

014000S01 Quality Requirements Design Guidelines

INTRODUCTION

The design guidelines are intended to direct project planning, programming, and design activities to:

- Enhance the prevailing character of the campus.
- Provide a sense of place and orientation.
- Provide a comfortable, secure and livable environment.
- Develop and maintain a coherent architectural character that promotes the attractiveness of the campus through continuity and consistency.
- Improve the visual organization of the campus, including its facilities, open spaces, circulation, site furnishings, and parking areas.
- Reduce the impact of visual liabilities and unattractive areas.
- Blend the natural environment with the built environment.
- Achieve an appropriate balance between aesthetic considerations, operation and maintenance costs, energy conservation measures, and systems life.

These goals can best be achieved by following good design practices. When campus design is successful, it achieves the design qualities discussed when following this link. The relationships between these qualities and their combined impact on a campus can significantly improve its appearance, function, and quality.

DESIGN GUIDELINES

The following guidelines include recommendations concerning the ground plane, buildings, site furniture, utilities, outdoor lighting, signs, and landscaping. They apply to all projects, both new construction and renovation. The impacted area of a renovation project should be designed according to these guidelines whenever possible and when substantial progress towards the objectives can be made.

GROUND PLANE

The most basic component of design is the treatment of the ground plane. This section addresses natural elements such as site drainage, as well as built elements like pedestrian walkways.

Site Drainage

Site drainage is a major consideration. It is critical to maintain or to grade the land surface so storm water readily runs off at all points to the appropriate drainage system. This should be done without increasing the existing rate or volume of runoff onto adjoining private properties or into the natural subsurface drainage system. Retention/detention systems should be designed so that they blend with the natural landscape, can be used for passive recreation and can be maintained with a reasonable degree of effort. Major walkways, landscape areas and gathering areas must not be located in low spots on the campus unless they can be designed to properly drain into an adequate and controlled underground drainage system.

Buildings that are located in areas where there is a potential for heavy storm water run-off should not have any occupied space below an elevation that would be under the risk of flooding conditions. Designs should consider the 100 year storm event as a basis for evaluation when establishing building floor elevations.

Certain substances and activities may pollute the ground water. All campuses and their respective buildings must be designed so they can be operated in accordance with the applicable Ground Water Protection Plan.

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Accessibility and Accommodating Special Needs

All areas of the campus and the buildings located within the campus should be physically accessible to all, regardless of disabilities that may affect mobility. Accommodate the special requirements of all people, including those who use wheelchairs, walking aids, those with hearing or sight impairments. Make the campus accessible by considering necessary site and building elements early in the design process and finding graceful and natural solutions that are appropriately integrated with the rest of the campus setting. Avoid awkward site elements such as multiple changes in ramp direction, over use of handrails, and building entries intended only for people with disabilities.

Pedestrian Walkways

Pedestrian walkways connect campus buildings and outdoor spaces. These walkways generate the skeleton which gives shape and scale to the campus and provide direction and order to pedestrian movement. Walkways also unite, coordinate and orchestrate the sequence of visual experiences that impart a sense of place. The materials used to construct campus walkways should reflect their usage.

- Major walkways intended to carry large volumes of pedestrian traffic during class changes should be wide enough to accommodate peak volume and lead from origin to destination without obstacle, deviation or interruption;
- more circuitous routes are encouraged for minor walkways where interesting terrain, spatial sequence, and leisurely traffic flow is desired;
- walkways should be designed so they are secure at night, passable in all weather, and constructed of materials that are sympathetic to the environs through which they pass;
- walkways should be designed and located according to the hierarchy of volume and use; thus major walks may incorporate a (where permissible) bicycle right-of-way and accommodate service and emergency vehicles ;
- minor walkways can be scaled down in these respects, but not neglected. When appropriate these walkways should be constructed to make the journey visually different from the main walkways;
- pedestrian traffic and vehicular traffic should be separated wherever possible, and unavoidable conflicts otherwise mitigated;
- the intersection of major paths and the spaces around them, should be designed to encourage participation in campus life;
- Special attention should be given to durability and ease of maintenance when designing the pedestrian walkway system. Drainage and expansion/contraction are key considerations. Water should be directed to drains and away from plant bedding areas.

