be as follows.

(1) Surface shall be turf.

(2) The preferred grading shall be a longitudinal crown with a 1 percent slope from center to each side and adequate subdrainage.

(3) Grading may be from side-to-side or corner-to-corner diagonally if conditions do not permit the preferred grading.

f) Special Considerations: Goal posts shall be provided at each end of the playing field. Pylons are to be provided as required by rules.

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3.9 Touch and Flag Football. The touch and flag football playing area (see Figure 30) shall be as follows.

a) Source of Information: National Touch and Flag Football Rules available from The Athletic Institute.

b) Recommended Area: The ground space shall be 41,200 ft² (3827.5 m²) minimum.

c) Size and Dimension: The playing field shall be 120 ft (36.58 m) wide x 300 ft (91.4 m) long. Additional area recommended shall be 6 ft (1.8 m) minimum unobstructed space on all sides.

d) Orientation: The preferred orientation is for the long axis to be northwest-southeast to suit the angle of the sun during the fall playing season, or north-south for longer periods.

e) Surface and Drainage: Surface and drainage areas shall be provided as follows.

(1) Surface shall be turf.

(2) The preferred grading is a longitudinal crown with a 1 percent slope from center to each side and adequate subdrainage.

(3) Grading may be from side-to-side or corner-to-corner diagonally if conditions do not permit the preferred grading.

f) Special Considerations: Goal posts are to be provided at each end of the playing field. Pylons are to be provided as required by rules.

3.10 Lacrosse, Men's. The men's lacrosse playing area (see Figure 31) shall be as follows.

a) Source of Information: National Collegiate Athletic Association (NCAA).

b) Recommended Area: The ground space shall be 63,000 ft² (5853 m²) to 81,400 ft² (7562 m²).

c) Size and Dimension: The playing field width shall be from 160 ft (48.7 m) to 180 ft (54.8m); the length shall be 330 ft (100.58 m). An additional area of 10 ft (3.05 m) (minimum) of unobstructed space around entire perimeter of field, with 5 ft (1.52 m) or 6 ft (1.82 m) high barrier fence, or 20 ft (6.6 m) without fence is recommended.

d) Orientation: The preferred orientation is for the long axis to be northwest-southeast to suit the angle of the sun during the fall playing season, or north-south for longer periods.

e) Surface and Drainage: Surface and drainage areas shall be as follows.

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(1) Surface shall be turf.

(2) The preferred grading shall be a longitudinal crown with a 1 percent slope from center to each side and adequate subdrainage.

(3) Grading may be from side-to-side or corner-to-corner diagonally if conditions do not permit the preferred grading.

3.11 Lacrosse, Women's. The women's lacrosse playing area (see Figure 32) shall be as follows.

a) Source of Information: National Association for Girls and Women in Sport (NAGWS).

b) Recommended Area: The ground space is optional 69,300 ft² (6438 m²) to 75,600 ft² (7023 m²).

c) Size and Dimension: The playing field width (minimum) shall be 210 ft (64 m). The length ranges from 330 to 360 ft (100.58 to 109.7 m). As in the original American Indian game, there are no definite boundaries or shape for the field of play, but before a match the officials decide on the boundaries and declare specified obstructions out of bounds.

d) Orientation: The preferred orientation is for the long axis to be northwest-southeast to suit the angle of the sun during the fall playing season, or north-south for longer periods.

e) Surface and Drainage: The surface and drainage areas shall be as follows.

(1) Surface shall be turf.

(2) The preferred grading shall be a longitudinal crown with a 1 percent slope from center to each side with adequate subdrainage.

(3) Grading may be from side-to-side or corner-to-corner diagonally if conditions do not permit the preferred grading.

3.12 Soccer (Men's and Boys'). The men's and boys' soccer playing area (see Figure 33) shall be as follows.

a) Source of Information: United States Soccer Federation (USSF).

b) Recommended Area: The ground space shall be 75,250 ft² (6712 m²) to 93,100 ft² (8649 m²).

c) Size and Dimension: The playing field shall be from 150 to 300 ft (45.7 to 91.4 m) wide and from 300 ft to 390 ft (118.8 m) long. An additional area recommended shall be 10 ft (3.05 m) minimum unobstructed space on all sides.

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d) **Orientation:** The preferred orientation is for the long axis to be northwest-southeast to suit the angle of the sun during the fall playing season, or north-south for longer periods.

e) **Surface and Drainage:** Surface and drainage areas shall be as follows:

(1) Surface shall be turf.

(2) Preferred grading shall be a longitudinal crown with a 1 percent slope from center to each side and adequate subdrainage. Grading may be from side-to-side or corner-to-corner diagonally if conditions do not permit the preferred grading.

3.13 **Soccer (Women's and Girls').** The women's and girls' soccer playing area (see Figure 34) shall be as follows.

a) **Source of Information:** United States Soccer Federation (USSF).

b) **Recommended Area:** The ground space shall be 72,250 ft² (6712 m²) to 93,100 ft² (8649 m²).

c) **Size and Dimension:** The playing field shall be from 195 to 225 ft (59.4 to 68.5 m) wide and 330 to 360 ft (100.6 to 109.7 m) long. An additional area of 15 ft (4.57 m) minimum unobstructed space on all sides is recommended.

d) **Orientation:** The preferred orientation shall be for the long axis to be northwest-southeast to suit the angle of the sun during the fall playing season, or north-south for longer periods.

e) **Surface and Drainage:** Surface and drainage areas shall be as follows:

(1) Surface shall be turf.

(2) The preferred grading is a longitudinal crown with a 1 percent slope from center to each side, and adequate underdrainage.

(3) Grading may be from side-to-side or corner-to-corner diagonally if conditions do not permit the preferred grading.

3.14 **Field Hockey.** The field hockey playing area (see Figure 35) shall be as follows.

a) **Source of Information:** United States Field Hockey Association (USFHA).

b) **Recommended Area:** The ground space shall be 64,000 ft² (5945.6 m²) minimum.

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c) **Size and Dimension:** The playing field shall be 180 ft (54.86 m) wide x 300 ft (91.4 m) long. The additional area recommended shall be 10 ft. (3.048 m) minimum unobstructed space on all sides.

d) **Orientation:** The preferred orientation shall be for the long axis to be northwest-southeast to suit the angle of the sun during the fall playing season, or north-south for longer periods.

e) **Surface and Drainage:** Surface and drainage areas shall be as follows:

(1) Surface shall be turf.

(2) The preferred grading shall be a longitudinal crown with a 1 percent slope from center to each side and adequate subdrainage.

(3) Grading may be from side-to-side or corner-to-corner diagonally if conditions do not permit the preferred grading.

3.15 **Flickerball.** The flickerball playing area (see Figure 36) shall be as follows.

a) **Source of Information:** United States Air Force.

b) **Recommended Area:** The ground space shall be 17,600 ft² (1635 m²) minimum.

c) **Size and Dimension:** The playing field shall be 90 ft (27.4 m) wide x 160 ft (48.7 m) long. Goals shall be 15 ft (4.57 m) beyond each end line. An additional area of 6 ft (minimum) unobstructed space on all sides is recommended.

d) **Orientation:** The preferred orientation is for the long axis to be northwest-southeast to suit the angle of the sun during the fall playing season, or north-south for longer periods.

e) **Surface and Drainage:** Surface and drainage areas shall be as follows:

(1) Surface shall be turf.

(2) The preferred grading shall be a longitudinal crown with a 1 percent slope from center to each side and adequate subdrainage.

(3) Grading may be from side-to-side or corner-to-corner diagonally if conditions do not permit the preferred grading.

3.16 **Speedball.** The speedball playing area (see Figure 37) shall be as follows.

a) **Source of Information:** National Association for Girls and Women in Sports (NAGWS).

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b) **Recommended Area:** The ground space shall be 36,400 ft² (3381.6 m²) (high school) to 76,000 ft² (7060.4 m²).

c) **Size and Dimension:** The playing field shall be 180 ft (54.86 m) wide x 300 ft (91.4 m) long. An additional 30 ft x 180 ft (9.14 x 54.86 m) out-of-bounds touchdown area is recommended on each end, and an unobstructed space of 10 ft (3.05 m) on all sides. The high school field shall be 120 ft (36.57 m) wide x 240 ft (73.1 m) long.

d) **Orientation:** The preferred orientation is for the long axis to be northwest-southeast during the fall playing season, or north-south for longer periods.

e) **Surface and Drainage:** Surface and drainage areas shall be as follows:

(1) Surface shall be turf.

(2) The preferred grading is a longitudinal crown with a 1 percent slope from center to each side and adequate underdrainage.

(3) Grading may be from side-to-side or corner-to-corner diagonally if conditions do not permit the preferred grading.

3.17 **Team Handball.** The team handball playing area (see Figure 38) shall be as follows.

a) **Source of Information:** United States Team Handball Federation (USTHF).

b) **Recommended Area:** The ground space shall be 11,120 ft² (1,033 m²).

c) **Size and Dimension:** The playing field shall be 20 m (65 ft 7-1/2 in.) wide x 40 m (131 ft 3 in.) long. An additional area of 2 m (6 ft 7 in.) minimum unobstructed space on all sides is recommended .

d) **Orientation:** The preferred orientation is for the long axis to be northwest-southeast during the fall playing season, or north-south for longer periods.

e) **Surface and Drainage:** Surface and drainage areas shall be as follows:

(1) Surface shall be turf.

(2) The preferred grading is a longitudinal crown with a 1 percent slope from center to each side and adequate subarainage.

(3) Grading may be from side-to-side or corner-to-corner diagonally if conditions do not permit the preferred grading.

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3.18 Golf Driving Range. The golf driving range (see Figure 39) shall be as follows.

a) Source of Information: National Golf Foundation, Inc.

b) Recommended Area: The ground space for a minimum of 25 tees shall be 13.5 acres (5.46 ha).

c) Size and Dimension: The minimum length shall be 900 ft (300 yds) (274.3 m). The minimum width, including buffer area on each side, shall be 620 ft (188.97 m). Add a 12-ft (3.66 m) width per additional tee.

d) Orientation: The preferred orientation is for the long axis to run southwest to northeast with the golfer driving toward the northeast.

e) Surface and Drainage: Surface and drainage shall meet the following criteria.

(1) The surface shall be turf closely mowed in center for ball collection. Side buffer areas shall be rough cut.

(2) Drainage shall be away from raised tee area and across the axis of play. Side buffer areas may rise to help contain stray drives.

f) Special Consideration

(1) The use of tee mats reduces maintenance. Automatic ball tees enable golfers to hit more balls over a shorter period.

(2) Target greens are recommended as they give golfers something at which to aim drives.

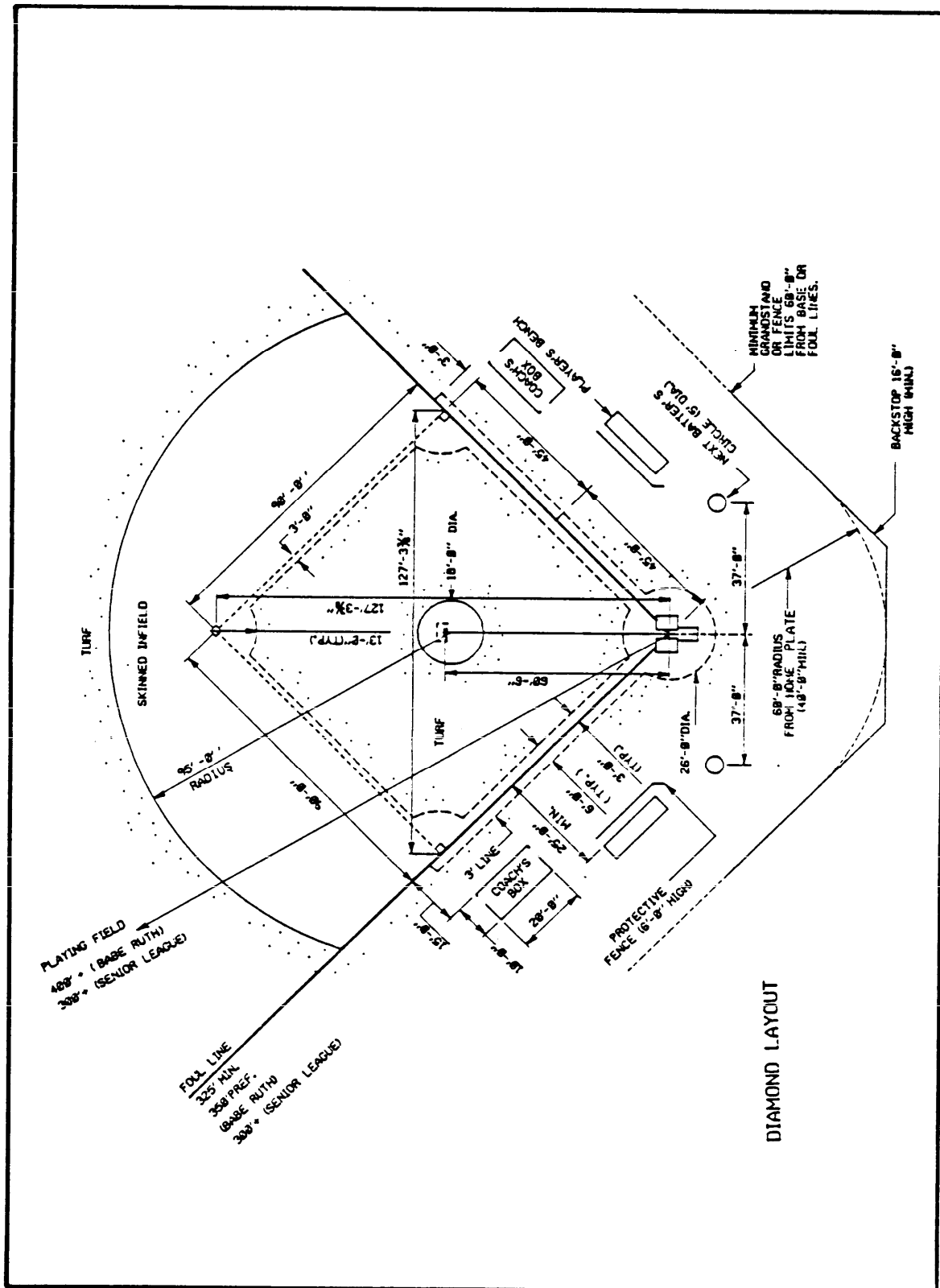


Figure 22a
Official Baseball Diamond -- Layout

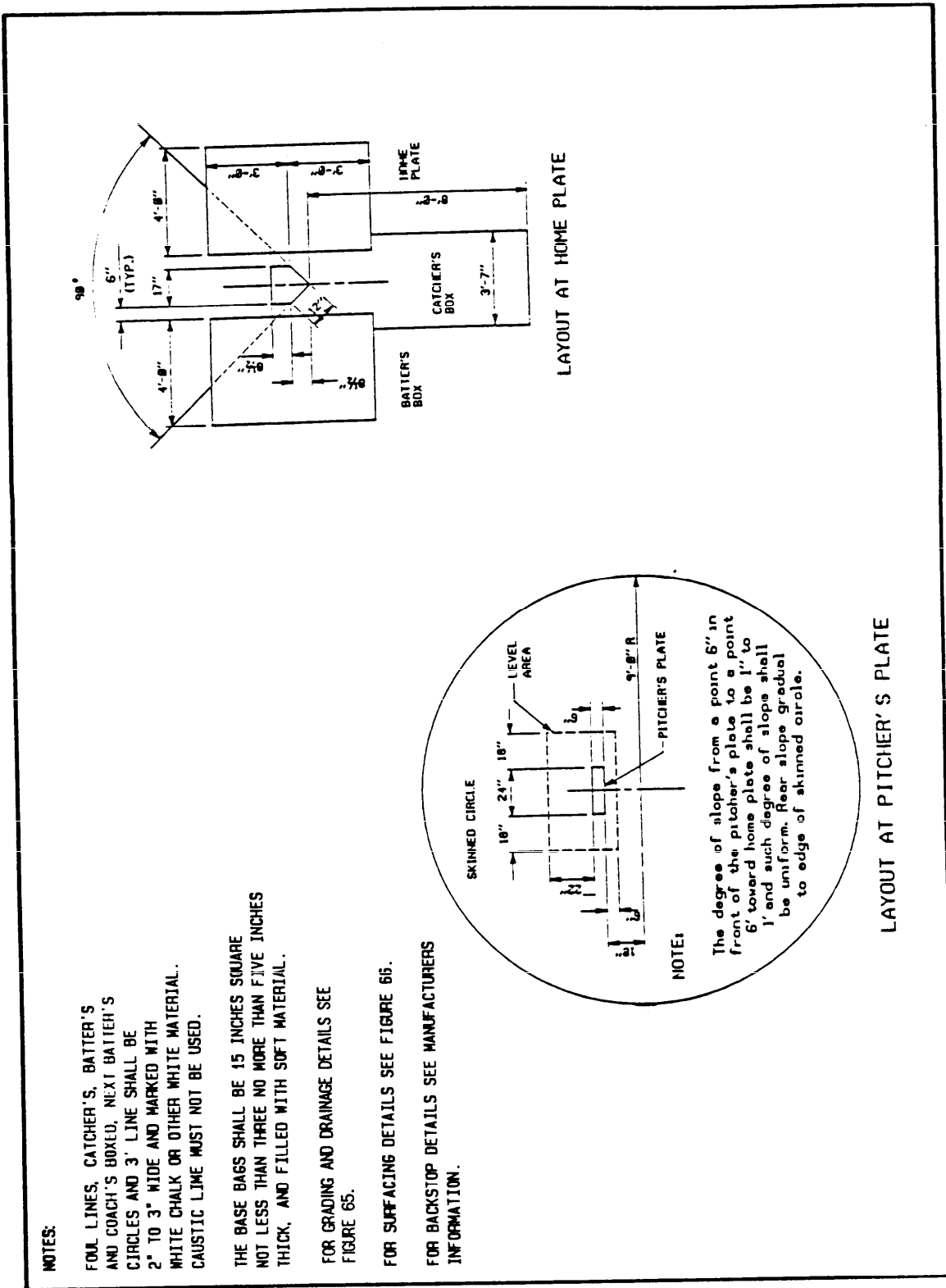


Figure 22b
Official Baseball Diamond -- Pitcher's Plate and Home Plate Details

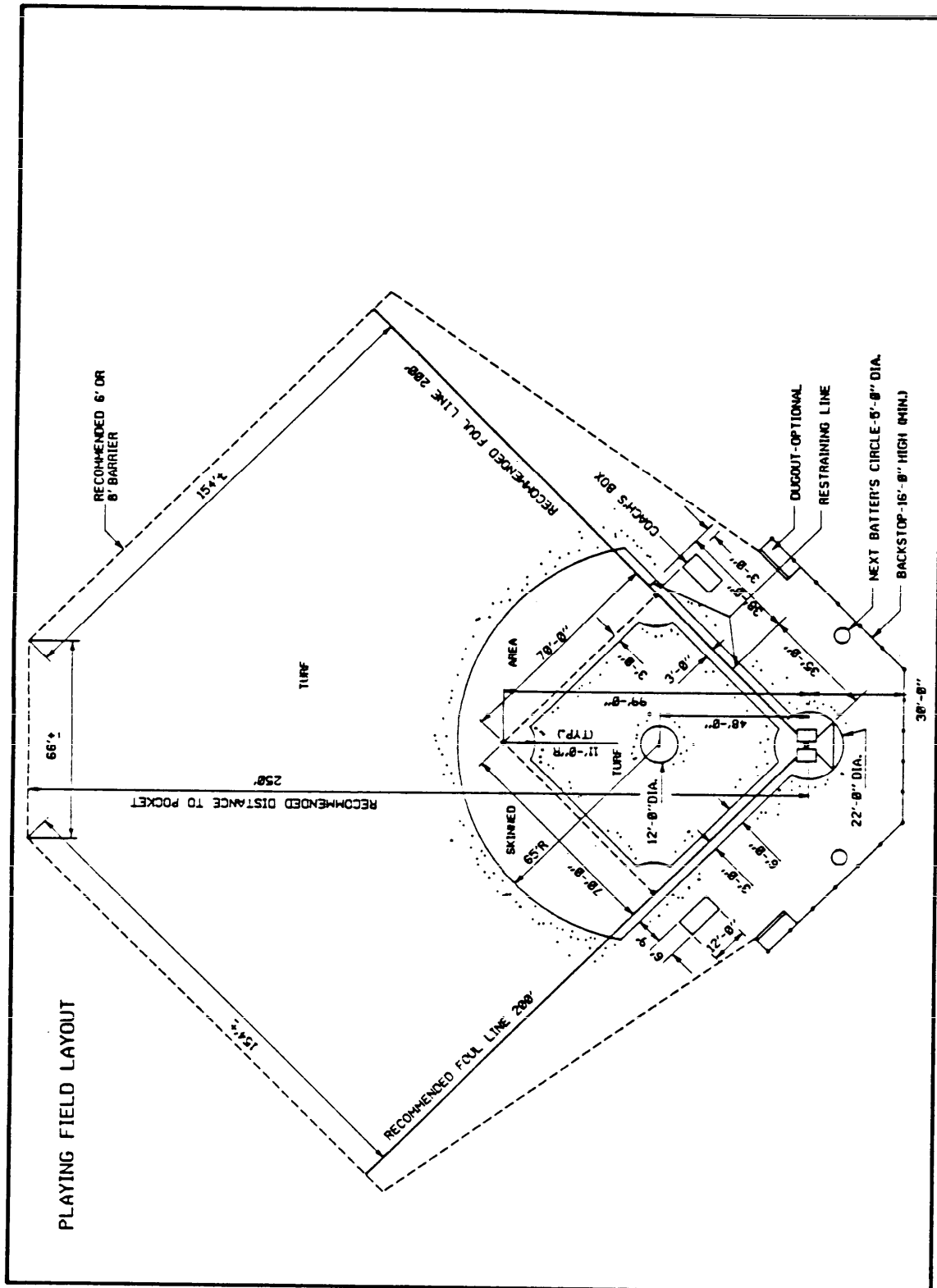


Figure 23a
Bronco League Baseball Diamond -- Layout

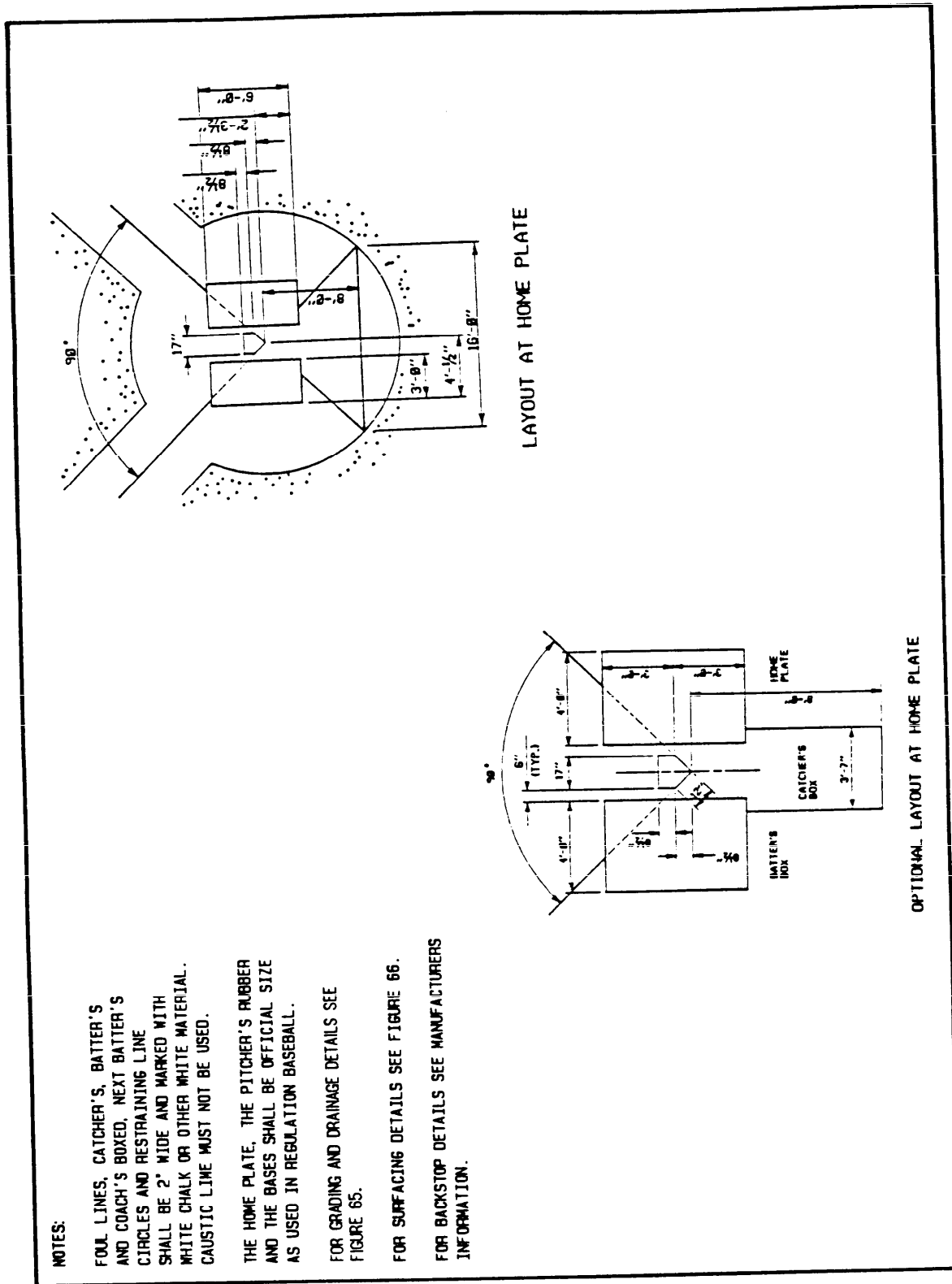
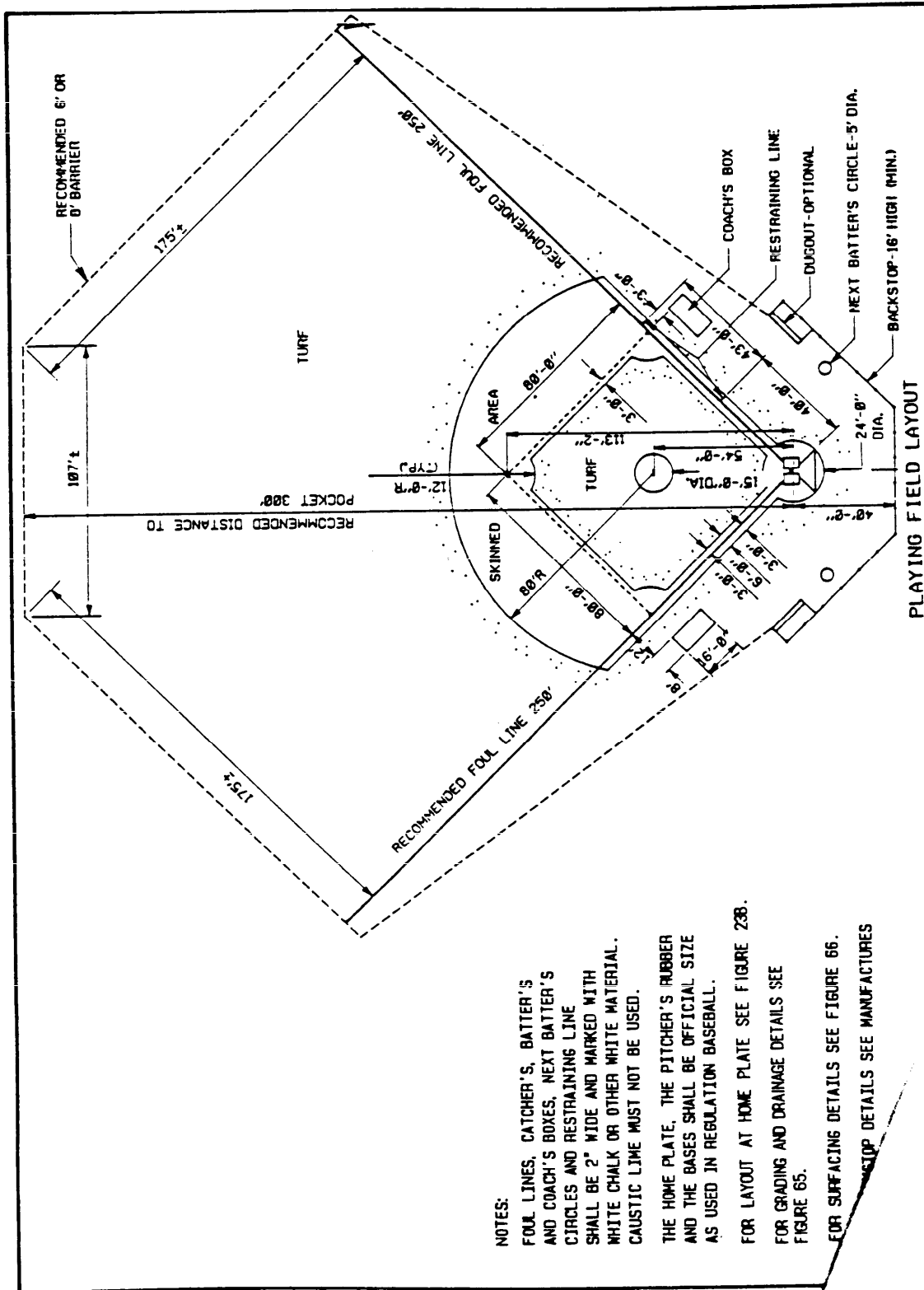


Figure 23b
Bronco League Baseball -- Home Plate Details



NOTES:
 FOUL LINES, CATCHER'S, BATTER'S
 AND COACH'S BOXES, NEXT BATTER'S
 CIRCLES AND RESTRAINING LINE
 SHALL BE 2" WIDE AND MARKED WITH
 WHITE CHALK OR OTHER WHITE MATERIAL.
 CAUSTIC LIME MUST NOT BE USED.
 THE HOME PLATE, THE PITCHER'S RUBBER
 AND THE BASES SHALL BE OFFICIAL SIZE
 AS USED IN REGULATION BASEBALL.
 FOR LAYOUT AT HOME PLATE SEE FIGURE 23B.
 FOR GRADING AND DRAINAGE DETAILS SEE
 FIGURE 65.
 FOR SURFACING DETAILS SEE FIGURE 66.
 BACKSTOP DETAILS SEE MANUFACTURES

