Development Guidelines
Architecture

2.0

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2.0 DEVELOPMENT GUIDELINES

The purpose of the development guidelines is to supplement the Master Plan and achieve the vision and principles set forth therein. The guidelines are the basis for review of all planning and design projects at the Cherokee Farm Campus. Flexibility is a hallmark of the campus plan, and the development guidelines extend that principle to individual projects as they pursue excellence and innovation. Over time, each building and site improvement should advance the master plan, producing a unified and cohesive campus. Designers must demonstrate compliance with the guidelines through the University's development review process (See Section 3.0).

2.1 ARCHITECTURE

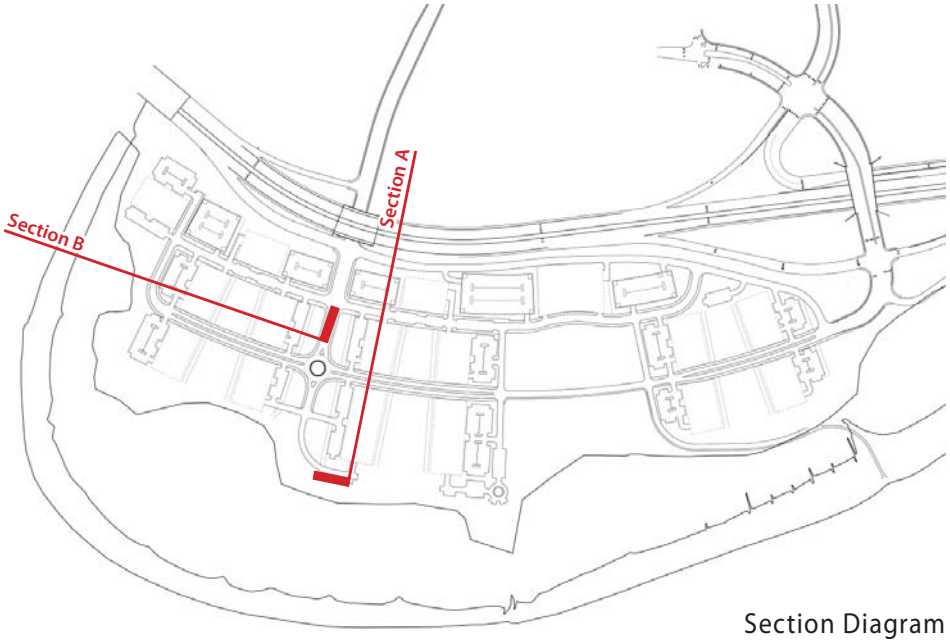
2.1.1 Goals

- ***Provide high quality buildings that demonstrate sustainable principles and are contemporary, functional, well designed, visually interesting and compatible with their surroundings.***
- ***Express the innovative and creative spirit of the campus through variation in building massing, fenestration, materials, details and systems.***
- ***Incorporate flexible design principles, recognizing that research programs change over time.***
- ***Encourage human-scaled buildings that provide a sense of enclosure and support pedestrian-oriented public spaces.***
- ***Promote interaction among faculty, students and visiting researchers in an open, inviting and creative environment.***

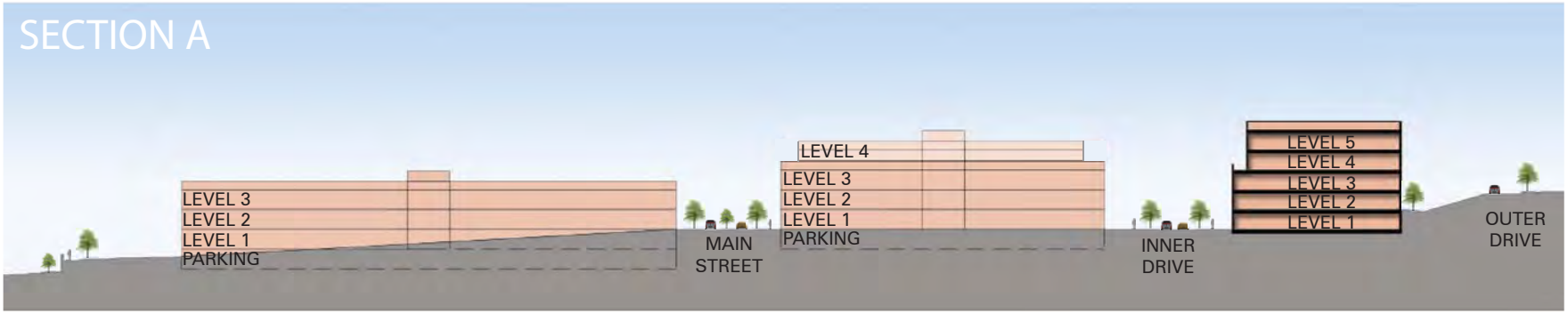
2.1.2 Building Heights

The Master Plan calls for buildings that respond to the topography and historical context of the site.

