Princeton Forrestal Center

Design and Development Criteria

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Introduction

The primary objective in establishing design and development criteria for the Princeton Forrestal Center is to insure a sense of continuity in esthetic values and environmental sensitivity in the overall development of the complex. A high standard is being promulgated in order to create an office-research complex that will be distinguished by a consistently high quality of architectural design sympathetically placed in a unique natural setting. These controls are intended to preserve confidence that the quality of the overall development will remain high and, therefore, that the economic and environmental values of locating in the Princeton Forrestal Center will be permanently protected.

In order to achieve these objectives, all plans for building and site design, including special requirements for the preservation of natural site characteristics, will be subject to review and approval by the Design Review Committee prior to implementation.

The Design Review Committee will consider each proposal on its merits. It will judge the particular opportunities, conditions, and problems of each parcel and development program. The Committee will be directed to evaluate each proposal according to its adherence to high esthetic standards, sympathy with the natural characteristics of the site, and compatibility with development on adjoining parcels.

The criteria and controls given in this manual provide a conceptual framework for the Committee and applicants to follow in evolving a design for each site that will be consistent with the architectural and environmental quality of the Princeton Forrestal Center.

All applicable public regulations will take precedence in any case where they are more restrictive than the criteria set forth in this manual.

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Design Review

Design Review Committee

The Design Review Committee is appointed by the Trustees of Princeton University and consists of three or more members, including at least one member with a professional architectural, engineering, or landscape architectural background. The Committee is authorized to review and act on all development proposals in accordance with the review procedures described in this section, applying its judgments in accordance with the criteria set forth under **Design and Development Criteria**. At its discretion, the Committee may retain the services of a professional technical adviser in the field of architecture, landscape architecture, and/or planning to assist in evaluating submissions on the basis of design and other technical considerations.

Administrative responsibility may be delegated by the Design Review Committee to the University Physical Planning and Facilities office or to any other office or agency empowered to manage the development of the Princeton Forrestal Center. Administration here includes submittals, Committee responses, and the coordination of meetings, as well as the supervision of compliance with design and development criteria during and after construction.

Design Review Procedures

Each development proposal will be reviewed by the Design Review Committee as the design for the building and site evolves.

▶ **Pre-Design Conference**: Before the design is initiated, the Design Review Committee will meet with the applicant, the applicant's architect, and other consultants to clarify mutual design objectives, the characteristics of the particular parcel, and technical issues related to design review procedures. At this meeting, the applicant will make available a topographical survey of the parcel at a scale of 1"=50' and including the following information:

1 Property boundaries, including relationship to adjacent lands and access roads.

2 Topography, shown by one foot contour intervals.

3 Locations of any existing utilities or other improvements on the site.

4 Description of general site drainage characteristics.

5 Location and description of any characteristics and noteworthy natural features such as marshes, stream beds, etc.

6 Description of existing site vegetation characteristics, to include the location of trees and shrubs (specifying them by name, size, and condition—monumental, individual, or clumped), which, because of intrinsic landscape value or relationship to their surroundings, are outstanding in terms of potential landscape development. This includes identification of every tree with a diameter of six inches or more at a height of three feet above grade as well as every group of trees of any size. A reasonable adjustment of the requirements will be made when it becomes difficult to specify the information required because of, for example, dense vegetation or other impediments.

A series of submissions will be made subsequently to the Design Review Committee, following the normal process of design, as follows:

Schematic Design: Including plans, sections, elevations, and other materials sufficient to clearly indicate the placement, height, and massing of the building(s), the vertical and horizontal layout of on-site access roads, parking facilities, and service areas, the location of building entries, the intended treatment and preservation of natural landscape features, and the application of new landscape elements.

Comments and recommendations will be made by the Committee within twenty days of receiving the submission. The Committee will reserve the right to request a meeting with the applicant and the applicant's architect to discuss the design at this stage.

Preliminary Plan Approval: The applicant will submit three sets of preliminary architectural and site plans, as follows:

1 Dimensioned building plans, sections, and elevations at a scale of 1/8"=1', with representations of exterior materials, textures, colors, fenestration, and other detailing necessary for accurately depicting the finished building and its site.

2 Outline specifications to indicate the intent for major architectural, structural, mechanical, electrical, and site elements.

3 A model of the building, accurately constructed at a scale of 1"=16', and inclusive of adjacent site features.

4 Samples of proposed exterior materials and colors.

5 Site plan(s) at a scale of 1"=50', showing:
a. Grading at a contour interval of one foot.
b. Layout and geometry of all roads, walks, paved areas, and other elements which constitute modification of the natural site.
c. Planting plan, including size, placement, and species of proposed new plant materials and integration with existing planting. New materials of sufficient maturity to be in scale with the architecture will be specified.
d. Indication of all site lighting, with heights, spacing, design, and illumination characteristics.

6 A cross section of the site at a scale of 1"=16' in longitudinal and transverse directions, indicating the relationship of the building and major grading to the street, adjacent properties, and tree edges. The site plan and sections will be sufficiently accurate to permit analysis of visual screening, erosion control, drainage, tree protection, and landscape architectural design.

7 Plans for the major entrance sign and building identification sign, if any, including dimensions, location, material, lettering, color, and lighting, and elevations of the prototype for on-site directional-type signs, showing format, letter face, and colors.

8 Detailing of proposed methods for protecting any existing trees affected by grading, paving, or other construction.

9 An estimate of the maximum number of employees contemplated for the proposed development.

10 A description of proposed operating characteristics in sufficient detail to permit assessment of the extent of noise, odor, glare, vibration, smoke, dust, gases, radiation, or liquid wastes that may be created.

Approval, rejection, or recommendation for changes will be made by the Committee within sixty days of receiving the proposal. The Committee will reserve the right to request a meeting with the applicant and the applicant's architect to discuss the design at this stage.

Final Plan Approval: The applicant will submit working drawings and specifications for the building and the site to insure adherence to the approved design.

Prior to any site-clearing, development, or building, the final plan must be submitted to the Design Review Committee for a review of the plan's conformity to the approved design. The Committee will have thirty days after three sets of the required drawings and specifications have been submitted to review and give an opinion of the final plan. The Committee will reserve the right to request a meeting with the applicant to discuss any modifications necessary to make the design conform to the approved preliminary design.

The Design Review Committee will return to the applicant one complete set of drawings and specifications marked 'approved' and signed by an authorized representative of the University. This set will become a part of the agreement between the applicant and the University.

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Design and Development Criteria

Building Criteria

Setbacks: The setbacks of buildings and paved areas from street rights of way and property lines will be evaluated by the Design Review Committee on the basis of the special conditions presented by each site. The Committee may require variations in setback if sight lines, topography, vegetation, or road alignment dictate special conditions.

However, in no case should the minimum setbacks be less than the following:

Building setback from U.S. Route 1, 100 feet,

Building setback from internal roads, 50 feet, and

Building setback from adjacent parcels, 30 feet.

(See **Figure 1** for guideline illustrations of the desired setback conditions.)

Height: The height of buildings will not exceed the profile of the major tree cover on the property. The intent will be to preserve the skyline of the natural tree cover as it is viewed when approaching the site, although each site will have particular topographical, vegetation, and visual conditions which will require evaluation.

Exterior Appearance: The architectural character of each proposed building or structure shall be contemporary, rather than traditional, in style; eclectic styles, such as gothic or colonial, will not be permitted. Architectural designs will be evaluated in terms of the sensitive integration of form, textures, and colors with the particular landscape and topographical character of each site.

To maintain a high standard of construction and appearance and to provide interesting and tasteful exteriors, the exterior walls of each building are to be constructed of durable, permanent materials, tastefully handled (carefully selected brick, treated concrete, or other architectural surfaces). No temporary or inflammable material will be approved. Vertical roof projections such as towers, vents, stacks, or roof-mounted equipment should be avoided. All penetrations through the roof (for example, mechanical equipment or skylights) must be organized in a manner that is integral to the architectural form of the building.

Parking, Service, and Access

All parking, loading, and unloading areas must be sufficient to serve the business being conducted on the parcel without using adjacent streets. The following criteria are minimum guidelines. More stringent requirements may be imposed if warranted by the intended use.

Parking Ratios: All parking required by the development of a parcel will be provided on the parcel in the following ratio:

One parking space per 300 gross square feet of building area, or

One parking space per 1.5 general office or research person,

One parking space for each management person, and

One visitor space for each ten management persons.

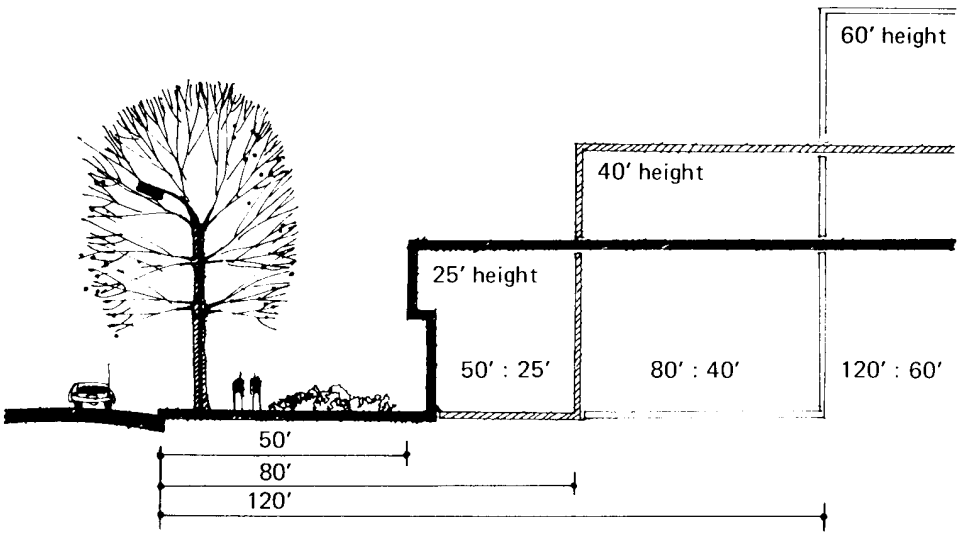


Figure 1. Section through Street Edge and Building Setbacks

Standard building setback from loop road equals twice building height

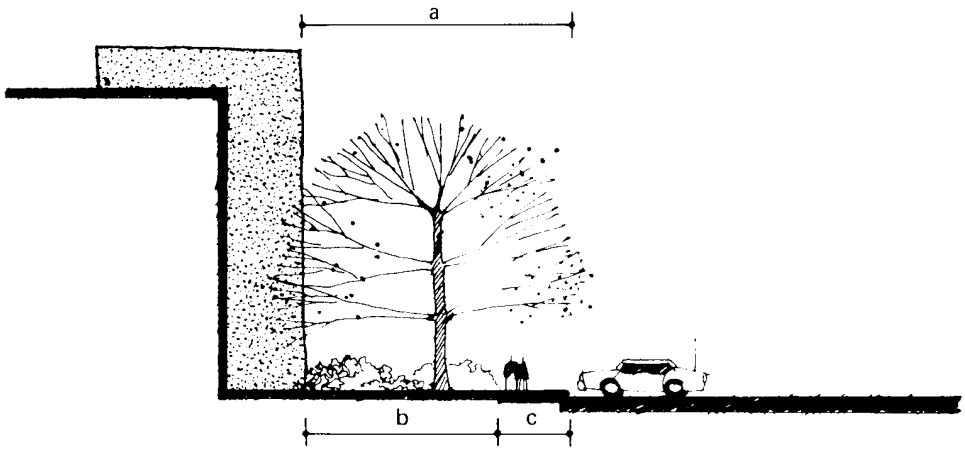


Figure 2. Section through Building and Paved Area

a. Standard building setback 40'

b. Planting area 30' minimum width

c. Concrete walk 10' minimum width; concrete curb and gutter

It will not be required that the entire parking area established by these ratios actually be paved, where the applicant can demonstrate that the minimum requirements are in excess of need, as long as the required amount is shown on the site plan, the land is kept available, and the actual parking space continues to be adequate. The University will reserve the right to require that adequate parking space be installed in the future.