Figure 24
 Pony League Baseball Field

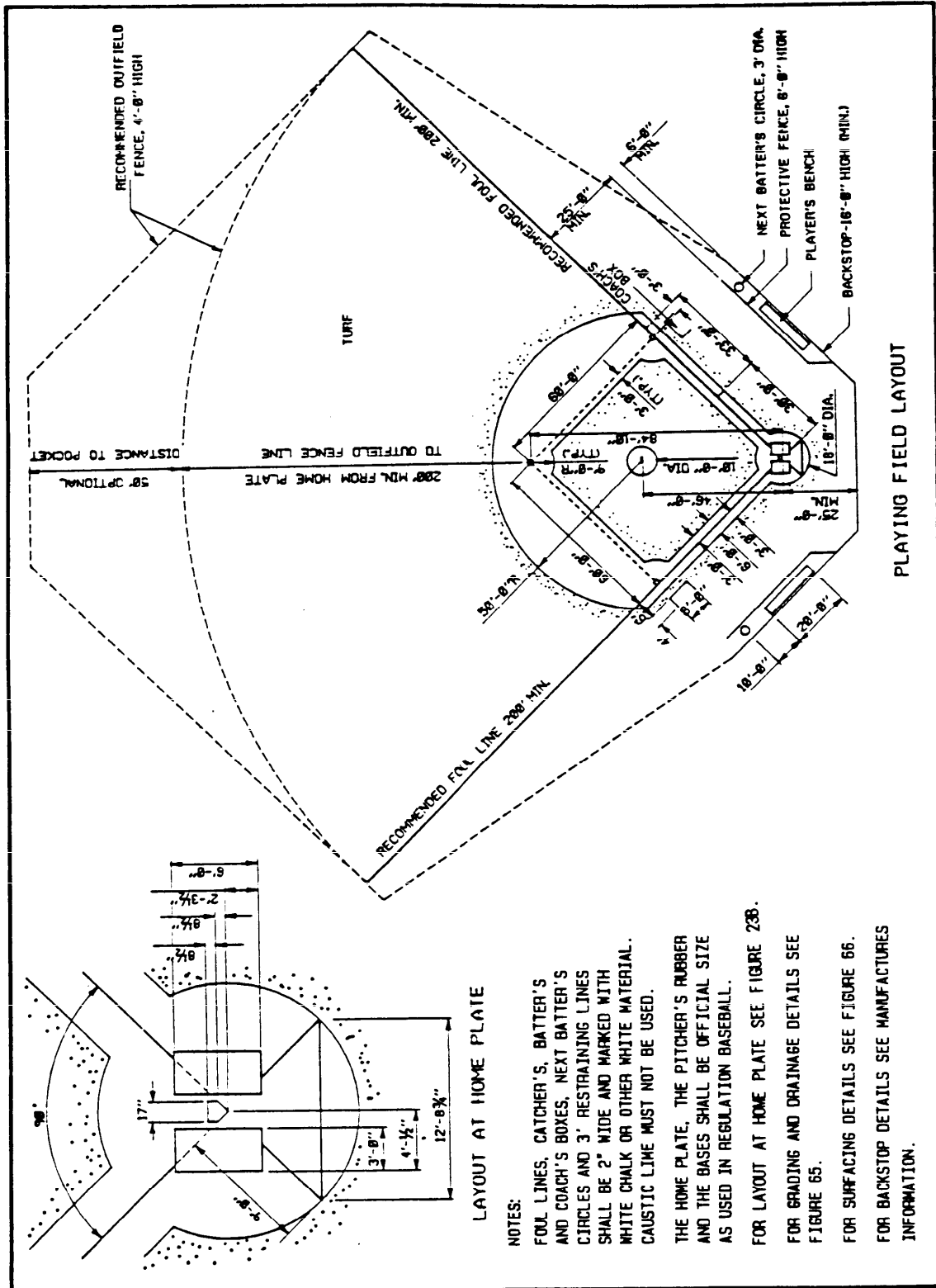


Figure 26
Little League Baseball Field

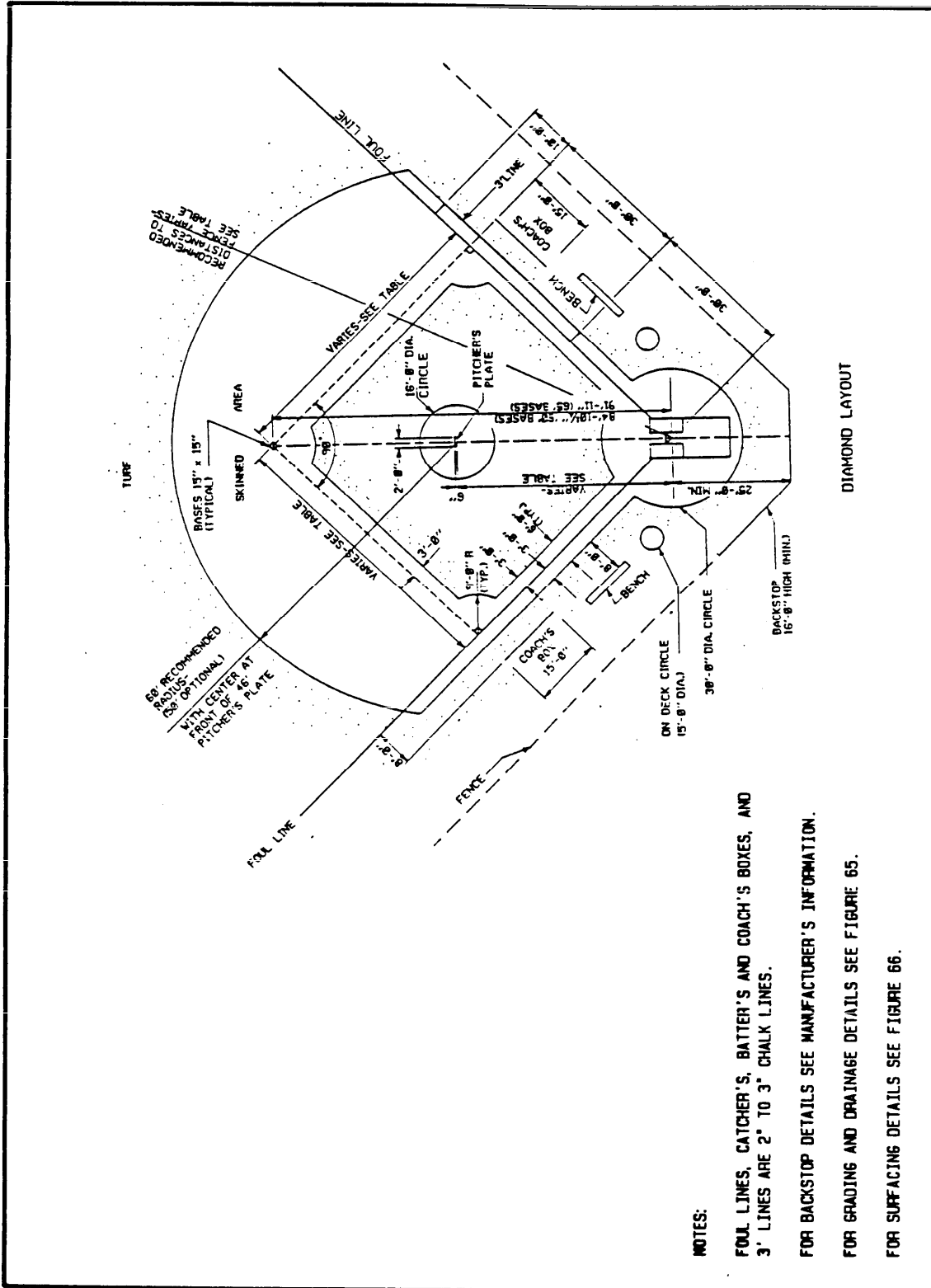


Figure 27a Softball (12-inch, Fast and Slow Pitch) -- Diamond

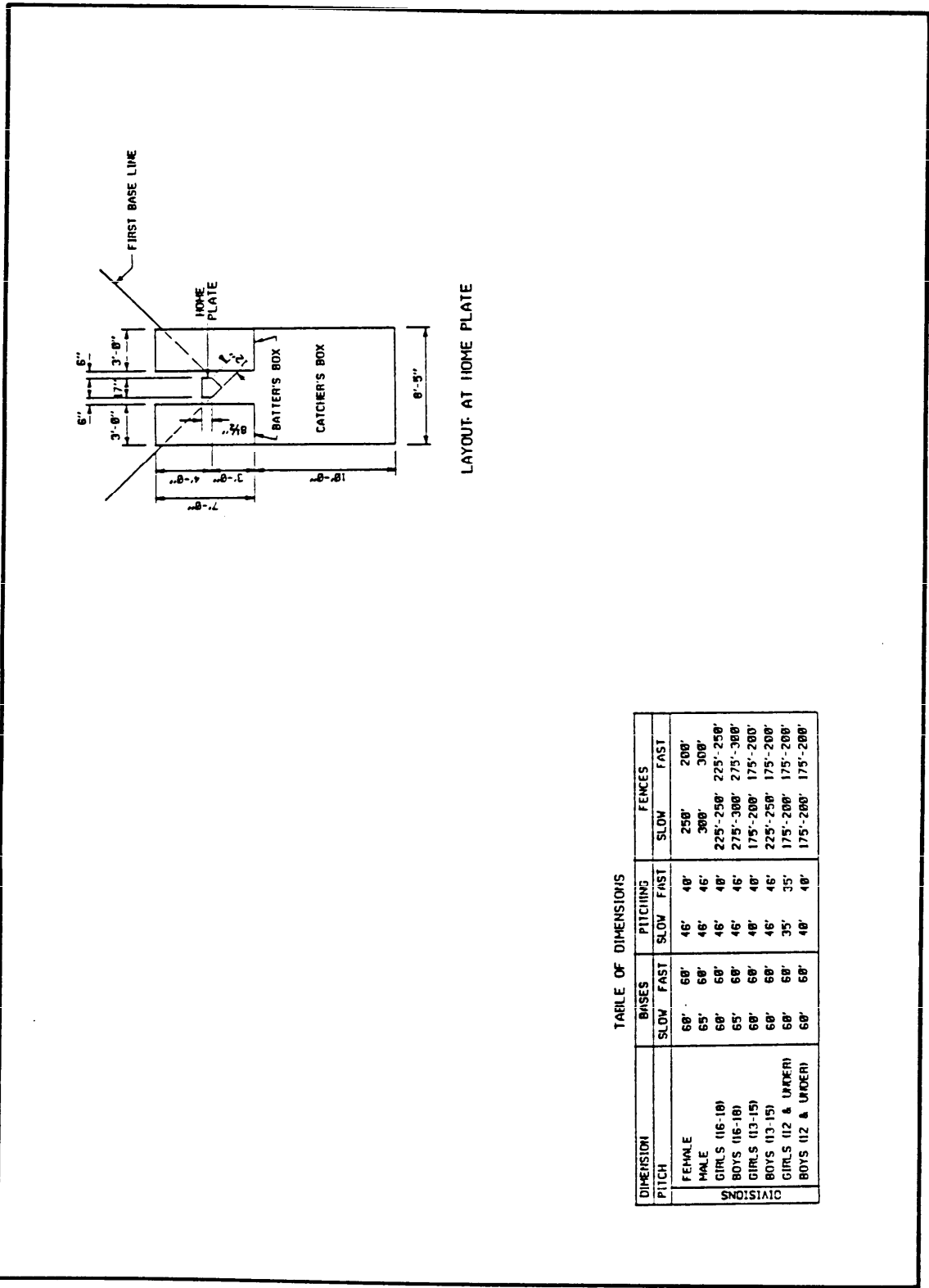


TABLE OF DIMENSIONS

DIMENSION	BASES		PITCHING		FENCES	
	SLOW	FAST	SLOW	FAST	SLOW	FAST
PITCH						
FEMALE	60'	60'	46'	48'	250'	200'
MALE	65'	60'	46'	46'	300'	300'
GIRLS (16-18)	60'	60'	46'	48'	225'-250'	225'-250'
BOYS (16-18)	65'	60'	46'	46'	275'-300'	275'-300'
GIRLS (13-15)	60'	60'	46'	48'	175'-200'	175'-200'
BOYS (13-15)	60'	60'	46'	46'	225'-250'	175'-200'
GIRLS (12 & UNDER)	60'	60'	35'	35'	175'-200'	175'-200'
BOYS (12 & UNDER)	60'	60'	48'	48'	175'-200'	175'-200'

Figure 27b
Softball (12-inch, Fast and Slow Pitch) -- Dimensions and Home Plate Layout

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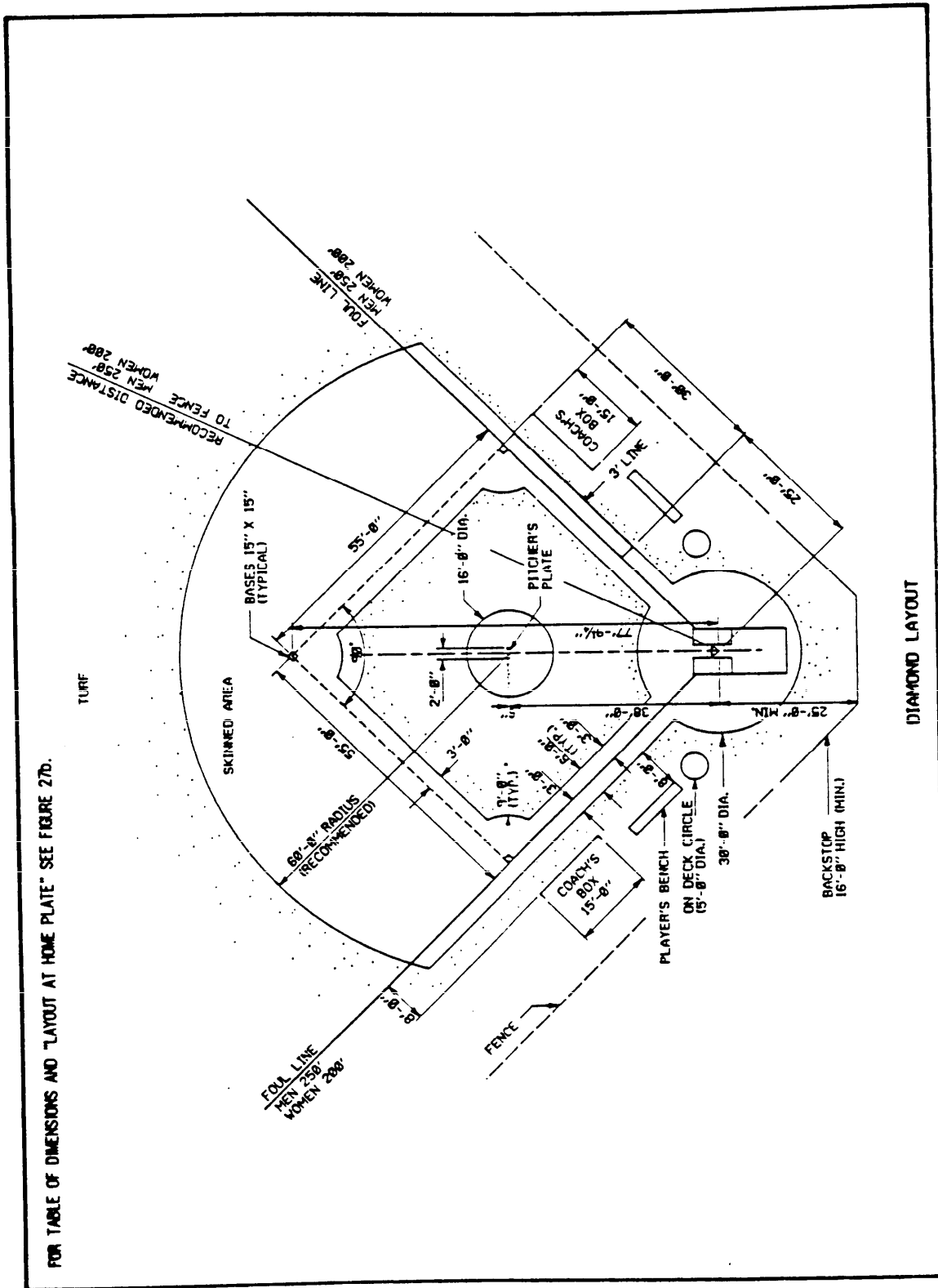


Figure 28 Softball (16-inch, Slow Pitch) -- Diamond

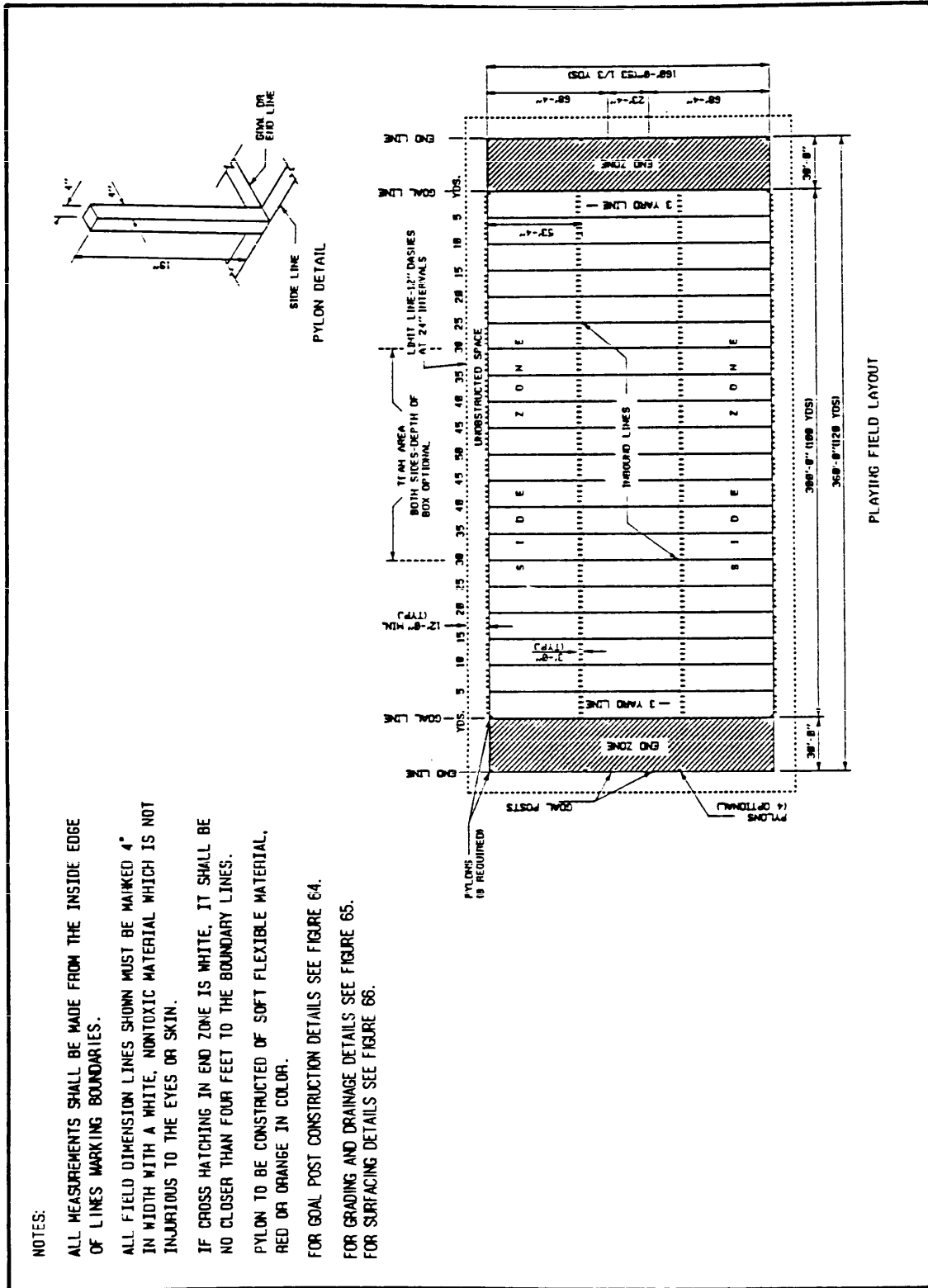
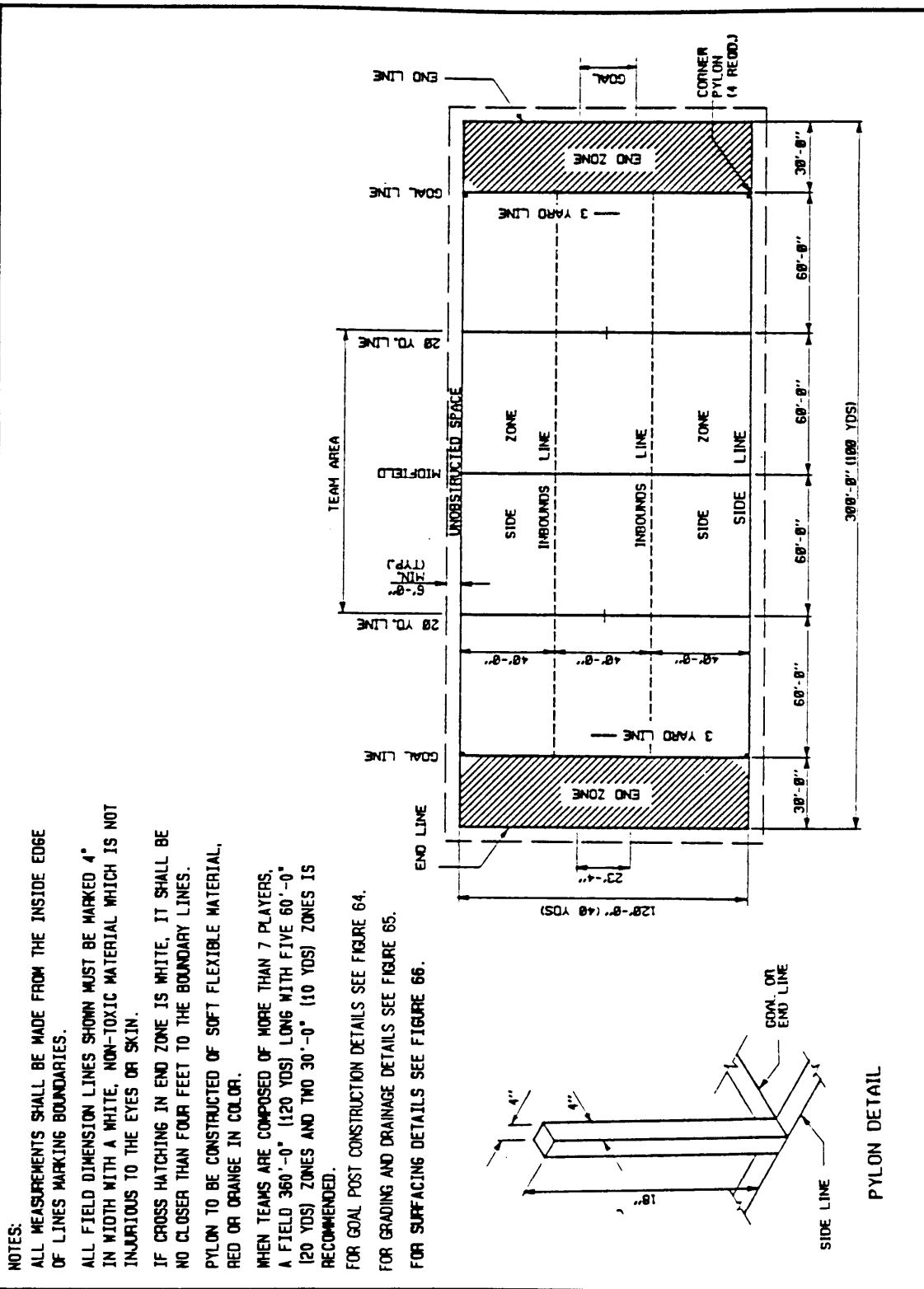


Figure 29
11-Man Football (NCAA) Pop Warner Junior League Football Field



NOTES:

ALL MEASUREMENTS SHALL BE MADE FROM THE INSIDE EDGE OF LINES MARKING BOUNDARIES.

ALL FIELD DIMENSION LINES SHOWN MUST BE MARKED 4" IN WIDTH WITH A WHITE, NON-TOXIC MATERIAL WHICH IS NOT INJURIOUS TO THE EYES OR SKIN.

IF CROSS HATCHING IN END ZONE IS WHITE, IT SHALL BE NO CLOSER THAN FOUR FEET TO THE BOUNDARY LINES.

PYLON TO BE CONSTRUCTED OF SOFT FLEXIBLE MATERIAL, RED OR ORANGE IN COLOR.

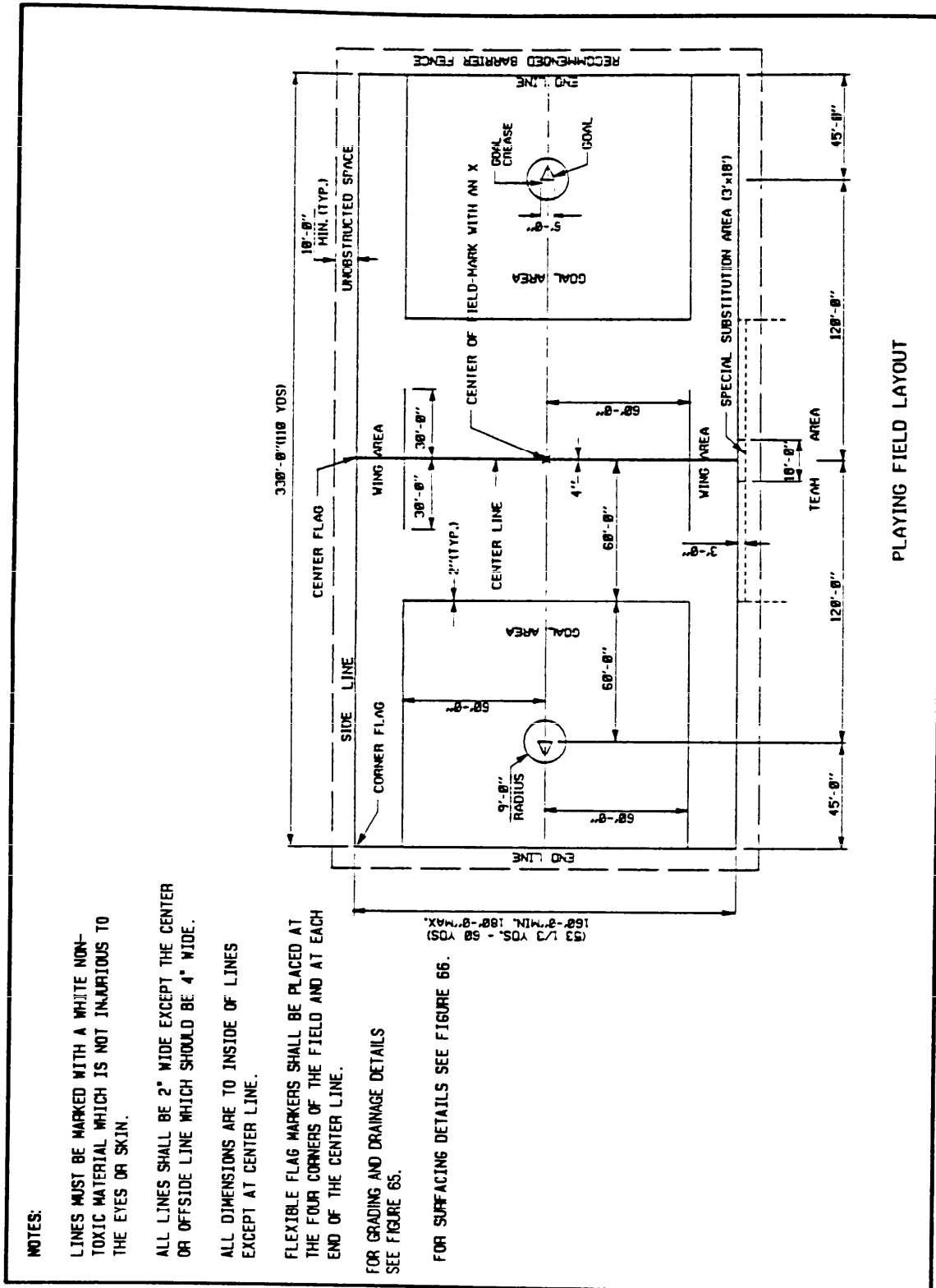
WHEN TEAMS ARE COMPOSED OF MORE THAN 7 PLAYERS, A FIELD 360'-0" (120 YDS) LONG WITH FIVE 60'-0" (20 YDS) ZONES AND TWO 30'-0" (10 YDS) ZONES IS RECOMMENDED.

FOR GOAL POST CONSTRUCTION DETAILS SEE FIGURE 64.

FOR GRADING AND DRAINAGE DETAILS SEE FIGURE 65.

FOR SURFACING DETAILS SEE FIGURE 66.

Figure 30
Touch and Flag Football Field



NOTES:

ALL LINES MUST BE MARKED WITH A WHITE NON-TOXIC MATERIAL WHICH IS NOT INJURIOUS TO THE EYES OR SKIN.

ALL LINES SHALL BE 2" WIDE EXCEPT THE CENTER OR OFFSIDE LINE WHICH SHOULD BE 4" WIDE.

ALL DIMENSIONS ARE TO INSIDE OF LINES EXCEPT AT CENTER LINE.

FLEXIBLE FLAG MARKERS SHALL BE PLACED AT THE FOUR CORNERS OF THE FIELD AND AT EACH END OF THE CENTER LINE.

FOR GRADING AND DRAINAGE DETAILS SEE FIGURE 65.

FOR SURFACING DETAILS SEE FIGURE 66.

160'-0" MIN. 180'-0" MAX.
130'-0" YDS. - 50
(33'-0" MIN. 45'-0" MAX.)

Figure 31a
Lacrosse Field (Men's) -- Layout

MIL-HDBK-1037/3

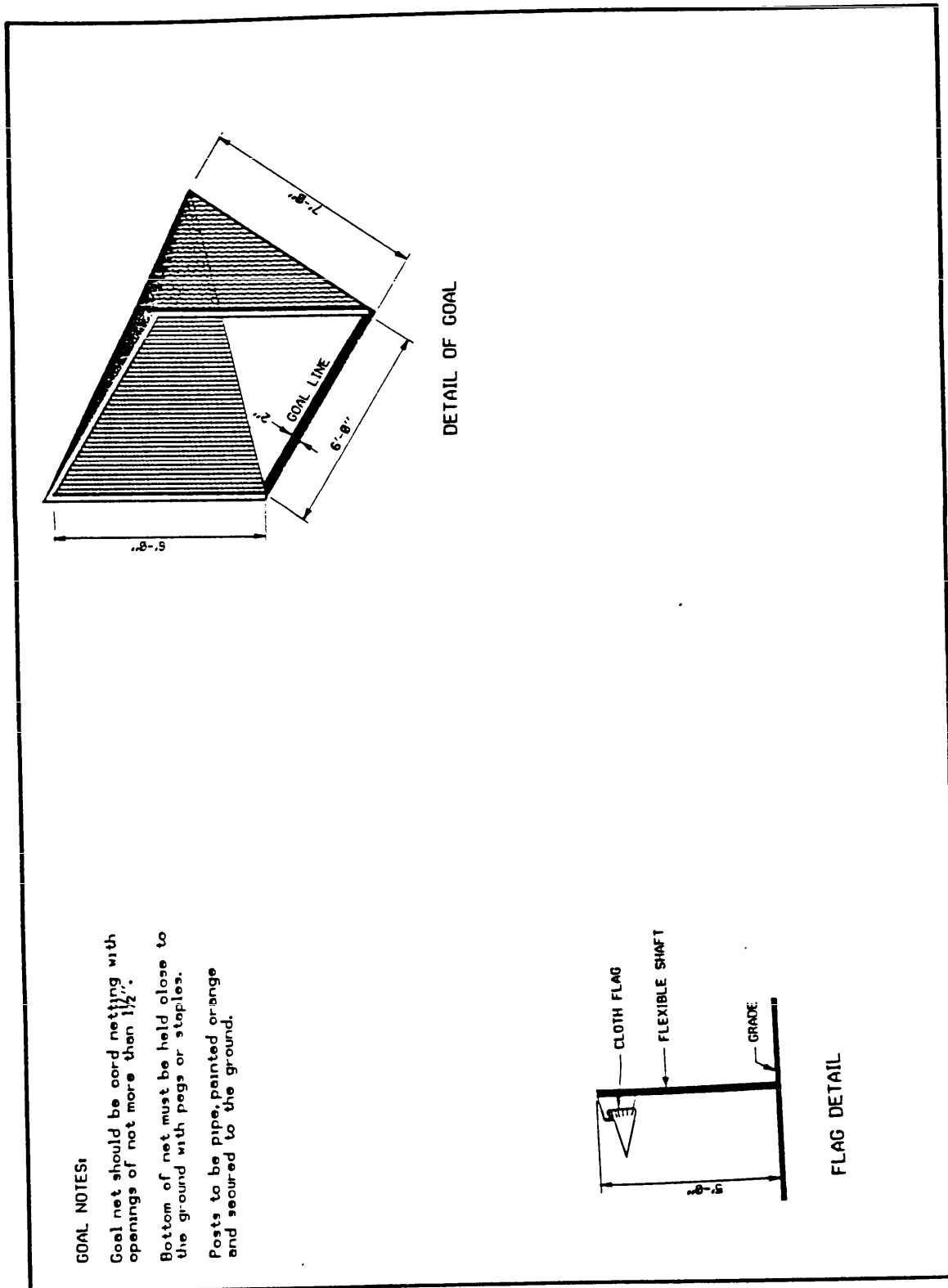


Figure 31b
Lacrosse Field (Men's) -- Flag and Goal Details

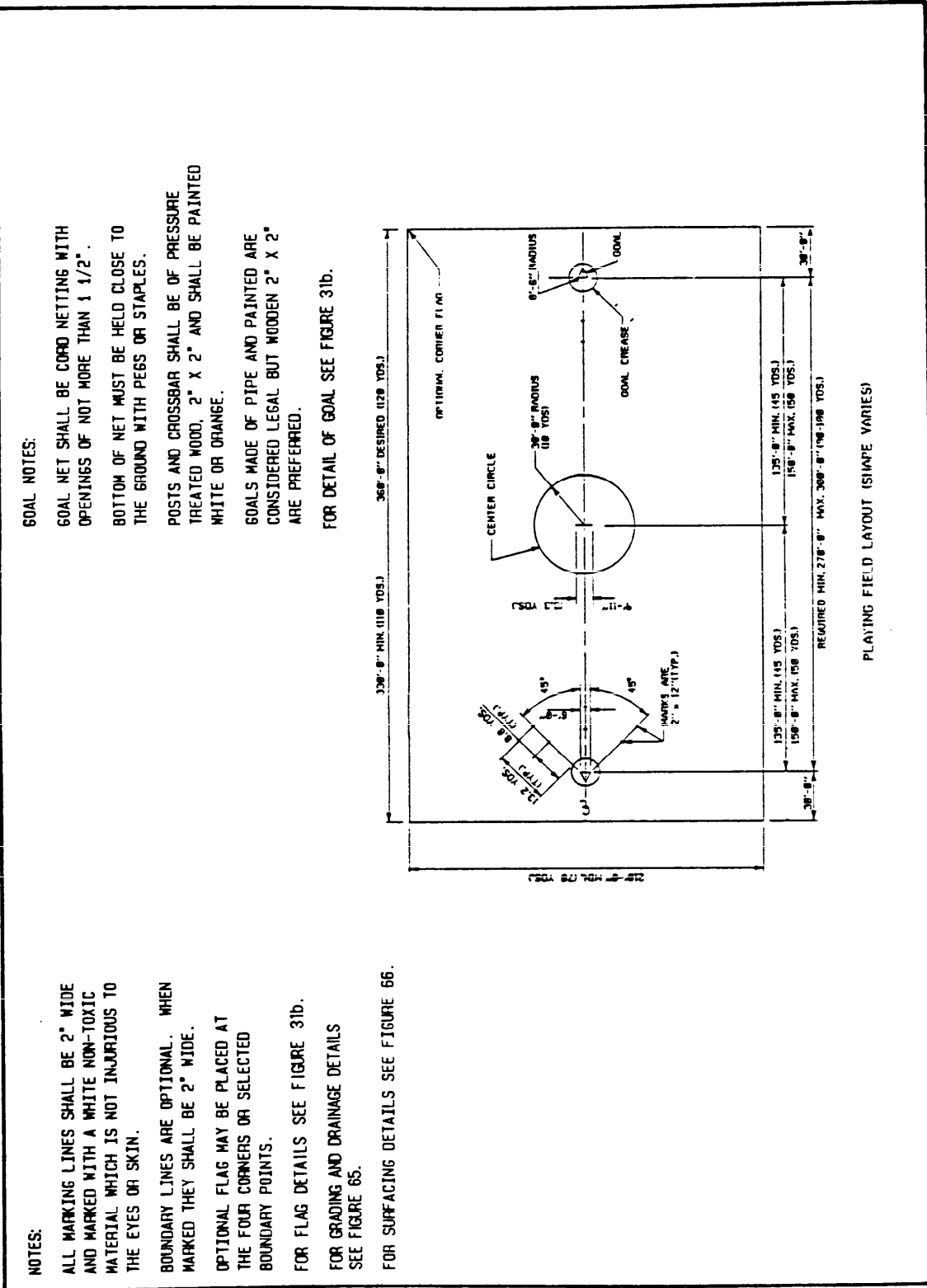


Figure 32
Lacrosse Field (Women's)