- The maximum building height in all development zones is 5 stories. The actual height may vary depending on floor-to-floor heights, but should not exceed 75 feet above average grade, defined as the average of the existing highest and lowest grade.
- Above 3 stories or 45 feet, building facades fronting a quad or street should step back a minimum of 10 feet.
- Building heights should correspond with adjacent buildings to achieve an overall compatible scale.
- Building heights should respond to changes in grade across the site, maintaining views of the river from the upper portions of the campus.



Section Diagram



View to North

2.1.3 Building Location and Orientation

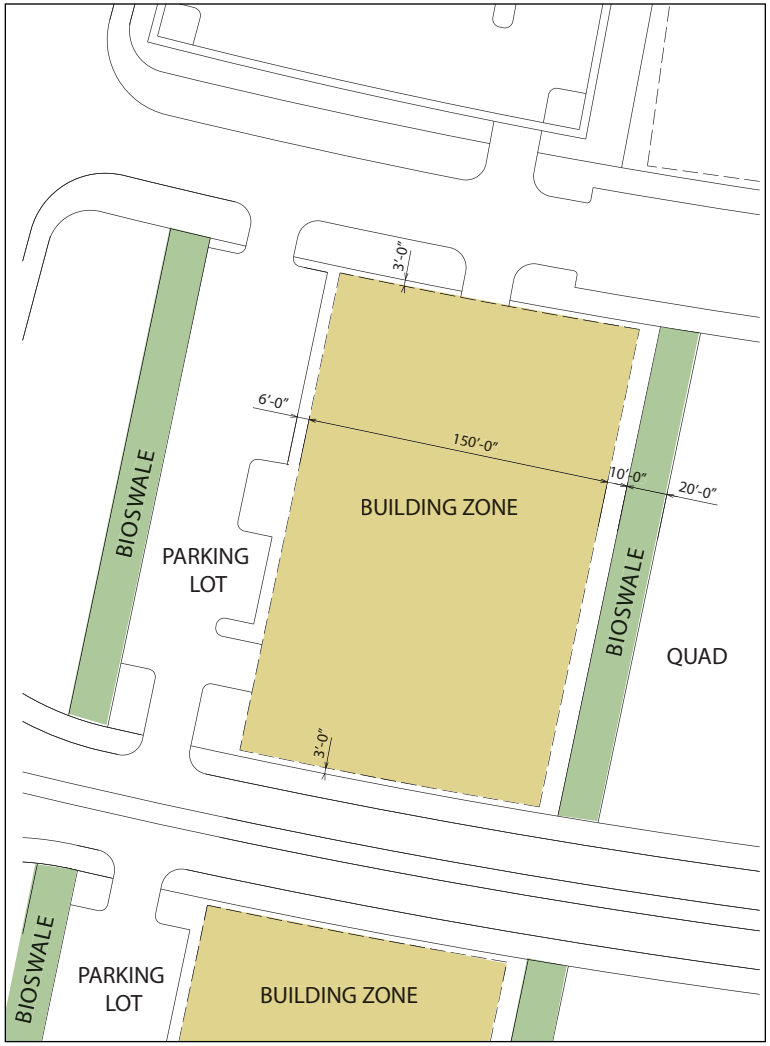
Building location and orientation affects the quality of indoor and outdoor spaces. Except for the building site east of the Preserve, all building zones have a maximum width of 150 feet. For buildings facing the quads, the building zone shall be setback 10 feet from the bioswale and 6 feet from the back of curb of the adjacent parking lot. For buildings facing the Inner Drive, building zone width begins 3 feet behind the sidewalk.

- While following the design intent expressed in the Master Plan, buildings may occupy any location within the building zones identified in the master plan.
- Buildings should orient active uses to adjacent public spaces, streets and sidewalks, parks and plazas.
- Buildings should respond to the natural topography of the site to minimize site disturbance.