Site Criteria for Parking, Service, Access, or other Paved Areas: No parking or other vehicular surface will be closer than 40 feet to a building line, except in the case of an automobile drop-off, a loading area, or a vehicular entry into the building. (See **Figure 2** for the desired minimum separation between parking areas and buildings.)

No parking, service, or storage area will be closer than 50 feet from any street edge, nor closer than 30 feet from any adjacent parcel. (See **Figures 3** and **4** for the desired minimum separation between parking areas and streets or property lines.)

All parking lots, driveways, and walks will be surfaced with bituminous concrete, concrete, brick, or an approved equal material. Lighting for walks, driveways, and lots will be as specified. All wiring must be underground.

All on-site access roads will be separated from the parking areas by a raised walkway, planting area, or a combination of the two. (See **Figure 5** for an illustration of the desired separation.)

Adequate loading and maneuvering space will be provided for each use, separated from the parking areas.

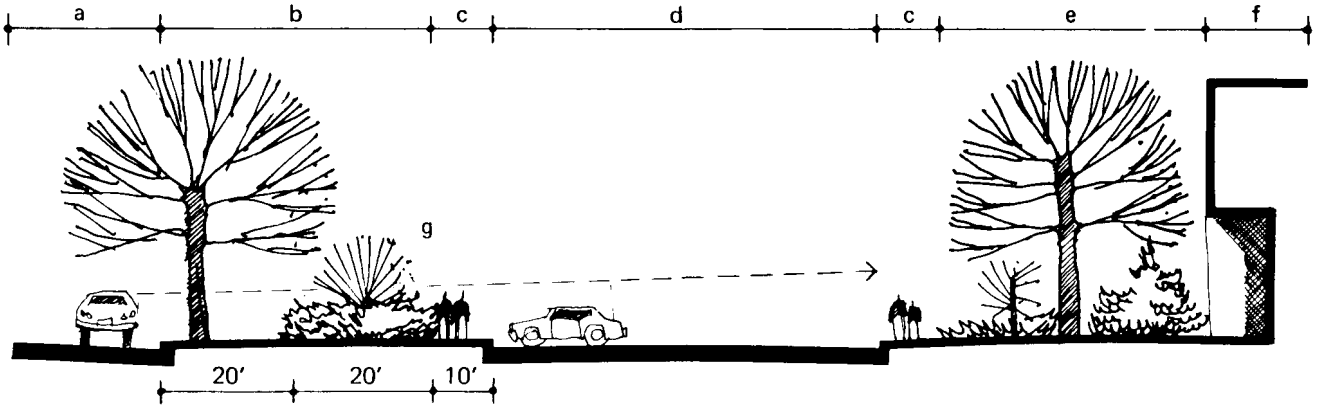


Figure 3. Section through Street Edge: Planted Buffer and Parking

a. Street

b. Planted buffer

c. Walk

d. Parking

e. Planting area

f. Building

g. Evergreen screen 5′ high

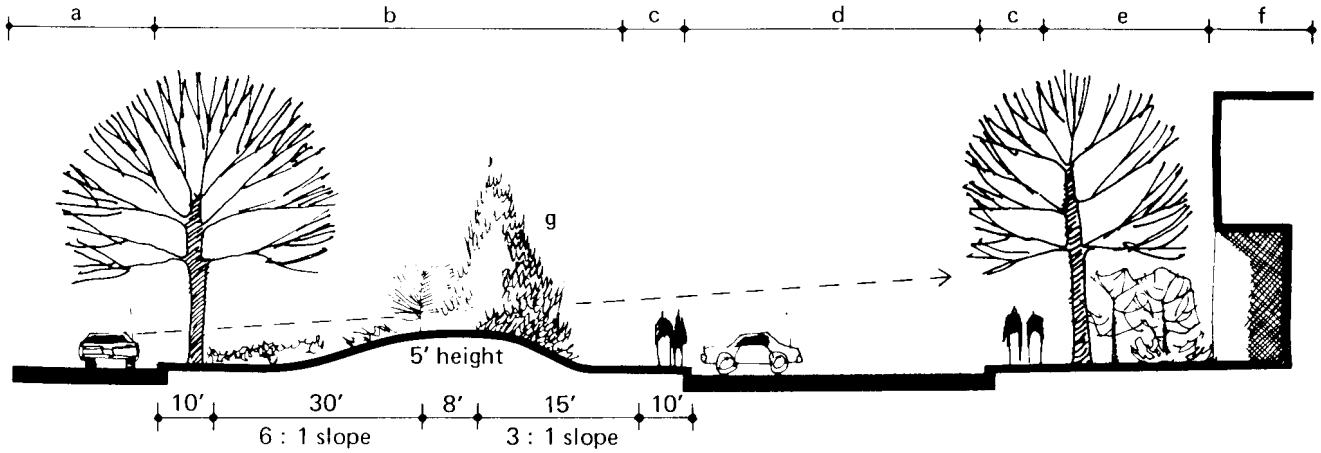


Figure 4. Section through Street Edge: Mounded Buffer and Parking

a. Street

b. Mounded buffer

c. Walk

d. Parking

e. Planting area

f. Building

g. Informal planting with views to building

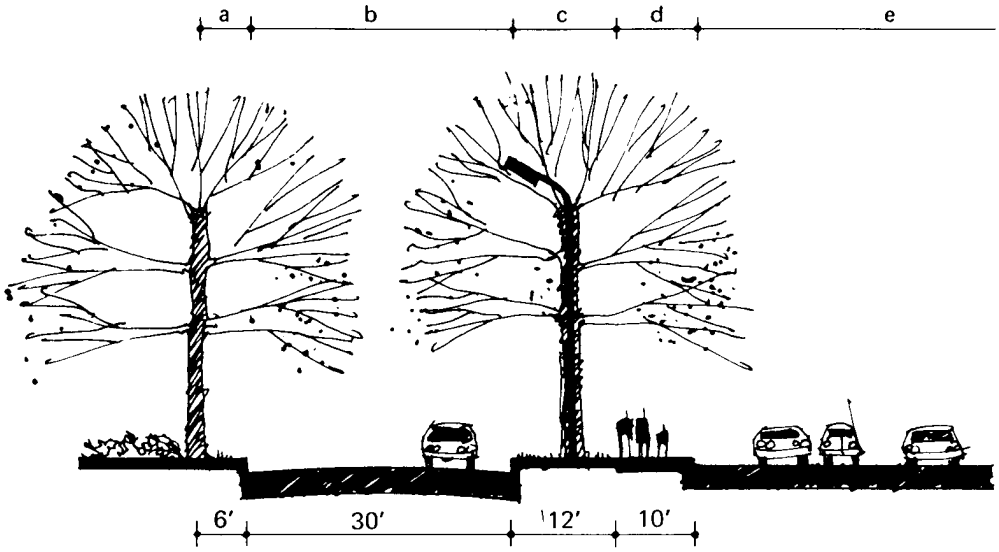


Figure 5. Section through Typical Entry Road and Parking

a. Street trees, signs, and lights located 6' from curb face

b. Typical entry road

c. Planting area

d. Walk

e. Parking:
parking stall is 9'x20';
parking bay is 65';
surface areas not to exceed one acre without planting buffers

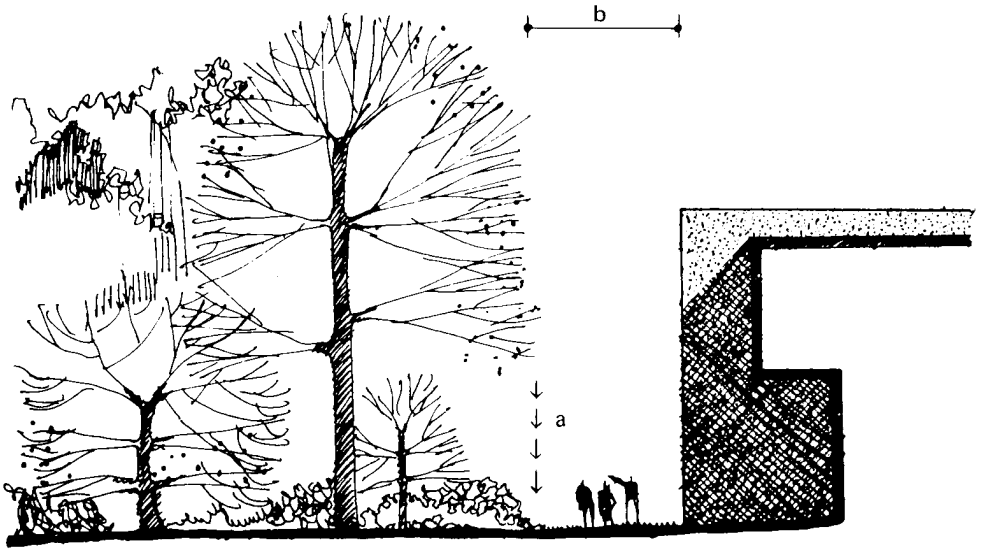


Figure 6. Section through Wooded Edge and Building

a. Wooded edge dripline

b. Standard building, roadway, and parking setback, 30';
walks and paths allowed within this area

All parking areas will be screened from road rights of way and adjacent developed parcels by earth berms or evergreen planting to assure that the visual effect of large paved areas and standing automobiles is minimized and that the effect of the natural landscape and the architecture dominates. (See **Figures 4** and **5** for the desired screening characteristics.)

Parking areas will be subdivided by islands containing trees or other landscape materials, so that no contiguous open parking area will exceed one acre in area.

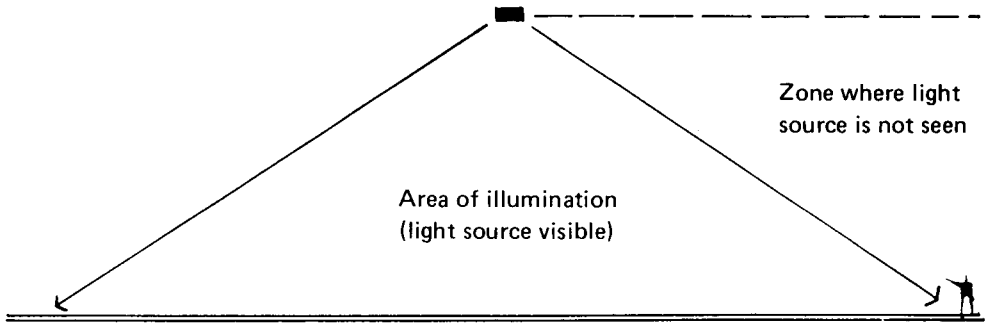
All exterior service, loading, storage, and utility areas (including transformers, cooling towers, etc.) will be located at the side or rear of the building and will be screened or sheltered so as not to be visible from the street right of way or from adjacent parcels.