Plazas and gathering areas should be designed to provide people with a variety of places to linger and observe in and around the space. By providing benches, seat walls, and other site amenities, the gathering areas will be more likely to promote contact, communication, and informal social life. Carefully selected site furnishings and landscaping will improve the level of human comfort as well as the campus appearance. Adequate lighting should be provided in outdoor spaces to allow for safe evening use.

Outdoor Steps, Ramps, and Railings

All steps should be designed to meet standard dimensions for outdoor stairs and have appropriately designed railings and guards when necessary. The width of steps and landings should match the walkway leading to them. Riser height and tread depth shall be uniform for each set of steps. A level landing sufficient in width and length to provide a safe access to the steps and from the steps shall be provided. Design treads and landings to ensure positive drainage away from buildings, stair landings, and walkways. Avoid designs that include potential trip hazards. Provide a walking surface with sufficient

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roughness to provide easy traction, even when wet. Effective warning methods shall be provided to alert a sight impaired person at the bottom and top of steps. Illuminate all steps for safe use at night.

Ramps should be provided to meet ADA requirements and where frequent service needs are anticipated. Outdoor ramps should have a surface with sufficient roughness to provide easy traction, even when wet. Illuminate all ramps for safe use at night.

Railings should be kept to a minimum but provided where conditions merit. The design of the rails should be timeless and compatible with the architecture and other campus elements nearby. Handrails shall be easy to grasp and extended a sufficient length from the bottom and top of the steps or ramp so that they may be easily grasped before entering onto or exiting the steps or ramp. The handrails shall terminate in a manner to prevent clothing or other articles from being caught on the rail.

SITE FURNITURE

Site furniture includes a variety of outdoor elements provided to increase the level of human comfort in outdoor spaces. Site furniture include benches, tables, trash receptacles, bicycle racks, ash urns, and bollards. The following guiding principles apply to all types of site furniture.

- Site furniture should be selected to compliment and enhance the prevailing campus architecture. If there is a pattern already established that fulfills this objective, then the existing elements should be repeated.
- Site furniture should be highly visible to encourage its use, but integrated into the physical setting. It should be located against a visual background such as landscaping or a building wall when possible.
- Site furniture should typically be located on paved or other easily maintained surface to facilitate use and reduce maintenance requirements. The surface area should be large enough to provide easy access and accommodate the intended use.
- Site furniture should be securely anchored or be of sufficient weight to ensure its safe use and to deter theft or vandalism.
- Site furniture should be sited to ensure human comfort and use. This includes consideration of sun and shadow patterns, precipitation, wind direction, drainage and grade conditions.
- Site furniture placement should consider night-time use and safety, especially in terms of lighting, security, landscaping and visibility.
- Site furniture and placement should be in compliance with current Americans with Disabilities Act (ADA) requirements.
- All wood furniture should have a natural finish and be allowed to weather with age. All metal furnishings should have the most durable, factory-applied finish available. The color should match the prevailing existing architectural metal on the campus.

Benches

Locate benches along walkways, within gathering spaces, near drop-off areas, adjacent to sports and recreation fields, and near building entrances. Provide a variety of arrangements, including individual benches for quiet contemplation and study, as well as small groups of benches facing or adjacent to each other. Take advantage of good views whenever possible.

Benches should be placed on appropriate surfaces and located so there is adequate space between the bench and the edge of pedestrian pathways that will accommodate wheelchairs. In addition to benches, informal seating opportunities should be provided through the use of seat walls and planter walls of appropriate height.

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Tables

Locate tables primarily adjacent to buildings or where there are opportunities for activities such as eating and studying. Tables should be placed so they can be easily accessed, serviced and maintained. Tables should be selected that allow interaction and use by all people and should accommodate wheelchairs.

Trash Receptacles

Locate trash receptacles adjacent to seating areas, eating areas, building entrances, gathering spaces, recreation and sports areas, and along major pedestrian pathways. Furnish sufficient numbers to provide convenience for waste disposal. Locate receptacles a minimum of 5 feet away from seating or eating areas to reduce the impact of odors and insects.

Ash Urns

Provide free-standing ash urns, as well as urns integral with tables or trash receptacles. Locate urns at building entrances in designated exterior smoking areas. The smoking areas should include a variety of seating arrangements and locations. Furnish sufficient numbers and sizes to accommodate demand and reduce litter. Locate ash urns and smoking areas on concrete pavement to allow for easy clean-up.