Sustainable Design:

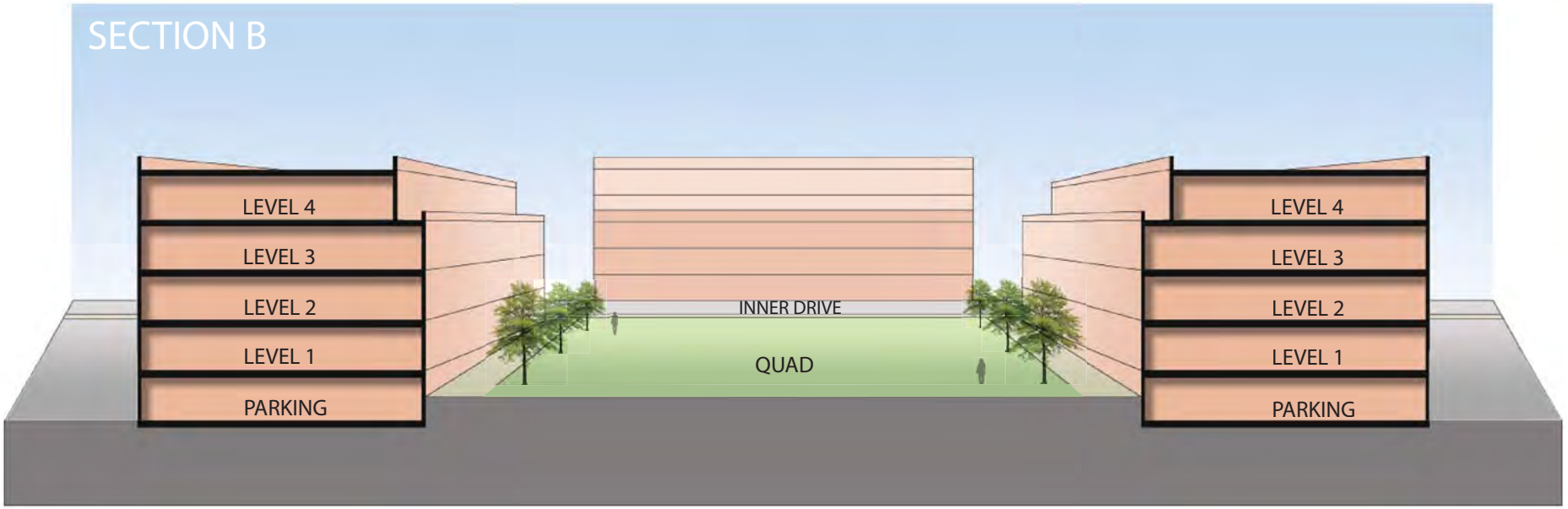
- *Select the building orientation (north, south, east, west) that best suits the site's solar attributes (solar energy, heat gain and daylighting) and topography.*

Reference: *State of Tennessee Sustainable Design Guidelines, section 1.02; C: Energy Efficiency and Atmosphere Protection, (2.b.iii.) Energy Efficiency of Building Systems.*