Figure 7. Lighting Concept

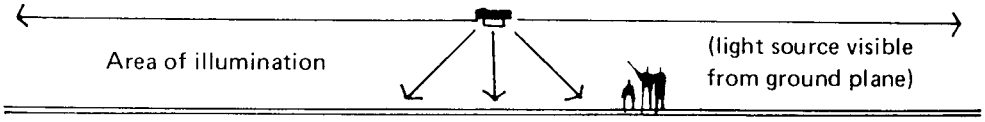
a. Concealed source: parking and roads; cool (mercury vapor)

b. Semi-concealed source: outer pedestrian path system; warm (metallic vapor or incandescent)

c. Visible source: inner building area, pedestrian path systems, and plazas; warm (incandescent)



a



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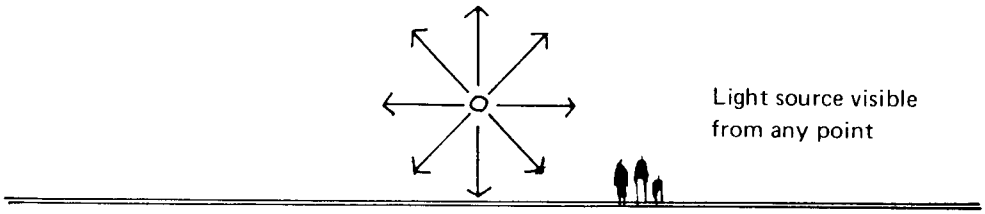


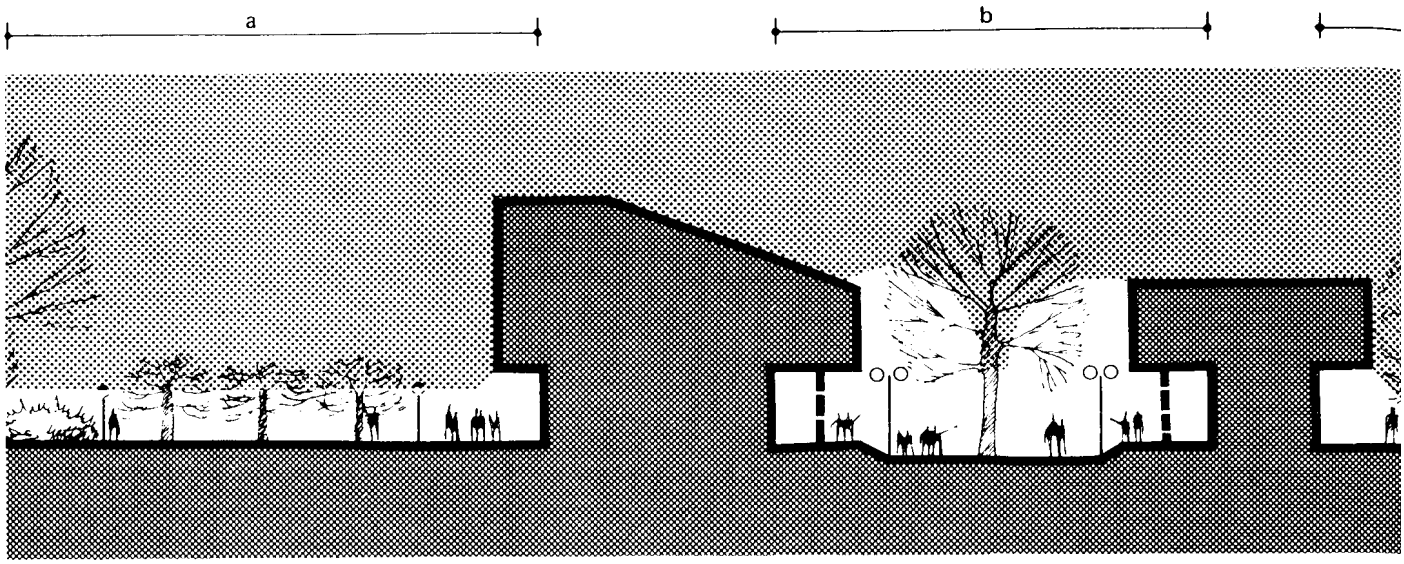
c

The number and area of access drives per parcel will be subject to design review to insure the intended landscape continuity of the setbacks, while allowing the necessary flexibility for development of individual lots. The recommendation is that access drives be a minimum of 24 feet in width. As a planning guide, all parcels with a frontage of less than 200 feet will be limited to one access drive, and no parcel should have more than two access drives. Consolidation of access drives on adjacent parcels will be encouraged, particularly when adjacent parcels are developed simultaneously. This will reduce the number and area of driveway openings on a given length of a major or secondary road, as well as provide tenants greater latitude in developing the sites.

Lighting

Well-designed soft lighting of the building exterior will be permitted, provided that the light source is not visible and that it complements the architecture. The lighting should not draw inordinate attention to the building.

Parking lot, service area, and roadway lighting will be provided by free-standing fixtures with cut-off light sources to assure that the source is not seen from the street or adjacent parcels. The material and color of the fixtures will be evaluated in terms of their compatibility with the architecture and natural site characteristics.



The lighting of pedestrian walkways may include either cut-off or exposed sources, but the height and intensity of light will be subdued. (See **Figures 7, 8,** and **9** for illustrations of the desired lighting characteristics.)

Signs

One identification sign will be erected at the entrance to each parcel in an area to be designated by the Design Review Committee. The design, format, and materials of the sign will be consistent with the site architecture in the development. No flashing or moving elements will be permitted. All necessary details will be provided by the Committee prior to final approval of tenants' plans.

An identification sign of a smaller scale will be permitted on the exterior of the building at a location related to the principal entrance. It may be placed on the building surface or in a free-standing position, provided that the latter is clearly integrated with the architecture. It will not project above any roof or canopy elevations and will not appear above the first-floor level.

Any directional, traffic, or parking control signs on the site will be reviewed by the Committee, with the intent that the signs will be restricted to the minimum necessary, will be visually unobtrusive, and will be consistent in format, lettering, and coloring.

Drainage

Each parcel's storm water drainage will be collected on-site and released at an approved location or locations. In cases where water drains onto the parcel from adjacent parcels, the drainage system will provide for the inflow, unless special arrangements are made to the contrary.

Storm water detention areas may be necessary to insure recharge of sensitive ground water systems at a rate equivalent to the natural site conditions before development. Determination of this need will be made by the Design Review Committee on the basis of topography, subsoil characteristics, aquifer characteristics, and ground coverage. The requirement of a detention area will be established after review of the site plan at the schematic design stage, at which time the coverage and grading can be properly determined.

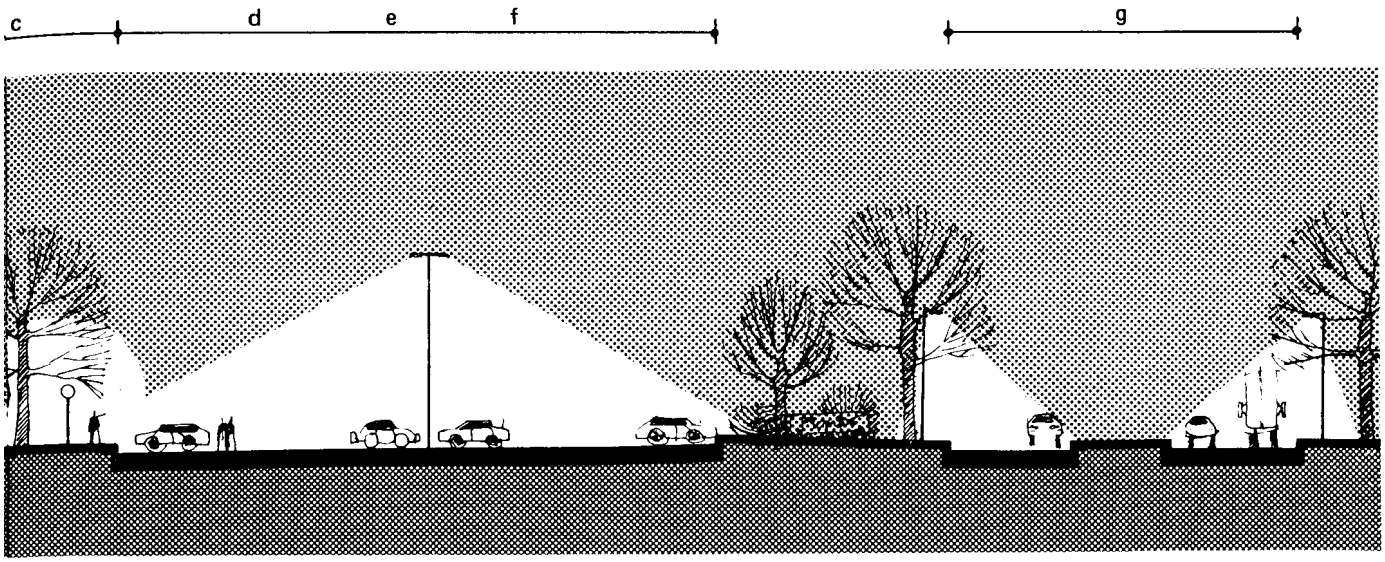
Figure 8. Typical Lighting Section

a. Outer pedestrian path system:
warm, semi-concealed source;
12' maximum height, dark poles;
8 lumen average per square foot surface area

b. Pedestrian plaza:
warm, semi-concealed, or visible source;
20' maximum height, dark poles;
lumens average per square foot surface area related to architectural design solution

c. Inner pedestrian path system:
warm, semi-concealed, or visible source;
12' maximum height, dark poles;
1.0 lumen average per square foot surface area

d. Parking:
cool, concealed source, cut-off design;
30'-45' heights, dark poles;
0.9 lumen average per square foot surface area



e. Entry roadway:
cool, concealed source, cut-off design;
35' height, dark poles;
90' spacing, both sides;
1.2 lumen average per square foot surface area

f. Minor roadway:
cool, concealed source, cut-off design;
35' height, dark poles;
90' spacing, one side or staggered;
0.8 lumen average per square foot surface area

g. Major roadway:
cool, concealed source, cut-off design;
35' height, dark poles;
120' spacing, both sides;
1.2 lumen average per square foot surface area

Preservation of Existing Major Trees

A premium will be placed on the preservation of the natural tree cover and other unique characteristics of the landscape in order to:

1 Maintain a sense of natural amenity, which will distinguish the property as a unique and attractive setting for business and research.

2 Take advantage of the natural subdivision of the total property into precincts or 'exterior rooms' created by the juxtaposition of windrows and wooded areas with open fields.

3 Preserve the intrinsic environmental values and continuity of mature, native tree cover as a wildlife habitat and as protection against erosion and contamination by run-off to streams on the site.

Therefore, all free-standing trees on the parcel with a trunk diameter of six inches or more at three feet above grade and all forested areas and windrows, including understory plant material, will be preserved. No such plant material will be removed without prior approval of the University. Special consideration will be given to efforts to treat the natural tree cover sympathetically.

In reviewing plans, particular attention will be given to grade changes and other work adjacent to the trees to be preserved. Grade, drainage, and aeration will be maintained around the trees.

Setbacks from Preserved Wooded Areas

Building lines and the edges of roads and parking or service areas will be set back at least 30 feet from the dripline edge of windrows or forested areas to be preserved. (See **Figure 6** for the desired minimum separation between buildings, parking areas, and tree edges.)

Use of Preserved Wooded Areas

The use of the wooded areas for walking paths, picnic areas, and benches will be encouraged. The layout of paths will be clearly defined by gravel or asphalt paving or by defined edges of stone, timber, or planting. Areas for picnic tables and benches will be distributed so as to prevent the concentration of use in any single part of the wooded area. The intent of these requirements is to avoid compaction of ground surfaces at the bases of the trees and to preserve the natural undergrowth.

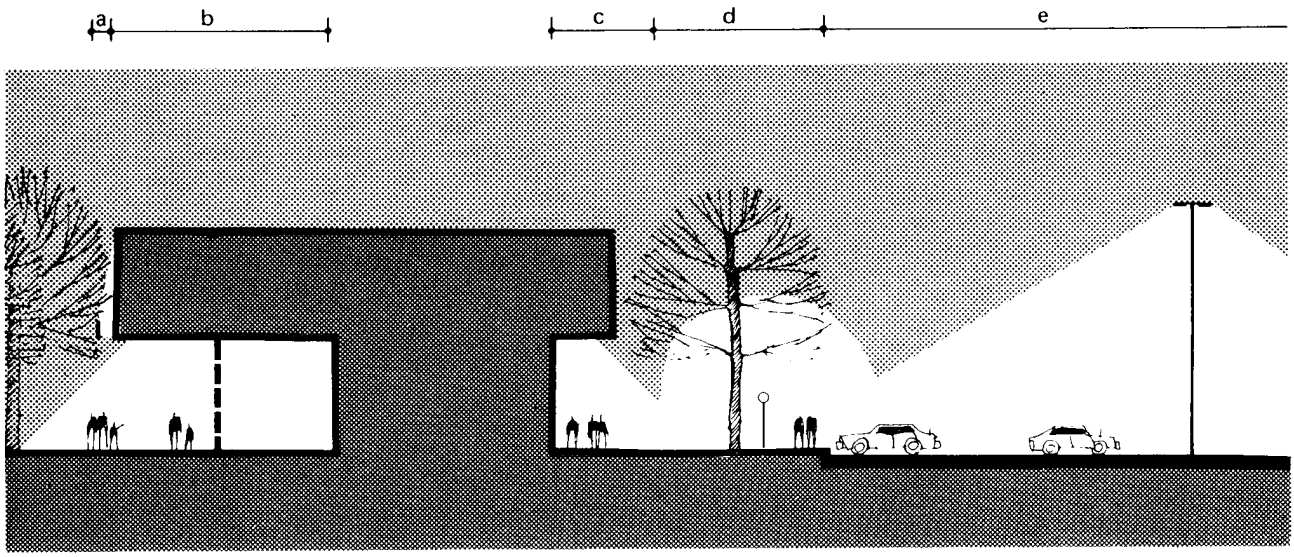


Figure 9. Typical Lighting Section

a. Concealed lighting of building surfaces

b. Supplemental illumination of exterior spaces from interior spaces

c. Lighting recessed in building overhang

d. Visible source lighting along pedestrian systems

e. Concealed source cut-off lighting in parking and road areas

Tree Protection during Construction

During any construction operations on the property, the builder will erect suitable protective barriers around all trees to be preserved, making sure that the trunks, branches, and root structures are not damaged by construction equipment. (See the following section, **Criteria for Environmental and Visual Protection during Construction**, for construction guidelines.)