Bicycle Racks

Locate bicycle racks near to primary destinations but not at building entrances or other areas of pedestrian congestion. Bicycle storage areas should be located contiguous to major parking lots and near primary pedestrian corridors. When racks must be located contiguous to a pedestrian pathway they should be set back sufficiently to avoid interference with pedestrian movement. Place bicycle racks on a paved surface, adequately sized to allow bikes to be maneuvered. Major bicycle storage sites should be located in well illuminated, highly visible areas to ensure safety and security.

Bicycle racks may be pre-manufactured or custom designed but of a style that compliments the campus architecture and other site furniture. Select designs that consider functionality to promote use and diminish the tendency to secure bicycles to other site elements.

Bollards

Bollards or post barriers may be used to define the separation between pedestrian and vehicular areas, to protect buildings and site elements and for path lighting. When used to separate pedestrians and vehicles, bollards should be spaced sufficiently close to clearly define the desired separation of space and to prevent intrusion of automobiles, but not so close that passage of small maintenance vehicles and wheelchairs is impeded. If chain barriers are used in conjunction with bollards care should be taken to assure that the chain is visible and not a hazard.

Bollards may be pre-manufactured or custom designed but of a style that compliments the campus architecture and other site furniture.

Seat Walls and Planters

Whenever possible, provide seat walls to retain earth, define spaces, and provide informal seating. Walls should be fabricated from materials that relate to the nearby architecture and compliment the other elements of the campus setting. The tops of seat walls should be sufficiently wide and have a smooth surface.

Planters also can provide informal seating areas and should be included in select, high-usage areas of the campus. Maintenance of the plant materials is critical to the appearance of the planters and the quantity of them should not exceed the institution's ability to adequately care for them.

Dumpsters

Locate dumpsters in service areas on concrete pads. Screen them from public view on at least three sides with a permanent screen wall compatible with the architectural character of adjacent buildings. Landscaping may be used in outlying areas if it is of sufficient density. Screen walls need to be of substantial design fabricated with quality materials. Dumpsters should be painted to blend with other permanent site elements of the campus. Consider placement, screening, and vehicular access to dumpsters during the design phase of any new facilities.

CAMPUS SIGN SYSTEMS

Signs are a crucial aid to navigation for all people. Campus sign Systems should provide useful information about the setting, and provide clear information directing people to their destination. Sign systems shall identify the destination at the point of arrival as well as provide basic operational information where required. All information contained on signs should be clear, precise and consistent.

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Placement, scale and graphic style are important design elements. Lettering styles and graphic symbols should be simple, and compliant with ADA Guidelines. Color scheme combinations selected should result in a high degree of visibility/readability and compatibility with other campus elements.

Signs should be plain, not fancy, and to the greatest extent possible in the language of the visitor. In some cases plain language as the sole content of the sign may be preferable to graphic information.

Exterior Signs

Exterior signs should be sequential, hierarchical and address the following four categories of information

1. Directional - Used to indicate a change in route or confirmation of a correct direction often in conjunction with a graphic like an arrow; i.e. hospital, main campus.
2. Informational - Used for overall information for general organization of a series of elements; i.e. campus plan, campus bus route(s), building layout.
3. Identification - Used to give specific location; i.e. visitor parking, accessible entrance.
4. Regulatory - Used to provide operational requirements, restrictions, warnings, traffic delineation and control; i.e. "stop", "one-way", "no parking".

Campus exterior signs should be designed to be compatible with the campus architecture and constructed of quality materials. Colors and finishes that resist fading should be selected. Designs should allow for changes to be made with minimum contrast between old and new.

Interior Signs

Interior signs are an extension of the exterior sign system and any design should take this into consideration. All buildings should have directories keyed to a floor plan graphic placed in prominent locations where major decisions regarding movement/circulation are made, i.e. entrance points, lobbies, elevators. The language and organization of the directories should relate to the exterior signs.

LANDSCAPING

The function, maintenance needs, and growth requirements of plant materials should be the basis of selection and placement of landscaping materials. Plants can be used to focus attention on attractive features, enhance and identify building entrances, form a screen or wall to block views, improve the micro-climate, control glare and heat reflection, direct or guide circulation, provide pedestrian scale, reduce noise, deter soil erosion, provide windbreaks and climate control, reduce dust and air pollution, define outdoor spaces, soften architectural elements and unify the campus,.