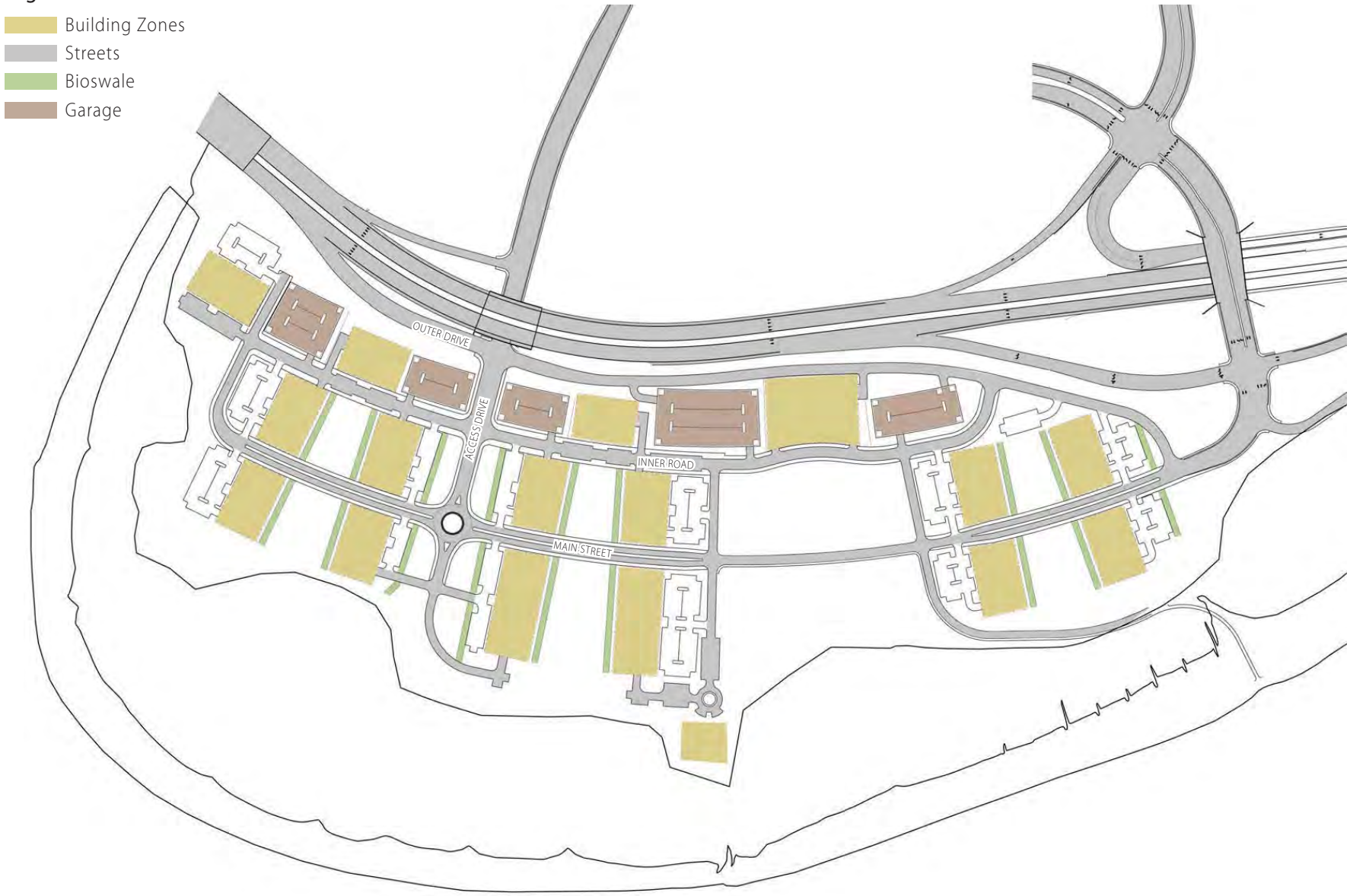
Building Zone Diagram

2.1.3 Building Location and Orientation



View East From Main Street

2.1.4 Building Zones Plan



2.1.5 Facades

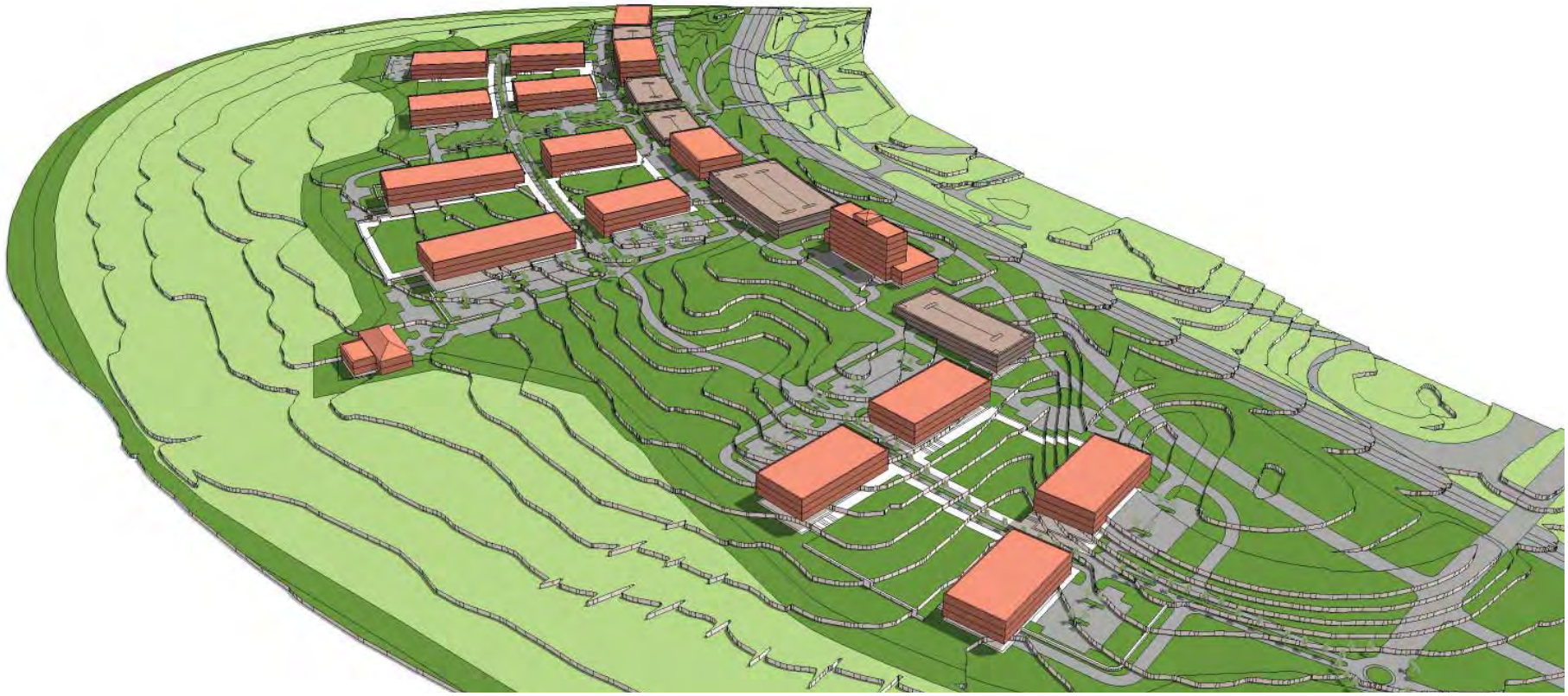
Building facades shape the identity of the campus, orient visitors to the site and serve as walls for public spaces. Building facades should have visual appeal and reflect the innovative spirit of the campus.

- All building facades should be comparable in quality to the primary entry façade.
- Building entrances should be distinct and intuitive and visible from the street and parking.
- Many buildings may have multiple public entrances. The entrances should express a clear hierarchy.
- Building facades should avoid large expanses of blank walls by varying materials, textures, forms and fenestration.
- Canopies, recessed windows and other shading devices are encouraged to create visual interest and scale and to respond to solar heat gain and daylight harvesting.
- Retail or restaurant uses on the ground level of parking structures should have a minimum 70% glazing, as measured between 2 and 12 feet from the adjacent ground plane. Transparency and reflectivity should allow visibility from the street during the day.
- Maximum building glazing is 70% of the total surface of each facade.
- Facade treatment should reflect solar orientation. To reduce solar heat gain and glare, designers are encouraged to utilize vegetation, screens, louvers, roof overhangs, recessed windows, light shelves and/or high efficiency glazing.

2.1.6 Massing

Building massing can reinforce the site's landform and the relationship of the campus to its larger context. The Master Plan calls for horizontal massing of buildings, leaving vertical elements to signal landmarks and gateways.