Other Landscape Design Considerations

New Planting: All ground, with the exception of walks, drives, parking facilities, and service areas, will be landscaped in a manner that is complementary to the architecture, provides the required screening, and forms an attractive transition to the natural landscape features of the site.

Ground occupied by trees to be preserved may not require additional landscape treatment, but the Design Review Committee will give consideration to effective efforts to integrate these areas with the developed parts of the site.

Lawn will be created in the area between the street curb and the first 'solid' edge developed at the street frontage (whether it is a building, planting screen, or wall). The intent is to establish a consistent, maintained street edge throughout the property. Proposed departures from this guideline will be evaluated on the basis of their effect on the desired visual sequence.

Fences: Fences are not desirable and will be approved only for limited storage areas. Chain-link and/or perimeter fencing will not be permitted.

Utilities: All utilities and related appurtenances on the site will be underground or in the main structure.

Criteria for Environmental and Visual Protection during Construction

Construction at the Princeton Forrestal Center is expected to take a number of years. In order to assure that there will be no environmental damage and in order to maintain an attractive, nuisance-free setting during the extended period of construction, special criteria will be imposed to insure that environmental and visual protection is provided during construction. Construction fences to screen vision of the site may be required.

Before construction begins, the applicant will submit to the Design Review Committee (or its designee) a program which delineates the proposed methods of compliance with criteria set forth in this section. This program may be submitted at the time of final plan approval, but it is required that the builder or contractor be given the opportunity to participate in formulating this program. In any event, the Committee (or its designee) should approve or make appropriate recommendations within fifteen days.

The criteria are as follows:

Equipment Access: Access to each construction site will be limited to one location along the public or common roadway subject to approval by the Committee. Mud, dirt, or other surface debris deposited on the public or common roadway at the access point will be washed or removed daily to avoid compaction and damage to the roadway and to minimize impact on the drainage system.

Temporary Structures: Temporary structures, portable offices, and other related facilities will be maintained in good repair and arranged in a compact and organized manner on the construction site. These facilities will be situated so as not to be obtrusive or unsightly when seen from the road or adjacent properties.

All temporary structures and portable facilities will be removed upon the completion of all construction activity and before occupancy of the building.

Temporary Utilities: All temporary utilities on the construction site will be contained in a single, unobtrusive alignment. Distribution to the various areas of construction will be from an approved on-site location.

Equipment and Materials Storage: The area designated for storage of equipment and materials will be at a location that will be visually unobtrusive from the roadway and adjacent properties. Mobile equipment is to be aligned in an orderly manner at the end of each work day.

Construction Debris: Construction debris will be totally concealed during construction either by on-site burial or by locating it in a visually screened place if it is to be removed on a regular basis. If a debris pit is used during construction, protective fencing will be required. Open burning of debris will not be permitted.

After construction is completed, temporary barriers, surplus materials, and all trash, debris, and rubbish will be removed from the site. All backfill will be cleared of building material, stone, and rubbish.

Soil Stockpiling: Both topsoil and fill material stockpiled on the site will be seeded or mulched and appropriately graded to avoid erosion. Stockpiles will be maintained and kept weed-free.

Interim Signs: Construction signs will conform to specified criteria in order to maintain the sense of overall continuity. The sign will identify the name of the projected facility, the parties participating in the design and construction, and the anticipated date of occupancy.

The location of the sign will follow the same criteria as that for permanent signs. The sign will be removed upon completion of the project. The size, format, and location will be limited to that specified for the permanent major identification sign for each parcel.

Erosion and Siltation Control during Construction: Methods of controlling erosion and sedimentation will be required during construction, in order to prevent irreversible ecological damage to fragile natural areas on and off the site, to avoid impact on adjacent roads and properties, and to avoid creating a visual nuisance. The controls will be planned as an integral part of the construction operation.

Approval of erosion control measures will be based on their effectiveness in dissipating storm run-off and on the maintenance of soil-holding ability for the life of construction.

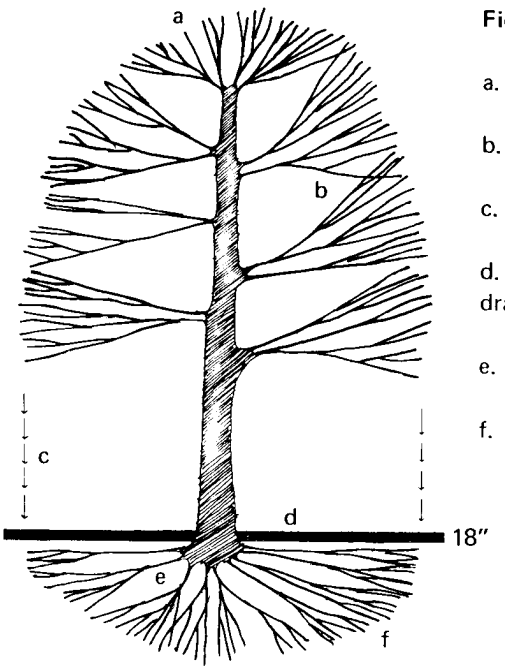


Figure 10. Tree Protection

a. Crown

b. Branch system

c. Dripline

d. Existing grade elevation, drainage, and soil character

e. Root system

f. Feeder root ends

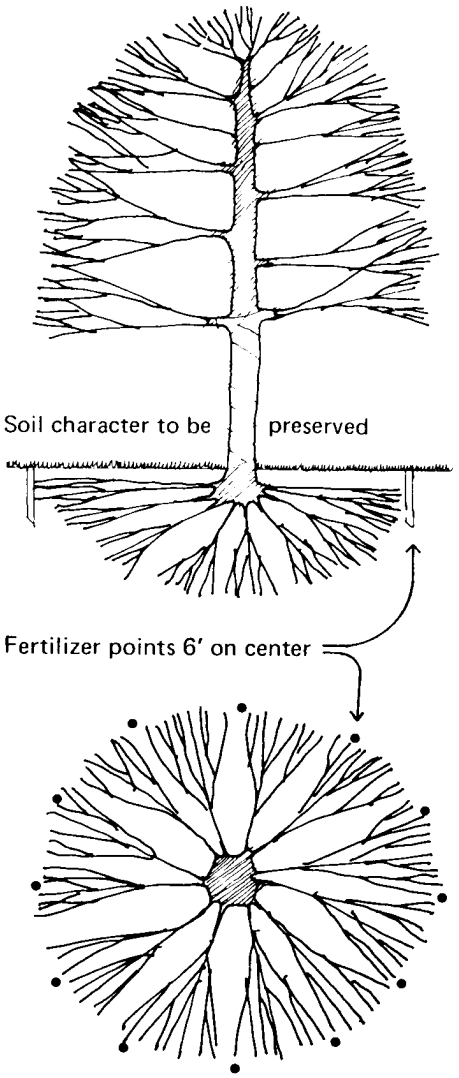


Figure 11. Selective Clearing Protecting Exposed Trees

Prune as necessary to remove weak and dead wood for more vigorous growth. Treat wounds and pruning points with asphaltic paint.

To maintain moisture, wrap burlap or tree paper in spiral bandage, extending downward from large branches to base of tree; should remain for two years and be removed.

Tree should be fed at dripline every 6', if within 50' of any grading work (road, banks, etc.).

Light weight construction equipment should be utilized for root protection during the selective clearing.

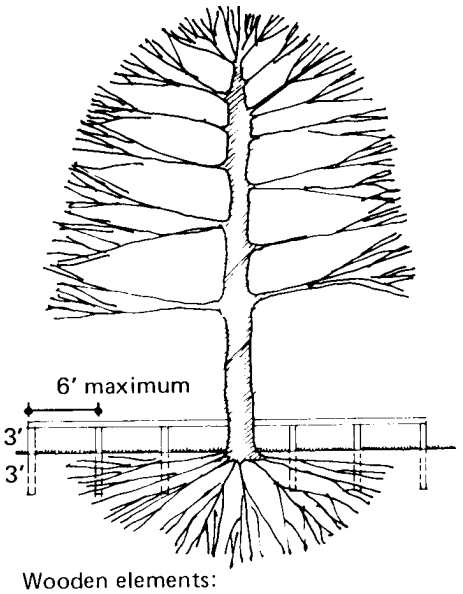
Figure 12. Specimen Tree Protection

Fence tree protection to be located around all existing trees to be saved as directed by the Review Committee. Installation shall occur before any work begins and shall be removed upon completion of all work. Protective fence to be installed beyond dripline of tree or trees.

Paint wooden elements (posts and rails) with exterior flat white undercoat. Finish with fluorescent orange paint.

Pruning and feeding during prolonged construction (over one year) and upon completion of work is recommended.

Any group or wooded tree edge within 100' of the outside of the contract limit area or controlled access points shall also have fence.



Wooden elements:
posts 4"x4"x6'
rails 2"x6"x6' maximum length

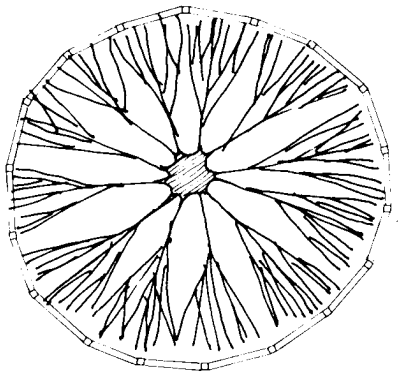


Figure 13. 0" to 6" Cut Protection; 0" to 6" Fill Protection

a. Road

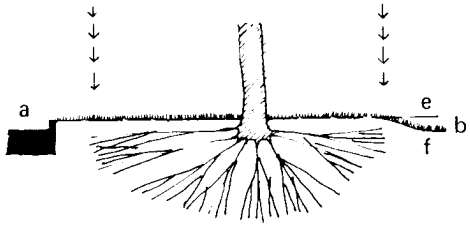
b. Cut 6":
no cut within dripline

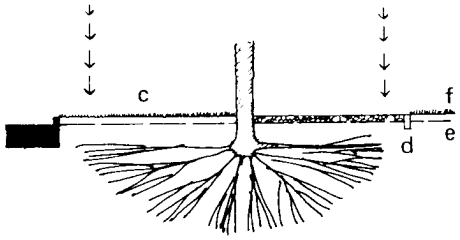
c. Fill 6":
top soil with grass, ground cover, or pea gravel

d. 4" architectural divider

e. Old grade

f. New grade





Positive methods of erosion control will vary according to the characteristics of each site and the construction procedures to be followed in each project. These methods will be reviewed in terms of their effectiveness in controlling erosion and siltation. Consideration will be given to the appropriate application of such devices as earth berms, channels, drains, culverts, rip-rap, terraces, underdrains, settling ponds, and vegetative or mulch controls.

The following precautions will be taken during construction, to minimize the causes of erosion and siltation:

1 An effort should be made to schedule the phases of construction that entail major soil disturbance to coincide with periods of lowest run-off. Final grading should coincide with the planting season to insure quick and effective stabilization of the soil.

2 Heavy equipment will be operated cautiously to avoid creation of new erosion channels. All construction vehicle tracks will be routed parallel to slopes rather than perpendicular to them wherever possible.

3 The fording of streams or major swales subject to rapid run-off is prohibited. Temporary culverts, bridges, and similar structures will be provided by the builder wherever it is necessary to avoid crossing stream channels or other surface areas vulnerable to rapid run-off.