MIL-HDBK-1037/3

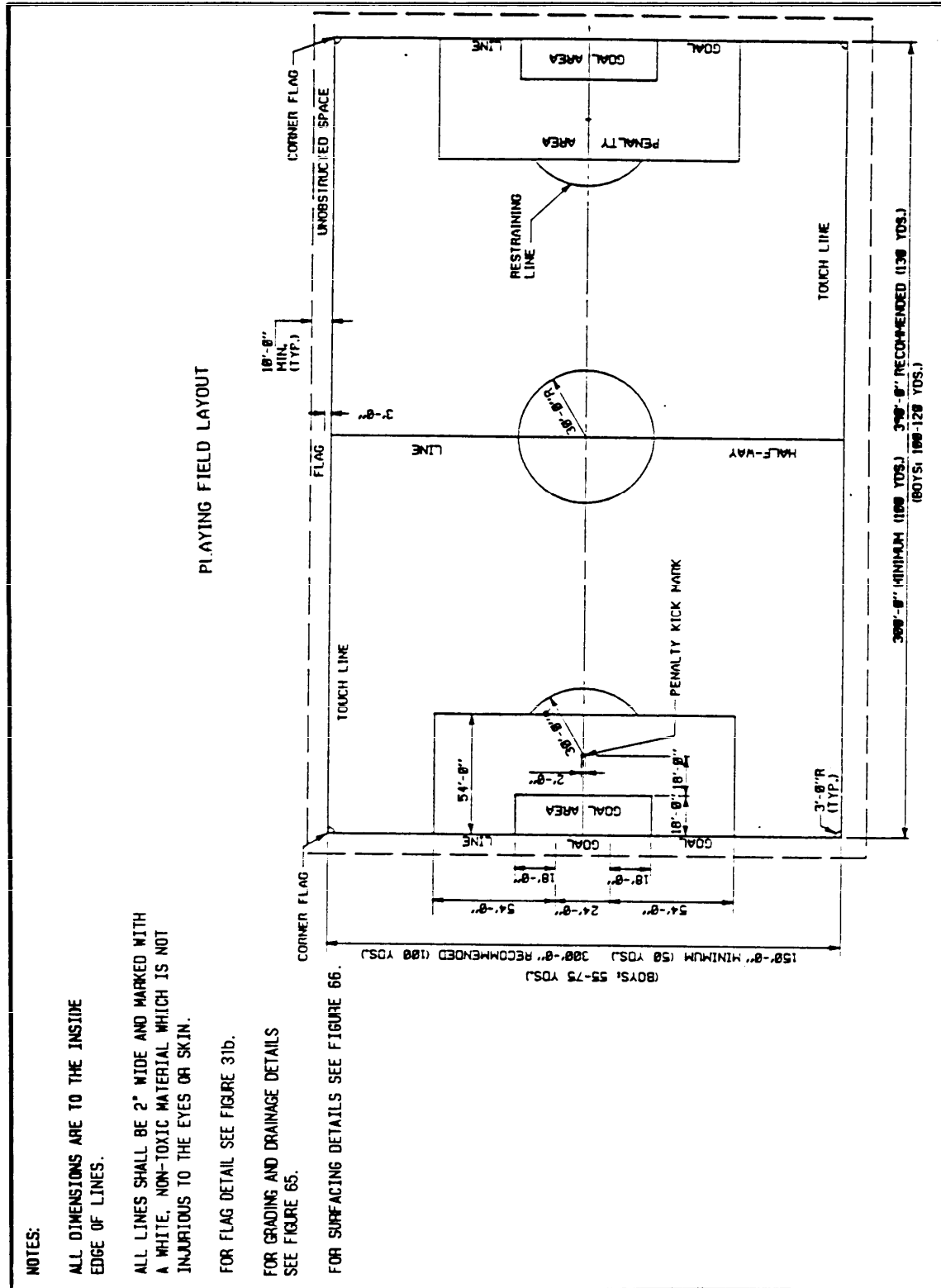


Figure 33a
Soccer Field (Men's and Boys') -- Layout

MIL-HDBK-1037/3

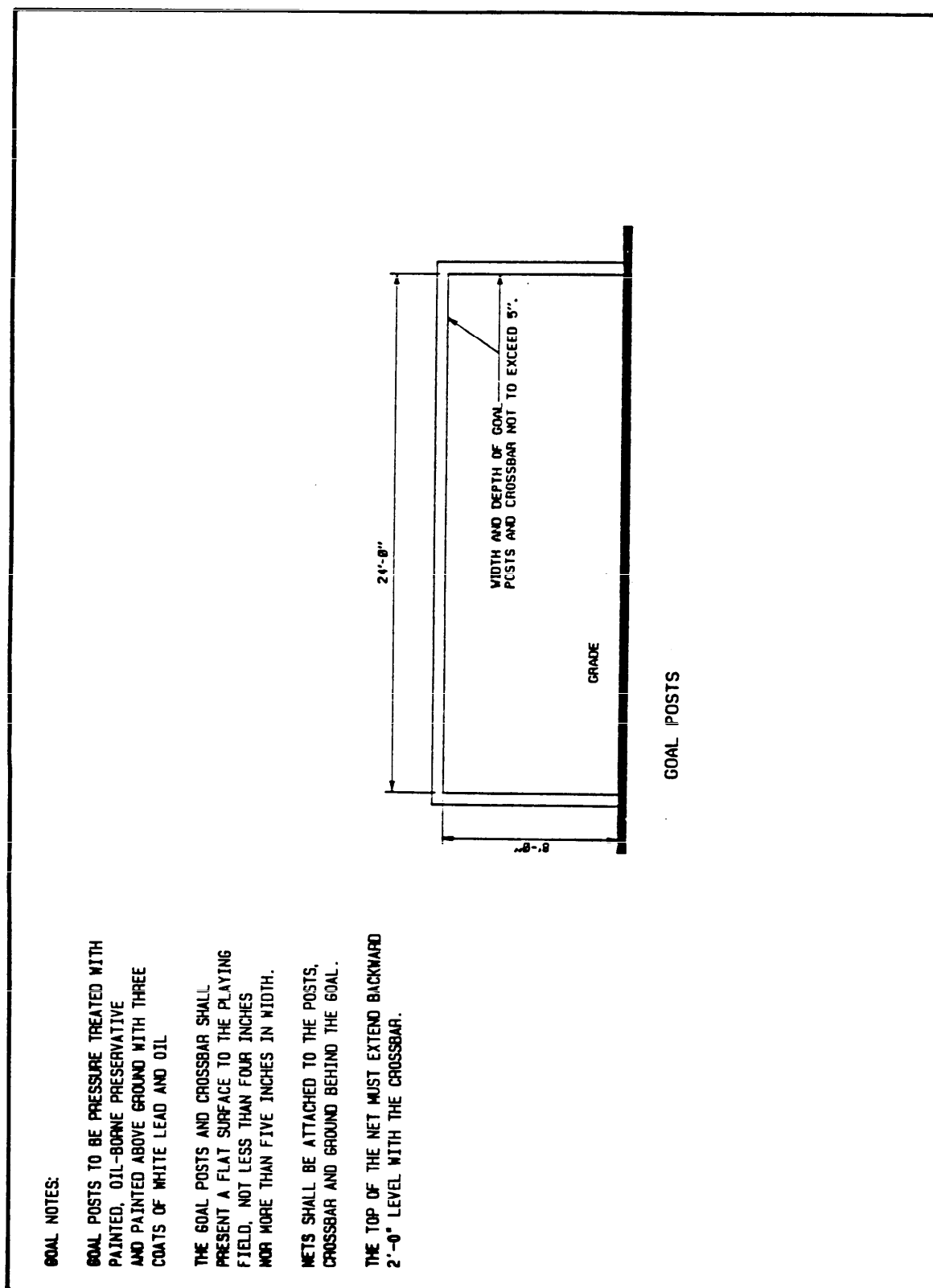


Figure 33b
Soccer Field (Men's and Boys') -- Goal Detail

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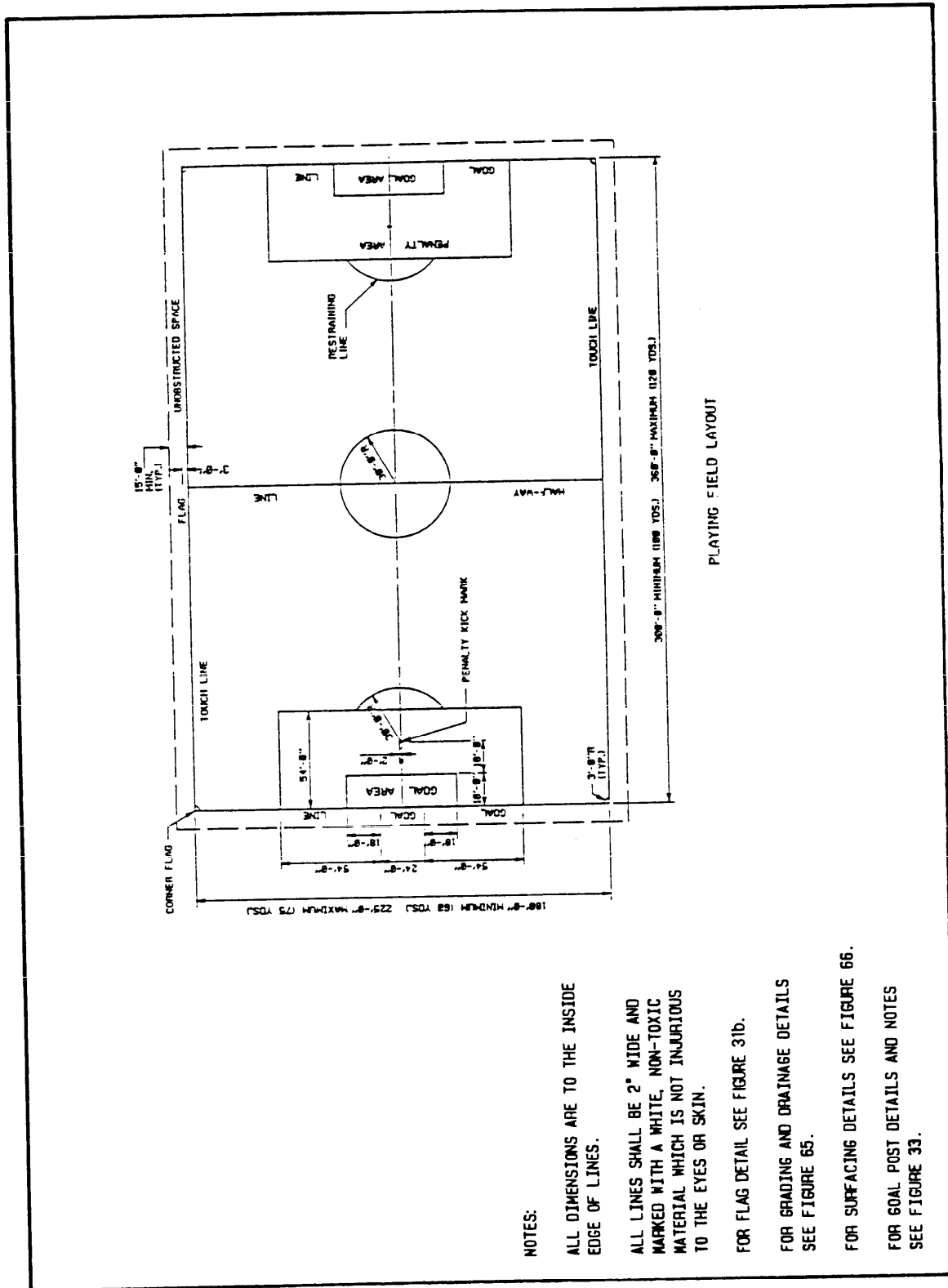


Figure 34
Soccer Field (Women's and Girls')

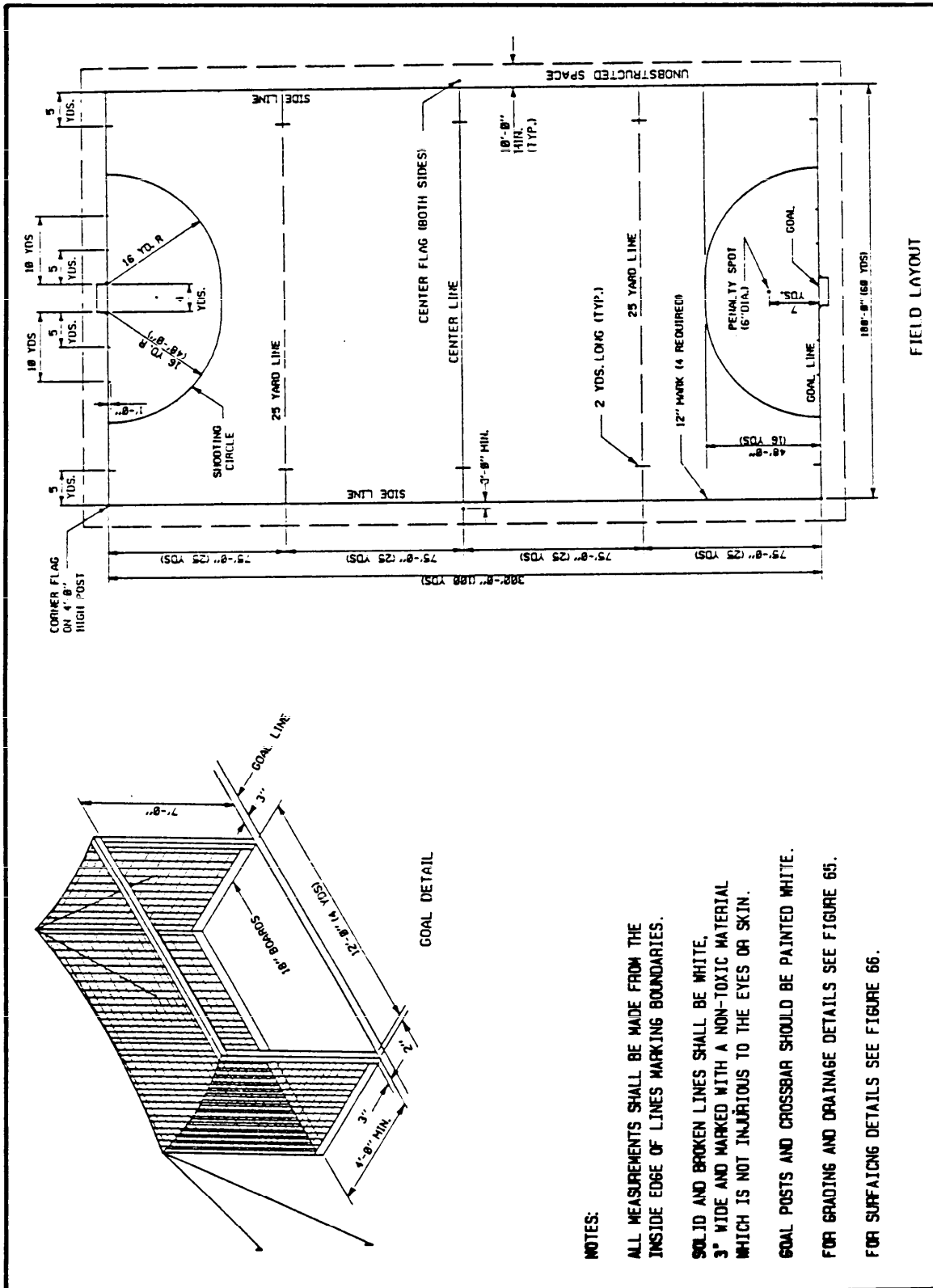


Figure 35
Field Hockey Field

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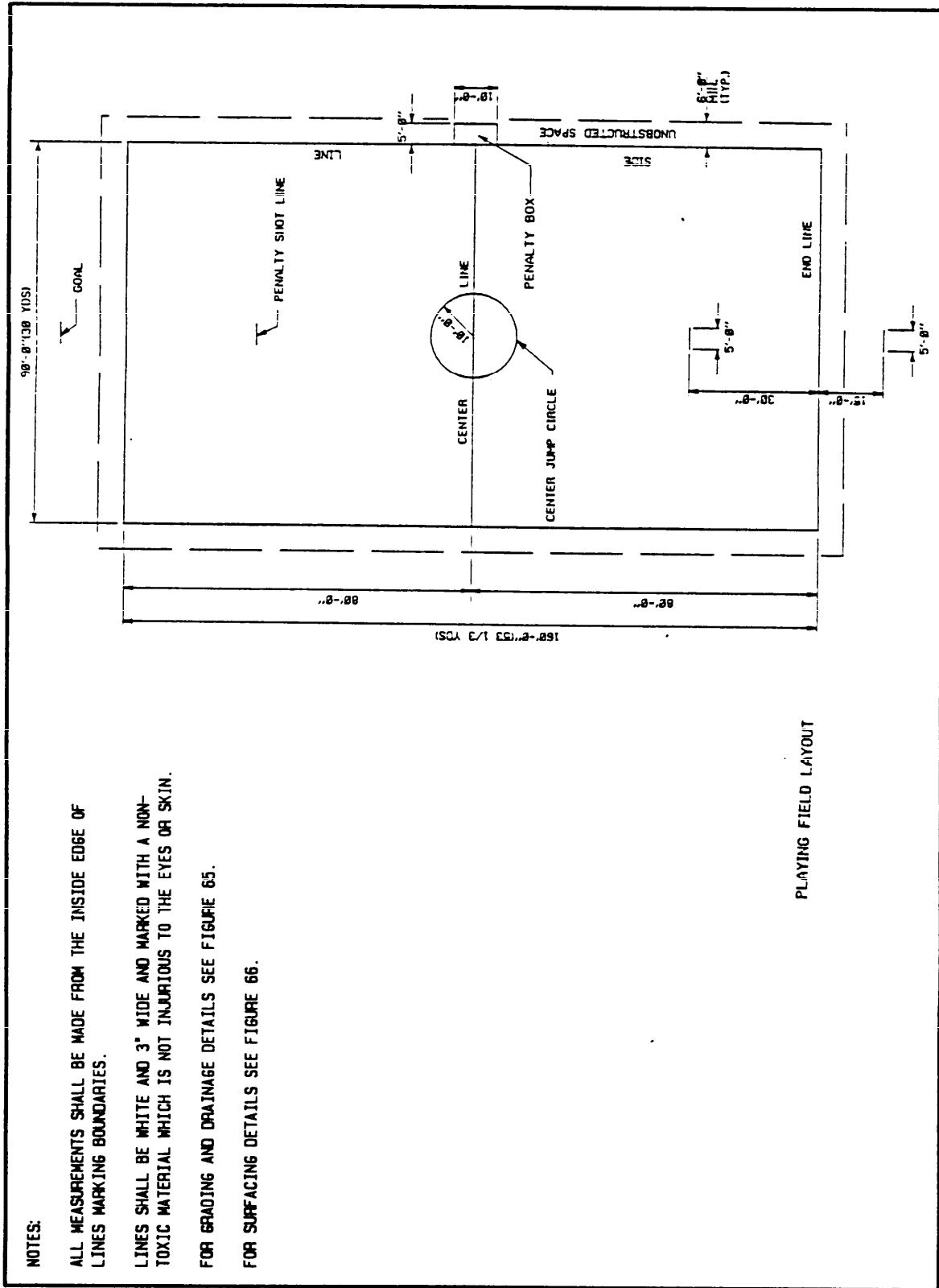


Figure 36a
Flickerball Field

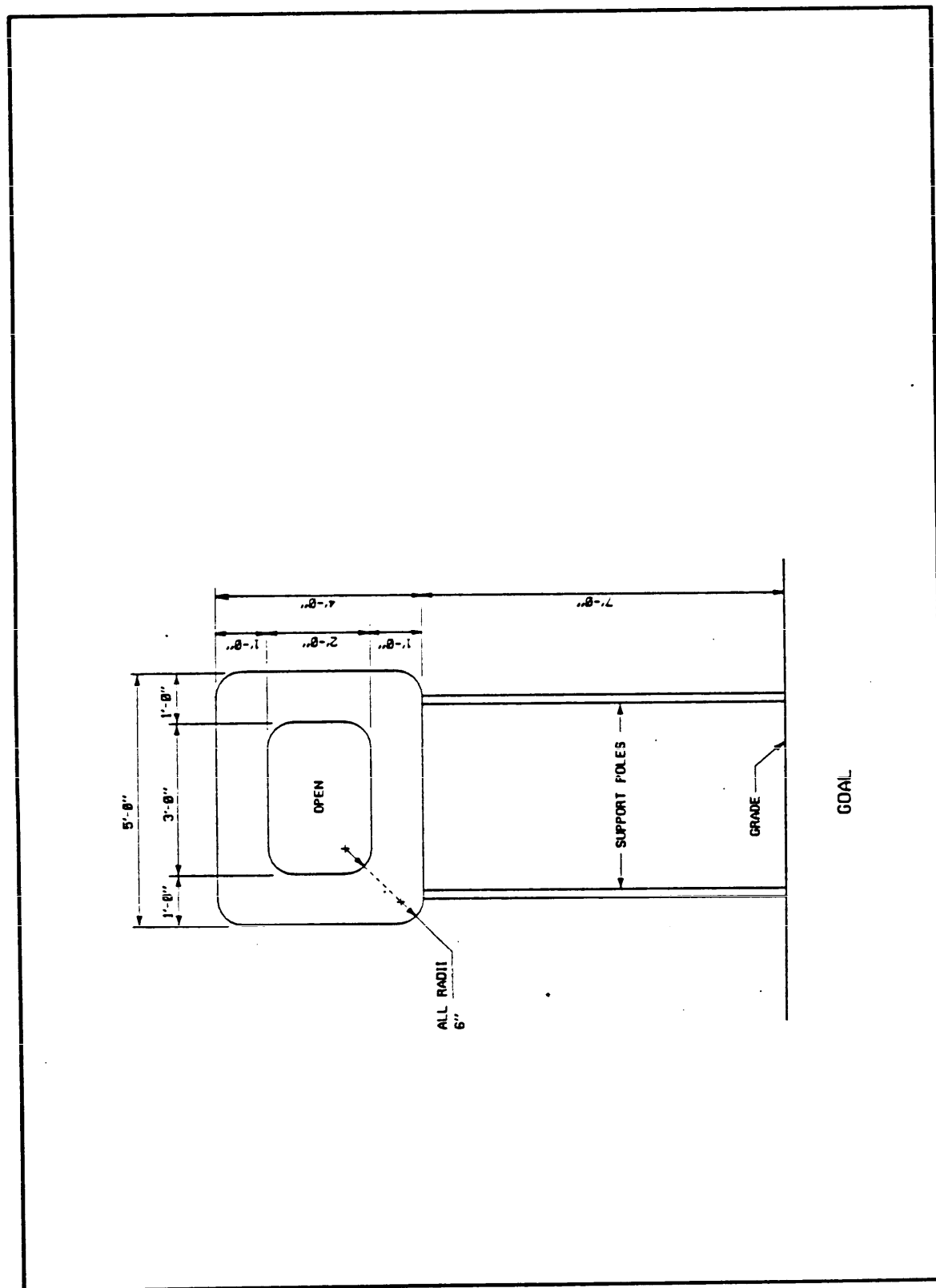


Figure 36b
Flickerball Field -- Goal Detail

MIL-HDBK-1037/3

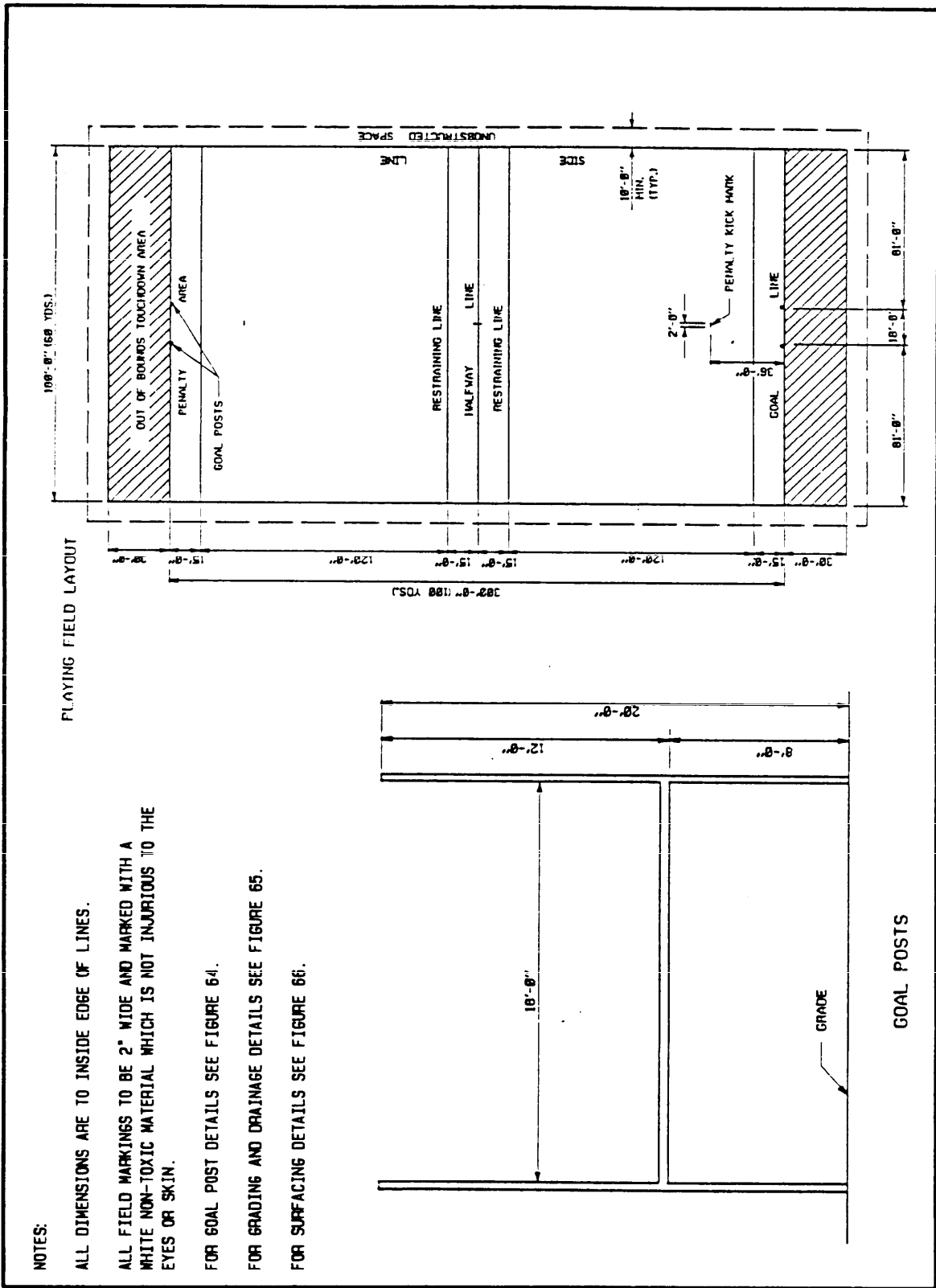


Figure 37
Speedball Field and Goal Detail

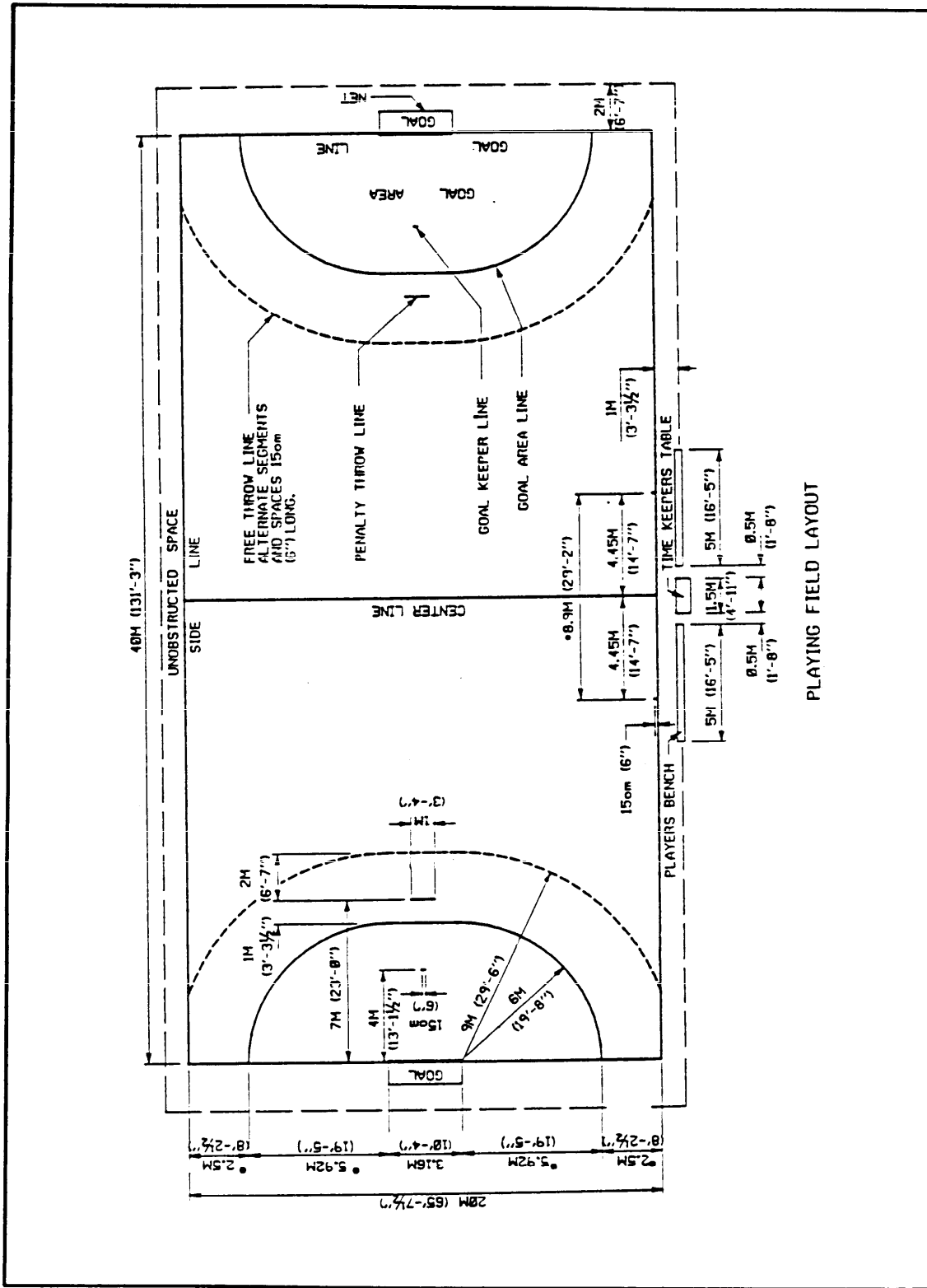


Figure 38a
Team Handball Field -- Layout

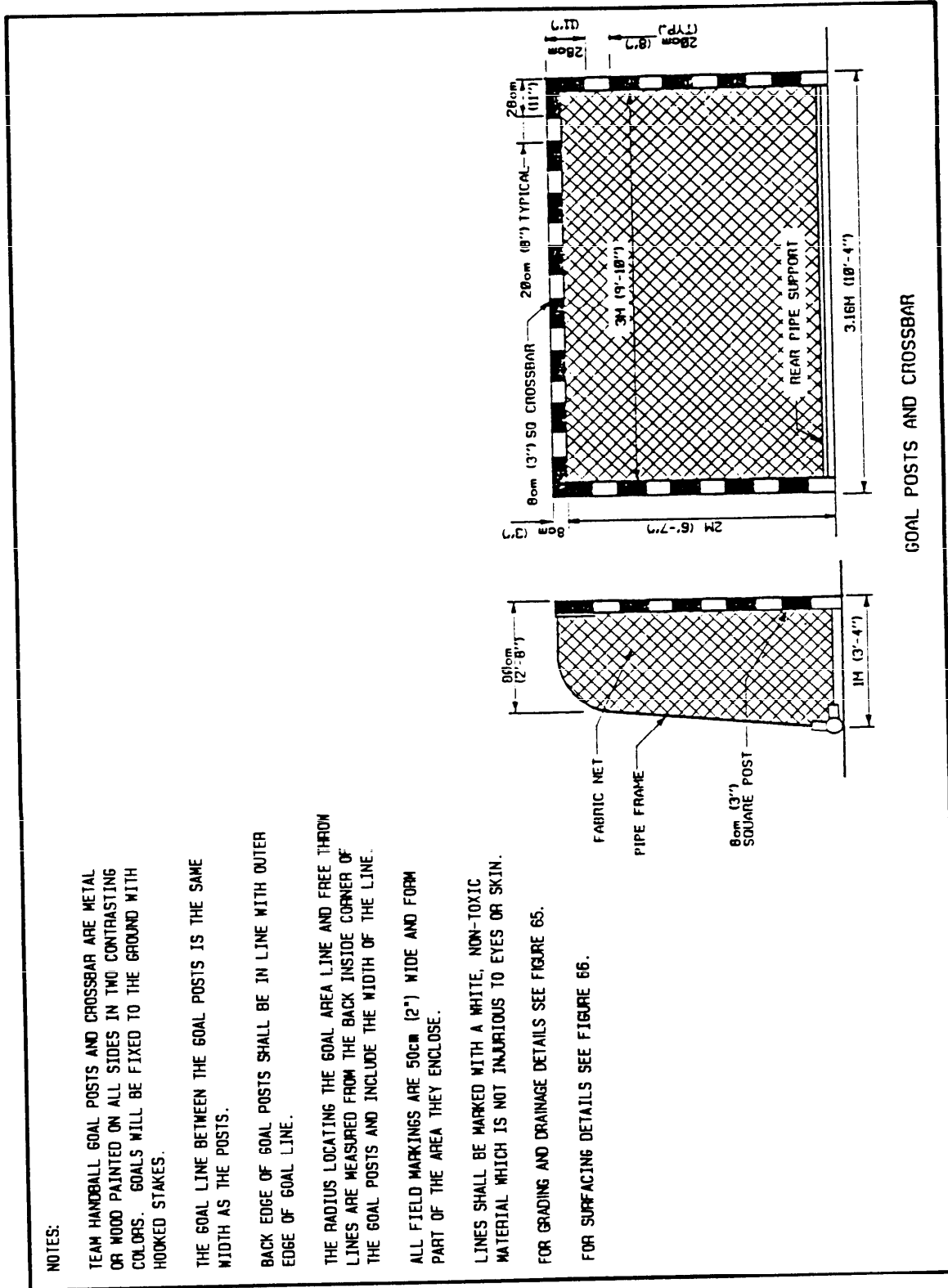
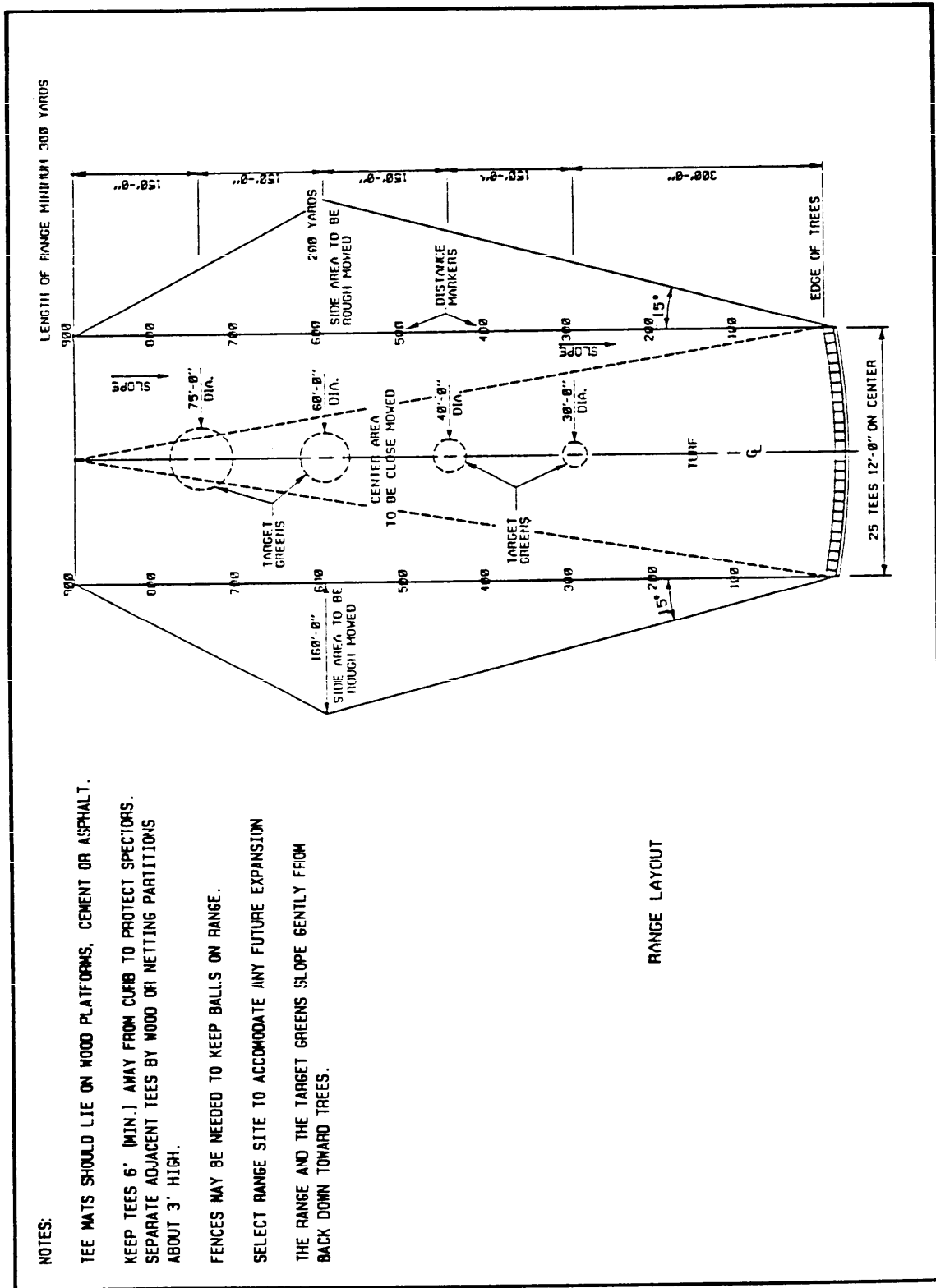


Figure 38b
Team Handball Field -- Goal Detail



NOTES:

- TEE MATS SHOULD LIE ON WOOD PLATFORMS, CEMENT OR ASPHALT.
- KEEP TEES 6' (MIN.) AWAY FROM CURB TO PROTECT SPECTATORS.
- SEPARATE ADJACENT TEES BY WOOD OR NETTING PARTITIONS ABOUT 3' HIGH.
- FENCES MAY BE NEEDED TO KEEP BALLS ON RANGE.
- SELECT RANGE SITE TO ACCOMMODATE ANY FUTURE EXPANSION
- THE RANGE AND THE TARGET GREENS SLOPE GENTLY FROM BACK DOWN TOWARD TREES.