Plant materials include deciduous shade trees, evergreen trees, ornamental trees, shrubs and ground covers. The following guiding principles apply to all types of landscape plantings:

- Select plant materials native to the region whenever possible. Avoid the use of exotic, difficult to maintain plant materials.
- Selected plant materials should be repeated throughout the campus to provide a sense of order and unity.
- Plantings should be simple and primarily informal.
- When used in mass, plants should be grouped together in clusters of odd numbers of plants such as three, five or seven of the same shrub.
- A sense of openness on the campus should be maintained by not over-planting with trees and maintaining a high canopy to preserve views.
- Messy plants or those with thorns should be avoided adjacent to pedestrian walkways or near parking areas and roadways.

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- Mature, trees and shrubs should not block windows, graphics or other building elements. The location of overhead utility lines and building overhangs should be considered in the selection and placement of trees and shrubs.
- Planting designs should be completed as a collaboration between the building and grounds department, an experienced landscape architect or horticulturist, and the University Architect. Items to be considered include exact site conditions and the particular requirements of the plant, ultimate desired size of plant materials versus its potential growth, purpose of the planting and maintenance capability and desired effort.
- All planting beds should have well-defined edges. Open areas between plants should be covered with a thick mulch of bark or stone.
- Plantings throughout the campus should provide year-round interest with a mixture of evergreens, shade trees and ornamentals providing color, texture and form. Native species should be used whenever possible.
- Formal plantings should be used only in specific settings such as ceremonial areas and major gathering points or as designated by the applicable physical development plan .
- Develop plans for planting that are sensitive to the landscape hierarchy set forth in the applicable physical development plan.
- Plantings of annual flowers and perennials may be used in special locations on the campus. Plantings of flowers should be used sparingly and massed to provide an adequate display.
- Plantings should be arranged to provide room for maneuvering grounds maintenance equipment.

Vehicular Circulation and Parking

Vehicles have a major impact on how a campus functions. Therefore, design guidelines for such a critical component are especially important. Design of campus roadways should comply with the engineering and technical design criteria published by the Kentucky Department of Transportation. Roadways and parking zones should be located in the areas designated by the applicable physical development plan.

Campus roadways and parking systems should be designed to reinforce the image of the campus, effectively separate pedestrian and vehicular movement, and contribute to the efficient use of the campus land area. Roads and parking areas should be paved and adequately designed for the intended usage.

Parking should be treated as a landscape element and as a utility, with supply and demand balanced by rationale need and alternatives. Surface parking areas should be well landscaped and designed to fit into, and preserve existing vegetation. If little or no natural vegetation exists, space for planting areas should be designed into the scheme, thereby reducing the potential for large unbroken paved areas. Parking lots should be situated where they are least intrusive and their worst features concealed. Parking areas should be buffered from pedestrian walks, roadways, and other campus areas using earth berms, plant screens and green space.

As new parking areas are developed or existing parking lots redeveloped, it is recommended that concrete curb and gutter and bituminous concrete paving be utilized. Curb and gutter will provide enhanced control of parking and internal circulation, longer pavement life, better drainage and protection of landscape plantings. Interior parking islands will reduce the visual scale and dominance of parking areas. In no case should less than 5% of the total parking area be dedicated to islands. Islands should be sized to provide adequate space for tree and landscape development (9-10 feet minimum width is recommended). All islands should be protected with curb and gutter, adequately drained and the soil properly prepared to support and sustain long term tree development.

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Accessible parking areas, complying with the current provisions of the Americans With Disabilities Act (ADA) and applicable state and local codes, should be distributed uniformly throughout all parking areas of the campus.

BUILDINGS

When implemented, the design guidelines will promote and enhance a consistent architectural character. They will provide visual and functional ties between new and existing buildings by creating order, clarity, interest and human scale.

The following design guidelines for buildings provide a framework for decisions about the site considerations of buildings as well as the appearance of the buildings themselves. Because design is a process that must consider many factors (i.e. cost, function, and specific site restrictions), these guidelines should be used as design parameters rather than rigid design solutions. This section will provide general guiding principles for new building projects, as well as address site considerations, design principles, and design elements. The general guiding principles are described below.