- Vertical and horizontal articulation of building mass is encouraged to establish scale and interest along building edges.
- Building wall offsets, projections and recesses, such as pilasters, should be used to break down the massing of a single building into bays.
- Building massing and form should maximize sunlight in all adjacent exterior public spaces, such as plazas and courtyards.



Bird's Eye View From Southwest

2.1.7 Materials and Colors

Materials and colors unify buildings in a campus setting and link the development to the natural landscape.

- Materials and colors should draw on regional examples and the natural environment.
- Public areas, building entrances, and ground floors should use durable, long lasting materials carefully detailed.
- Buildings should use materials such as brick, pre-cast concrete and large expanses of glass on elevations oriented toward the primary streets.
- Minimize the number of primary exterior building materials to three, with one serving as the dominant cladding.

Appropriate exterior wall materials are:

- Brick
- Natural or artificial stone
- Concrete: finish should be of architectural quality
- Metal panels: individual or systems of architectural quality
- Glass curtain wall systems

Appropriate materials for limited exterior accents are:

- Metal (galvanized, painted or ornamental)
- Concrete (pre-cast or unfinished exposed concrete)
- Tile

Inappropriate materials include:

- Applied stone
- Exposed concrete masonry units (full width)
- Mirrored glass
- Exterior insulation and finishing system (E.I.F.S.)