4 Soil stockpiles will be graded and covered or seeded soon after they are deposited.

5 The permanent subsurface drainage system will not be used during construction unless entering water is virtually free of soil particles. To insure effectiveness, silting basins will be installed at locations to intercept water before it enters catch basins and at outfall locations. Silting basin cleanout will be required after each substantial storm.

6 Care will be taken to prevent brush and grass fires to avoid unnecessary erosion.

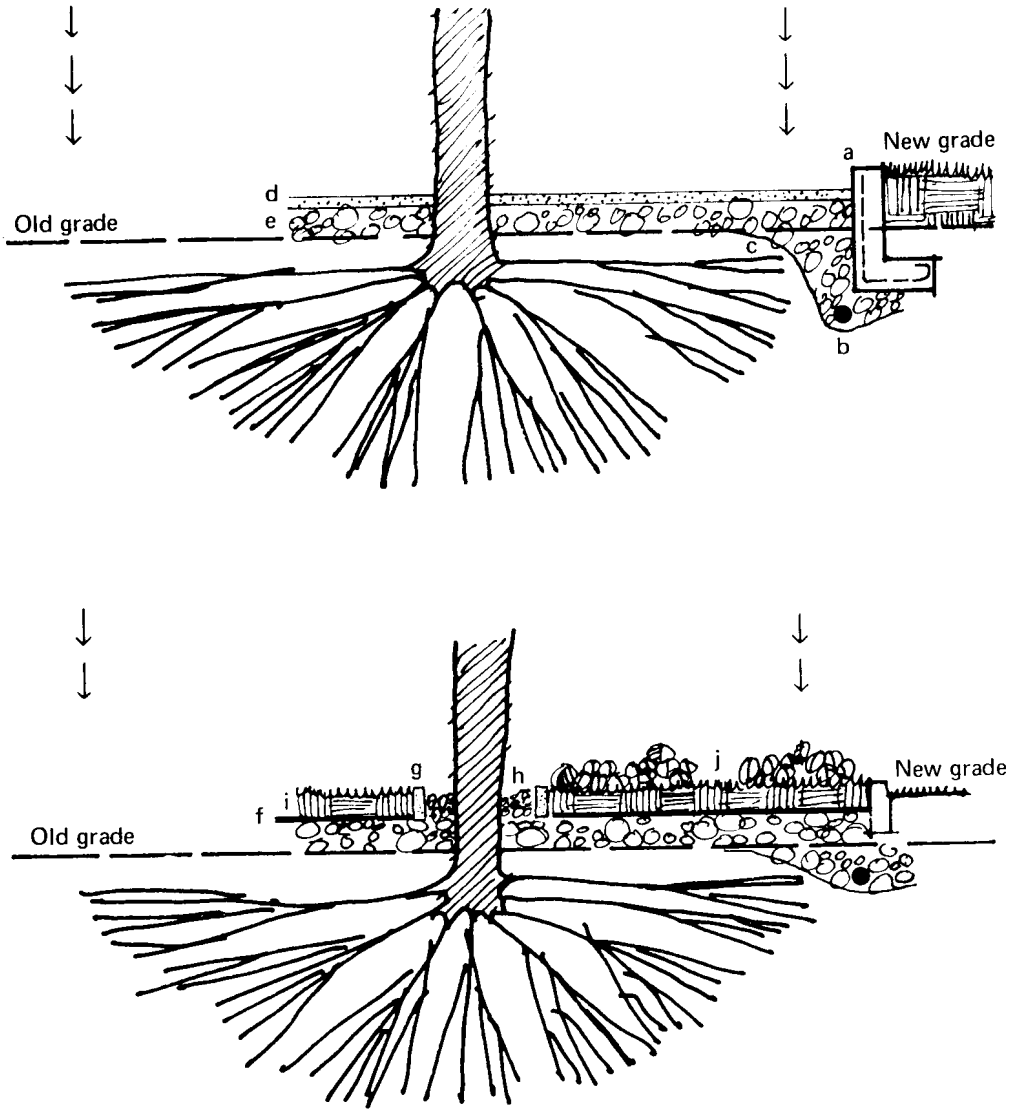


Figure 14. 6" to 2' Fill Protection

a. Reinforced concrete wall or other material

b. 4" vitrified clay drain tile sloped to drain outlet

c. 2% subgrade slope to drain tile

d. 6" pea gravel

e. 2" diameter crushed stone

f. Fiberglass separator

g. 4" concrete curb

h. 6" minimum width (pea gravel)

i. Sandy top soil

j. Grass or ground cover

7 Temporary berms, swales, settling ponds, and other control mechanisms will be reshaped and planted to blend with the surrounding environment when the project has been completed.

8 Interim control measures may be necessary if there are significant time lags between successive stages of construction. Seasonal control will also be required.

In summary, all measures required by sound engineering and design principles will be employed to protect the environment from visual and ecological degradation.

Tree Protection during Construction and as a Condition of Site Modifications: All trees and other plant materials designated in the approved design for preservation will be protected during construction and will be permanently protected in case of site modifications that alter the trees' environment. After the final site plan and before construction approval, those trees that are to remain shall be marked in the field by the builder. Damage or destruction of any tree will be the responsibility of the applicant whether caused by the applicant, its agents, employees, contractors, or licensees.

Figure 15. 2' to 4' Fill Protection

a. Reinforced concrete wall or other material

b. 4" vitrified clay drain tile sloped to drain outlet

c. 2% subgrade slope to drain tile

d. 6" pea gravel

e. 2' maximum of 2" diameter crushed stone

f. 6" minimum width (pea gravel)

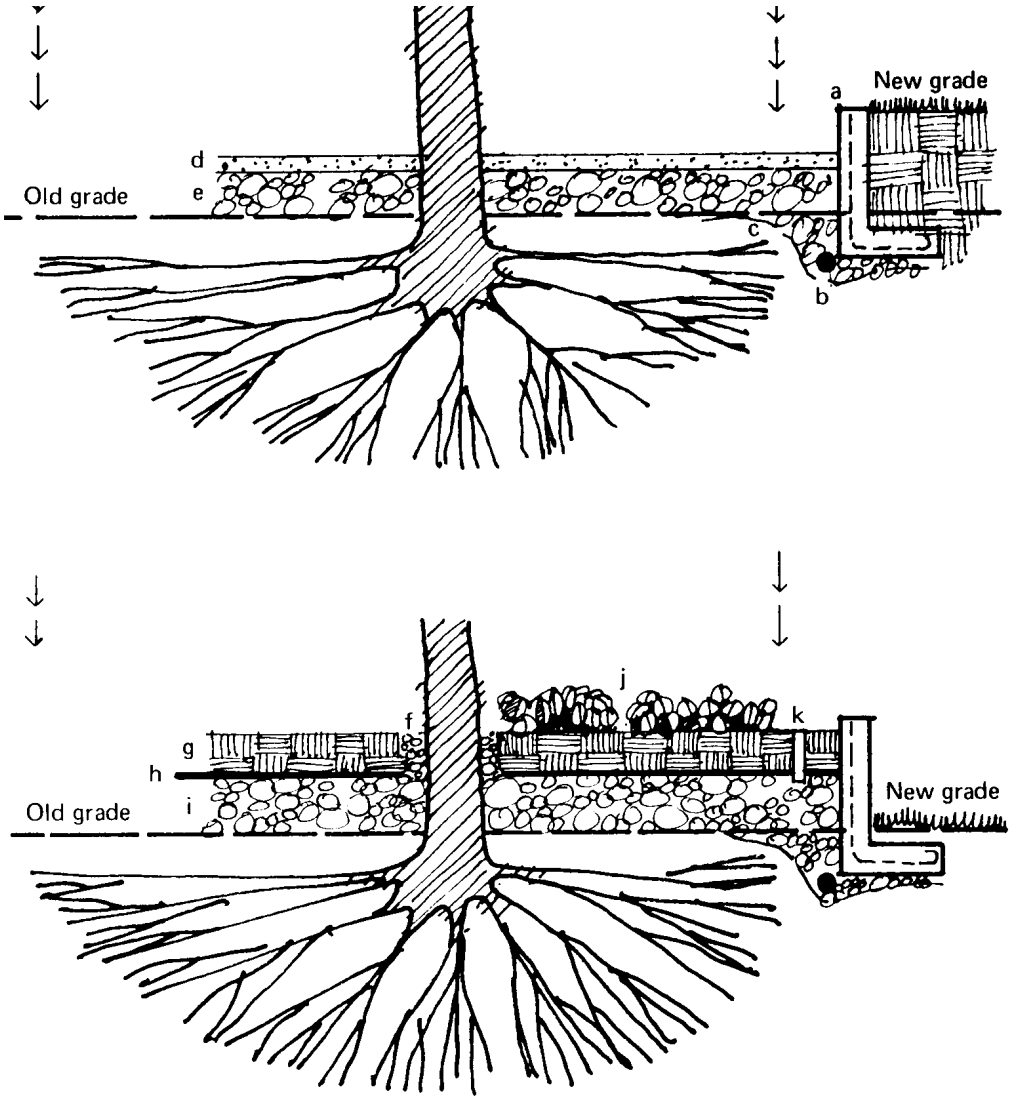
g. 18" minimum sandy top soil

h. Fiberglass separator

i. 2" diameter crushed stone

j. Small shrubs, ground cover, or grass

k. 4" vitrified clay drain tile (screened top) 6' apart around well



All trees that are not to be preserved are to be removed in a manner that will not damage the remaining trees. Any trees to remain which have been damaged during the clearing operation must be repaired in an approved manner by a qualified New Jersey arborist (tree expert) as soon as final clearing has been completed.

The methods of tree protection for various conditions or site changes imposed by construction are illustrated in the manual.

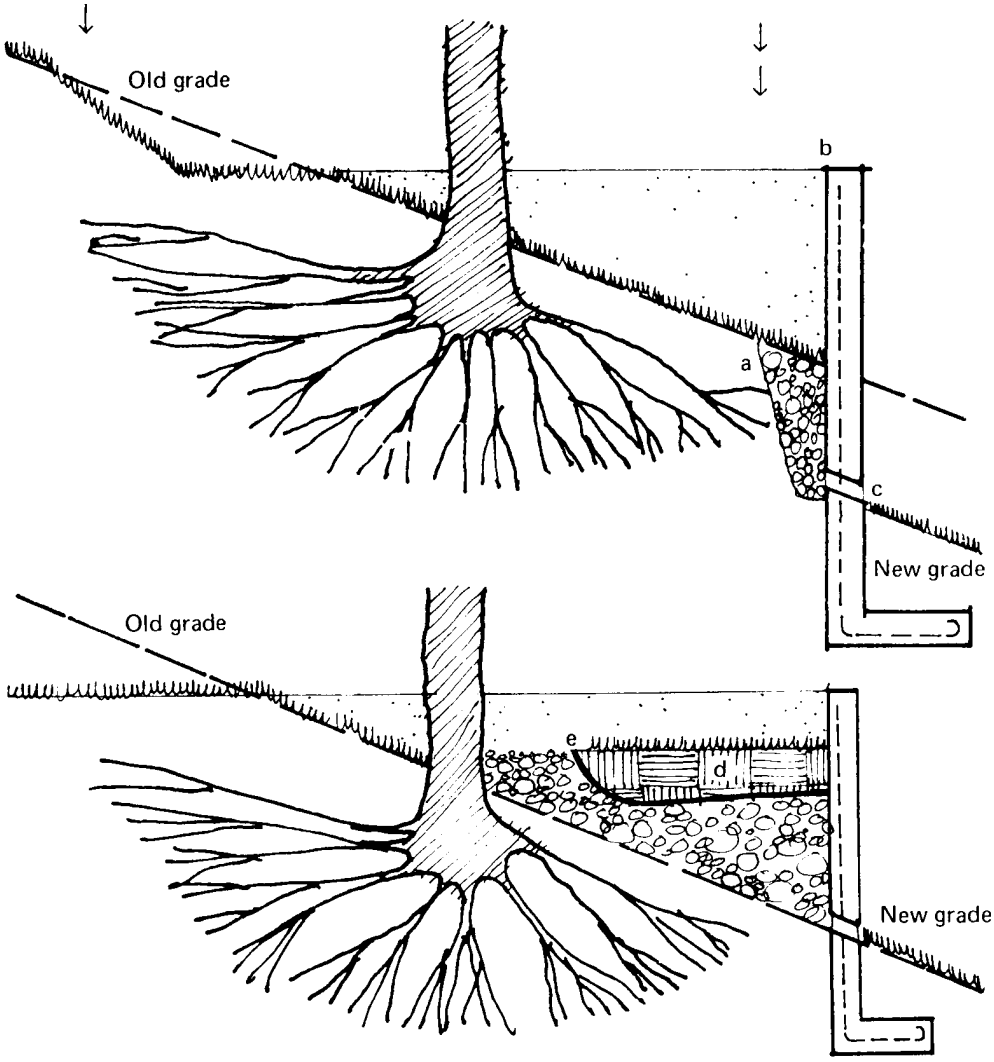


Figure 16. Trees at Cut Slope; Trees in Partial Fill

a. 2" diameter crushed stone

b. Reinforced concrete wall or other material

c. Weep holes (6' on center)