- Because a campus is a cohesive arrangement of elements, each new building design or expansion project should consider pedestrian and vehicular access; parking, service, and open space requirements; and future plans for the campus as proposed in the physical development plan.
- Buildings should be placed in the locations identified in the physical development plan and their footprints contained within the building envelopes. Major entrances and service areas should be placed as indicated in the plan.
- The desired campus architecture is necessarily subordinate and integral. New structures should be thoughtful, artful and handsome, but fitting and modest.
- "Signature" buildings are discouraged. All new construction should be in some ways harmonious with the rest of the campus architecture through the use of scale, fenestration, materials, design, roof, or other uniting elements.
- New campus buildings should be subordinate to the campus spaces in which they participate, be they quadrangles, malls, or streets.

The word subordinate here is used in terms of desired functional relationships among buildings, the symbolic implications of continuity versus contrast, and the orchestration of visual effects; that is, the play of foreground and background buildings.

- Referential campus designs that provide strong appropriate images are welcome. Elements that help create institutional symbols such as colonnades, arched entrance ways, pergolas, fountains, bell towers, ceremonial stairs, and other "place markers" enrich the built environment of the university.
- Building design should consider the view from any prominent vantage point. Visible roof areas should be given a finished appearance and designed with the same care and consideration as the other exterior components of the building envelope.
- Light and shadow should be introduced into the design through careful manipulation of the exterior components of the building. Large blank wall surfaces are rarely an asset.
- Building lobbies, atriums and major corridors should compliment the external campus circulation system, both in function and design. Internal and external materials and patterns should relate to each other. Building lobbies and atriums should be of adequate size to announce arrival, support pedestrian traffic and provide a sense of direction within the facility. Stairwells and elevators should be positioned logically and in locations where they can be easily found. Corridors should have some natural light and provide occasional views to key outdoor spaces to help orient the

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user. Public and required exit stairwells should also have natural light and have doors held open to the corridor whenever permitted by the applicable code. Public and exit stairwells should have the same quality finish as the other major public spaces within the building.

- Public restrooms should be carefully designed, functional, spacious and constructed of easily maintained high quality materials. Restrooms should be positioned logically and in locations where they will be easily accessed from public spaces.

Site Considerations

Consider the existing natural elements and climatic conditions present on the campus. Design buildings to maintain and enhance attractive site features such as mature trees and pleasant views. Avoid impacting elements that can cause difficulties and increased costs such as drainage ways and wetlands.

Consideration of climatic conditions such as seasonal solar orientation and prevailing wind direction can reduce the demands on mechanical systems and make buildings and adjacent outdoor spaces more comfortable. Carefully consider window areas and entry points that face prevailing north or west winter winds and protect north-facing exterior walls whenever practicable. Optimize the buildings' exterior surface areas whenever possible to reduce heat loss in the winter and gain in the summer.

Use the buildings to define useful outdoor spaces, and where appropriate, provide additional enclosure with landscaping and other site elements. Furnish adequate lighting, furniture and landscaping to make the outdoor areas comfortable. Design all open spaces that are adjacent to buildings so that spaces have an attractive, finished appearance.

Design Principles

Conduct an "existing conditions survey" that assesses the materials, structural systems, mechanical systems and past modifications of buildings to be renovated or the collection of buildings near the proposed new construction. The survey should determine the character of the buildings through an historic analysis. Such a formal analysis provides a basis for any new design by identifying the significant features of the buildings. In the case of buildings which have been expanded, the analysis identifies the transformation of the original.

Identify the significant qualities of the existing buildings in relationship to campus arrangements, especially to the definitions of boundary and qualities of closure. Identification of the underlying compositional order is the goal.

New construction should develop in relation to the features which have been identified as characteristic of the original buildings. This will include materials and details as well as roof shaping and massing. Duplicating context is not the aim. An inventive interpretation of forms which acknowledges the evolutionary nature of architectural expression is the goal.

The designer should demonstrate the relation of the new building to the entire campus. Here the compositional analysis of the second design principal is critical. The new work should be woven into the fabric of the campus, developing relationships of outdoor space and circulation networks will strengthen and extend the original order.

In the design of new construction, size the plan and the elevations to relate to the mass of adjacent structures. This will maintain unity of the campus, permit natural vegetation to show strong visual presence, and establish a human scale. Massing refers to a building's overall volume.