Sustainable Design:

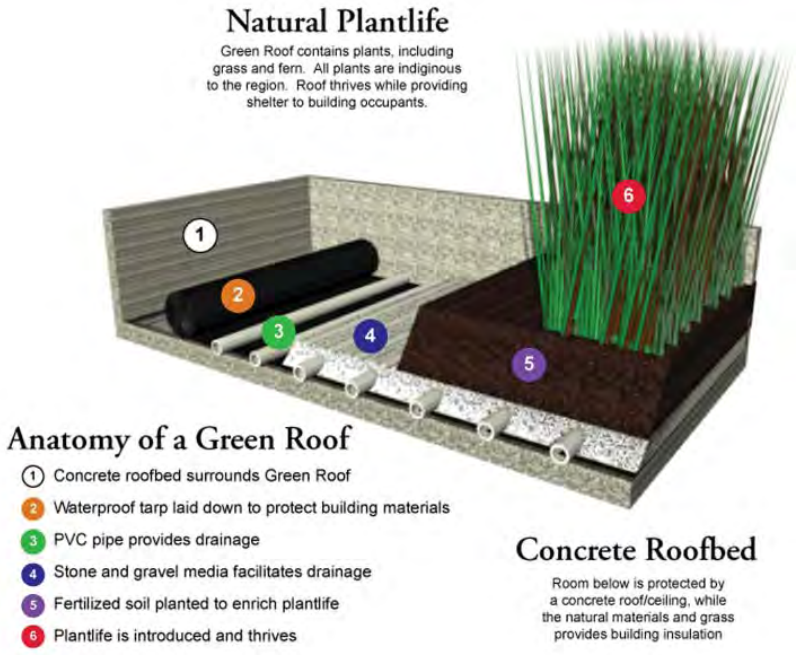
- *Buildings should utilize sustainable materials that are locally produced, indigenous to the region and high in recycled content.*
- *Where practical, all natural materials used in buildings should be of rapidly renewable origins.*
- *For wood building products, utilize Forest Stewardship Council (FSC) certified wood for a minimum of 50% of wood.*
- *Where practical, utilize salvaged or recycled materials in design and construction of new facilities.*

Reference: *State of Tennessee Sustainable Design Guidelines, Section 1.02; D: Materials and Resource Use, (3.d), Sustainable Material Preference.*

2.1.8 Roofs

Roofs should reinforce the building's composition, its shape, form, massing, facades and the exterior spaces it makes.

- Roofs may be flat provided that feature elements of the building are articulated by change in height of the parapet or incorporate vertical elements that engage or extend above the roofline.
- Rooflines should modulate or vary to prevent larger expanses of uninterrupted roofs.



- All mechanical equipment located on a roof should be incorporated in the overall composition of the building, either contained within roof forms or screened by parapet walls.
- To the extent possible, vegetated roofs, using drought resistant plants, are a preferred option to mitigate heat absorption and stormwater runoff and reduce energy costs and roof replacement costs.

Intensive Vegetated Roof

Sustainable Design:

- *For low-sloped roofs (slope ≤ 2:12), finished roof surface should have a Solar Reflectance Index (SRI) of 78 or greater for a minimum of 75% of the roof surface.*
- *For steep-sloped roofs (slope ≥ 2:12), finished roof surface should have a minimum SRI of 29 or greater for a minimum of 75% of the roof surface.*

- *When utilizing vegetated roof surfaces, the vegetated space should cover at least 50% of the roof surface.*

- *When utilizing a combination of vegetated and high solar reflectance roof surfaces, install them such that the following equation is satisfied: (Area of SRI Roof / 0.75) + (Area of Vegetated Roof / 0.5) ≥ Total Roof Area.*

Reference: *State of Tennessee Sustainable Design Guidelines, Section 1.02; A: Land Management, (5.b.), Roof Surfaces.*

2.1.9 Exterior Building Lighting

Lighting is an important part of the campus environment for safety, wayfinding and aesthetics.

- Apply even levels of light to areas like parking lots and walkways and slightly higher levels of light to plazas, gathering spaces adjacent to buildings and building entrances.

- Recommended light level guidelines and uniformity ratios established by the Illumination Engineering Society of North America (IESNA), in the IESNA Lighting Handbook (current edition), should be considered when determining appropriate lighting design solutions.