Figure 39a
Golf Driving Range -- Layout

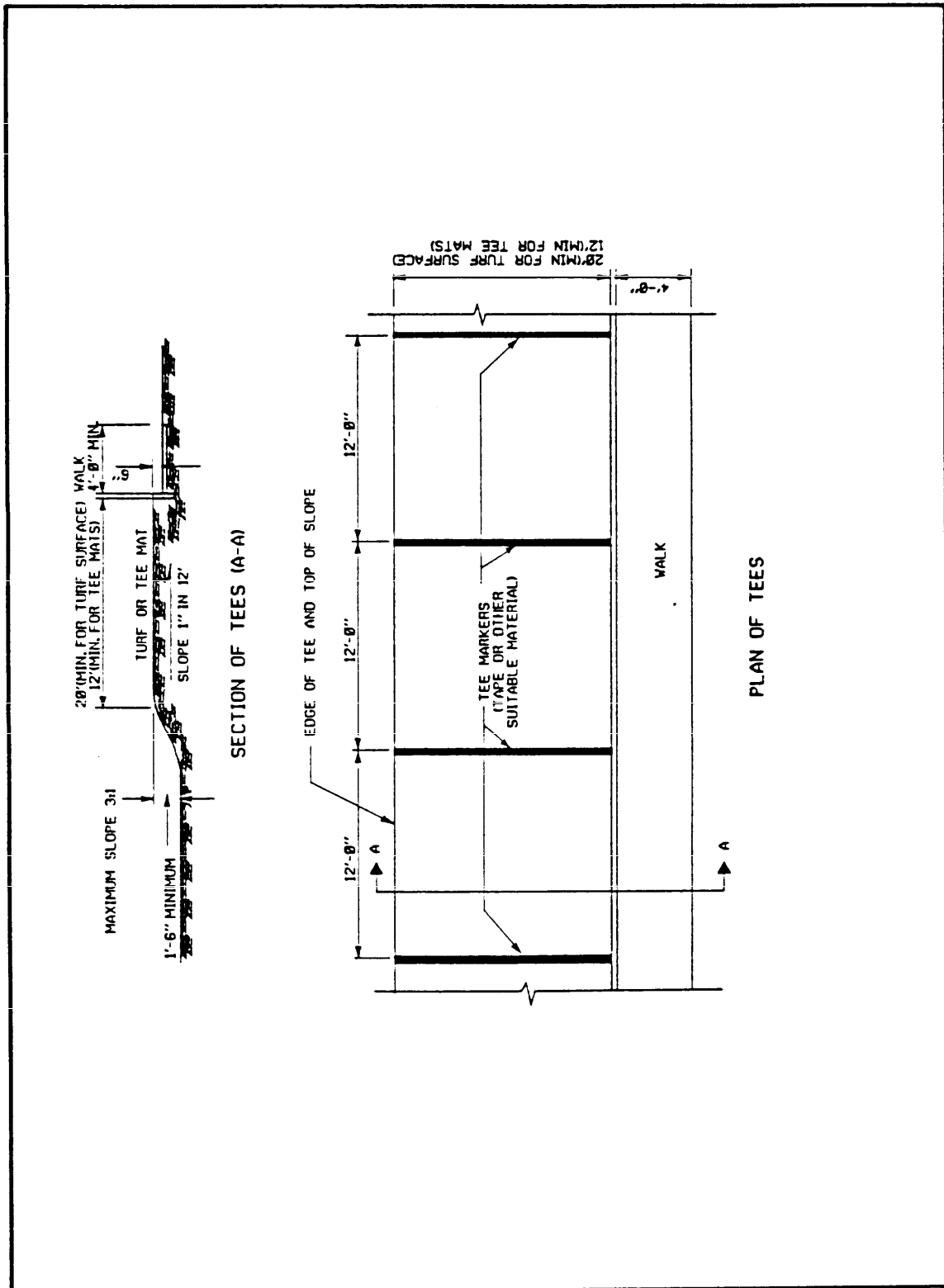


Figure 39b
Golf Driving Range -- Construction Details

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Section 4: TRACK AND FIELD

4.1 400-meter Running Track. The 400-meter running track (see Figures 40 and 41) shall meet the following criteria.

a) Source of Information: The Athletic Congress.

b) Recommended Area: The ground space shall be approximately 4.1 acres (1.66 ha).

c) Size and Dimension: The radius to trackside face of curb shall be 103.44 ft (31.53 m). The track width shall be 28 ft (8.53 m) for 8 lanes (each lane 3.50 ft or 1.067 m wide).

d) Orientation: The track shall be oriented with the long axis to be in a sector from north-northwest to south-southeast. The finish line shall be on the north.

e) Surface and Drainage: The track shall meet the following criteria.

(1) The preferred track surface shall be bituminous material with a hot plant cushion course mix. Protective colorcoating shall be optional.

(2) The maximum slopes for the running track are 2 percent (1:50) inward in the center of curves, 1 percent (1:100) inward in the straightaways, and 0.1 percent (1:1000) in the running direction.

f) Special Considerations: Drainage shall be provided for the track surface, but will depend upon site grading.

4.2 Shot Put. The shot put area (see Figure 42) shall be as follows.

a) Source of Information: The Athletic Congress.

b) Recommended Area: The ground space shall be 2,100 ft² (195 m²) minimum.

c) Size and Dimension: The shot put circle shall be 7 ft (2.134 m) in diameter. The throwing sector shall have a 40-degree angle and minimum radius of 70 ft (21.33 m).

d) Orientation: The preferred orientation is for the throwing direction to be toward the northeast quadrant.

e) Surface and Drainage: The surface of the inner circle shall be concrete or similar material. The throwing sector shall be turf at the same level as the top of the metal ring.

f) Special Considerations:

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(1) The stopboard shall be firmly fixed so that its inner edge coincides with the inner edge of the shot put circle.

(2) Sector flags are required to mark the end of the landing zone at the distance required by the competition.

4.3 Hammer Throw. The hammer throw area (see Figure 43) shall be as follows.

a) Source of Information: The Athletic Congress.

b) Recommended Area: The ground space shall be 23,000 ft² (2136.7 m²) minimum.

c) Size and Dimension: The hammer throw circle shall be 7 ft (2.13 m) in diameter. The throwing sector shall be a 40-degree angle with a minimum radius of 250 ft (76.2 m).

d) Orientation: The preferred orientation is for the throwing direction to be toward the northeast quadrant.

e) Surface and Drainage: The throwing sector shall be turf at the same level as the top of the metal ring.

f) Special Considerations: Section flags are required to mark end of landing zone at distance required by the competition.

4.4 Discus Throw. The discus throw area (see Figure 44) shall be as follows.

a) Source of Information: Athletic Congress.

b) Recommended Area: The ground space shall be 18,100 ft² (1681.5 m²) minimum.

c) Size and Dimension: The discus throwing circle shall be 8 ft 2-1/2 in. (2.50 m) in diameter. The throwing sector shall be a 40-degree angle and 220 ft (67.06 m) radius (minimum).

d) Orientation: The preferred orientation shall be for the throwing to be toward the northeast quadrant.

e) Surface and Drainage: The throwing sector shall be turf at the same level as the top of the metal ring.

f) Special Considerations: Sector flags are required to mark end of landing zone at distance required by the competition.

4.5 Javelin Throw. The javelin throwing area (see Figure 45) shall be as follows.

a) Source of Information: The Athletic Congress.

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b) Recommended Area: The ground space shall be 24,000 ft² (2229.6 m²) minimum.

c) Size and Dimension: The runway length shall be a minimum of 120 ft (36.5 m). The runway width shall be 13 ft 1-1/2 in. (4 m). The throwing sector shall be a 30-degree angle with a minimum radius of 300 ft (91.5 m).

d) Orientation: The preferred orientation is for the throwing direction to be toward the northeast quadrant.

e) Surface and Drainage: Surface and drainage shall meet the following criteria.

(1) The runway may be turf or specialized bituminous surfacing with a maximum slope of 1 percent (1:100) laterally and 0.1 percent (1:1000) in the running direction.

(2) The throwing sector shall be turf at the same level as the runway behind the throwing arc.

f) Special Considerations: Sector flags are required to mark the end of landing zone at distance required by the competition.

4.6 Long Jump and Triple Jump. The long jump and triple jump area (see Figure 46) shall be as follows.

a) Source of Information: The Athletic Congress.

b) Recommended Area: The ground space shall be 1,500 ft² (139.35 m²) minimum.

c) Size and Dimension: The runway shall be 130 ft (36.92 m) long minimum and 4 ft (1.22 m) wide (minimum). The landing pit shall be 9 ft (2.75 m) wide minimum and 32 ft 10 in. (10 m) long minimum.

d) Orientation: The preferred orientation is for the running direction to be toward the north or northeast.

e) Surface and Drainage: The surface and drainage shall be as follows:

(1) Preferred runway surface shall be bituminous material with a hot plant cushion course mix. Protective colorcoating shall be optional.

(2) The maximum slope shall be 1 percent (1:100) laterally and 0.1 percent (1:1000) in the running direction.

(3) The landing pit shall be sand at the same elevation as the takeoff board.

f) Special Considerations: The takeoff board shall be of wood and must be fixed in the runway.

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4.7 Pole Vault. The pole vault area (see Figure 47) shall be as follows.

a) Source of Information: The Athletic Congress.

b) Recommended Area: The ground space shall be 1,500 ft² (139.35 m²) minimum.

c) Size and Dimension: The runway shall be 125 ft (38.1 m) long minimum by 4 ft (1.22 m) wide minimum. The vault pit shall be 16 ft (5 m) wide minimum and depth ranges from 12 ft (3.66 m) minimum to 16 ft (5 m) preferred. Height of the material in the jumping pit shall range from 18 in. (0.46 m) to 36 in. (0.92 m) preferred, with a connecting apron of the same material and decreasing height around the vaulting box.

d) Orientation: The preferred orientation is for the running direction to be toward the north to east-northeast.

e) Surface and Drainage: The surface and drainage shall be as follows:

(1) The runway shall be of a bituminous material with a hot plant cushion course mix (protective colorcoating shall be optional).

(2) The maximum slope shall be 1 percent (1:100) laterally and 0.1 percent (1:1000) in the running direction.

f) Special Considerations: The pole vault box shall be fixed in the ground with its entire front edge flush with the front edge of the jumping pit.

4.8 High Jump. The high jump area (see Figure 48) shall be as follows.

a) Source of Information: The Athletic Congress.

b) Recommended Area: The ground space shall be 4,100 ft² (380.9 m²) minimum.

c) Size and Dimension: The high jump runway shall have a minimum semicircle radius of 50 ft (15.24 m) and preferably 70 ft (21.3 m). The high jump pit shall be a minimum of 16 ft (5 m) wide x 8 ft (2.5 m) deep. The material in the jumping pit shall be a minimum of 28 in. (0.7 m) high. The takeoff area shall be a semicircle with a 10 ft (3 m) radius with the centerpoint directly under the center of the cross bar; no point within this area may be higher than the point of measurement.

d) Orientation: The preferred orientation is for the direction of jumping.

e) Surface and Drainage: The surface and drainage shall be as follows:

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(1) Runway preferably shall be constructed of bituminous material.

(2) Synthetic surface shall be optional.

(3) Maximum approach apron slope shall be 1 percent laterally (1:100) and 0.1 percent (1:1000) in the running direction.

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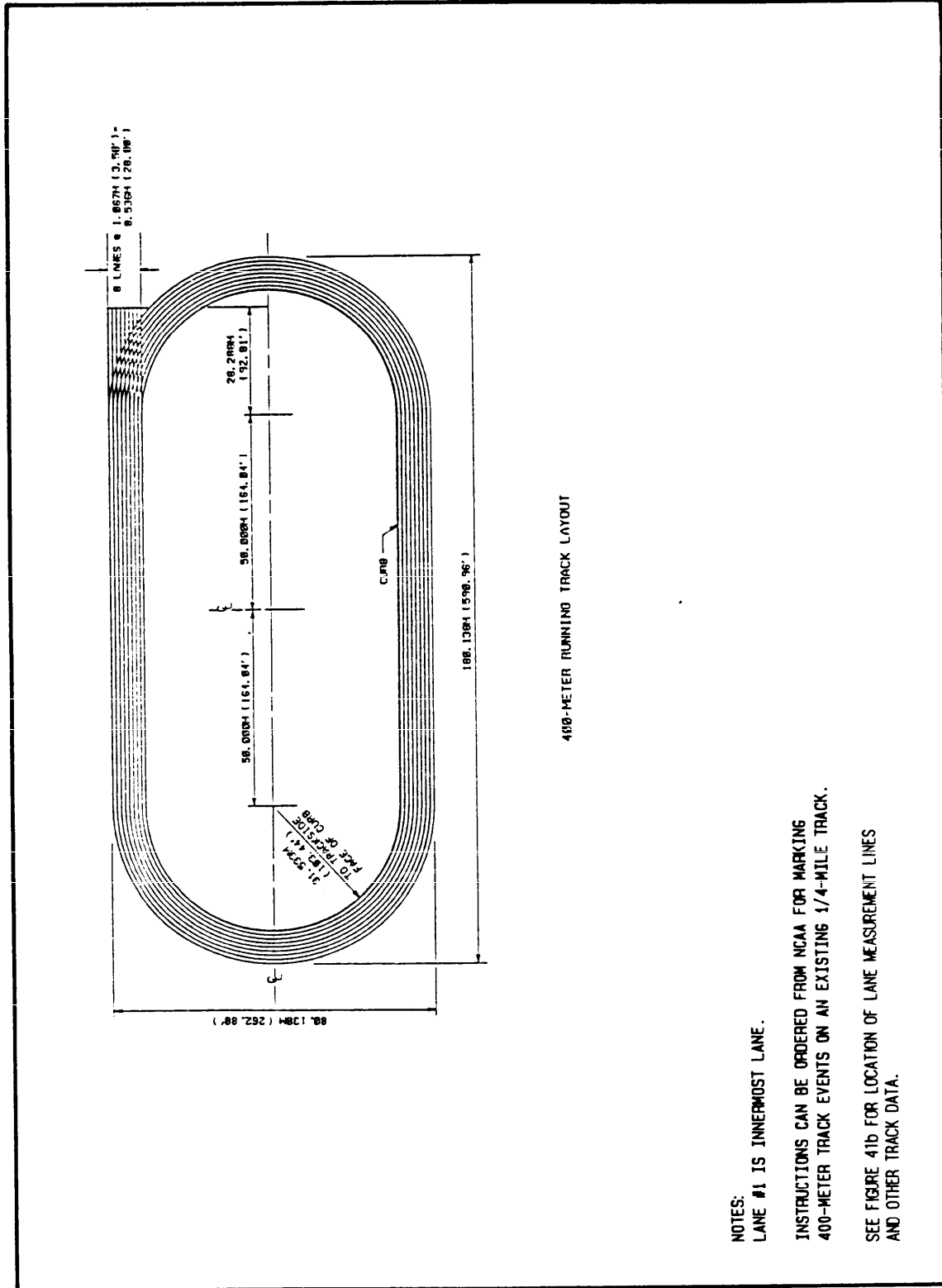


Figure 40
400-Meter Running Track -- Layout

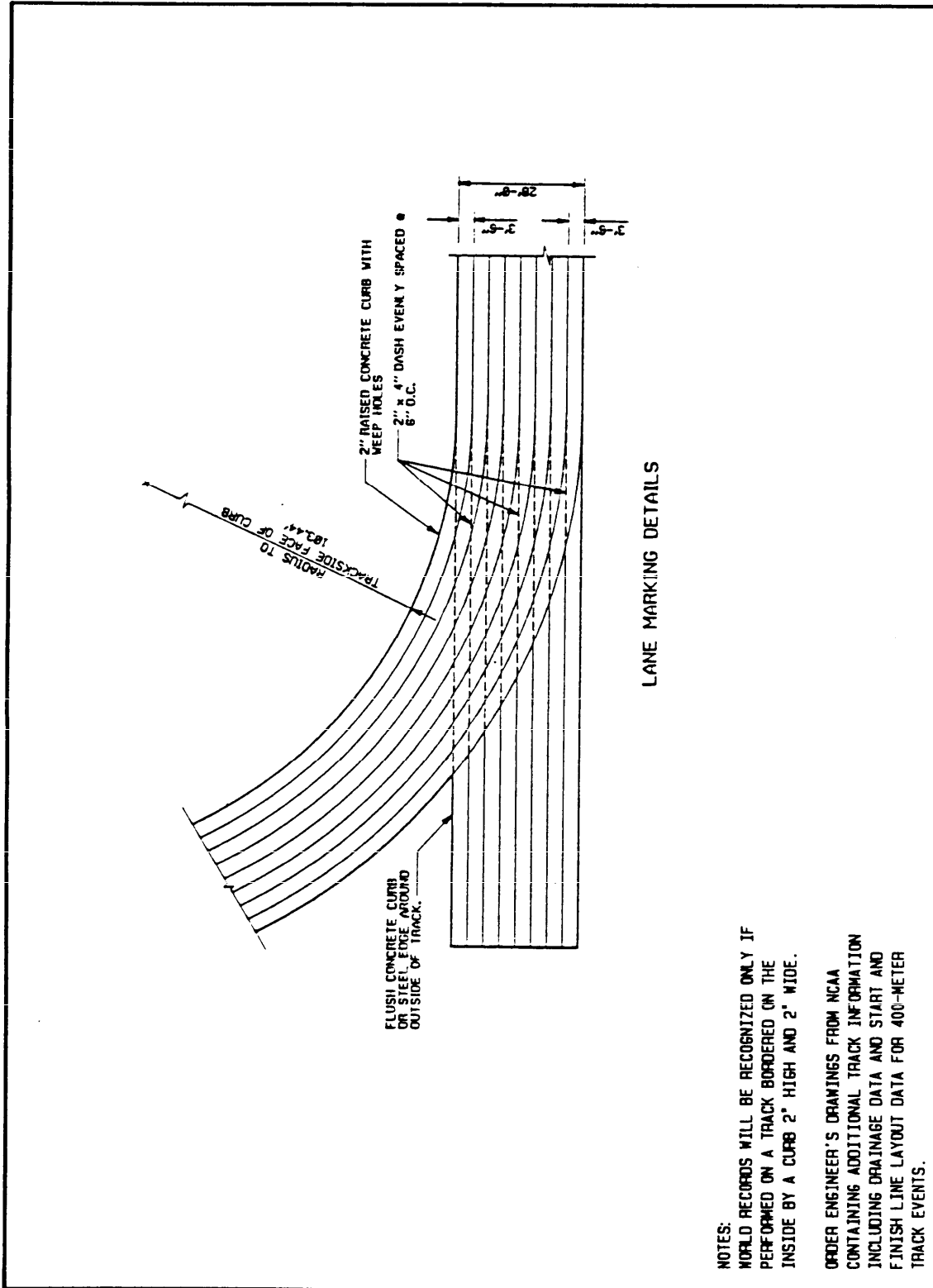
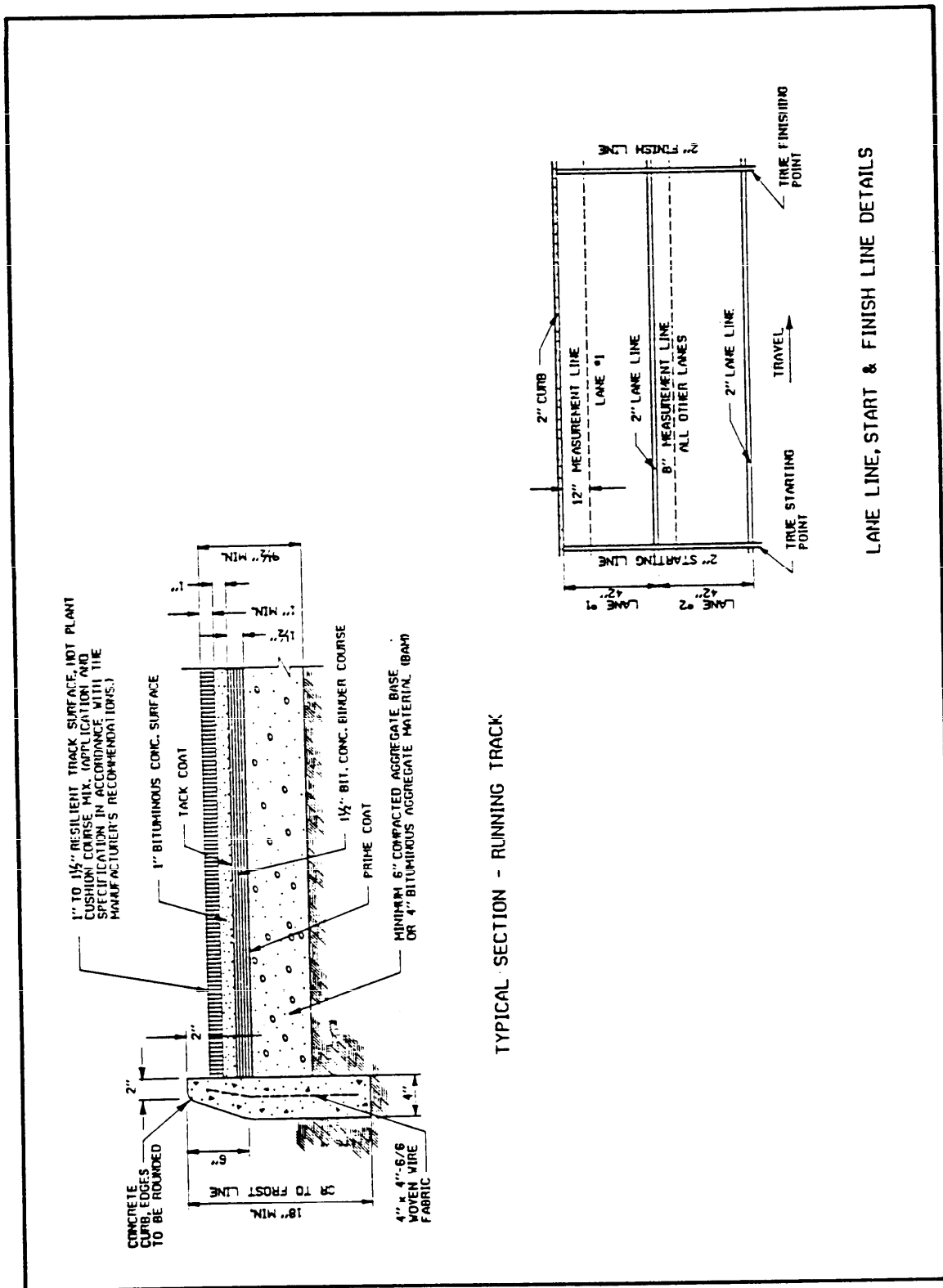