The form of new buildings should relate to the adjacent structures and their overall characteristics to ensure compatibility. A building's form is its outline or silhouette. The primary form givers are the size and proportion of the elevation and the roof shape.

Detail buildings to provide a human scale. Limit large expanses of blank walls and use landscaping to help create a comfortable human scale. Scale refers to how building elements such as windows and doors are perceived in relation to other building forms.

The rhythm of new buildings should relate to the adjacent structures and their overall characteristics to ensure compatibility. The term rhythm is used here to describe the design of wall panels and fenestration of the building. It is the placement and pattern of solids and voids.

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Design Elements

By creating an appropriate palette of design elements to be used for any new construction, the existing architectural character will be maintained and reinforced.

Building entrances should be a visible, dominant feature of the building elevation. Place main entrances to respond to primary pedestrian circulation patterns. Use larger, recessed entries with glass doors whenever possible. Consider vestibules at primary entrances to trap seasonally conditioned air and lower utility costs. Use lighting and landscaping to highlight major entrances. Wash wall surfaces of recessed entries with light to enhance impact and safety. Provide accessible entrances that conform to Americans with Disabilities Act (ADA) requirements.

Locate service areas as shown in the applicable physical development plan and screen unattractive views. Provide vehicular access to service areas, keeping in mind that the points where pedestrian walkways cross the vehicular access should be visible to vehicular traffic.

Locate mechanical equipment within the building envelope. Avoid prefabricated penthouses and exposed mechanical equipment. Laboratory and other potentially hazardous exhausts mounted on the open rooftop must be given special consideration to reduce the impact of their appearance.

When mechanical equipment must be externally located above grade, group the equipment appropriately and screen the elements informally with plant materials and/or masonry walls that are integrated with the design of the building. Design the condition to minimize the impact of noise and/or exhaust.

Locate loading dock facilities and pedestrian drop-off areas away from building air intake and exhaust louvers to minimize the impact of vehicle/building exhaust and other unpleasant odors.

Locate air intake and exhaust louvers to assure proper function and appropriate indoor air quality. Any design should carefully consider the existing conditions that may impact the proper function of the louvers. Integrate louvers and other related mechanical elements with the architecture of the building.

UTILITIES

Utilities are essential to the operation of a campus, providing water, electricity, gas, air conditioning or heating and carrying away wastes and storm water. In spite of their importance, utilities should not dictate the visual quality of the human environment. A definite cost factor is involved with the location, screening, and maintenance of utility systems. While it is hard to translate improvement in quality of life into dollars, it is necessary to allocate adequate consideration and funding for the proper treatment of utilities. The following paragraph contains some suggested techniques to mitigate the visual impact of utilities at a reasonable cost.

Locate all ground-mounted utilities in unobtrusive locations, near buildings or site walls if possible. Screen all utility structures with informal landscaping, fences or screen walls that are integrated with the building design. When possible, locate compatible utilities underground in common banks. When it is necessary to place utilities lines above the ground, use the same transmission pole system, follow existing building lines, mirror existing utility lines, or follow the edges of tree lines. Consider the existing plant materials when locating utilities and the minimize damage to them during installation and operation.

Utility Service and Corridors

All new utility service on any campus should be placed underground. As new construction or upgrading of existing utilities occur, efforts should be directed to placing existing overhead utilities below grade. Where new primary services must be extended from off-campus locations and cannot be located underground, they should be placed to avoid highly visible locations or areas of frequent public use.

Underground utility systems and other similar elements should be designed to minimize conflicts with existing or future site, landscape or building development. As new utility systems are developed or existing systems upgraded, efforts should be directed toward development of defined utility corridors. These corridors should be logically located and developed to avoid random placement of lines. Because the primary walkway system links all areas of campus, consideration should be given to development of corridors that parallel these walks.

Where new utilities conflict with existing landscape development, efforts should be directed toward tunneling or boring rather than traditional trenching systems. This approach results in significantly less damage and ultimate loss to landscape plantings and other site improvements.

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Utility Structures

Utility structures such as manholes, fire protection pits, valve boxes and other similar underground structures should be designed to avoid placement in pedestrian walks or paving areas. Where this cannot be avoided they should be designed to integrate visually with the paving and placed out of the line of primary pedestrian traffic flow.