- Lighting designs should minimize glare and light trespass, maximize energy conservation, and maintain dark skies. Lighting should utilize automatic controls systems to eliminate excessive light during non-active hours of site and building operation, while maintaining safety and security.
- Full cut-off fixtures, mounting heights, and shielding should be utilized to effectively control glare and light trespass on adjacent buildings and properties.
- Exterior lighting should complement the building's design and not spotlight individual features. Lighting of expansive wall planes, towers, and roofs or the use of architectural lighting that results in "hot spots" should be avoided.
- Light mounts to the roof parapet are not permitted. Wall mounted light fixtures used to illuminate parking lots are not permitted.
- Decorative lighting should be used at building entryways, along streets and public spaces, while more utilitarian fixtures are acceptable in parking and service areas.
- Exposed lamps are not allowed.

Sustainable Design:

- *Design building façade and site lighting with lighting power densities that promote safety but minimize light pollution from the building site.*
- *Design exterior area lighting power densities to be 20% less than lighting power densities defined in ASHRAE 90.1-2007, Exterior Lighting Section.*
- *Design building façade lighting to be 50% less than the lighting power densities defined in ASHRAE 90.1-2007, Exterior Lighting Section.*
- *Design the placement and fixture styles of site lighting to minimize illumination above the horizontal plane and to minimize light trespass at the site boundary.*
- *Use fixture types designed as "cutoff" and "full-cutoff" styles to minimize fixture lumens emitted at 90 degrees or higher from straight down.*
- *Select exterior fixtures and locate them on the site to minimize light trespass at the site boundary. Document the foot-candle levels at the site boundary with a site illumination model.*

Reference: *State of Tennessee Sustainable Design Guidelines, section 1.02; (A.7), Exterior Site Lighting.*

2.1.10 Exterior Building Signage

- Signs should be constructed with high quality, durable materials appropriate to the physical demands of an urban setting.
- Buildings should be designed with locations to accommodate signage that is complementary to the building architecture, detailing, and materials.
- Sign colors, materials, sizes, shapes and lighting should complement the other elements of the façade and landscape design.
- No signage should be painted directly on a building façade.
- Signs should not project above the roofline of a building, or floor line for a ground floor commercial establishment.
- Signs should not be oriented toward the Tennessee River/Ft. Loudon Lake.
- Commercial signage should be limited to one sign per street frontage.
- Commercial signage should serve to identify a tenant rather than advertise it.
- No advertising devices, slogans, symbols or marks other than the company logo or word mark should be used.
- Commercial signage should be consistent with the surrounding signs in scale, format, materials, colors, illumination and legibility. Neon signs are prohibited.
- Signs should be illuminated by a steady, stationary, shielded light source, directed solely at the sign or internal to it, without causing glare for motorists, pedestrians or neighboring premises.
- Signage plans shall be reviewed prior to implementation for consistency with existing signage on the campus.

2.1.11 Interior Building Systems

Daylighting:

- Provide a connection between indoor and the outdoor spaces through the introduction of daylight and views into regularly occupied areas of the building.
- Demonstrate that a minimum daylight illumination level of 25 footcandles has been achieved in at least 75% of the regularly occupied spaces.
- Design the building to maximize the interior daylighting by considering the use of floor plates with minimum widths, building orientation, increased building perimeter, exterior and interior shading devices, high performance glazing, and light shelves to project light deeper into the spaces.
- Daylighting strategies should address color schemes, integrated lighting systems and direct beam penetration into spaces.

Mechanical, Plumbing and Electrical Systems:

- Select refrigerants and HVAC that minimize or eliminate the emission of compounds that contribute to ozone depletion.
- Utilize fire suppression systems that do not contain HCFCs or Halons.
- Raised flooring systems are encouraged. This system provides conditioned air at the level of the occupants while allowing flexibility in locations for outlets and vents.
- Specify high-efficiency fixtures and dry fixtures such as waterless urinals.
- Consider using rainwater or gray water systems for irrigation, flushing toilets and urinals and process water needs.
- Maintain consistent lighting levels through the use of photo responsive controls.
- Appliances should be Energy Star rated.
- Verify that the buildings energy related systems are installed, calibrated and perform according to basis of design and construction documents through a commissioning process.
- Evaluate the project site for on-site renewable energy opportunities, including solar photovoltaic, solar heating, wind generated electricity and geothermal.