Figure 41a
 400-Meter Running Track -- Lane Marking Details



TYPICAL SECTION - RUNNING TRACK

LANE LINE, START & FINISH LINE DETAILS

Figure 41b
400-Meter Running Track -- Construction Details

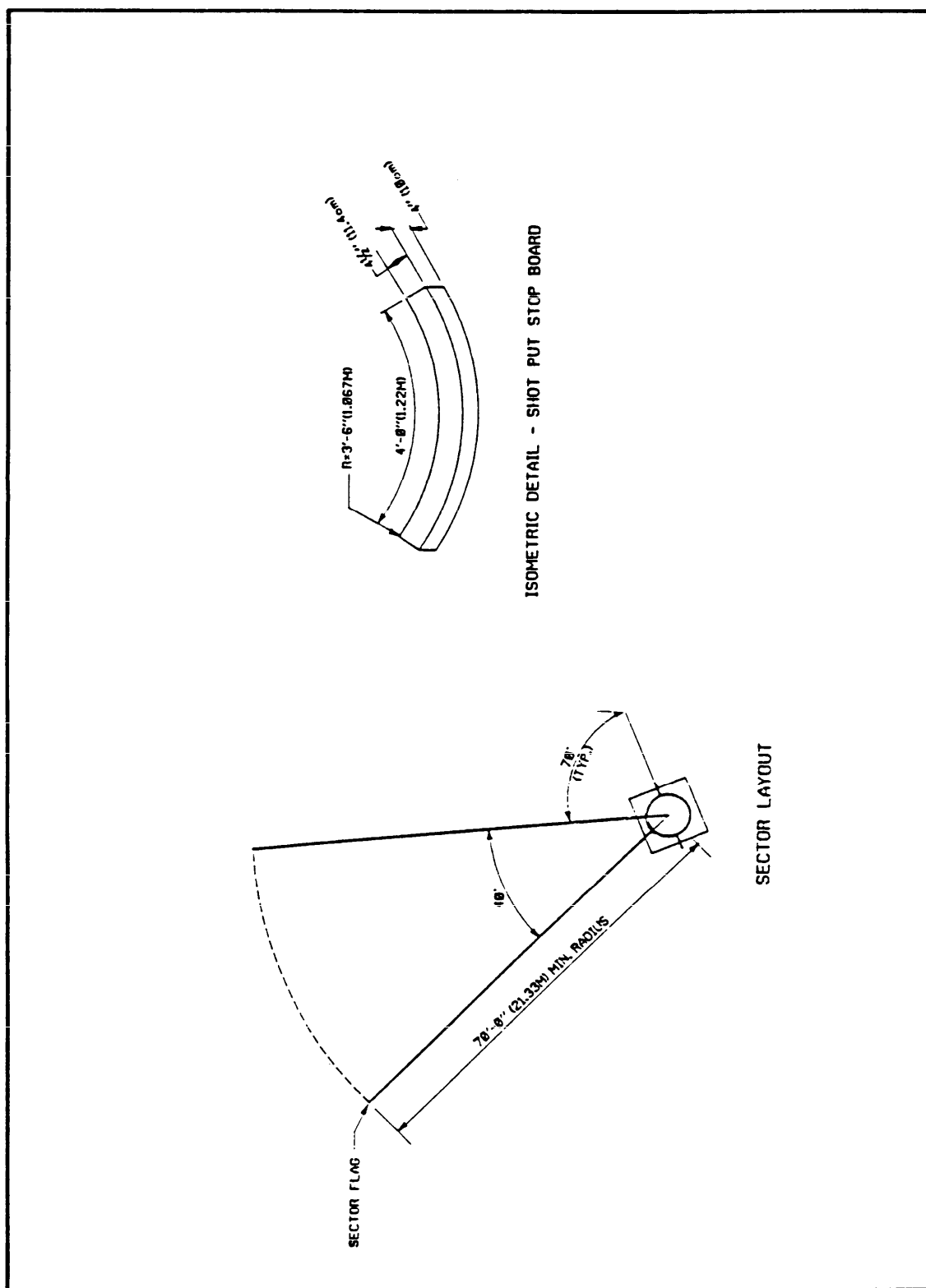


Figure 42a
Shot Put Circle -- Layout

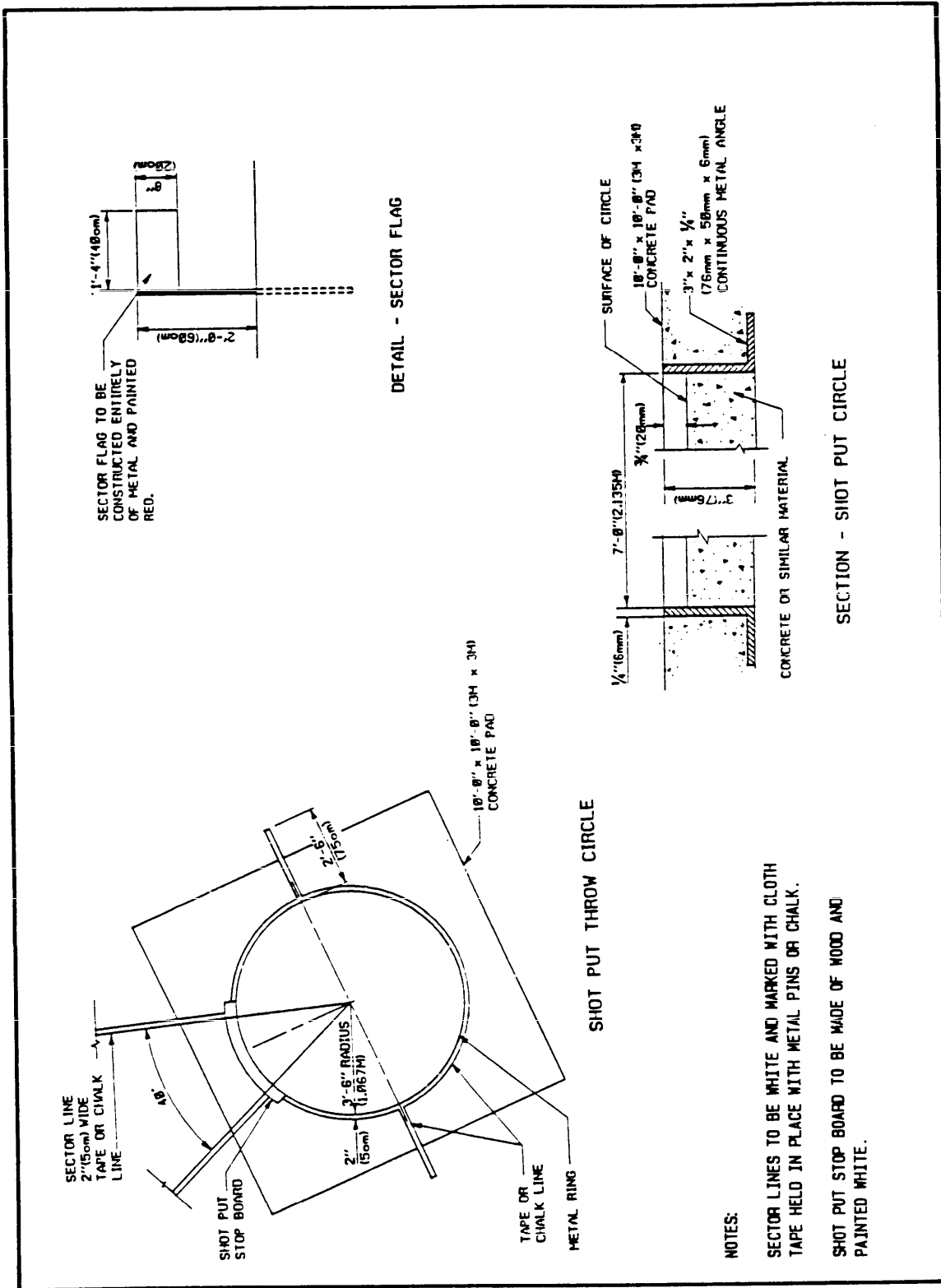


Figure 42b
Shot Put Circle -- Construction Details

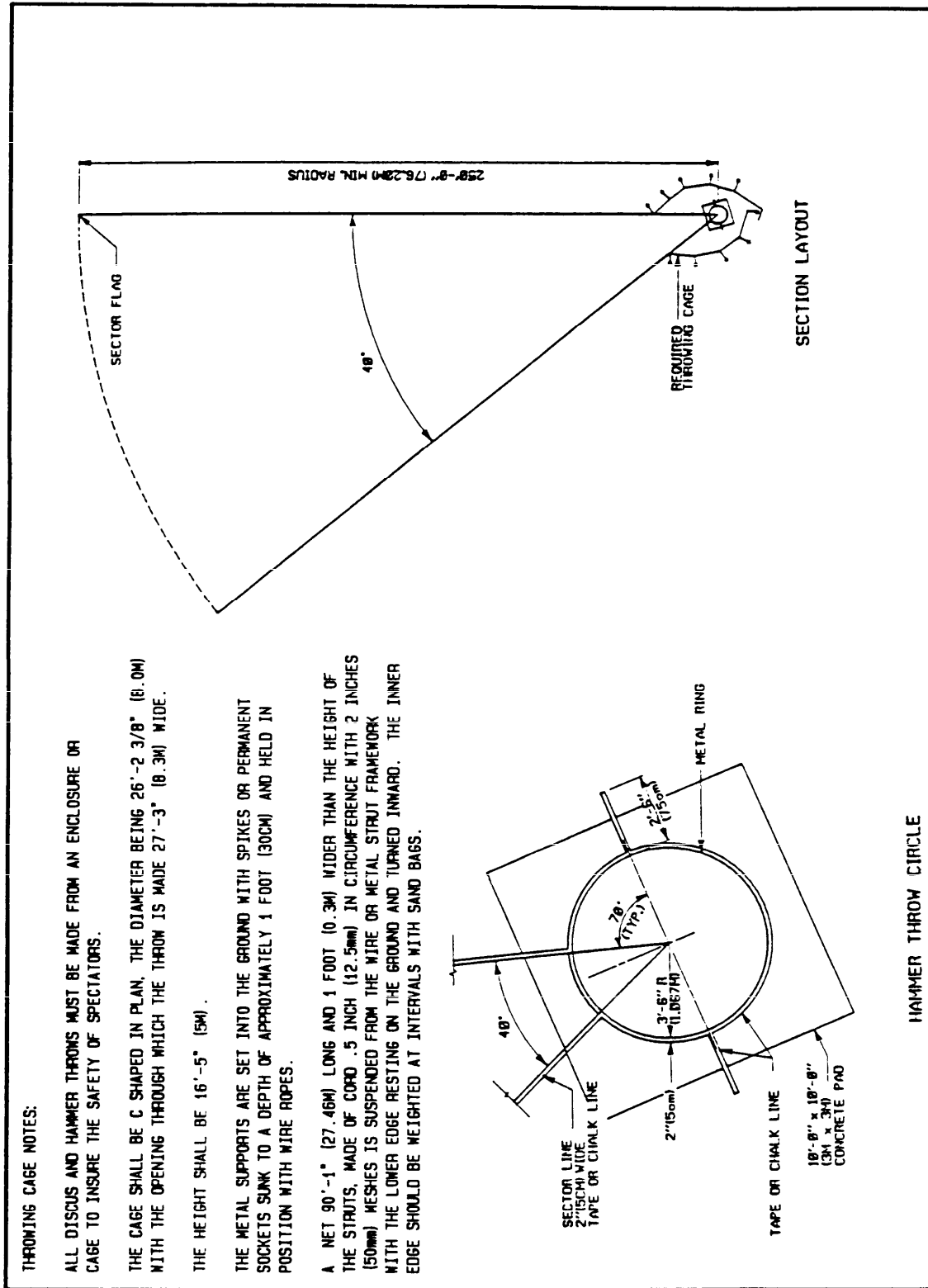


Figure 43a
Hammer Throw -- Section Layout

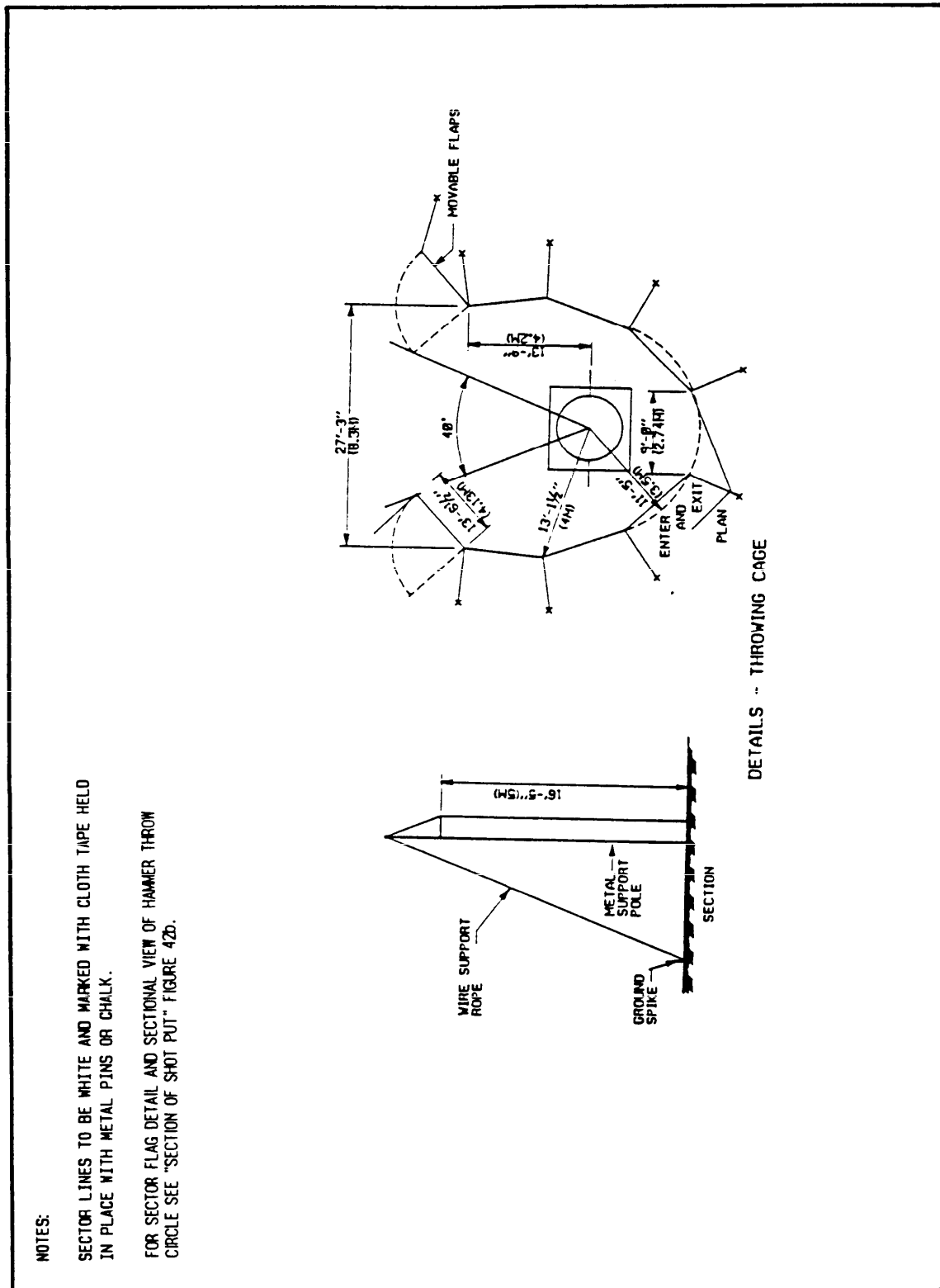


Figure 43b
Hammer Throw -- Throwing Cage Construction Details

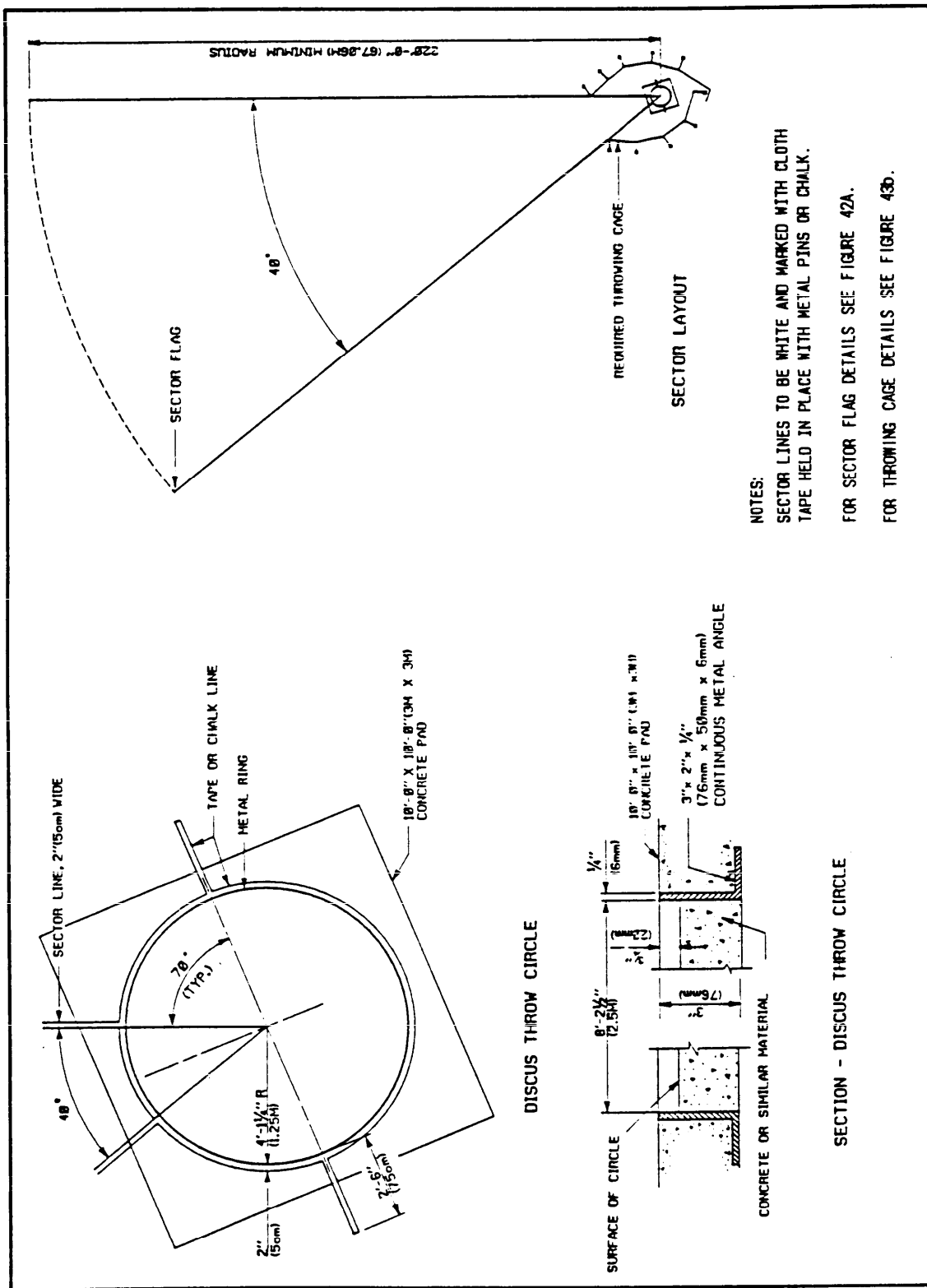


Figure 44
Discus Throw Sector

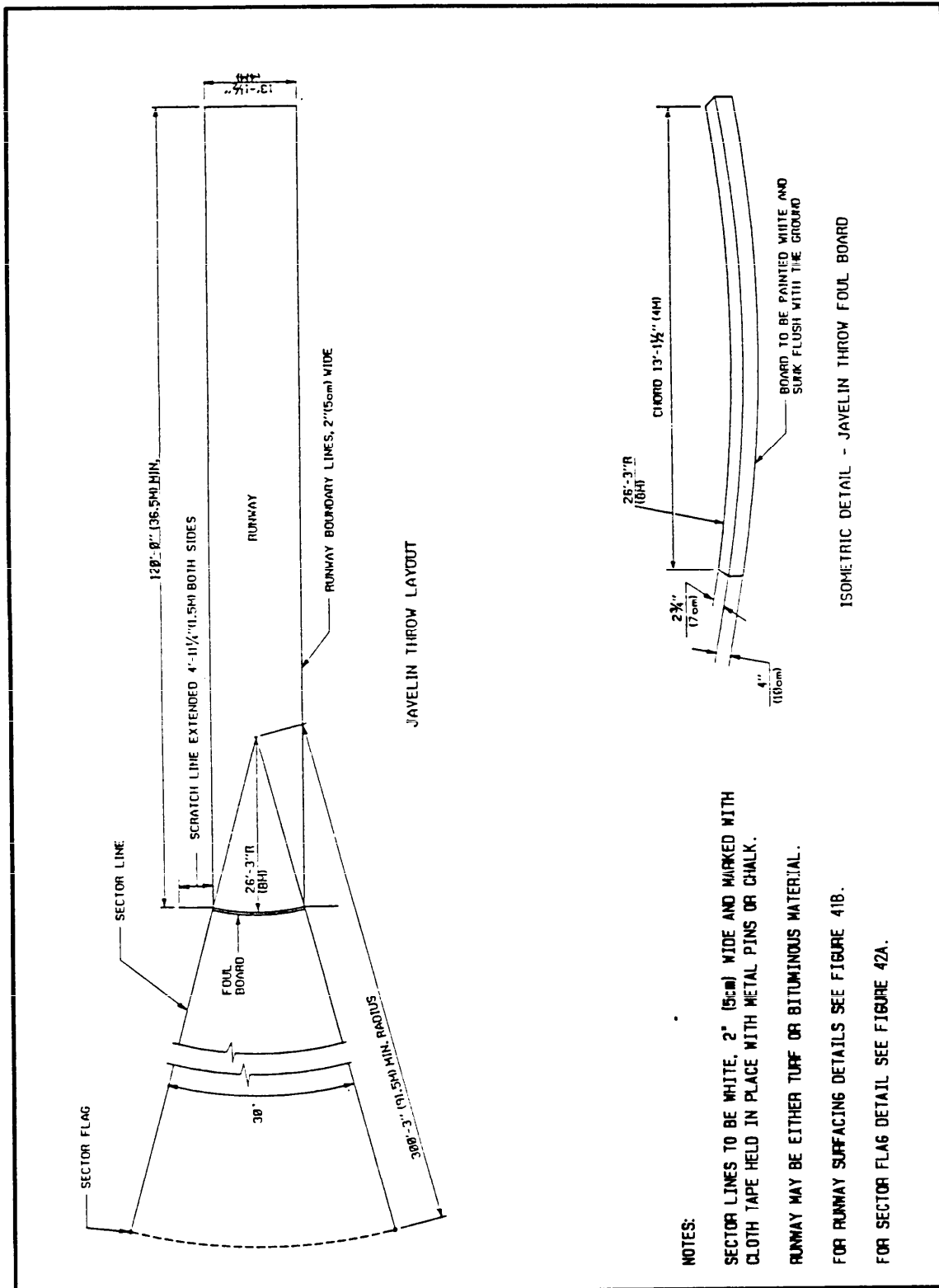


Figure 45
 Javelin Throw Area

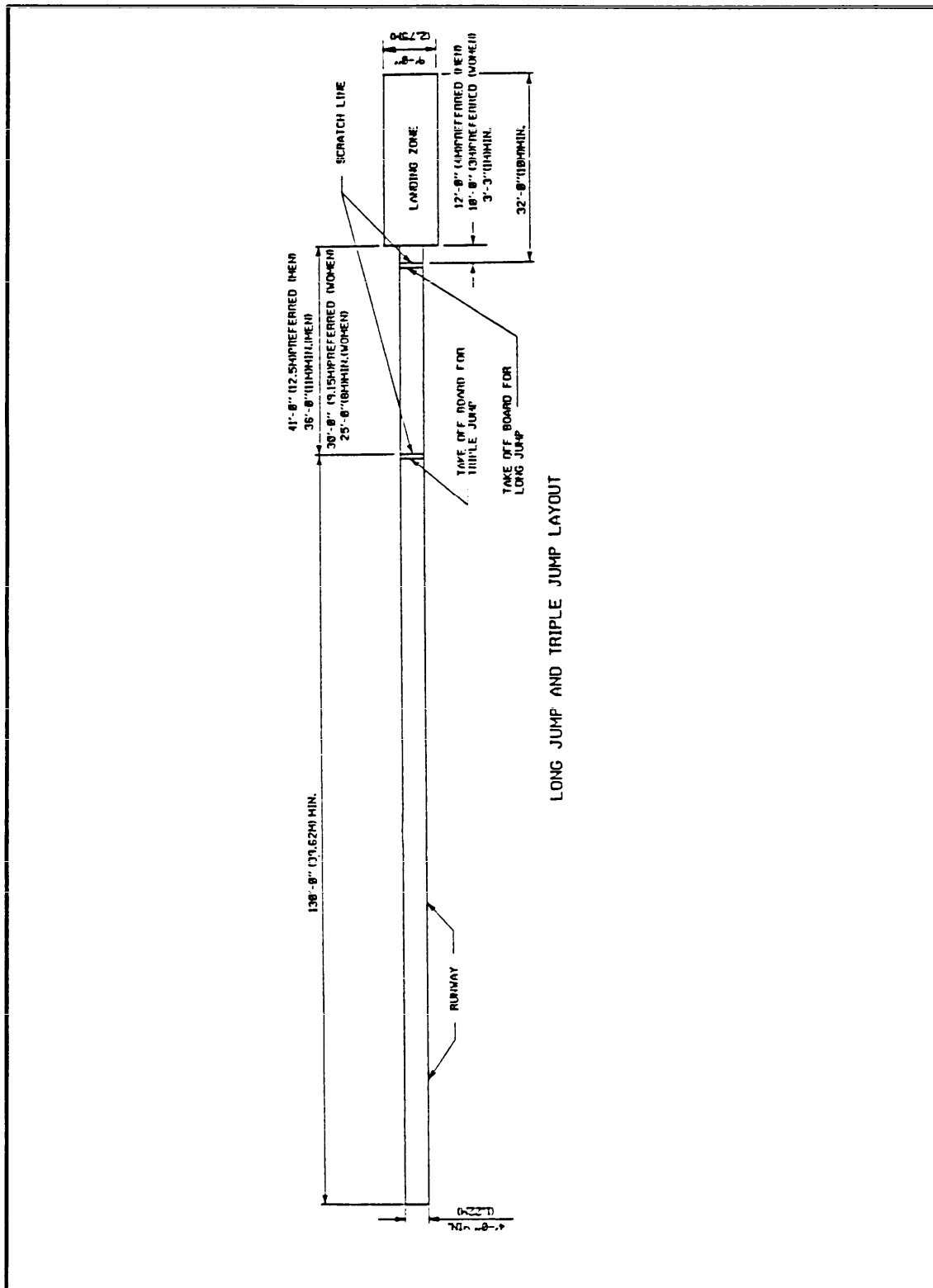


Figure 46a
Long Jump and Triple Jump Area -- Layout

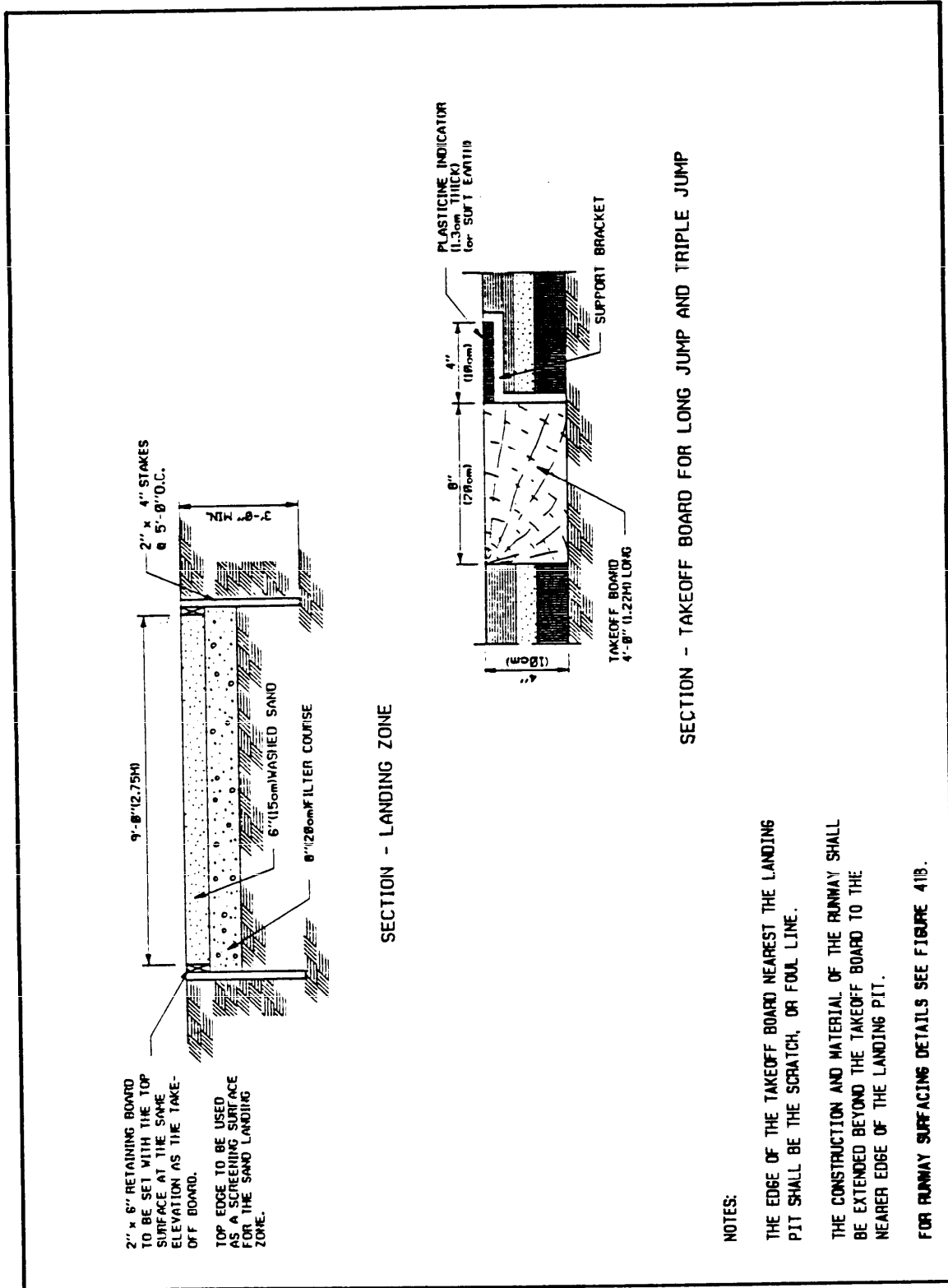


Figure 46b
Long Jump and Triple Jump Area -- Construction Details

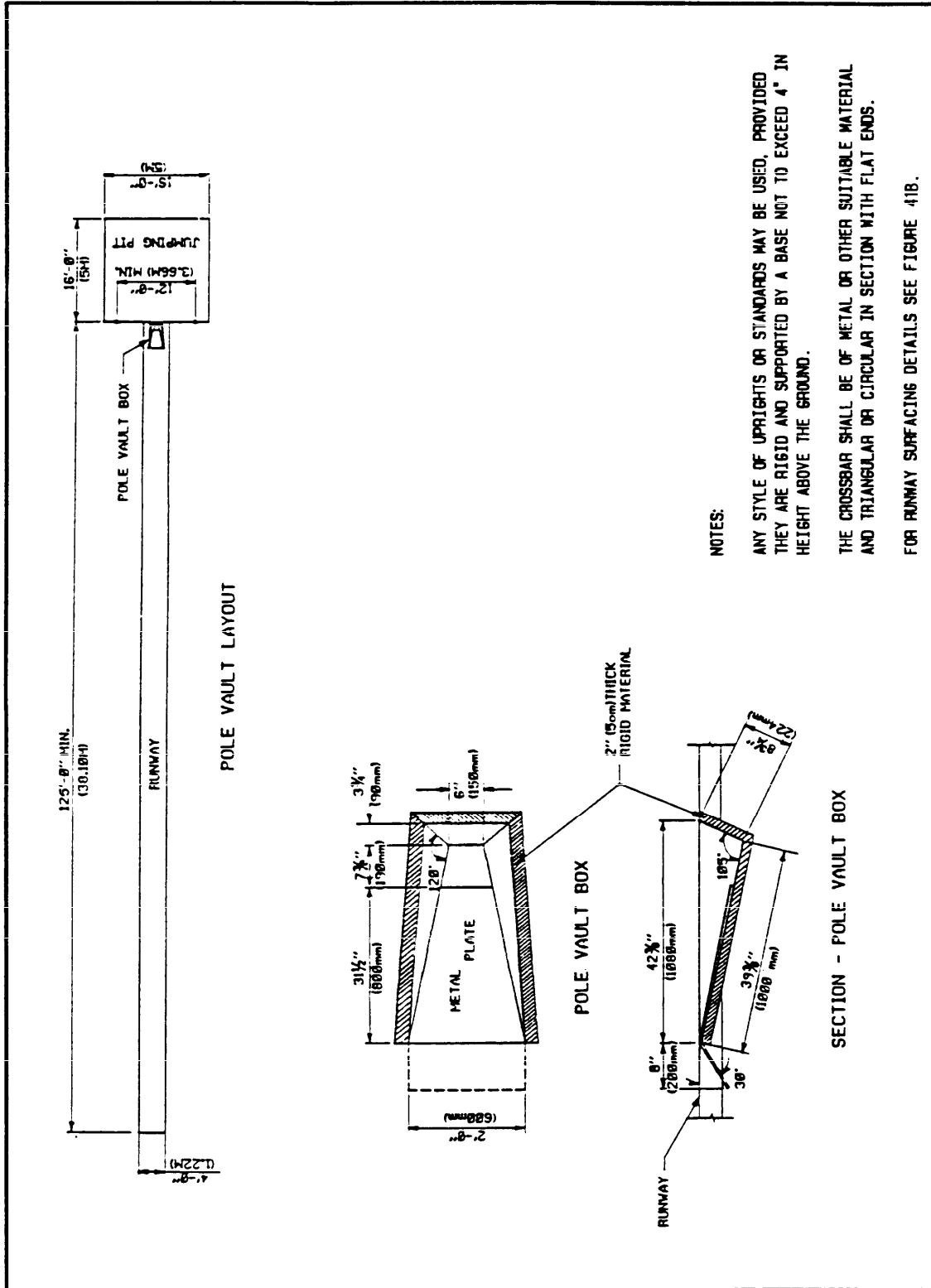


Figure 47a
 Pole Vault Area -- Layout

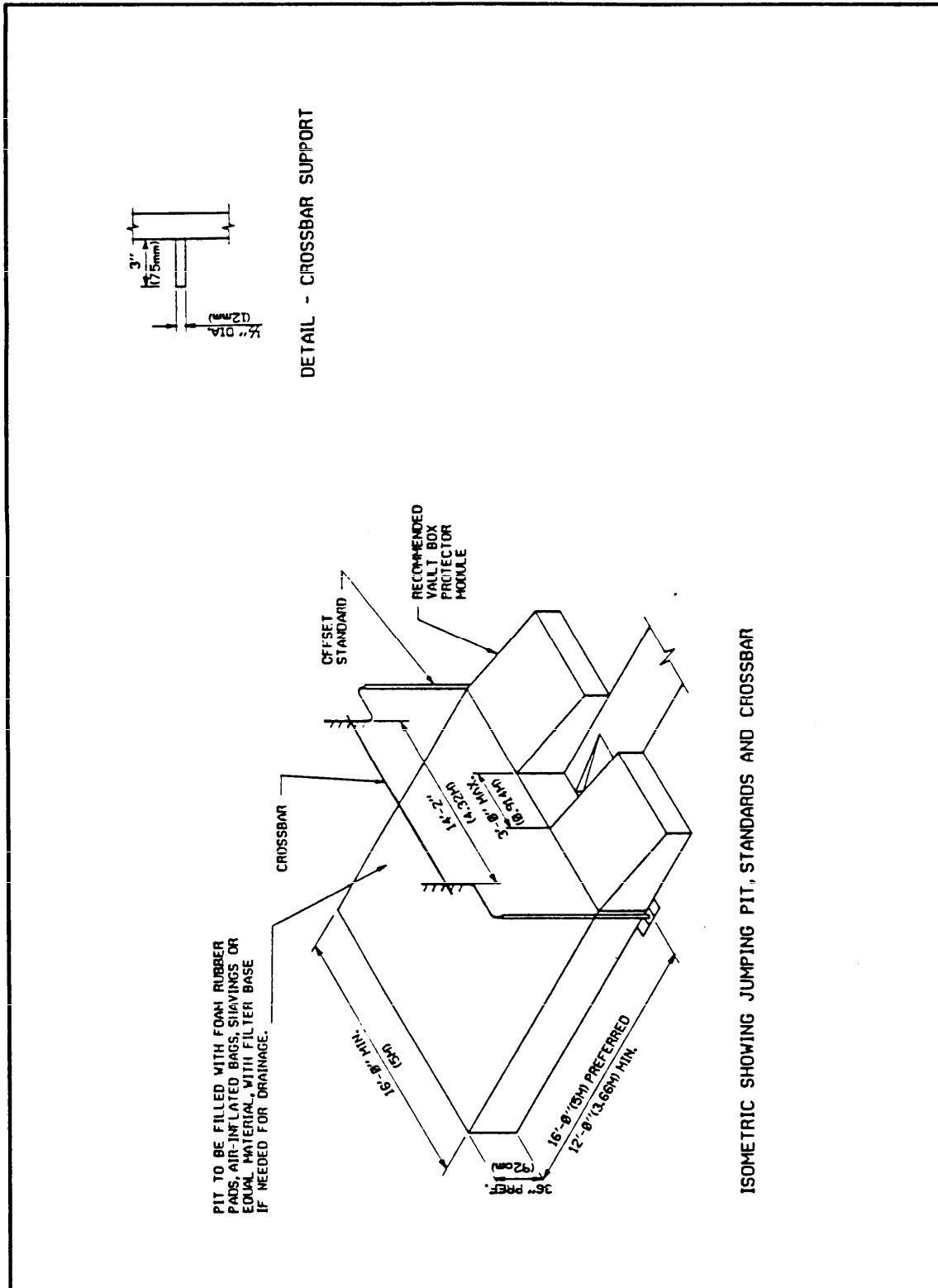


Figure 47b Pole Vault Area -- Pit and Crossbar Details

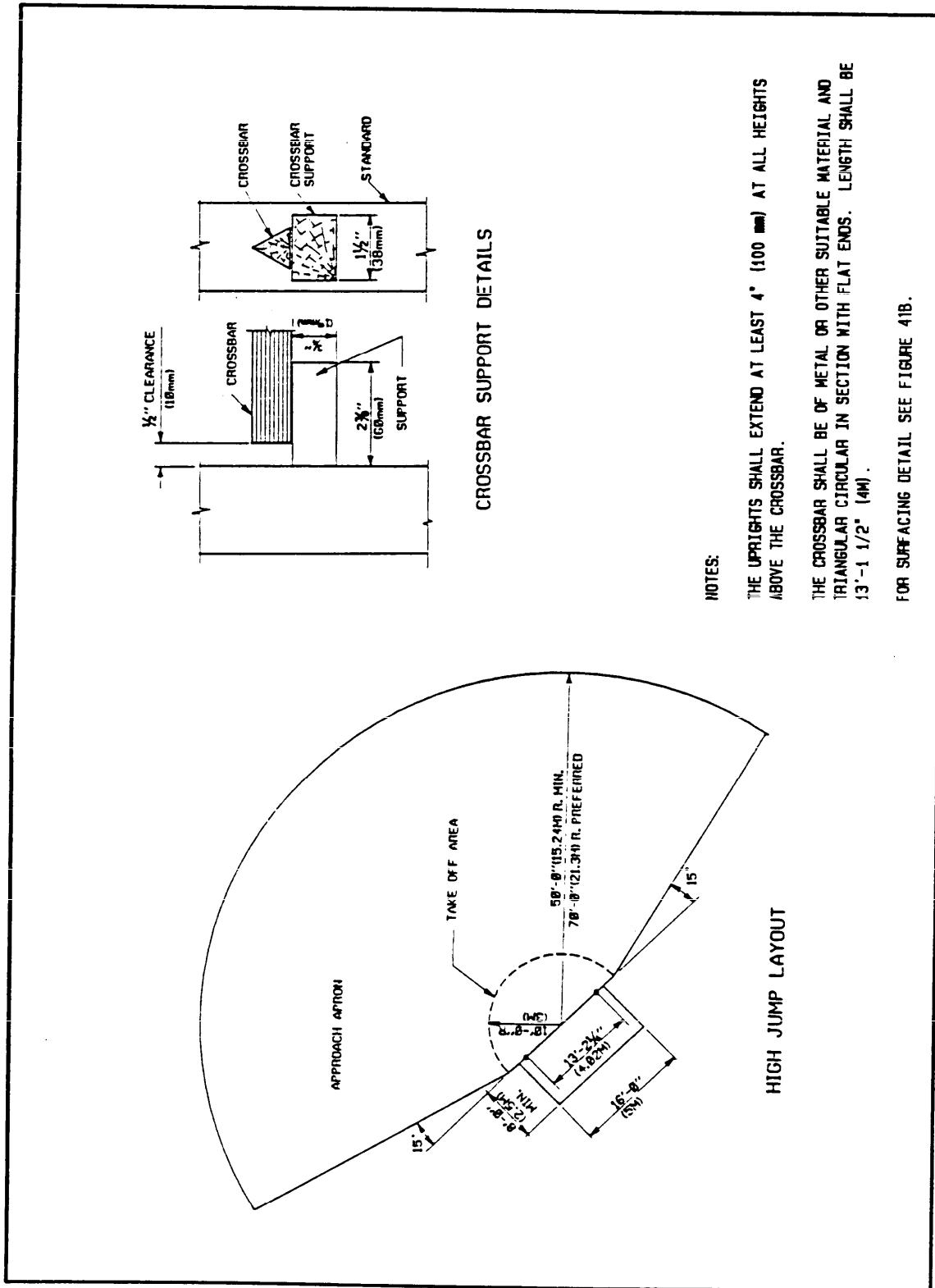


Figure 48a
High Jump Area -- Layout

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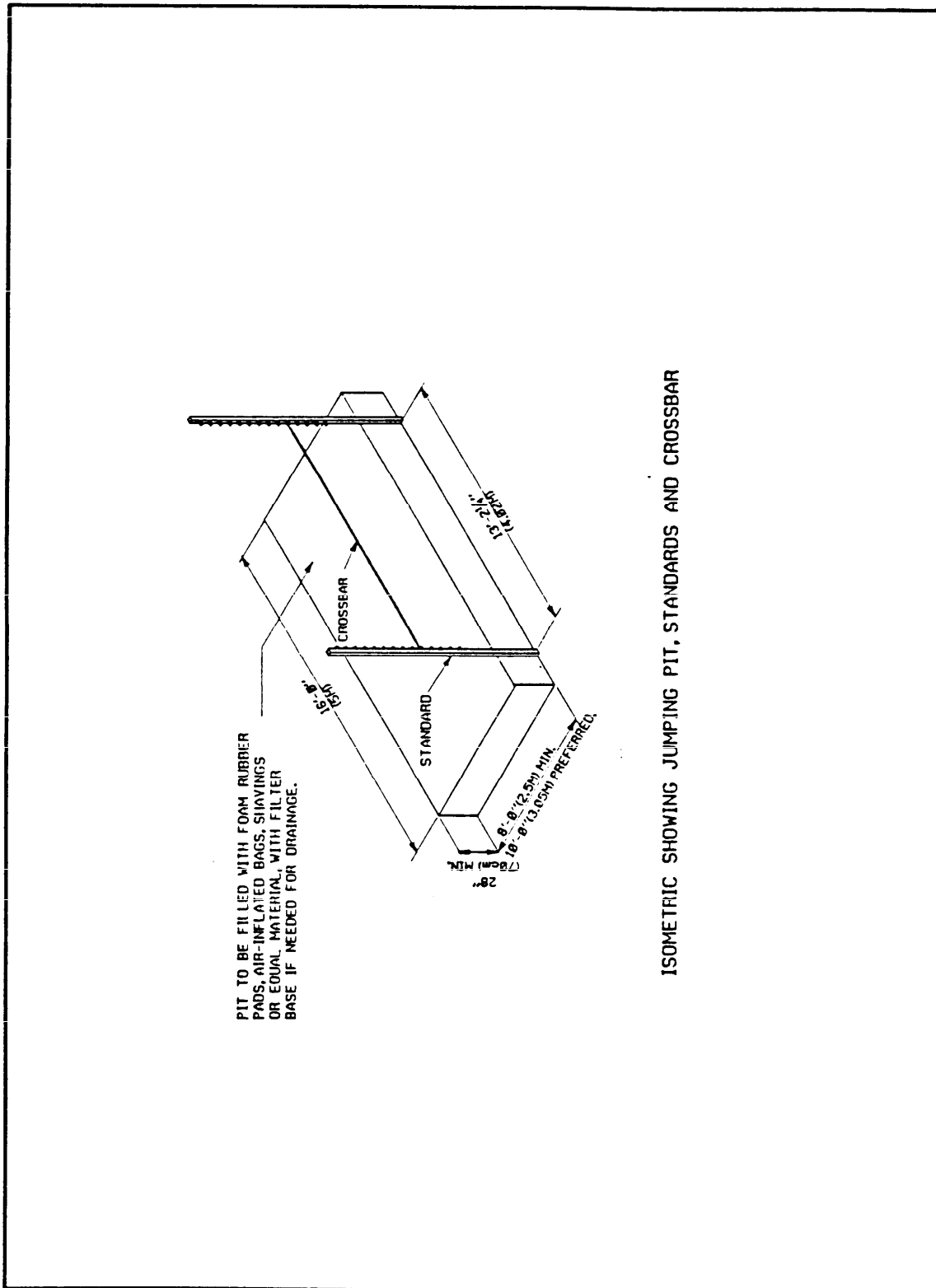


Figure 48b
High Jump Area -- Pit Details

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Section 5: MULTIPLE SPORTS COMPLEXES

5.1 Combination Basketball and Volleyball Court Complex. The combination basketball and volleyball court complexes (see Figure 49) shall be as follows.

- a) Source of Information: Basketball--NCAA; Volleyball--USVBA.
- b) Recommended Area: The ground space shall be 0.2 acres (0.0809 ha) for 1 basketball and 2 volleyball courts.
- c) Size and Dimensions: The overall length shall be 114 ft (34.74 m) and the overall width shall be 80 ft (24.38 m).
- d) Orientation: The preferred orientation is north-south for the long axis of the court expected to have primary use.
- e) Surface and Drainage: The surface and drainage shall meet the following criteria.
 - (1) Surface shall be of concrete or bituminous material (protective colorcoating shall be optional).
 - (2) Drainage shall be end-to-end, side-to-side or corner-to-corner diagonally at a minimum slope of 1 inch (25.4 mm) in 10 feet (3.05 m) (0.8 percent).
- f) Special Considerations: To allow unobstructed use of the basketball court, volleyball posts must be removable and post-holes equipped with flush-mounted deck plates.

5.2 Combination Tennis, Volleyball, Basketball, Badminton Court Complex. The combination tennis, volleyball, basketball, badminton court complex area (see Figure 50) shall be as follows.

- a) Source of Information: Basketball--NCAA; Volleyball--USVBA; Badminton--ABA; Tennis--USTA.
- b) Recommended Area: The ground space shall be 24,720 ft² (2296.5 m²) for four tennis courts with one basketball, one volleyball, and one badminton court superimposed thereon.
- c) Size and Dimension: The overall length shall be 206 ft (62.78 m) and the overall width shall be 120 ft (36.57 m).
- d) Orientation: The preferred orientation is north-south for the long axis of all courts.
- e) Surface and Drainage: The surface and drainage shall meet the following criteria.
 - (1) The surface shall be of concrete or bituminous material

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(protective colorcoating shall be optional).

(2) The drainage shall be end-to-end, side-to-side or corner-to-corner diagonally at a minimum slope of 1 in. (25.4 mm) in 10 ft (3.05 m) (0.8 percent).

f) Special Considerations:

(1) Special provisions shall be made to allow the various net posts to be erected for different court games.

(2) Court shall be enclosed by a 10-ft high fence.

5.3 Multiple Sports Court. Multiple sports courts (see Figure 51) shall be as follows.

a) Source of Information: Basketball--NCAA; Volleyball--USVBA; Tennis--USTA; Shuffleboard--General Sportcraft Company, Ltd.

b) Recommended Area: The ground space shall be 9,840 ft² (914.14 m²).

c) Size and Dimension: 120 ft (36.6 m) long x 82 ft (25 m) wide (overall).

d) Orientation: The preferred orientation is north-south for the long axis of the court expected to have primary use.

e) Surface and Drainage: The surface and drainage shall be as follows:

(1) The surface shall be of concrete or bituminous material; shuffleboard courts must be concrete. Protective colorcoating shall be optional.

(2) The preferred drainage shall be from end-to-end at a slope of 1 in. in 10 ft (0.8 percent). The 12 ft (3.66 m) areas on each end shall be level for the shuffleboard courts.

f) Special Considerations:

(1) Removable posts with flush-mounted deck plates must be used for tennis and volleyball to allow unobstructed use of other courts.

(2) Fencing shall be provided, on all sides of the court, of 10-ft high (3.05 m) chain link fence which shall conform to NFGS-02444.