Utility Expansion

As new utility development occurs or upgrading of existing facilities occurs, efforts should be directed toward anticipating and accommodating future campus needs through provision of larger line or conduit sizes and additional or spare conduits.

OUTDOOR LIGHTING

Outdoor lighting increases visibility for safe vehicular and pedestrian travel, highlights various site features such as plazas or courtyards, and expands the period of use for outdoor spaces. Outdoor lighting should support the design concept for the area, provide orientation, and be comfortable. This section addresses pedestrian and vehicular pole mounted lights, specialty lighting and lighted bollards. The following guiding principles apply to all outdoor lighting:

- Outdoor lighting should be designed to achieve desired levels of lighting based on manufacturer's photometric diagrams and the lighting designer's input. The ratio of the average horizontal illumination to the minimum horizontal illumination (uniformity) should be low. Maintain good coverage (the percentage of any secure area whose illumination is at least one-tenth of the average illumination) in all secure areas. Utilize light sources that render color effectively and provide a high degree of peripheral vision per unit of energy. See the following chart for suggested average light levels.

Area/Activity	Lux	Footcandles
Building Exterior		
Entry— Active Use	50	5.0
Locked or Infrequent Use	10	1.0
Vital Locations or Structures	50	5.0
Building Surroundings	10	1.0
Building and Monuments (Floodlighted)		
Bright Surroundings		
Light Surfaces	150	15.0
Medium Light Surfaces	200	20.0
Medium Dark Surfaces	300	30.0
Dark Surface	500	50.0
Dark Surroundings		
Light Surfaces	50	5.0
Medium Light Surfaces	100	10.0
Medium Dark Surfaces	50	5.0
Dark Surface	200	20.0
Pedestrian Tunnels	40	4.0
Pedestrian Overpasses	03	0.3
Pedestrian Stairways	05	0.5
Light Surfaces	200	20.0
Dark Surface	500	50.0
Gardens		
General Lighting		
Path and Steps	10	1.0
Backgrounds, Fences, walls		
Trees and Shrubbery	20	2.0
Flower Beds and Rock Gardens	50	5.0
Trees and Shrubs (When Emphasized)	50	5.0

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Focal Points (Large)	100	10.0
Focal Points (Small)	200	20.0
Roadways		
Academic Areas	14	1.4
Residential Areas	10	1.0
Walkways		
Academic Areas	06	0.6
Residential Areas	02	0.2
Parking Areas	10	1.0
Parking Structures	06	0.6

- The number of fixtures should be increased in potentially hazardous locations such as exterior stairs, sidewalk intersections, and remote parking areas. Lights used for emergency purposes should reach their full candlepower within 10 seconds of the time that the emergency power source is activated.
- Plant materials should be selected, placed and pruned to avoid blocking light.
- All fixtures should use energy-efficient lamps, photocells, and timers to conserve energy and preserve the life of lamps.
- Outdoor specialty lighting should be used, when appropriate, to accent plant material, building facades, building entrances, or signs. Ensure that lamp color and any visible fixtures are compatible with lighting standards for the campus.
- Light sources with a high color-rendering index (CRI) are to be utilized for outdoor lighting, including parking areas. Avoid conditions where there is an obvious color contrast in light sources/coloration.
- Ground level fixtures are to be vandal proof, unobtrusive and resistant to damage from mowing and other normal maintenance operations. Coordinate the placement of ground level fixtures and plant materials to assure the intended function.
- Exterior lighting should define the circulation pattern, emphasize aesthetic features, and contribute to the attractiveness of the space and surroundings.

•Roadway Lighting

•Vehicular lights are generally those fixtures with a mounting height of 25+/- feet or greater. To prevent damage to poles or vehicles that come in contact with them, locate light standards a minimum of 3 feet behind the curb along roadways. In parking areas provide a concrete base to protect the light standard or locate the fixtures within a planting island. Use only fixtures having adjustable glare control and cut-off features.

•Pedestrian Lighting

•Pedestrian lights are generally those fixtures with a mounting height of 10 to 14 feet. Place standards on a concrete base. Follow the general criteria described above for placement. For additional safety and comfort, increase lighting levels along main walkways and routes connecting parking areas to primary campus destinations.