d. 12" sandy top soil

e. Fiberglass separator

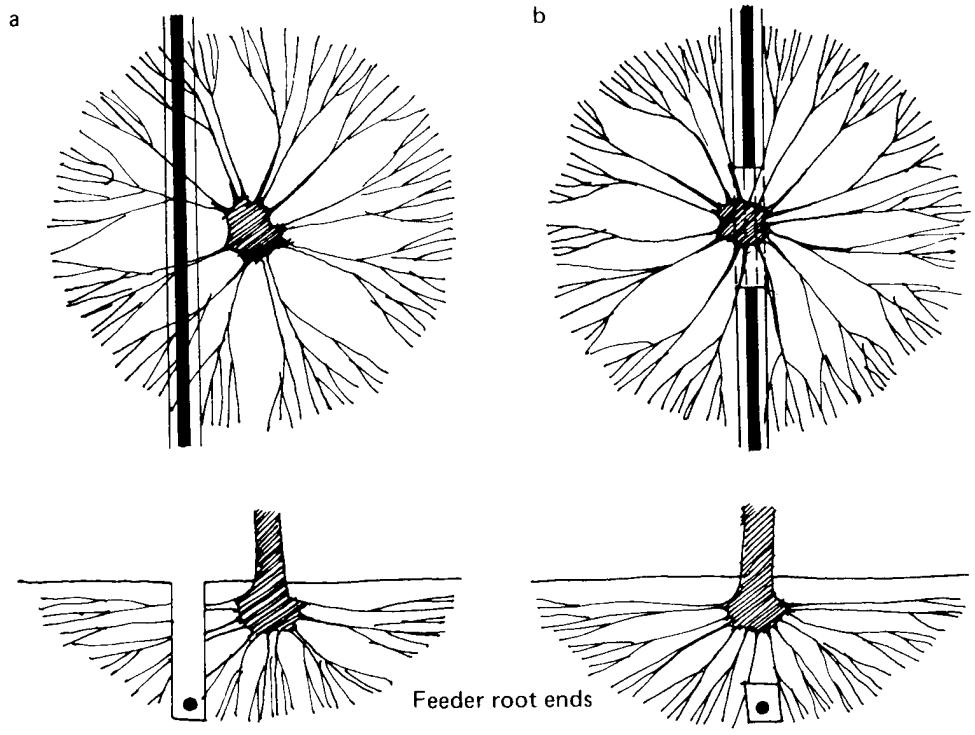


Figure 17. Utility Lines and Tree Protection

a. Unacceptable method: one-third of roots severed, as indicated in darker area, by digging trenches close to the tree trunk.

b. Acceptable method: only a few roots are destroyed by digging directly toward and under the tree trunk.

Provisions for Review of Energy Conservation Measures

The Design Review Committee will evaluate with each development proposal the projected means of providing for the conservation of energy in the design and operation of the building(s). Substantive proposals for effecting energy conservation will be required; innovation will be actively encouraged by the Design Review Committee. The intent of these special provisions is to:

1 Respond in practical terms to ways of conserving energy.

2 Assure the long-term usefulness of the buildings and their internal systems by minimizing energy consumption.

3 Establish the Princeton Forrestal Center as a workshop and model for coordinated planning and implementation of energy conservation methods among individual owners.

4 Accumulate work data on application and performance which can be used in the future.

The applicant will be required to provide a program delineating proposed methods of providing for the heating, cooling, lighting, and other energy requirements of the projected building(s). The program will include, by whatever measure is deemed appropriate by the Design Review Committee, a projected quantification of the energy component in terms of fuel and/or electric consumption. The applicant will also provide a description of the architectural and mechanical applications conceived to minimize the consumption of energy. The description may be in outline form, sufficient to be cross-referenced to the drawings and specifications required in the design review phases as described in the first section of this report.

The following considerations are offered as areas of potential investigation for the conservation of energy:

Building shape, massing, orientation, and placement: Perimeter configurations and proportions, as well as clustering and linkages between building elements.

Materials: Insulation characteristics, the ability of surfaces to absorb and/or deflect exterior heat.

Fenestration: Amount, location, and properties of glass, and the use of shading devices; operating characteristics relative to natural ventilation potential.

Mechanical system characteristics: Methods of heat recovery, lighting as a heat source.

Energy source characteristics: Total energy arrangements, autonomy potential, applications of solar energy.

The Design Review Committee, acting as agent for Princeton University, will maintain a policy of encouraging land-planning arrangements by individual owners which can be directed to the conservation of energy. For example, the Committee may waive side or rear yard setback requirements in favor of no setbacks if two or more individual owners present a sound plan for clustering their buildings. In addition to fulfilling the design and development criteria described in the preceding sections of this report, such a plan will have to demonstrate the energy-conserving measures that can be effected by clustering the building elements.

Development Group

K. S. Sweet Associates
project management/financial analysis

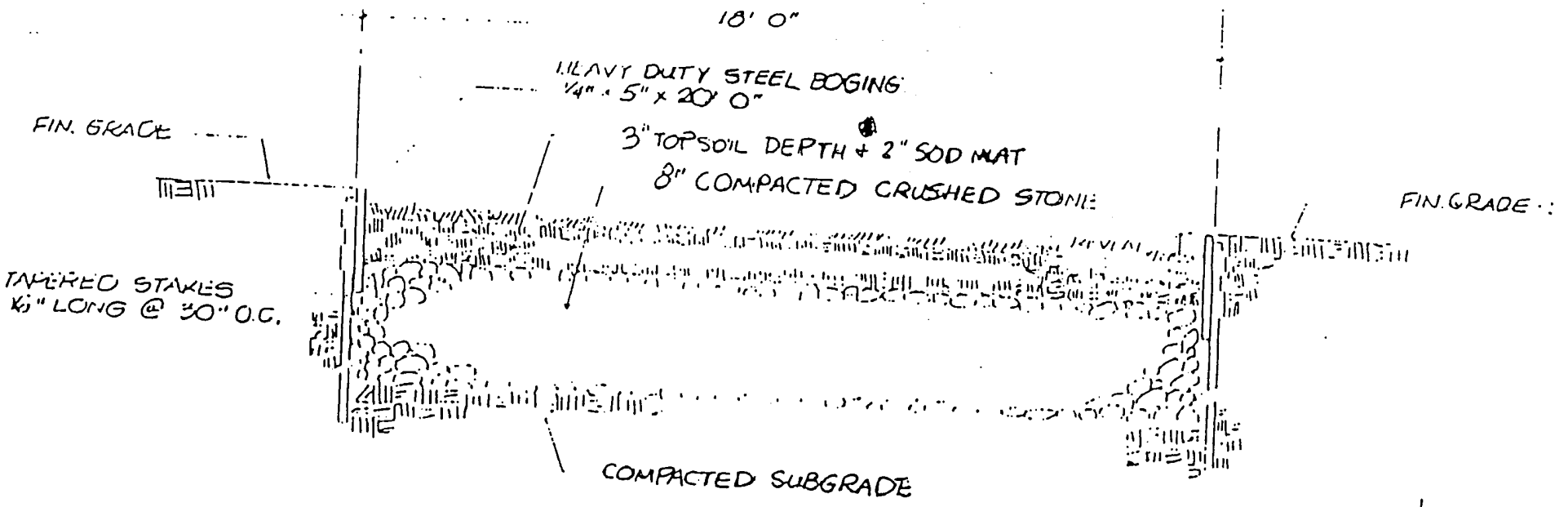
Sasaki Associates, Inc.
planning and civil engineering

Princeton University Officials

R. Manning Brown, Jr.
Chairman of the Executive Committee
of the Board of Trustees and Chairman
of the Special Trustee Committee on
Real Estate

William G. Bowen
President

John P. Moran
Vice President for Facilities



21 FIRE ACCESS LANE DETAIL

3/4" = 1'-0"

(2) Where a local street intersects a major collector street: ninety (90) feet on the minor and two hundred (200) feet on the major collector.

(3) Where a local street, minor or major collector street intersects an arterial street: ninety (90) feet back on the minor or collector streets and three hundred (300) feet back on the arterial streets.

F. No fences or any other obstruction nor any planting exceeding twenty-four (24) inches in height as measured on a horizontal from the center line of the road may be placed in any sight triangle.

G. Unless necessary to provide access to a lot in separate ownership existing before the date of this section, no driveway access to property or additional street intersection may be permitted within the extra widths or sight triangles as specified herein.

H. The Planning Board may require roadway widening or other street improvements on arterials and major collectors, including acceleration and deceleration lanes and concrete curbs, to assure safe ingress and egress. The following minimum standards are recommended.

Legal Speed Limit (mph)	Acceleration Lanes		Deceleration Lanes	
	Full Length (feet)	Taper (feet)	Full Length (feet)	Taper (feet)
25	100	50	150	50
35	200	75	200	75
40	300	75	200	75
50	300	75	200	75

§ 85-20.3. Fire lanes. [Added 7-8-85 by Ord. No. 0-85-13]

A. Fire lanes shall be provided in accordance with the Uniform Construction Code,[1] as amended. Depending upon a building's

[1] Editor's Note: See Ch. 55, Construction Codes, Uniform.

reduced to a ten-inch thickness if the surface is treated with asphalt cement and stone or gravel) or precast concrete panels. Topsoil seeded or sod [maximum of two (2) inches] on a fire lane shall be allowed as long as the topsoil is mixed uniformly with fifty percent (50%) one-fourth-inch to one-half-inch clean crushed stone and all performance standards are met.

(4) Fire lanes need not be separate accessways but may be incorporated as part of an off-street parking, access aisles, walkways or other features as long as they are properly posted and adequately designed to support fire-fighting equipment. Fire lanes shall not be obstructed to impede fire apparatus access.

(5) Fire lanes shall at all times be maintained so as to meet the standards and purposes for which they were designed. Maintenance shall include snow removal over the full width of fire lanes after accumulation of four (4) inches.

(6) The township shall establish a schedule for fire-lane inspection at the discretion of the Fire Official to ensure that they meet the performance standards specified herein. The full cost of the inspection shall be borne by the owner, developer or applicant, and the owner shall provide the testing equipment.

§ 85-21. Street signs.

Street signs shall be metal on metal posts of the type, design and standard previously installed elsewhere in the township. The location of the street signs shall be determined by the Board, but there shall be at least two (2) street signs furnished at each intersection. All signs shall be installed free of visual obstruction.

§ 85-22. Sidewalks.

A. Sidewalks shall be required on both sides of all streets serving a collector or primary local function as stipulated

design configuration and use, location of its egress points with respect to a public street or fire apparatus space and location of fire hydrants, the requirements of the code may be increased by the Planning Board during the course of site plan review upon receipt and acceptance of a report from the Township's Fire Official justifying why such increases are necessary.

B. The minimum construction standards for a fire lane shall be:

(1) Minumum width: eighteen (18) feet.

(2) Marked by pairs of signs, plantings or other methods approved by the Planning Board and located to show alignment at appropriate intervals as determined by the Fire Official and/or Township Engineer during all weather conditions.

(3) Design and construction.