5.4 Combination Sports Fields. The combination sports fields (see Figure 52) shall be as follows.

a) Source of Information: Baseball--The Official Playing Rules Committee, Official Baseball Rules; Softball--Amateur Softball Association of America (ASA); Touch and Flag Football--The Athletic Institute. Football, 11-man--NCAA.

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b) Recommended Area: Varies with the number of fields and the configuration.

c) Size and Dimension: Varies with the number of fields and the configuration.

d) Orientation: The preferred orientation varies when combinations are used. Selection for priority shall be based on anticipated use, time of play, and local site conditions.

e) Surface and Drainage: Surface and drainage shall be as follows:

(1) Surface shall be turf.

(2) Drainage shall be provided following guidelines for individual sports.

f) Special Considerations: Safety aspects of each sport shall not be compromised when multi-use concepts are employed.

5.5 Sports Fields within Running Tracks. Sports fields within running tracks (see Figure 53) shall be as follows.

a) Source of Information: Football--NCAA; Soccer--United States Soccer Federation (USSF).

b) Recommended Area: The ground space shall be approximately 4.1 acres (1.66 ha).

c) Size and Dimensions: See Figures 40 and 41 for track details. See Figures 29 and 30 for football field details, and Figures 33 and 34 for soccer field details. The overall length shall be 600 ft (182.8 m) and the overall width shall be 276 ft (84.12 m).

d) Orientation: Refer to para 4.1d.

e) Surface and Drainage: Surface and drainage shall be as follows:

(1) Surfaces shall be in accordance with the provisions as stated in Section 5 for the particular sports field.

(2) Details for drainage shall be obtained from the NCAA (see Figures 40 and 41 for 400 m track grading and drainage).

f) Special Considerations: Special Considerations will be those noted for the particular sport or event as stated in Section 4.

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5.6 Multiple Field Events within Running Tracks. Multiple field event areas within running tracks (see Figure 54) shall be as follows.

a) Source of Information: NCAA.

b) Recommended Area: The ground space shall be approximately 4.1 acres (1.66 ha).

c) Size and Dimensions: See figures 40 and 41 for track details. See Figure 42 for shot put, Figure 46 for long jump and triple jump, Figure 47 for pole vault, and Figure 48 for high jump.

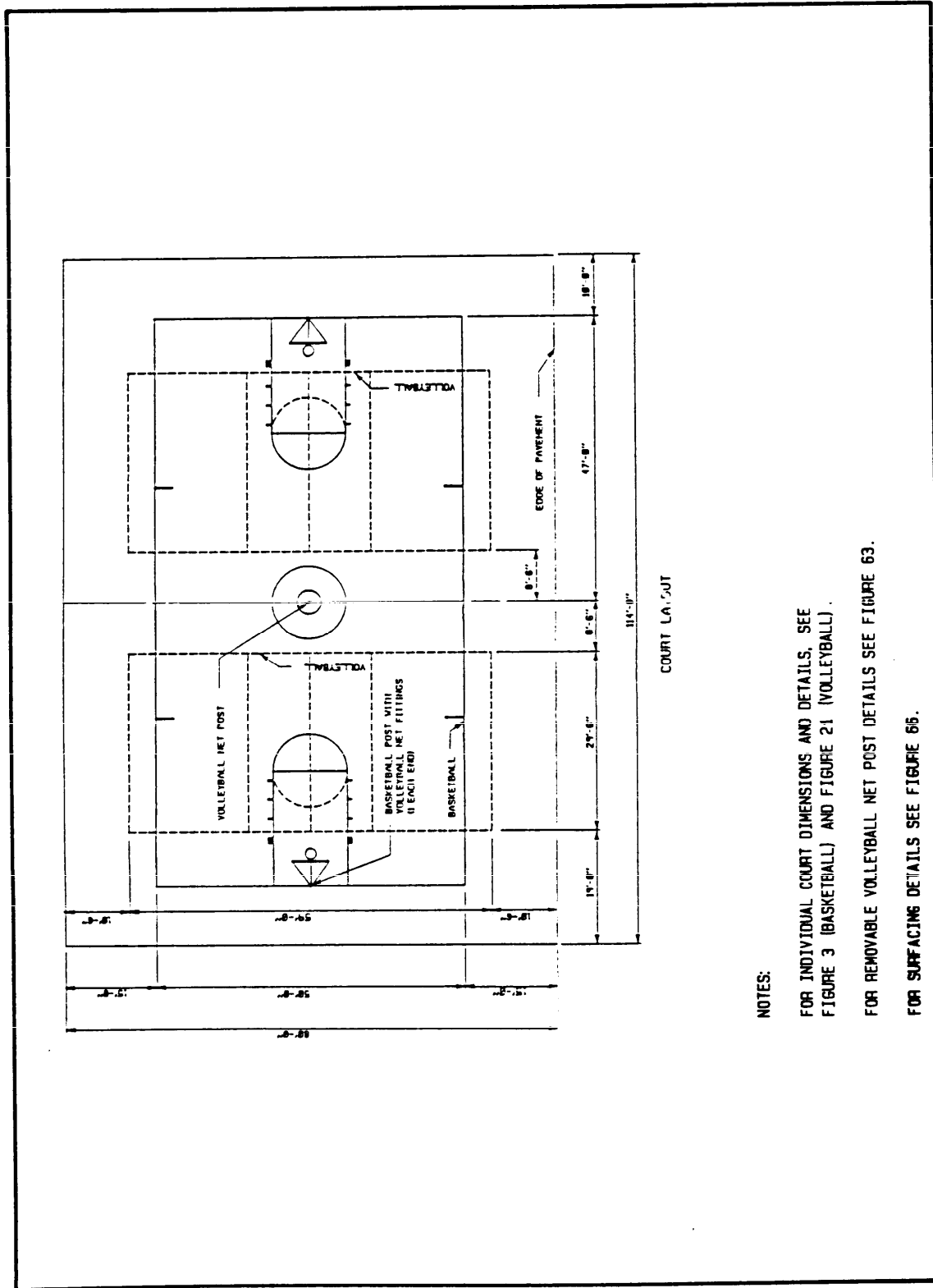
d) Orientation: Refer to para 4.1d for orientation details.

e) Surface and Drainage: Surface and drainage shall be as follows.

(1) Surface shall be in accordance with the provisions as stated in Section 5 for the particular event.

(2) Details for drainage shall be obtained from the NCAA.

f) Special Considerations: Special Considerations will be those noted for the particular sport or event as stated in Section 4.



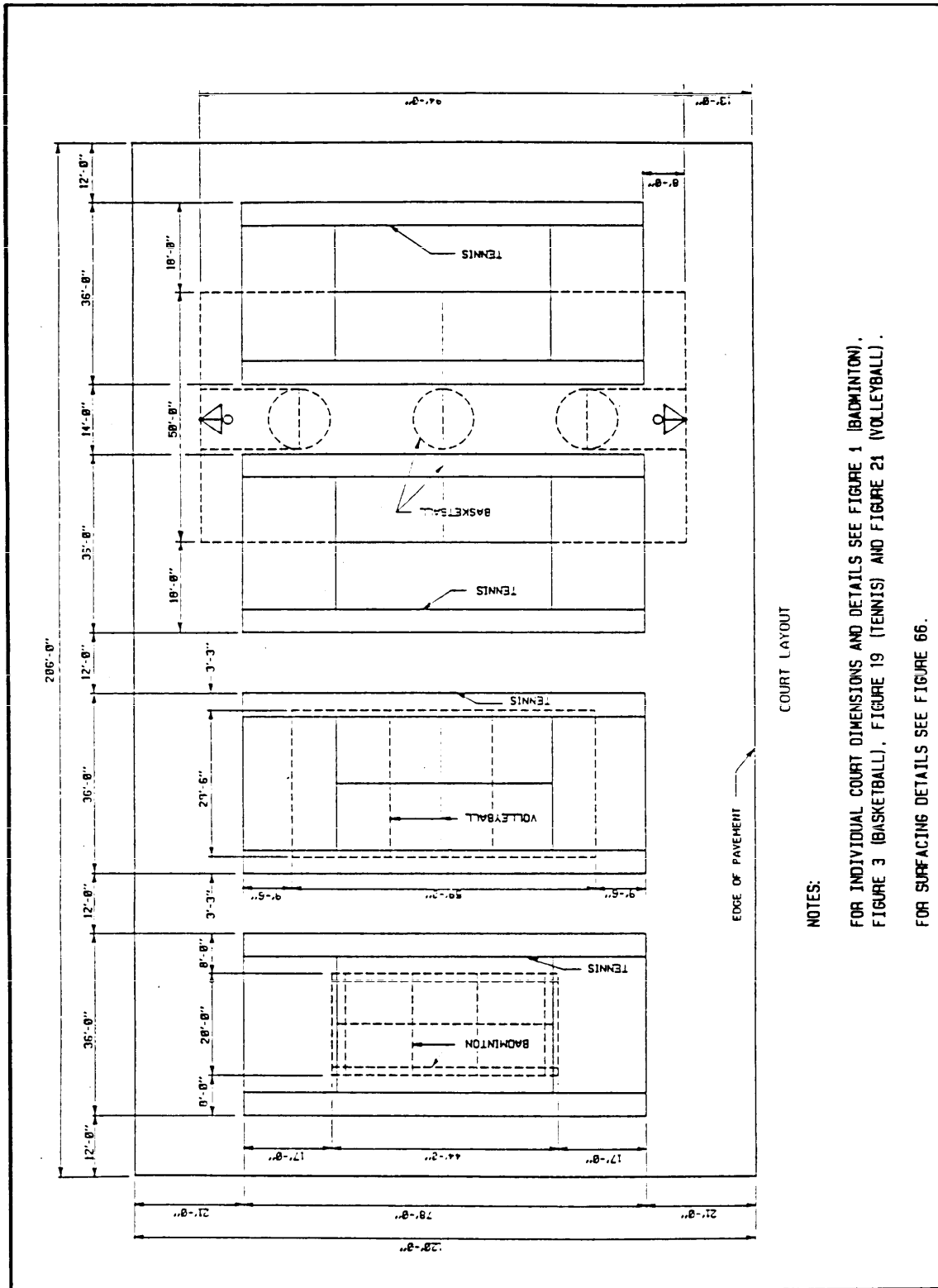
NOTES:

FOR INDIVIDUAL COURT DIMENSIONS AND DETAILS, SEE FIGURE 3 (BASKETBALL) AND FIGURE 21 (VOLLEYBALL).

FOR REMOVABLE VOLLEYBALL NET POST DETAILS SEE FIGURE 63.

FOR SURFACING DETAILS SEE FIGURE 66.

Figure 49
Combination Basketball-Volleyball Court Complex



COURT LAYOUT

NOTES:

FOR INDIVIDUAL COURT DIMENSIONS AND DETAILS SEE FIGURE 1 (BADMINTON), FIGURE 3 (BASKETBALL), FIGURE 19 (TENNIS) AND FIGURE 21 (VOLLEYBALL).

FOR SURFACING DETAILS SEE FIGURE 66.

Figure 50
Combination Tennis, Volleyball, Basketball, Badminton Court Complex

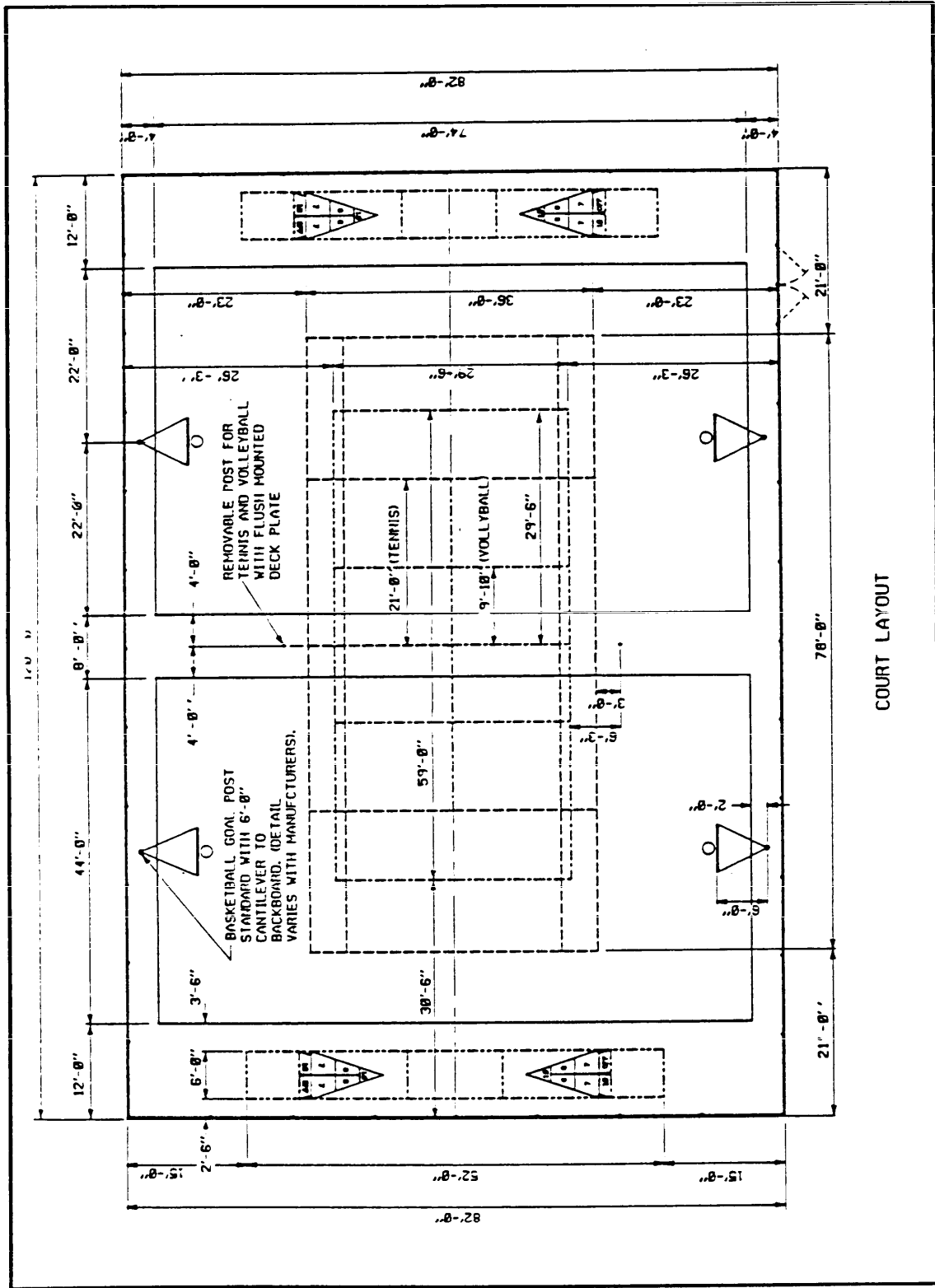


Figure 51a
Multiple Sports Court -- Layout

NOTES:

FOR INDIVIDUAL COURT DIMENSIONS AND DETAILS SEE FIGURE 3 (BASKETBALL), FIGURE 15 (SHUFFLEBOARD), FIGURE 19 (TENNIS) AND FIGURE 21 (VOLLEYBALL).

THE AREA IN WHICH SHUFFLEBOARD COURTS ARE LOCATED MUST BE PAVED AS AN OVERRUN FOR THE TENNIS COURT WHETHER OR NOT THE SHUFFLEBOARD COURTS ARE INSTALLED; END TO END MODIFIED DRAINAGE SCHEME MUST BE USED IF THEY ARE INSTALLED.

TO ACCOMMODATE REGULATION-SIZED BASKETBALL COURTS, PAVED AREA MUST BE INCREASED TO AT LEAST 102' X 132'.

FOR REMOVABLE NET POST DETAILS SEE FIGURE 63.

FOR DRAINAGE DETAILS SEE FIGURE 65.

FOR SURFACING DETAILS SEE FIGURE 66.

COURT IDENTIFICATION LEGEND:

- BASKETBALL
- SHUFFLEBOARD
- TENNIS
- VOLLEYBALL

Color key for painted court lines

- Basketball.....Light Green
- Tennis.....White
- Volleyball.....Yellow
- Shuffleboard.....Black

Figure 51b
Multiple Sports Court -- Color Key and Notes

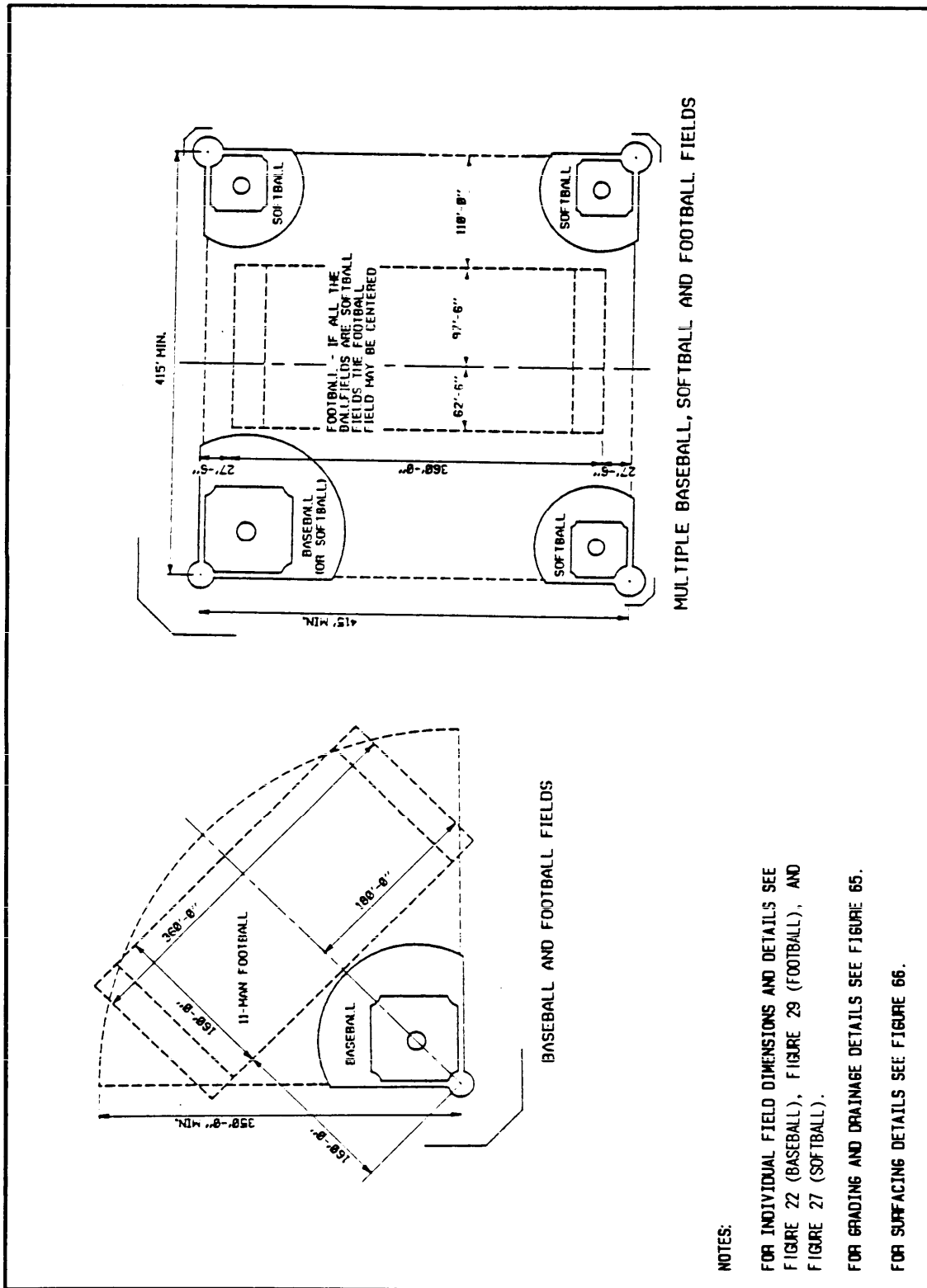


Figure 52a
 Combination Sports Fields -- Baseball, Softball, and Football

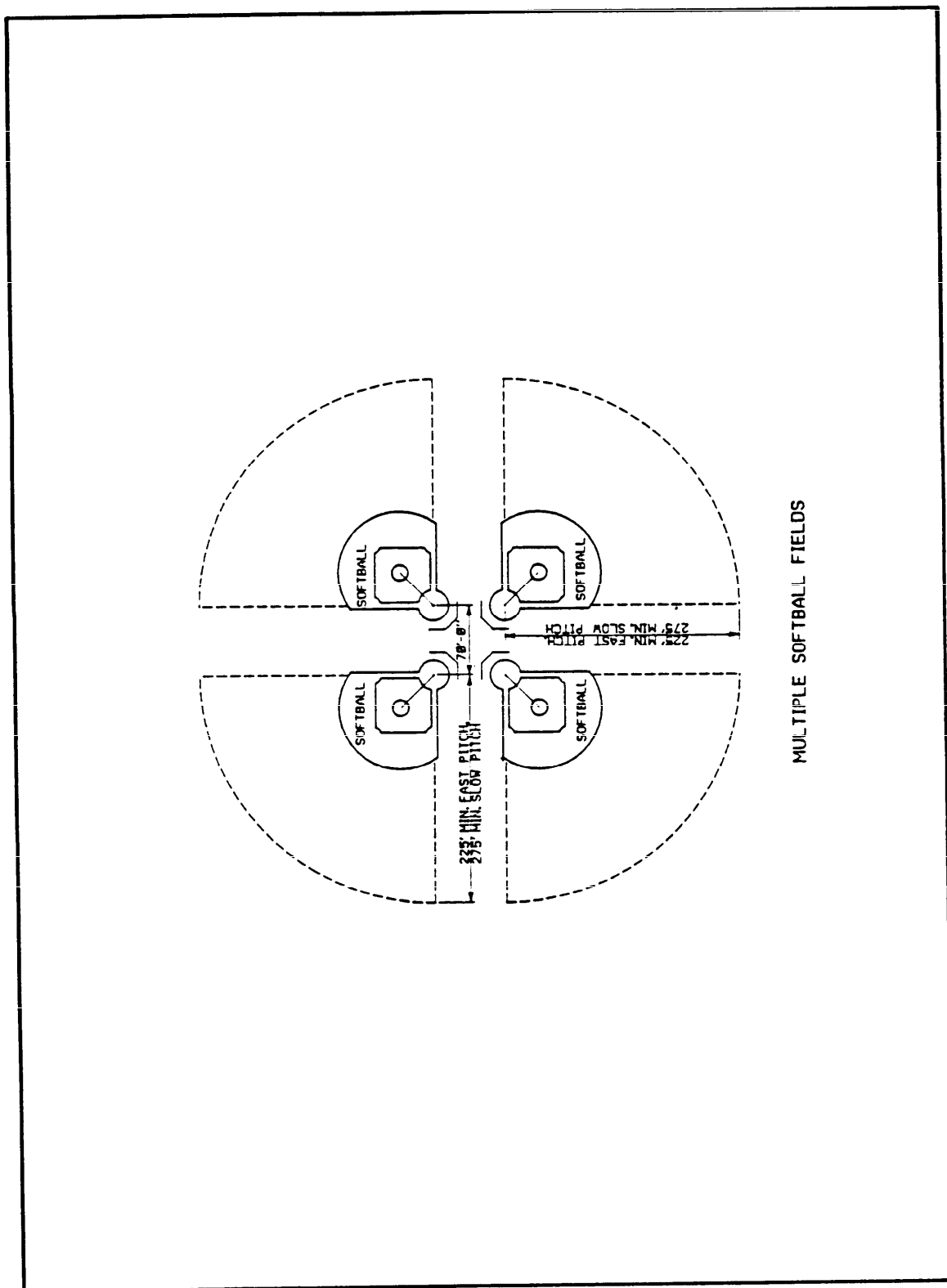


Figure 52b
Combination Sports Fields -- Multiple Softball Fields

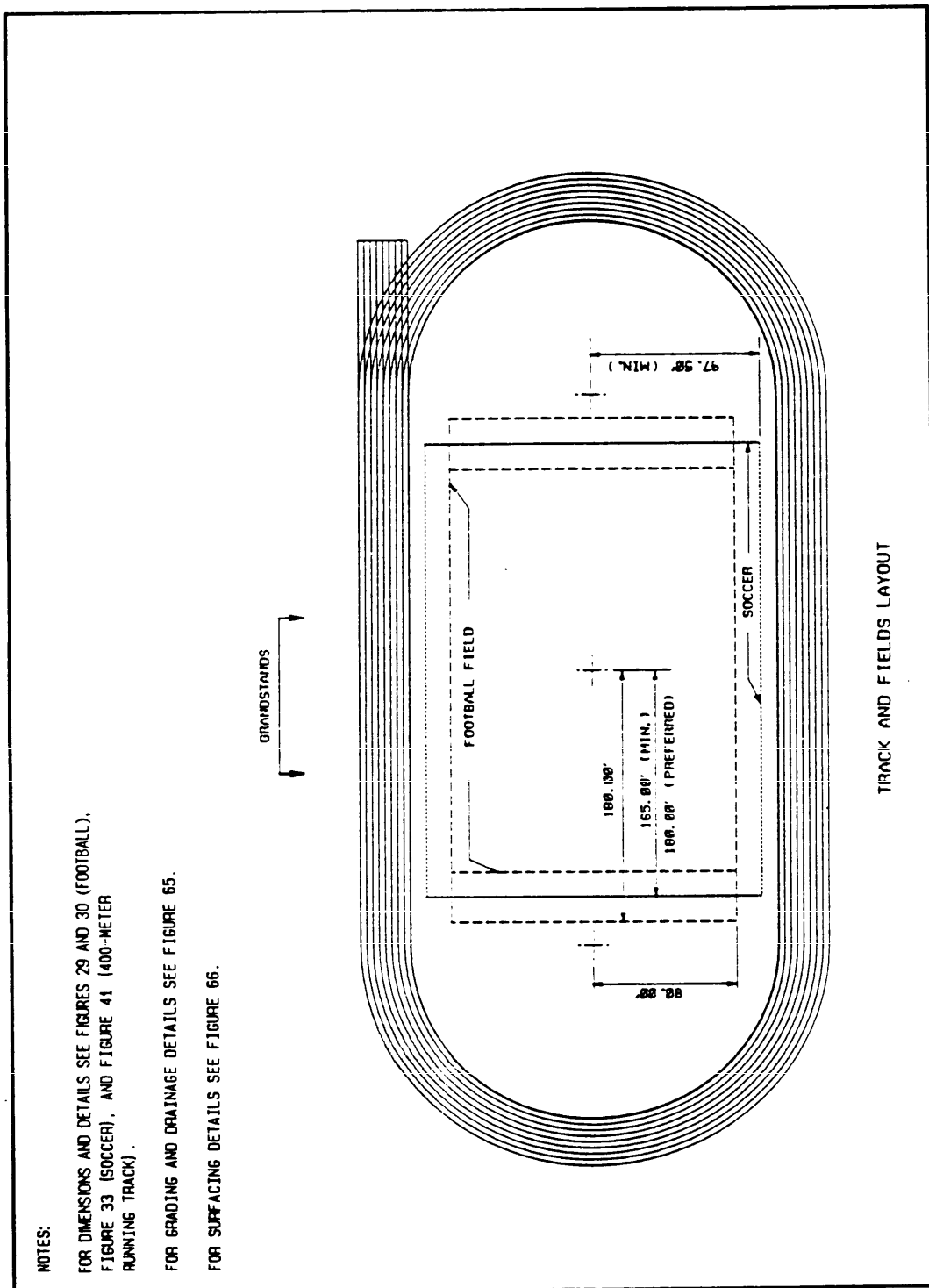
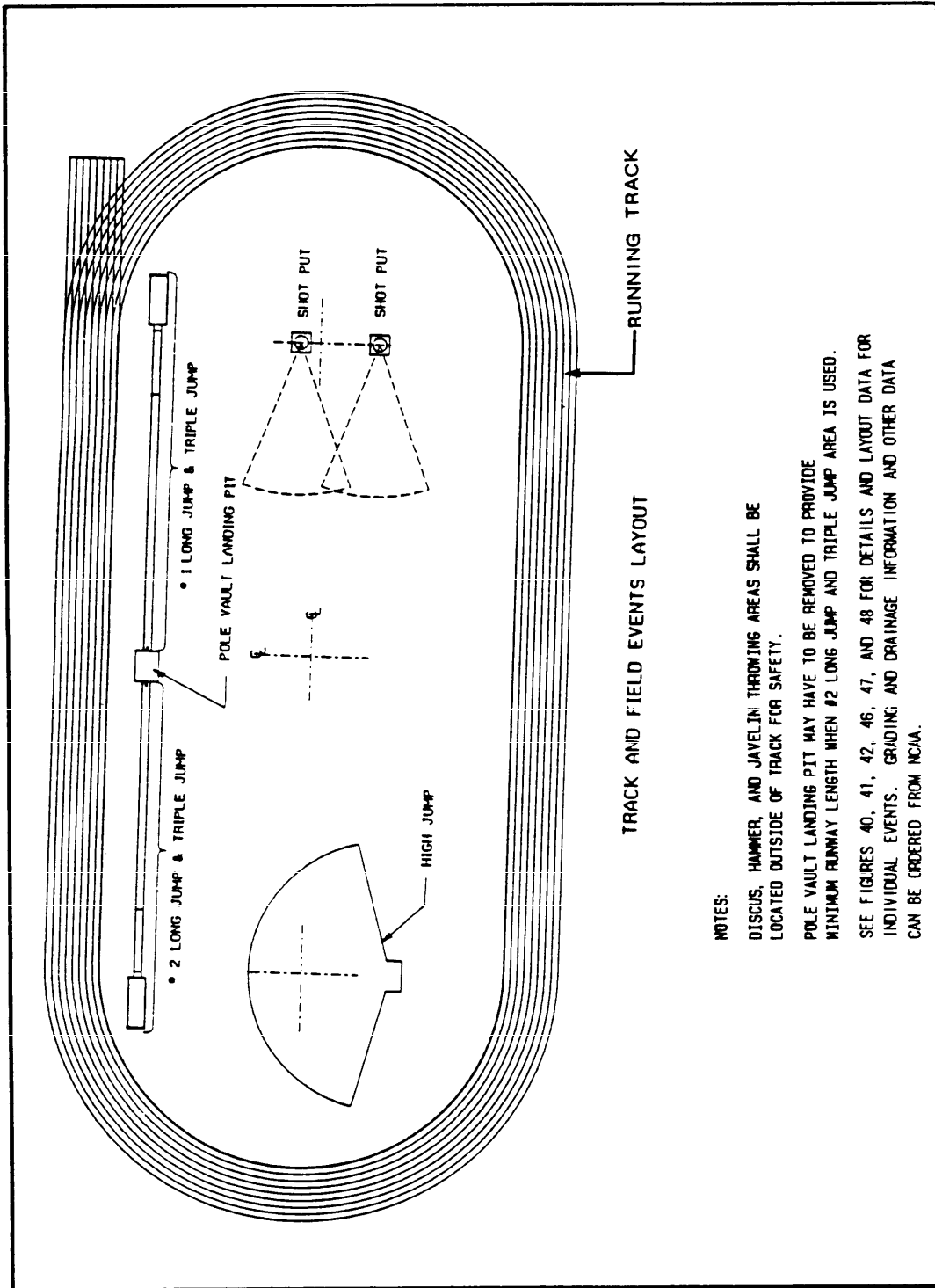


Figure 53
Sports Fields Within Running Tracks



NOTES:

DISCUS, HAMMER, AND JAVELIN THROWING AREAS SHALL BE LOCATED OUTSIDE OF TRACK FOR SAFETY.

POLE VAULT LANDING PIT MAY HAVE TO BE REMOVED TO PROVIDE MINIMUM RUNWAY LENGTH WHEN 42 LONG JUMP AND TRIPLE JUMP AREA IS USED.

SEE FIGURES 40, 41, 42, 46, 47, AND 48 FOR DETAILS AND LAYOUT DATA FOR INDIVIDUAL EVENTS. GRADING AND DRAINAGE INFORMATION AND OTHER DATA CAN BE ORDERED FROM NCAA.

Figure 54
Multiple Field Events Within Running Tracks

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Section 6: RECREATIONAL SHOOTING RANGES

6.1 Archery, Target Range. The archery target range (see Figure 55) shall be as follows.

- a) Source of Information: National Archery Association (NAA).
- b) Recommended Area: The ground space shall be 1.1 acres (0.445 ha) minimum.
- c) Size and Dimension: The shooting range shall be 426.51 ft (130 m) long with 16.40 ft (5 m) minimum between targets. Roped clear space on each side of range shall be 32.81 ft (10 m) minimum. Roped clear space behind targets shall be at least 82 ft (25 m) or 41 ft (12.5 m) with bunker.
- d) Orientation: The range shall be located so that the archer shall be facing north, plus or minus 45 degrees.
- e) Surface and Drainage: Surface and drainage shall be as follows:
 - (1) Surface shall be turf and free from obstructions or hard objects.
 - (2) Drainage shall be preferably from side-to-side to maintain a constant, relatively level elevation between the target and the archer at the various shooting distances.
- f) Special Considerations: Range warning signs shall be provided on the range's sides and rear to warn people of the range.

6.2 International Shooting Union Automatic Trap. The international shooting union automatic trap (see Figure 56) shall be as follows.

- a) Source of Information: National Rifle Association (NRA).
- b) Recommended Area: Allowance shall be 15 acres (6.07 ha) for a single field. The entire field shall be located in a relatively flat area with an open background.
- c) Size and Dimension: Size and dimension shall be as follows:
 - (1) Walks and structure shall occupy an overall area approximately 60 ft (18.29 m) deep x 45 ft (13.72 m) wide.
 - (2) Shooting stations shall be 3 to 3.3 ft (0.9 to 1 m) square.
- d) Orientation: The preferred orientation shall be for the centerline through station No. 3 to run northeast-southwest with the shooter facing northeast.
- e) Surface and Drainage: The shooting stations shall be portland

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cement concrete. Walkways may be paved or unpaved. The shooting area and a surrounding minimum radius of 75 to 82 yards (68.6 to 75 m) shall be turf. The 300-yard (274.3 m) radius shotfall danger zone outside of the cleared area may be turf, water, or left in natural condition.

f) Special Considerations:

(1) If shooting is entirely over land there shall be safety provisions for fencing, posting of warning signs, and clearing away of concealing brush.

(2) If shooting is over water, warnings posted on buoys or other signs are required and the trap house should be far enough inland to permit recovery of unbroken targets.

(3) Range safety shall be in accordance with installation safety requirements and outdoor range safety manuals.

(4) Contact the NRA for information on trap house construction and trap machines.

6.3 Skeet Field. The skeet field (see Figure 57) shall be as follows.

a) Source of Information: National Skeet Shooting Association (NSSA), 1974.

b) Recommended Area: Allow 29 acres (11.74 ha) for a single field. Shotfall danger zones of adjacent fields partially overlap and require only 2 acres (0.81 ha) additional land.

c) Size and Dimension: Walks and structures shall occupy an area approximately 130 ft (39.6 m) x 80 ft (24.38 m) deep. The minimum cleared area shall be a semicircle with a radius of 100 yards (91.44 m) (3.25 acres or 1.32 ha). The shotfall danger zone shall be a semicircle with a radius of 300 yards (274.3 m) (29 acres or 11.74 ha).

d) Orientation: The preferred orientation shall be for the centerline from station No. 4 through station No. 8 to run northeast-southwest with the shooter facing northeast.

e) Surface and Drainage: Shooting stations shall be portland cement concrete. Walkways may or may not be paved. Shooting area and 100-yard radius minimum cleared area are to be turf. The 300-yard radius shotfall danger zone may be turf, water, or left in natural condition, and the entire field shall be located in a relatively flat area with an open background.

f) Special Considerations:

(1) If shooting is entirely over land, there shall be safety provisions for fencing, posting of warning signs and clearing away of concealing brush.