(a) Design and construction adequate to support for test and actual use, the fire equipment in the use of the fire-fighting service of the township. For current township fire equipment, this requires that fire lanes be constructed to support a live load of three and five-tenths (3.5) tons per square foot under any weather condition. It also requires that turning radiuses be sufficient to allow the fire equipment to maneuver around the curves while being within fire-fighting distance of the building. The minimum inside turning radius for the current township fire equipment for a hard-surface lane is forty-three (43) feet. Turf lanes will require greater radiuses depending on specific site grade and soil conditions. The Planning Board shall approve the fire lane design based on recommendations from the Township Engineer and Fire Official.

(b) Suggested fire lane design and construction shall include, but not be limited to, five (5) inches of bituminous concrete pavement, a twelve-inch thickness of quarry process road stone (which may be

DESIGN REVIEW CRITERIA
SIGNAGE ADDENDUM

A. SIGNS ON BUILDINGS FACADES

1. Only permitted on buildings that have no central lobby. Such signs should identify the individual entrance for a user and should be compatible in size, placement and design with the building architecture.

2. Company logos are permitted.

3. Maximum letter height: 28" but may be reduced to maintain consistency with criterion outlined in 1.

B. ROAD SIGNS

1. Designed in accordance with the attached specifications.

2. Only one sign permitted per curb cut.

3. Sign must include street address if more than one user occupies space in the building.

4. Signs bearing a company name will be permitted if that user leases more than 50% of the space.

5. No additional messages may be placed on such road identification signs.

6. Company logos, where permissible under the 50% criterion, may be used but must appear in white letters on the brown background and conform to letter size specifications.

7. In the case where street address and company name appear on a sign the 2 foot height dimension of the sign may be increased to reasonably accommodate both identities outlined in the attached specifications.

C. TEMPORARY CONSTRUCTION/PROJECT SIGNS

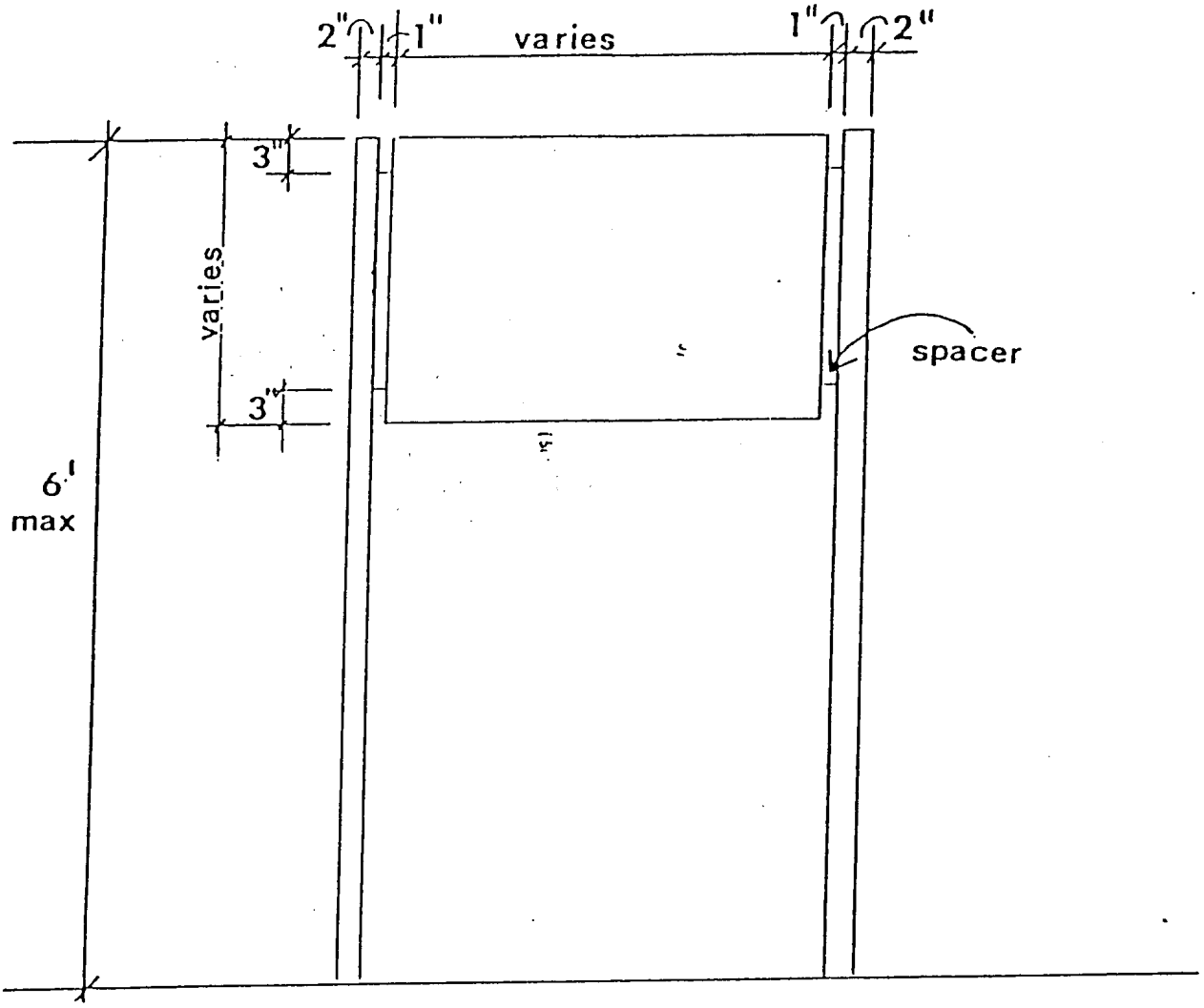
1. No larger than 8' x 10'.

2. Dark Bronze #313 background, white medium helvetica letters, no larger than 6".

3. Company logos are permitted in color, no larger than 9" in height.

4. Sign design and location to be approved by Princeton Forrestal Center office

PFC Typical Information Sign



Sign board to be 1" thick aluminum or steel Dark Bronze #313 panel.

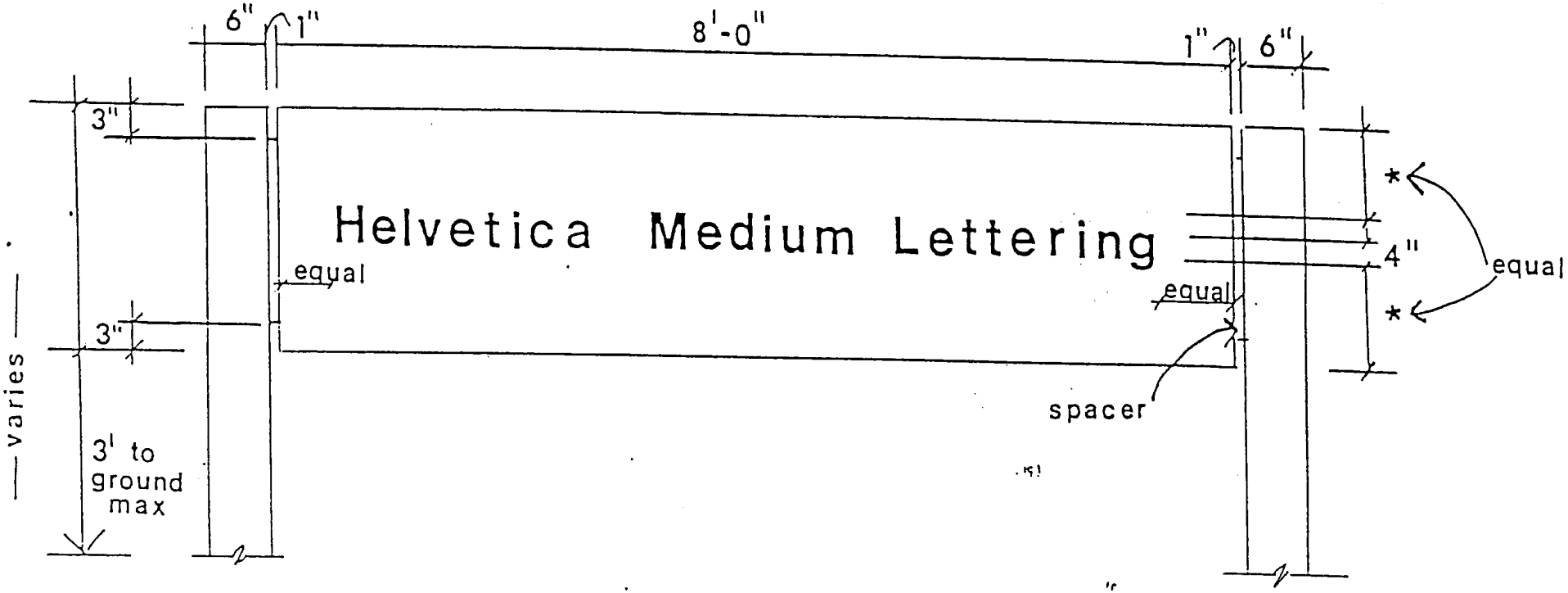
Supports to be 2" x 2" Dark Bronze #313 square aluminum or steel posts, with weld seam on inside center and water tight weld 1/4" cap. All joints to be ground smooth.

Letters and arrows to be white, medium helvetica, reflectorized pressure sensitive tape (scotch lite or equal).

Supports to be set in concrete footing, 2'-0" below grade.

1983

PFC Address Sign



Only one address sign per curb cut will be permitted.

Sign face to be Dark Bronze #313 in color, panel 3 3/4" thick.

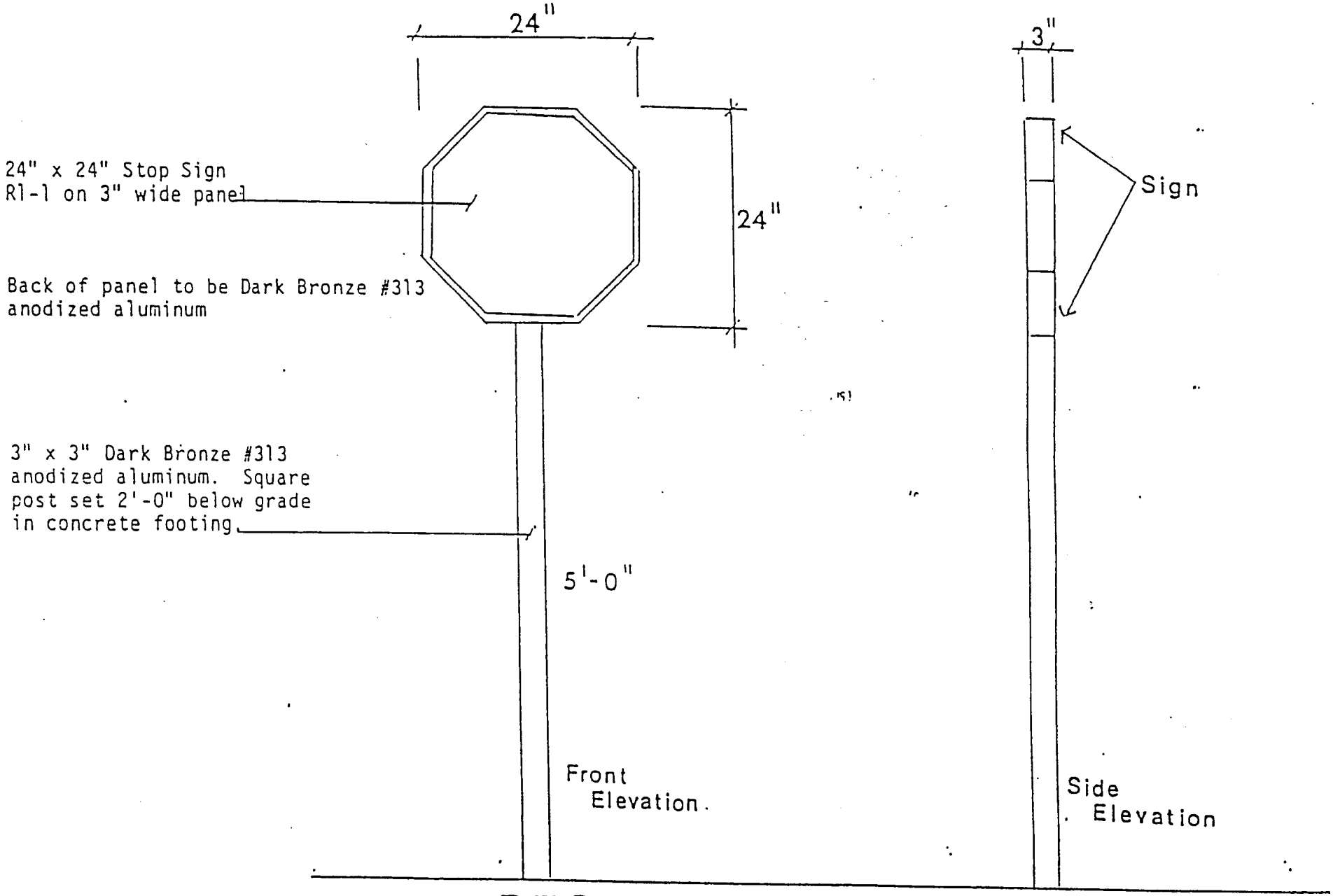
Anodized aluminum or 16 gauge enameling metal having fired porcelain finish, Dark Bronze #313 in color.