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(2) If shooting is over water, warnings posted on buoys or other signs are required, and skeet houses shall be far enough inland to permit recovery of unbroken targets.

(3) Range safety shall be in accordance with installation safety requirements and outdoor range safety manuals.

(4) Contact the NRA for information on skeet house construction and trap machines.

6.4 Trap Field. The trap field (see Figure 58) shall be as follows.

a) Source of Information: Amateur Trapshooting Association (ATA).

b) Recommended Area: Allow 18 acres (7.3 ha) for a single field. Shotfall danger zones of adjacent trap fields may overlap.

c) Size and Dimension: Walks and structures shall occupy an overall area approximately 100 ft (30.48 m) deep x 65 ft (19.81 m) wide. The minimum cleared area shall be a section with a radius of 100 yards (91.44 m) (3.25 acres or 1.32 ha). The shotfall danger zone shall be a section with a radius of 300 yards (29 acres) (274.3 m or 11.74 ha).

d) Orientation: The preferred orientation shall be for the centerline through shooting station No. 3 to run northeast-southwest with the shooter facing northeast.

e) Surface and Drainage: Shooting stations shall be portland cement concrete. Walkways may be paved or unpaved. The shooting area and 100-yard radius minimum cleared areas shall be turf. The 300-yard radius shotfall danger zone may be turf, water, or left in natural condition, and the entire field shall be located in a relatively flat area with an open background.

f) Special Considerations:

(1) If shooting is to be entirely over land there shall be safety provisions for fencing, posting of warning signs, and clearing away of concealing brush.

(2) If shooting is to be over water, warnings posted on buoys, or other signs are required, and the trap house shall be far enough inland to permit recovery of unbroken targets.

(3) Range safety shall be in accordance with installation safety requirements and outdoor range safety manuals.

(4) Contact the NRA for information on trap house construction and trap machines.

6.5 Combination Skeet and Trap Field. Combination skeet and trap fields (see Figure 59) shall be as follows.

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- a) Source of Information: Skeet--NSSA; Trap--ATA.
- b) Recommended Area: Allow 30 acres (12.14 ha) for a combination field.
- c) Size and Dimension: All walks and structures shall occur within an area approximately 130 ft (39.6 m) wide x 115 ft (35.05 m) deep. Minimum cleared area shall be contained within two superimposed segments with a 100-yard radii (3.25 acres). The shotfall danger zone shall be contained within two superimposed segments with 300-yard (274.3 m) radii (29 acres or 11.74 ha).
- d) Orientation: The preferred orientation shall be for the centerline from skeet station No. 4 through station No. 8 to run northeast-southwest with the shooter facing northeast.
- e) Surface and Drainage: Shooting stations shall be portland cement concrete. Walkways may or may not be paved. The shooting area and minimum cleared area shall be turf. The shotfall danger zone may be turf, water, or left in natural condition, and the entire field shall be located in a relatively flat area with an open background.
- f) Special Considerations:
 - (1) If shooting is entirely over land there shall be safety provisions for fencing, posting of warning signs and clearing away of concealing brush.
 - (2) If shooting shall be over water, warnings posted on buoys or other signs are required and the trap house shall be far enough inland to permit recovery of unbroken targets.
 - (3) Range safety shall be in accordance with installation safety requirements and outdoor range safety manuals.
 - (4) Contact the NRA for information on skeet and trap house construction and trap machines.

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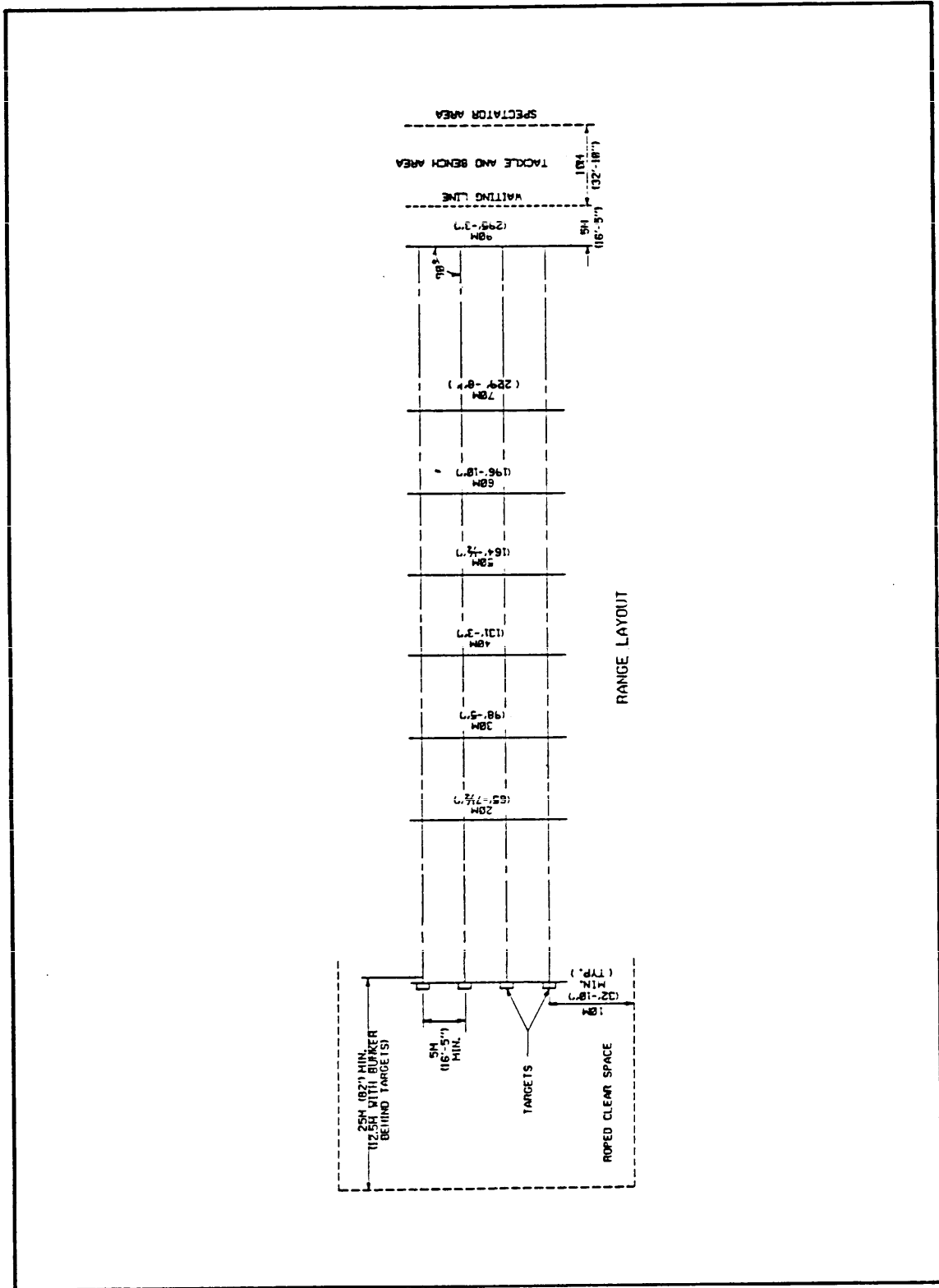


Figure 55a
Archery Range -- Layout

NAA CHAMPIONSHIP ROUNDS

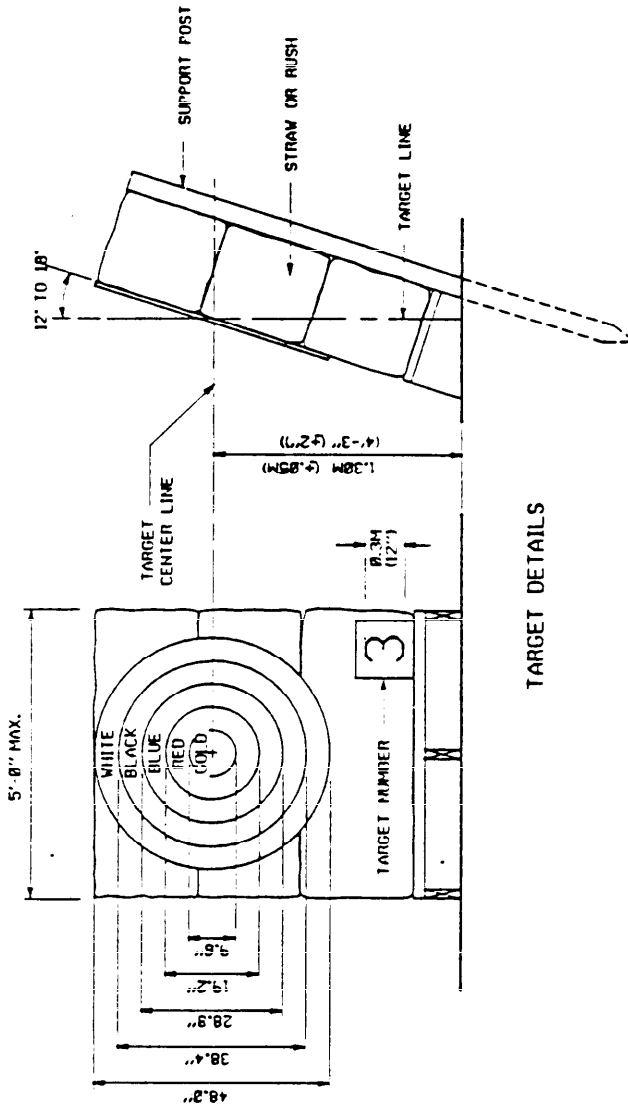
DIVISION	FIRING DISTANCE	ARROWS PER DISTANCE
900 METRIC	60, 50, 40 METERS	30, 30, 30
COLLEGIATE	50, 40, 30 METERS	20, 20, 20
JUNIOR 900 (UNDER 15 YRS)	50, 40, 30 METERS	30, 30, 30
CADET 900 (UNDER 12 YRS)	40, 30, 20 METERS	30, 30, 30
EASTON (TEAMS)	60, 50, 40 METERS	20, 20, 20

NOTES:

BACKGROUND BEHIND TARGETS TO BE PREFERABLY DENSE TREES, NATURAL OR MANMADE HILLS OR PROTECTIVE SHIELDS.

FEDERATION INTERNATIONAL TARGET ASSOCIATION (F.I.T.A.) (OLYMPIC) ROUNDS REQUIRE 80 CM (31.5") TARGET FACES AND A 90 M RANGE. SEE THE OFFICIAL N.A.A. RULEBOOK FOR DETAILS.

TARGETS MAY BE MOUNTED ON A ROUND BUTT OF SPIRALLY SEWN STRAW OR RUSH SUPPORTED BY A PORTABLE SOFT WOOD TARGET STAND. COLORS MAY BE PAINTED ON AN OILCLOTH COVER.



TARGET DETAILS

Figure 55b
Archery Range -- Target Details

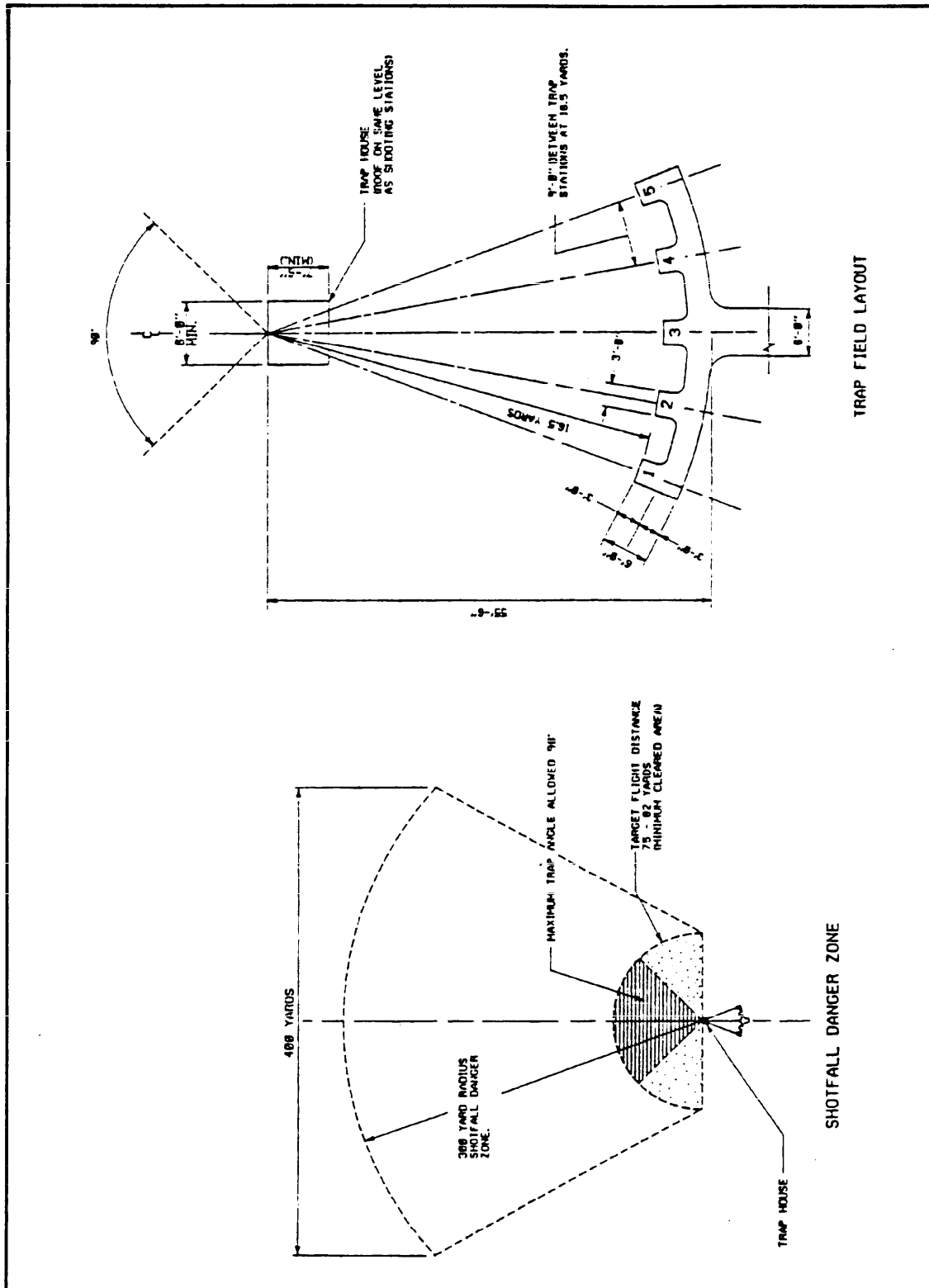


Figure 56
International Shooting Union Automatic Trap

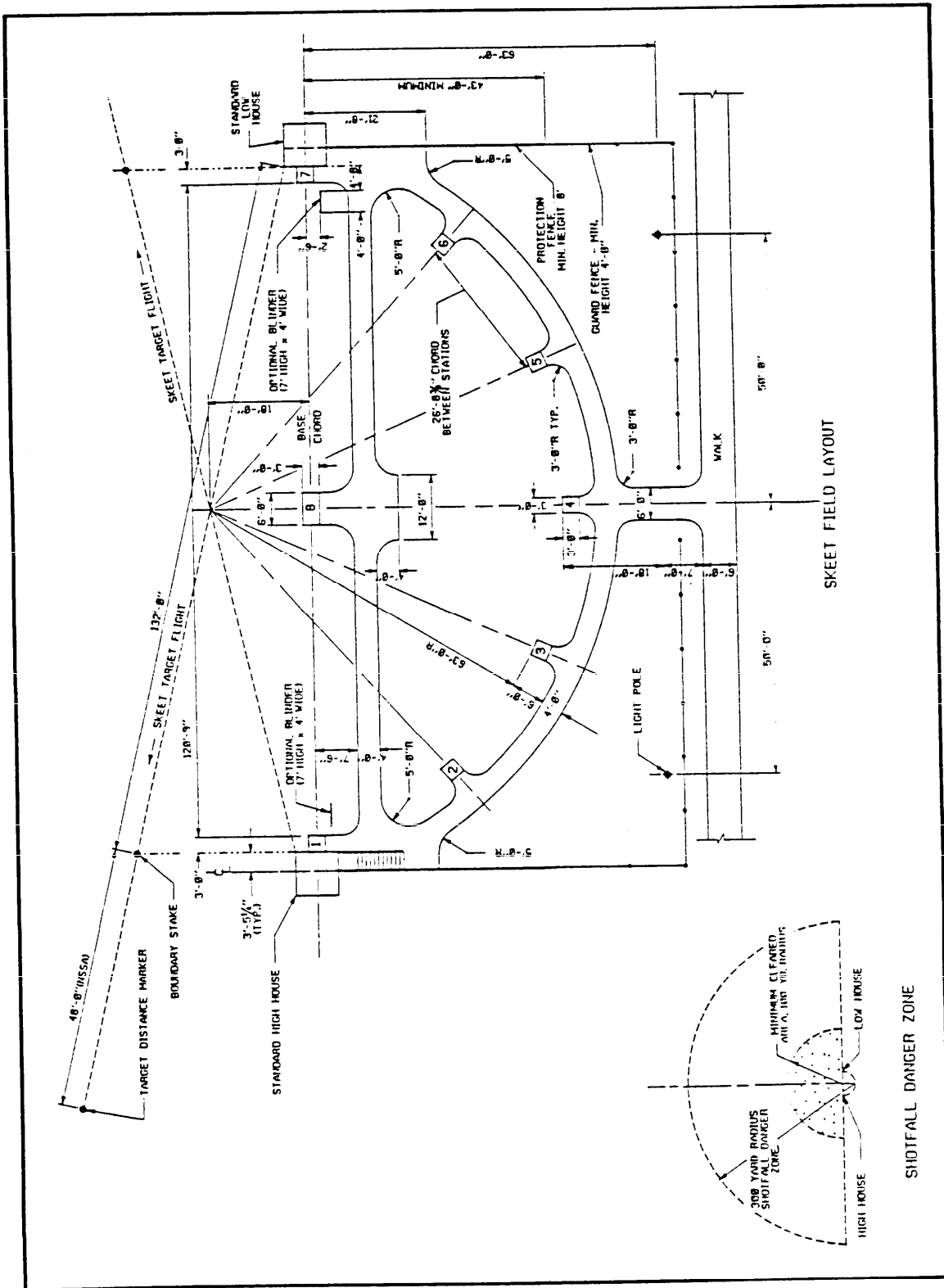


Figure 57
Skeet Field

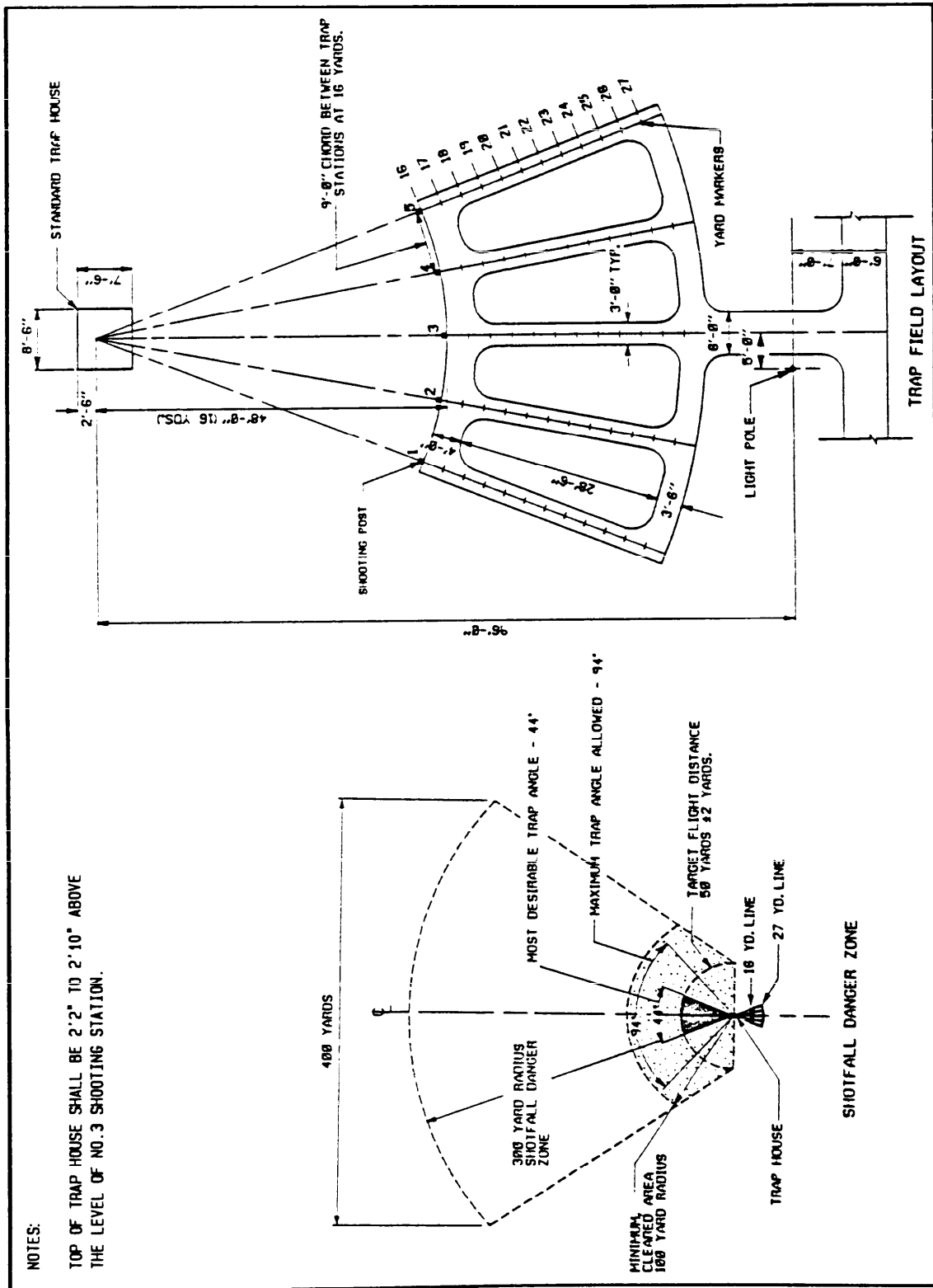


Figure 58
Trap Field

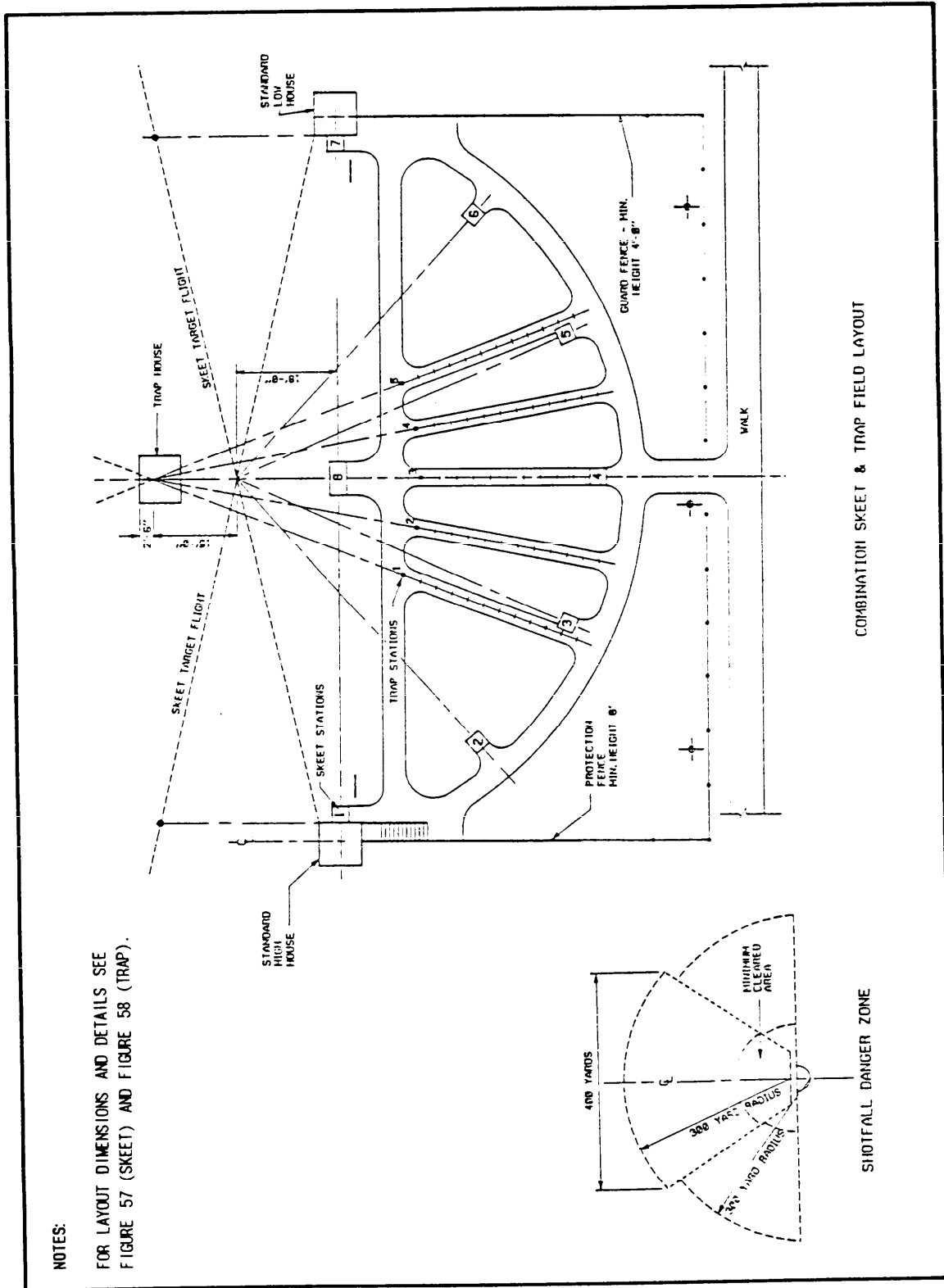


Figure 59
Combination Skeet and Trap Field

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Section 7: MOTOR SPORTS

7.1 Go-Kart (Oval Track). The oval go-kart track (see Figure 60) shall be as follows.

a) Source of Information: International Kart Federation, Inc. (IKF).

b) Recommended Area: The ground area varies from 2 to 2.7 acres (0.81 to 1.1 ha).

c) Size and Dimension: Specific track layout data are given in Figure 60. The track surface width in a turn shall be a minimum of 5 ft (1.5 m) wider than straightaway width.

d) Orientation: The track shall be located so that the long axis points roughly north-south. The start-finish line shall be located so that karts cross the line traveling north.

e) Surface and Drainage: Surface and drainage shall be as follows:

(1) Track surfaces can be asphalt, concrete or dirt graded to a smooth surface, free of holes and rough spots. Gravel surfaces are not permitted. Banked turns are permitted, but flat tracks with no banked turns are strongly recommended.

(2) Inlets and underground pipes are normally needed to drain the inside of the oval.

f) Special Considerations:

(1) A 35-ft (10.67 m) width (minimum) safety apron shall be maintained around entire track on all sides. This area must be free of ditches, holes, trees and all other obstacles. Safety apron shall be loose dirt graded flat or with a 2 percent slope (maximum) for drainage.

(2) If a paved track is used, the pit area shall also be paved.

7.2 Go-Kart (Road Track). The go-kart road track (see Figure 61) shall be as follows:

a) Source of Information: International Kart Federation, Inc. (IKF).

b) Recommended Area: The ground space shall be approximately 5.5 acres (2.23 ha).

c) Size and Dimension: The track surface width (in an oval turn) shall be a minimum of 5 ft wider than straightaway track width.

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d) Orientation: The track long axis shall point north-south. The kart shall cross the start-finish line traveling north.

e) Surface and Drainage: Track surfaces may be asphalt, concrete or dirt graded to a smooth surface, free of holes and rough spots. Gravel surfaces are not permitted. Banked turns are permitted, but flat tracks with no banked turns are strongly recommended. Inlets and underground pipes are required for draining the inside of track.

f) Special Considerations:

(1) A 35-ft (10.67 m) wide (minimum) safety apron will be maintained around entire track on all sides. This area must be free of ditches, holes, trees and all other obstacles. The safety apron will be loose dirt graded flat or with a maximum of 2 percent slope for drainage.

(2) When a paved track is used, the pit area will be paved also.

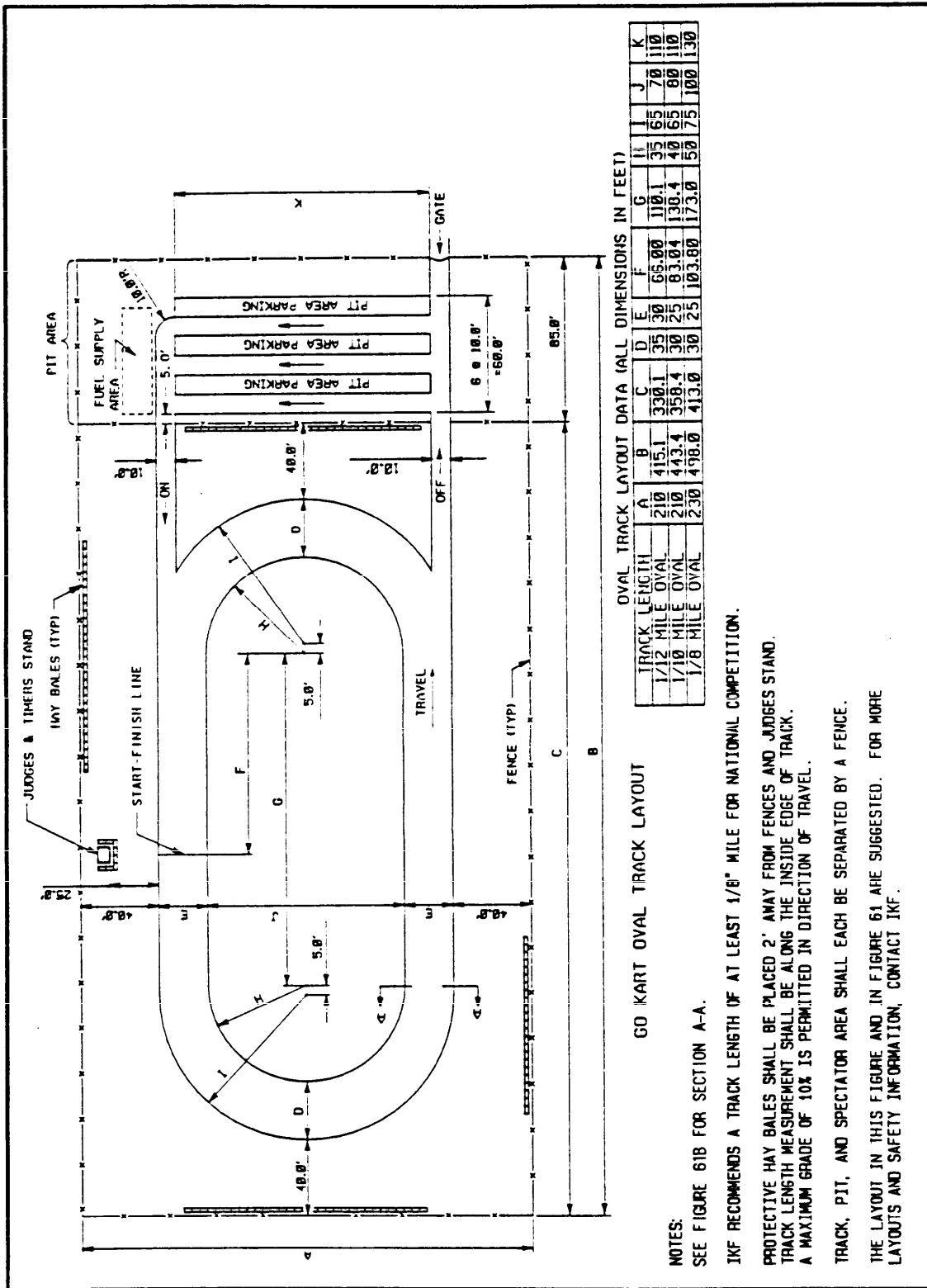


Figure 60
Go Kart Oval Track -- Layout

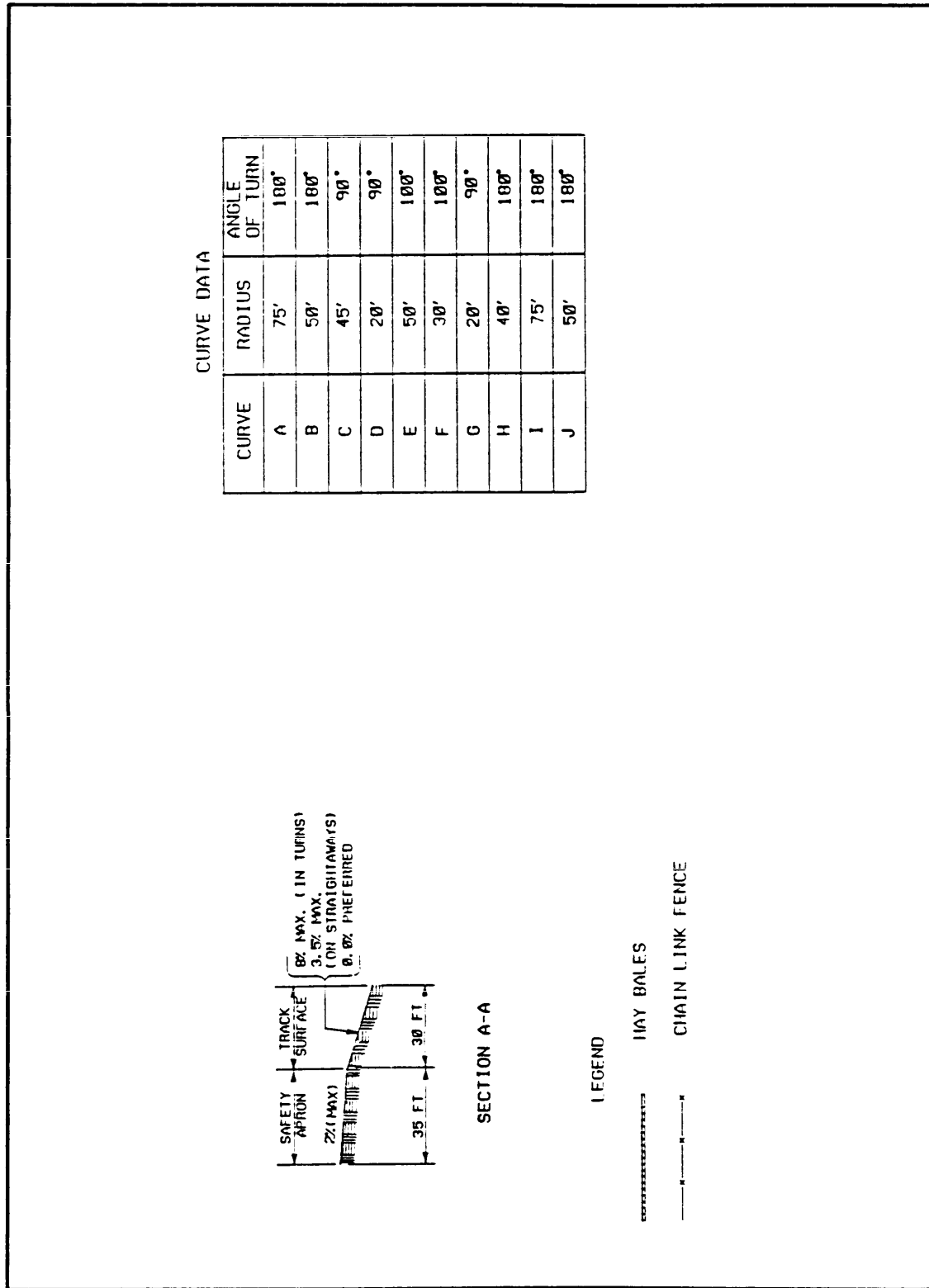


Figure 61b
Go Kart Road Track -- Construction Details

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Section 8: CONSTRUCTION DETAILS

8.1 Posts, Grading, Drainage, and Surfacing. This section contains details for net post and goal post construction, grading, drainage, and playing surfaces for a variety of sports.