Supports to be 6" x 6" Dark Bronze #313 anodized aluminum or steel square posts, with weld seam on inside center and water tight weld 1/4" cap. All joints to be ground smooth.

Letter and arrows to be 4" high (lower case), white, medium helvetica, reflectorized pressure sensitive tape (scotch lite or equal).

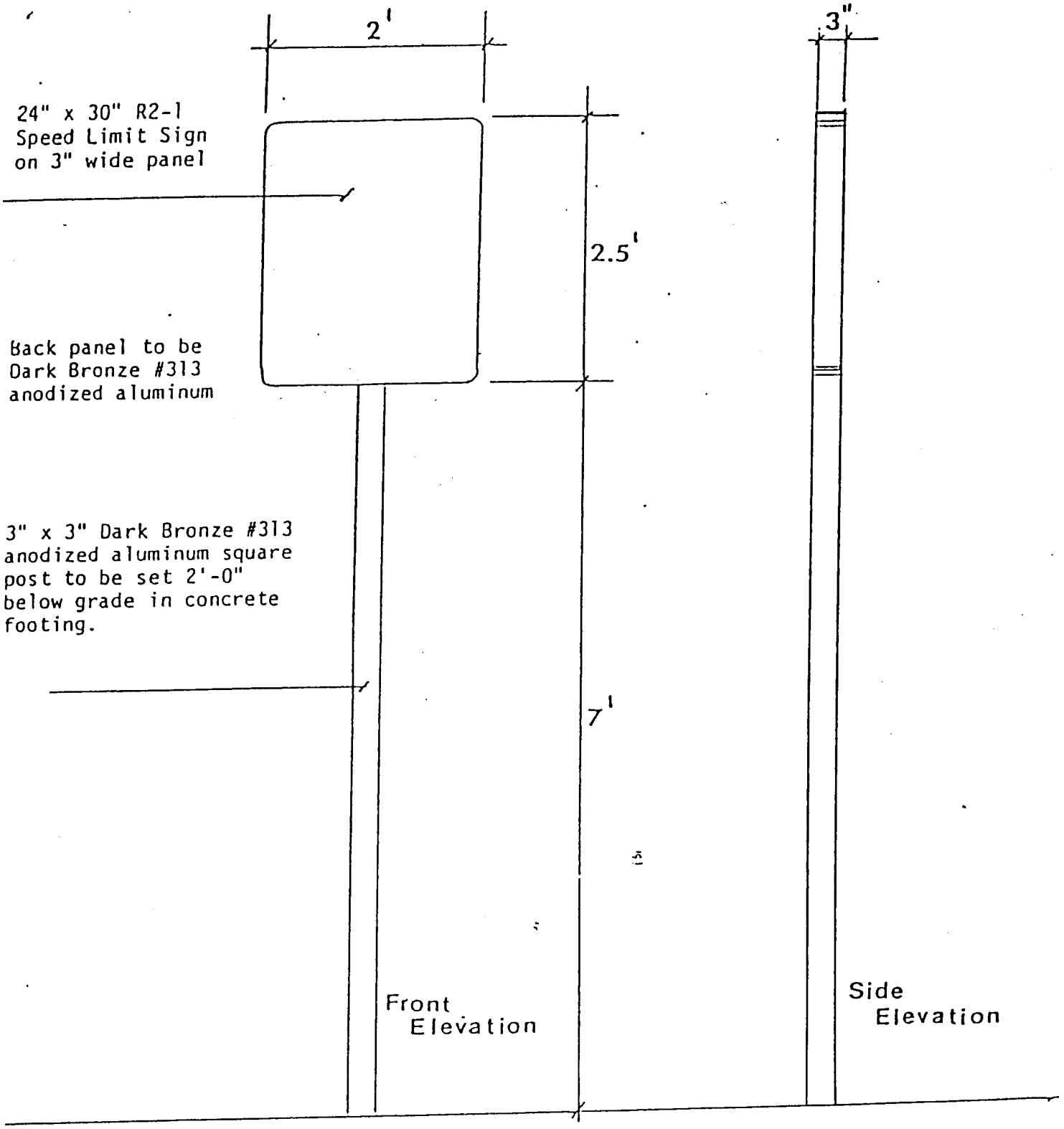
Footing to be concrete and minimum of 2'-0" below grade.

Spacers to 1" x 2" Dark Bronze #313 anodized aluminum or steel.

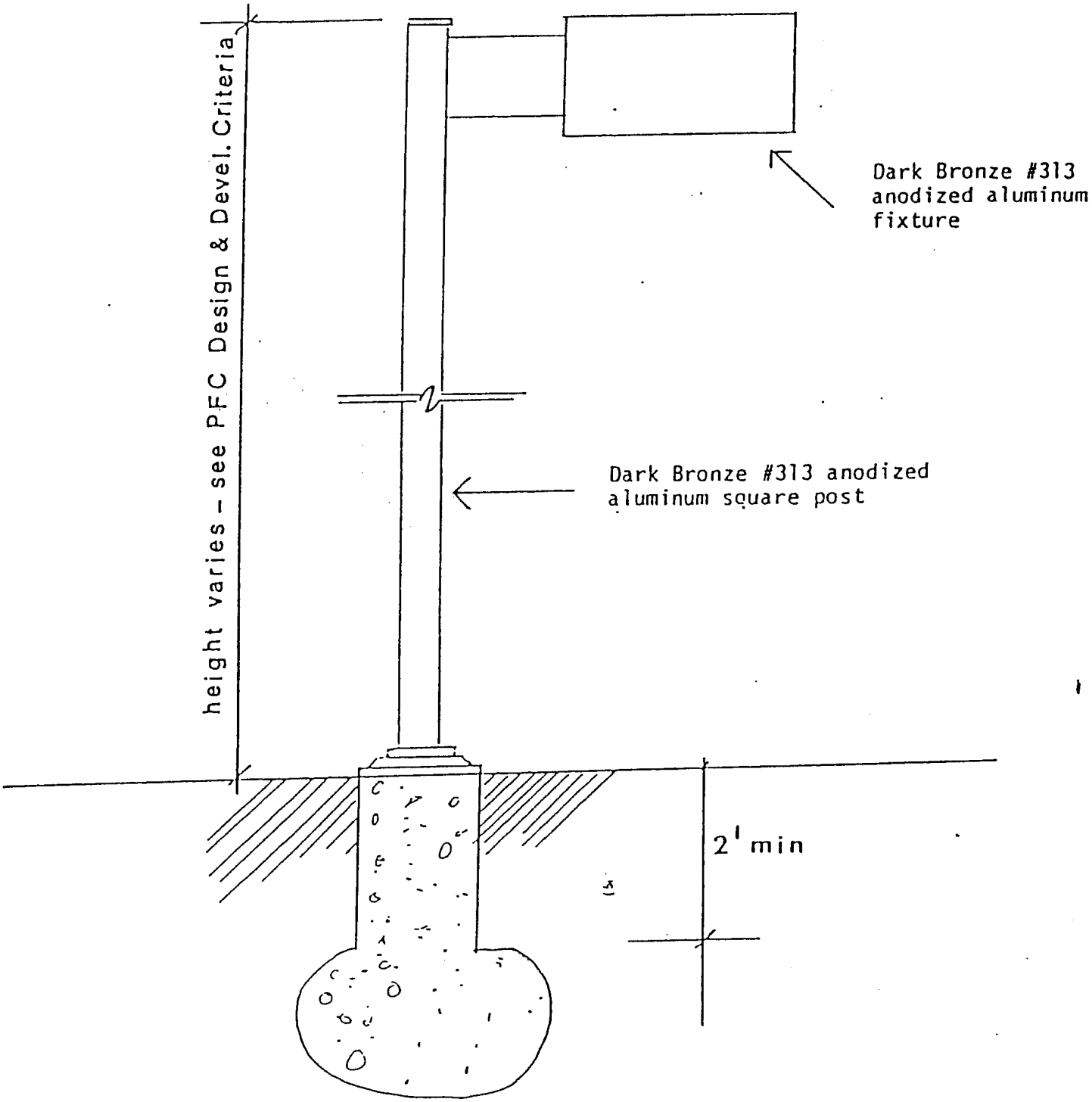


PFC Stop Sign

*Note: Stop Sign face must conform to the U.S. Department of Transportation specifications for Uniform Traffic Control Devices.



Note: Sign face must conform to the U.S. Department of Transportation specifications for Uniform Traffic Control Devices.


height varies - see PFC Design & Devel. Criteria
Dark Bronze #313 anodized aluminum fixture
Dark Bronze #313 anodized aluminum square post
2' min

CONSTRUCTION - All signs shall be mounted on a 3" thick dark bronze aluminum panel which in turn shall be supported by a 3" square aluminum post painted to match the dark bronze aluminum. Posts should be set in a concrete footing 2'-0" below grade. (See attached drawing for stop sign.)

Sign faces must conform to suggested U.S. Department of Transportation specifications as described in the Manual on Uniform Traffic Control Devices (examples shown below). Sign faces may be purchased separately and fastened to the aluminum panel or painted on the aluminum panel itself. All signs must be reflectorized.

R1-1
30" x 30"

R7-8
12" x 18"

28-24

R5-1
30" x 30"

R7-1
12" x 18"

This sign should have the same dimensions but contain the language "NO PARKING EXCEPT IN DESIGNATED AREAS BETWEEN PAINTED LINES".

LOCATION - Signs shall be generally located as shown on drawings provided by Princeton Forrestal Center after exact field conditions have been taken into consideration, i.e. existing trees, sight lines, curbs, underground utilities, etc.

HEIGHT- All signs must have the lower edge of the face 5'-0" above grade. Speed limit signs must be 7'-0" above grade.

PRINCETON FORRESTAL CENTER APPROVAL - Shop drawings of proposed tenant signs must be submitted to Princeton Forrestal Center Administration for aporoval prior to fabrication of signs. Also, Princeton Forrestal Center Administration must be notified where the signs are to be precisely located prior to installation.

10-19-81

PRINCETON FORRESTAL CENTER
LEASING SIGN GUIDELINES

(1) Sign design and location to be approved in writing by Princeton Forrestal Center prior to installation.

(2) The signs shall be no larger than 4' x 4' with a total height of no more than 8' from the ground.

(3) The background color must be dark bronze #313 however, another color may be used for the company logo. No overly bright colors will be permitted unless they are critical to the logo design. All other letters must be white (preferably medium helvetica).

(4) No logo or letters shall be taller than 12".

(5) The signs may be constructed of wood rather than aluminum but must have bronze sides, back, and posts in accordance with permanent Princeton Forrestal Center signage specifications.

(6) No sign shall be permitted unless at least 10,000 square feet of space is available in a particular building.

(7) Only one leasing sign per building will be permitted however, double faced signs may be permitted where appropriate. A separate leasing sign may be installed in addition to a temporary construction sign if the project is under construction. After completion only one or the other is allowed.

(8) If the signs are to be located along College Road East or Research Way, they shall be placed back away from the curb and shall clearly be associated with the building. No sign shall penetrate the sight triangle established for traffic on public and internal loop roads. The specific location must be approved by Princeton Forrestal Center.

(9) The applicant shall be responsible for obtaining a sign permit from Plainsboro Township, contacting the Utility Locator Service regarding underground utilities, and repairing damaged signs.

(10) Once the space is leased, the temporary signs shall be removed promptly by the applicant.