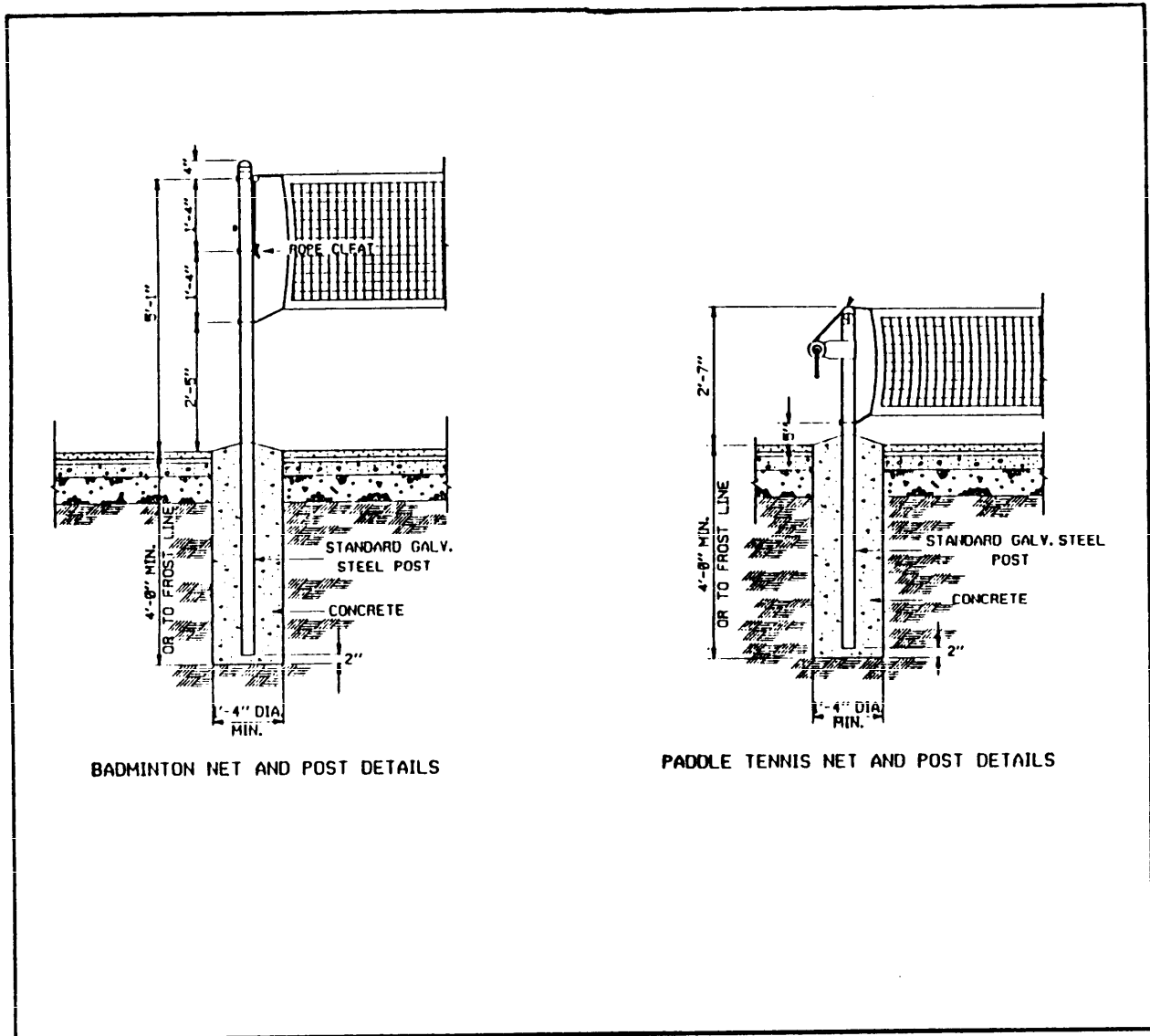


Figure 62a
Fixed Net Posts -- Badminton and Paddle Tennis

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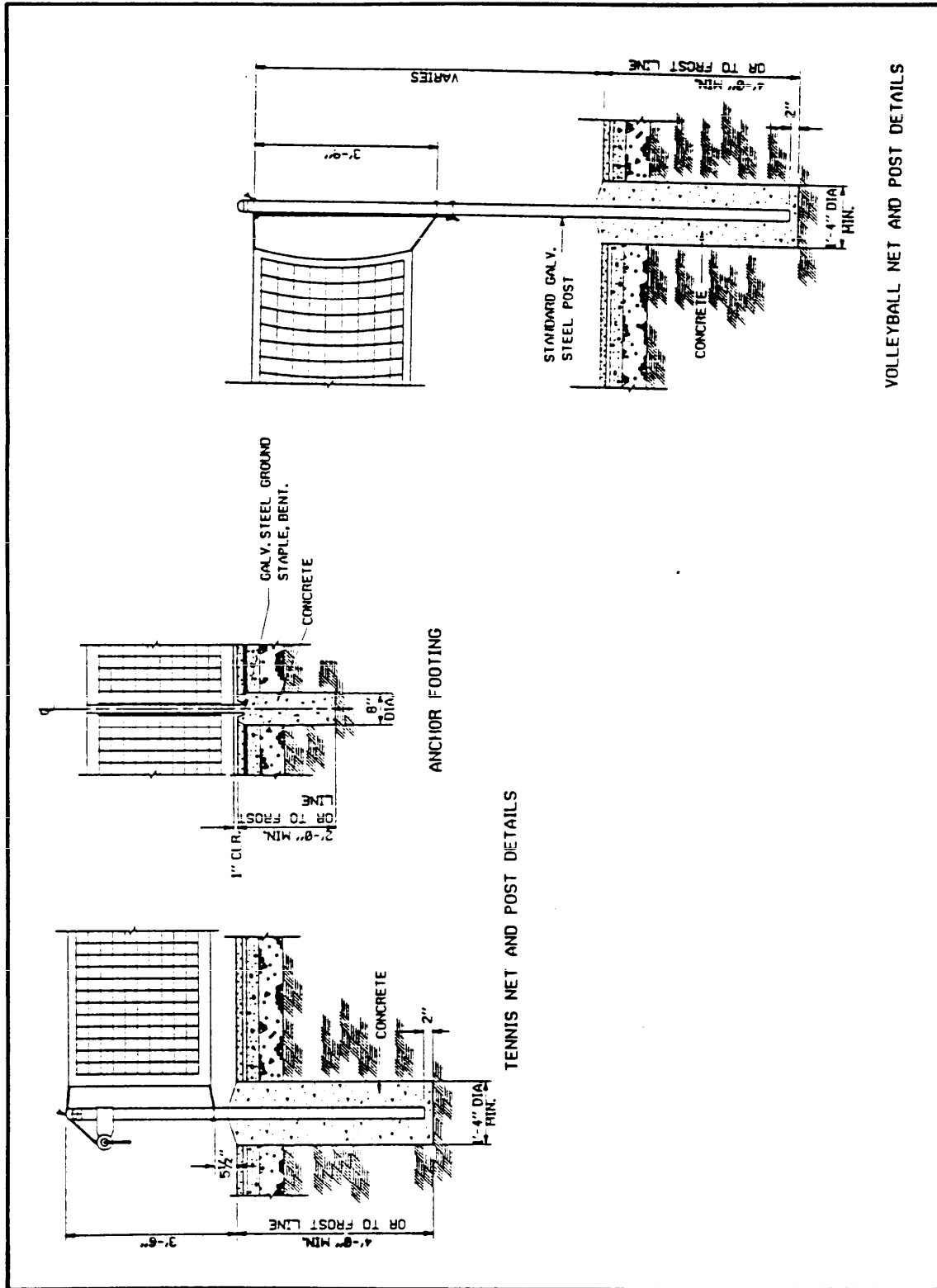


Figure 62b
Fixed Net Posts -- Tennis and Volleyball

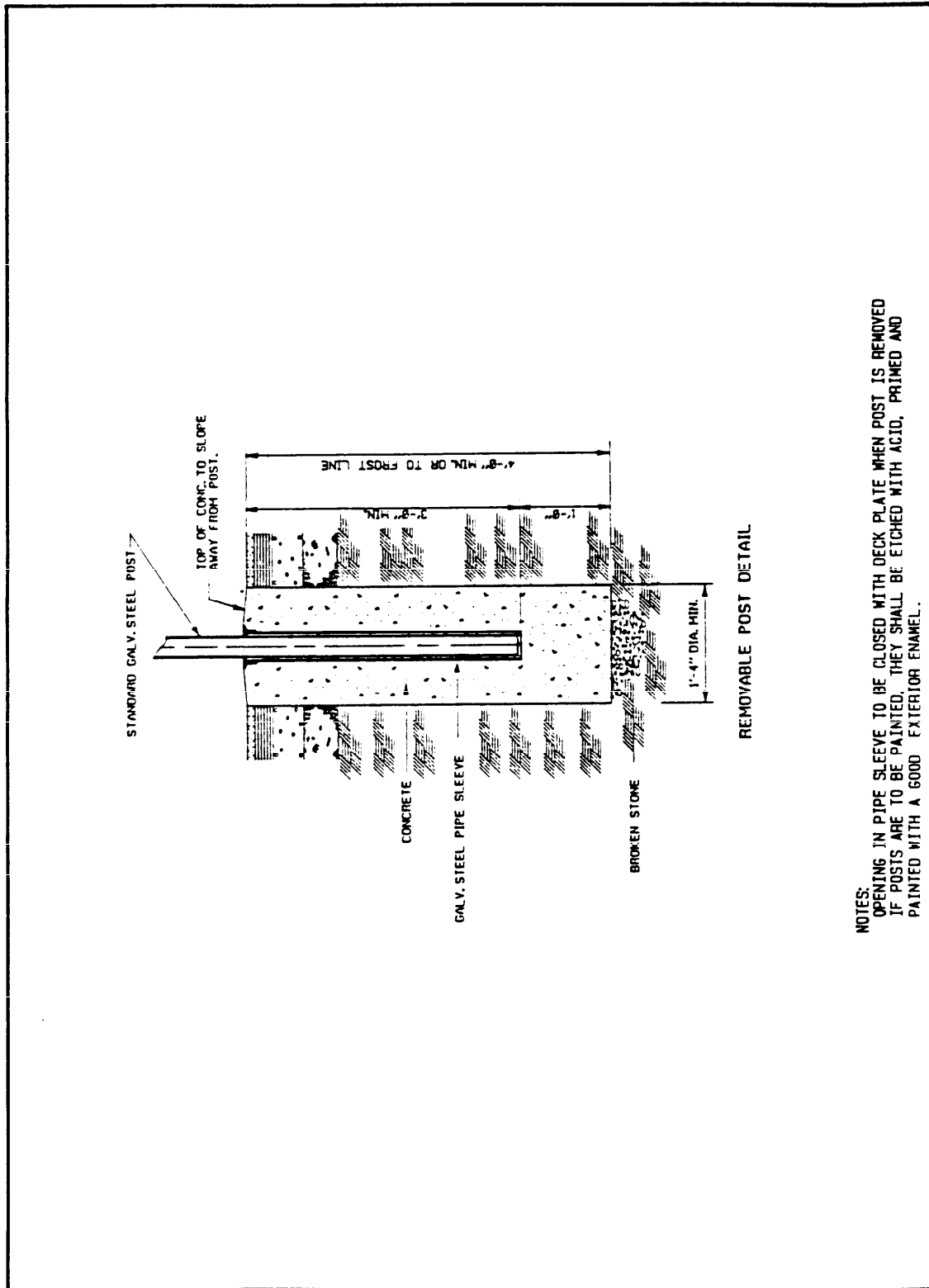


Figure 63
Removable Net Posts

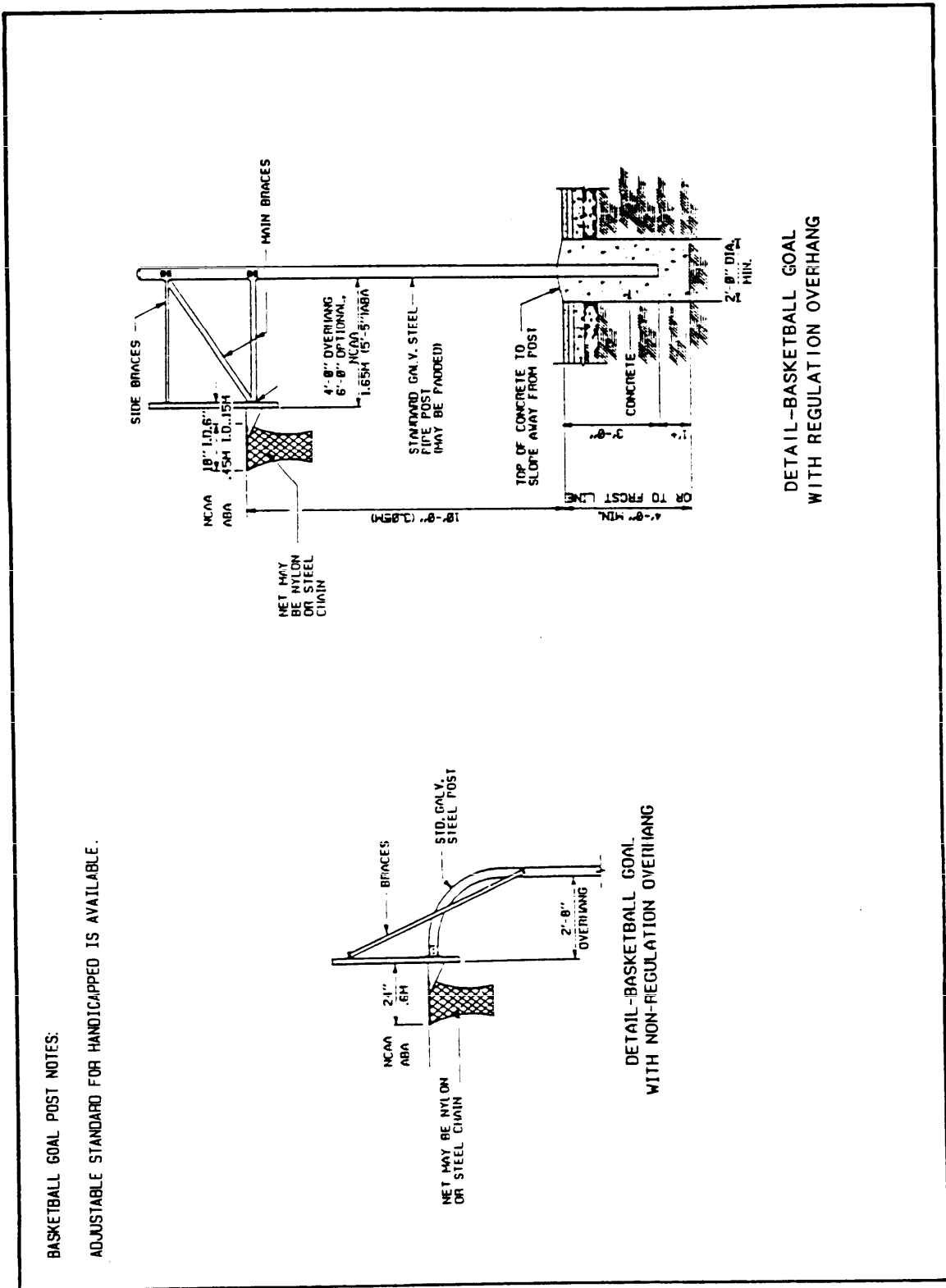


Figure 64a
Goal Post Details -- Basketball

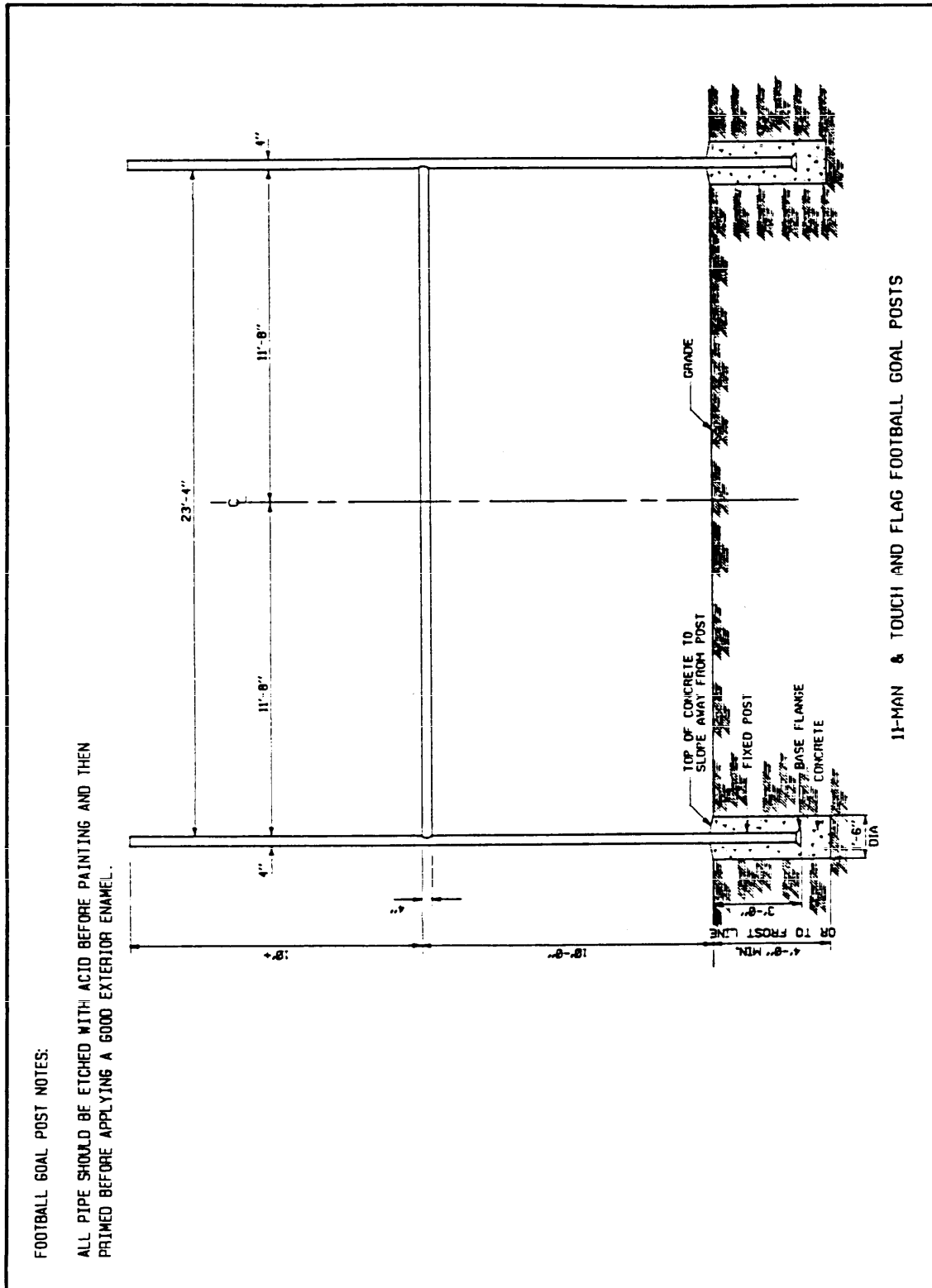


Figure 64b
Goal Post Details -- Football

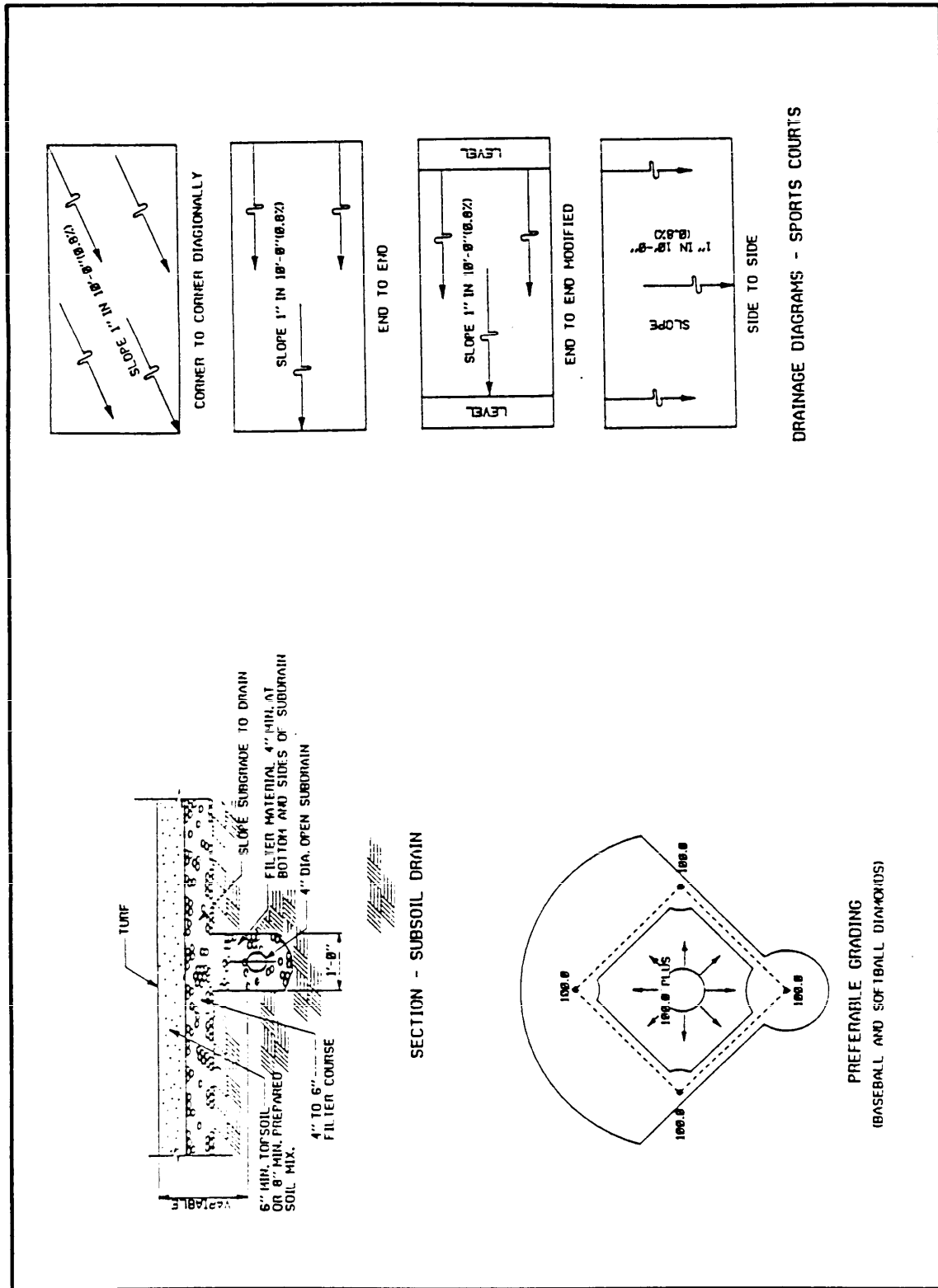


Figure 65a
Typical Grading and Drainage Details -- Courts and Diamonds

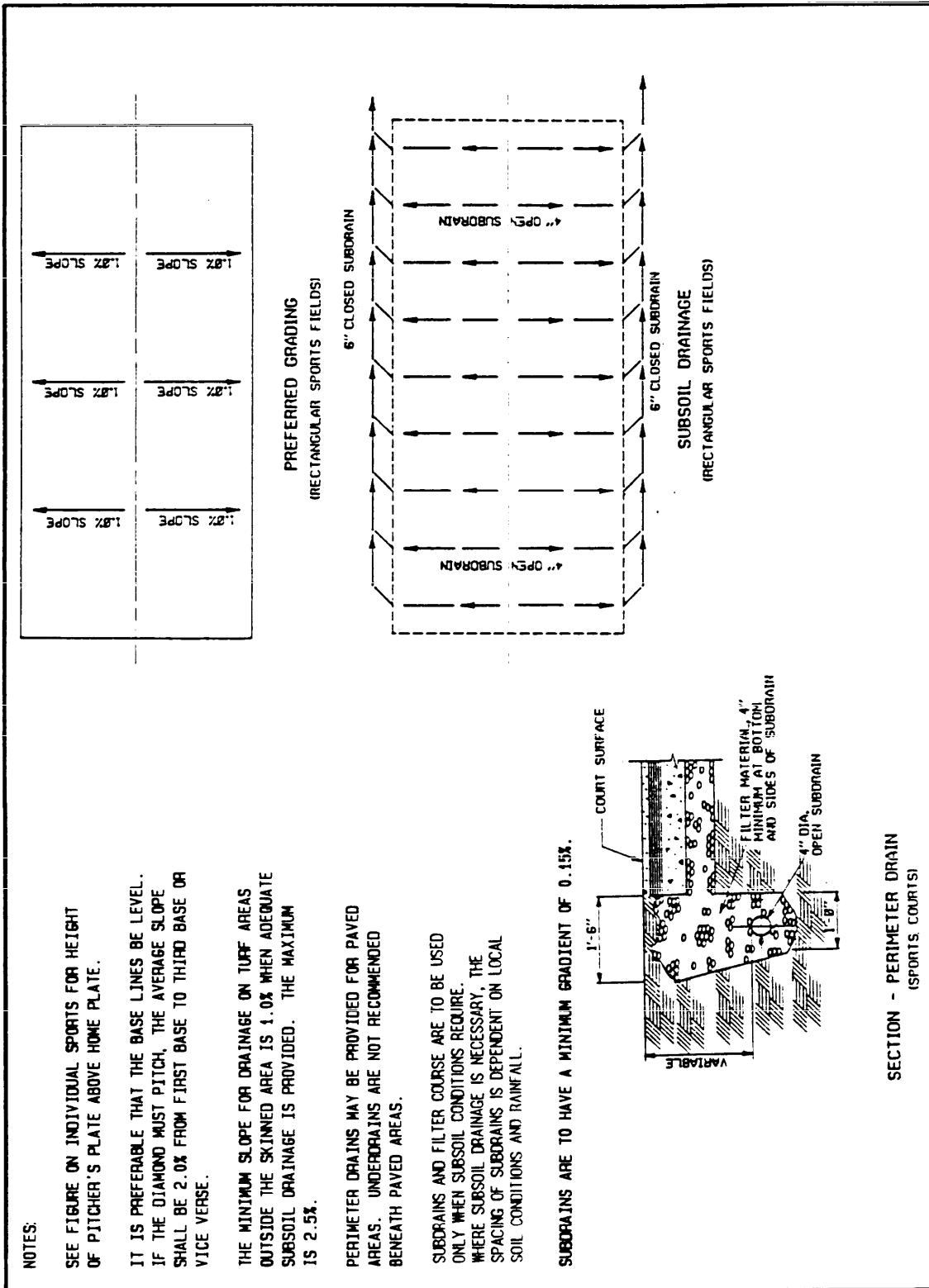


Figure 65b
Typical Grading and Drainage Details -- Rectangular Sports Fields

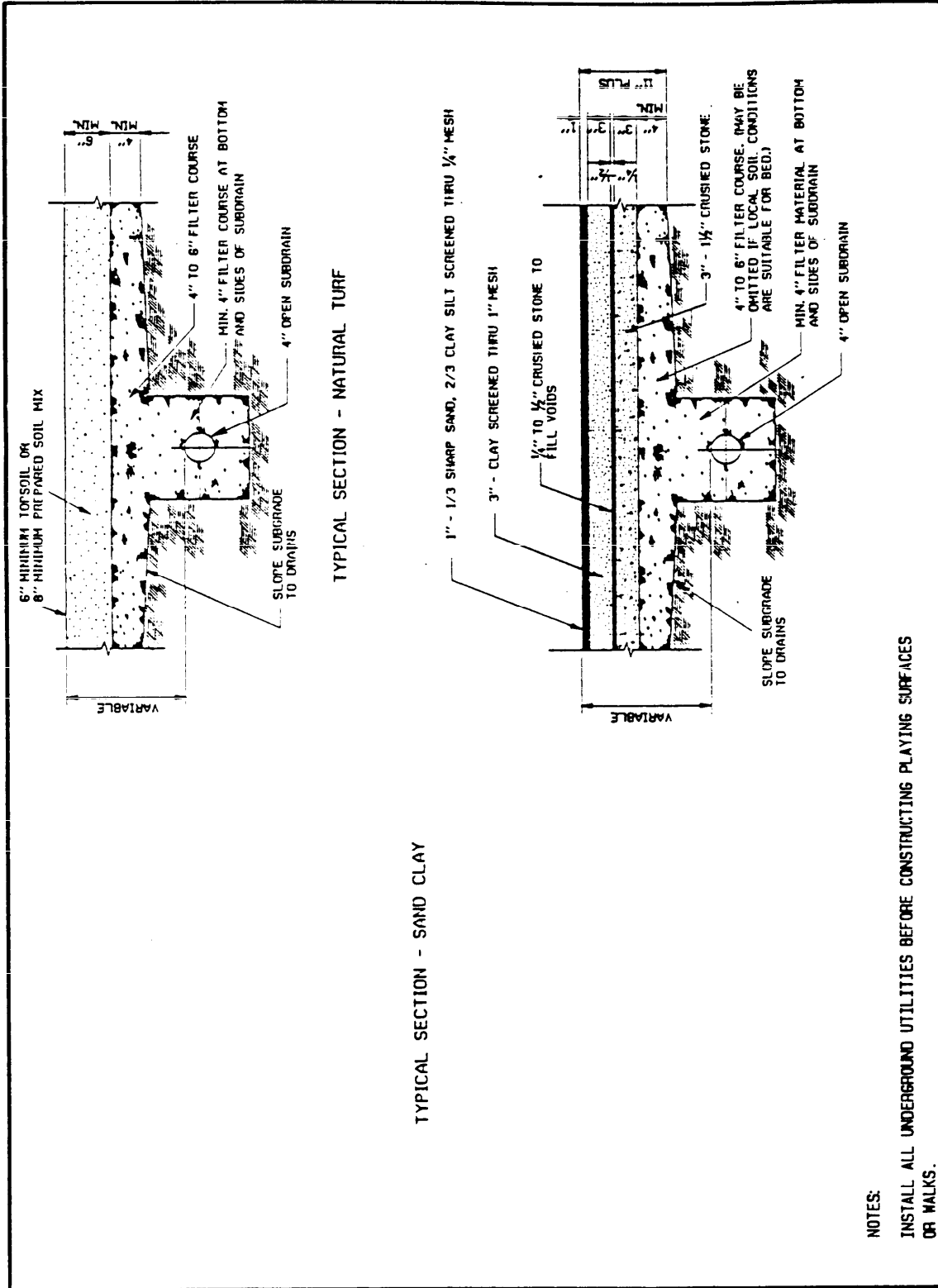


Figure 66
Typical Playing Surface Details

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REFERENCES

NOTE: Unless otherwise specified in the text, users of this handbook should utilize the latest revisions of the documents cited herein.

FEDERAL/MILITARY SPECIFICATIONS, STANDARDS, BULLETINS, HANDBOOKS, AND NAVFAC GUIDE SPECIFICATIONS:

The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise indicated, copies are available from Commanding Officer, Naval Publications and Forms Center, ATTENTION: NPODS, 5801 Tabor Avenue, Philadelphia, PA 19120-5099.

SPECIFICATIONS

NAVFAC GUIDE SPECIFICATION

NFGS-02444 Fence, Chain Link

STANDARDS

MILITARY

FED-STD-795 Uniform Federal Accessibility Standards

NON-GOVERNMENT PUBLICATIONS

The following publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the Department of Defense Index of Specifications & Standards (DODISS).

ILLUMINATING ENGINEERING SOCIETY (IES)

Recommended Practice for Sports Lighting

(Unless otherwise indicated, copies are available from the Illuminating Engineering Society, 345 East 47th Street, New York, NY 10017, (212) 705-7641.

GAME RULES AND REGULATIONS

The rules and regulations specified in the text form a part of this document to the extent specified herein and are available through the organizations listed below.

Amateur Athletic Union (AAU), 3400 West 86th Street, Indianapolis, IN 46268

Amateur Basketball Association-USA (ABAUSA), 1750 East Boulder Street, Colorado Springs, CO 80909

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Amateur Hockey Association of the United States (AHAUS), 2997 Broadmoor Valley Road, Colorado Springs, CO 80906

American Lawn Bowls Association (ALBA), 11660 S.W. King George, King City, OR 97224

Amateur Softball Association America (ASA), 2801 NE 50th Street, Oklahoma City, OK 73111

Amateur Trapshooting Association (ATA), 601 West National Road, Vandalia, OH 45377

American Platform Tennis Association (APTA), PO Box 901, Upper Montclair, NJ 07043

American Roque League, Inc. (ARL), 4205 Briar Creek Lane, Dallas, TX 75214

AMF Voit, Inc., 3801 South Harbor Boulevard, Santa Anna, CA 92704

The Athletic Congress, 200 Castlewood Drive, North Palm Beach, FL 33408

Babe Ruth Baseball, 1770 Brunswick Ave, PO Box 5000, Trenton, NJ 08638

Field Hockey Association of America (FHAA), 1750 East Boulder Street, Colorado Springs, CO 80909

General Sportcraft Co., Ltd., 140 Woodbine Street, Bergenfield, NJ 07621

International Kart Federation (IKF), 416 South Grand, Covina, CA 91724

International Shooting Union (ISU), Wiesbaden-Klarenthal, West Germany. Rules may also be obtained from the National Rifle Association.

Little League Baseball, Inc., PO Box 3485, Williamsport, PA 17701

National Archery Association of the United States (NAAUS), 1750 East Boulder Street, Colorado Springs, CO 80909

National Association for Girls and Women in Sports (NAGWS), 1900 Association Drive, Reston, VA 22091

National Collegiate Athletic Association, PO Box 1906, Mission, KS 66201

National Golf Foundation, 200 Castlewood Drive, North Palm Beach, FL 33408

National Horseshoe Pitchers Association of America (NHPA), 2648 Basswood Street, Newport Beach, CA 92660

National Rifle Association (NRA), 1600 Rhode Island Avenue, Washington, DC 20036

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National Skeet Shooting Association (NSSA), PO Box 28188, San Antonio,
TX 78228

National Spa and Pool Institute, 2000 K Street, NW, Washington, DC 20006

The Official Playing Rules Committee, Official Baseball Rules, c/o The
Sporting News, 1212 North Lindberg Blvd., St. Louis, MO 63132

Pony Baseball, Inc., PO Box 225, Washington, PA 15301

Pop Warner Junior League Football, 1315 Walnut Street, Suite 606,
Philadelphia, PA 19107

U.S.A. Field Hockey Association (USAFHA), 1750 East Boulder Street,
Colorado Springs, CO 80909

U.S. Air Force, c/o Director of Student Operations, Squadron Officer
School, Maxwell Air Force Base, AL 36112

U.S. Badminton Association (USBA), 501 West 6th Street, Papillion, NB
68046

U.S. Diving, 901 West New York Street, Indianapolis, IN 46202

U.S. Handball Association (USHA), 4101 Dempster Street, Skokie, IL 60076

U.S. Soccer Federation (USSF), 1750 E. Boulder Street, Colorado Springs,
CO 80909

U.S. Paddle Tennis Association (USPTA), 189 Seeley Street, Brooklyn, NY
11218

U.S. Swimming (USS), 1750 East Boulder Street, Colorado Springs, CO
80909

U.S. Team Handball Federation (USTHF), 1750 East Boulder Street,
Colorado Springs, CO 80909

U.S. Tennis Association (USTA), 729 Alexander Road, Princeton, NJ 08540

U.S. Volleyball Association (USVBA), 1750 East Boulder Street, Colorado
Springs, CO 80909

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