

UNIVERSITY OF GUAM VISION 2025



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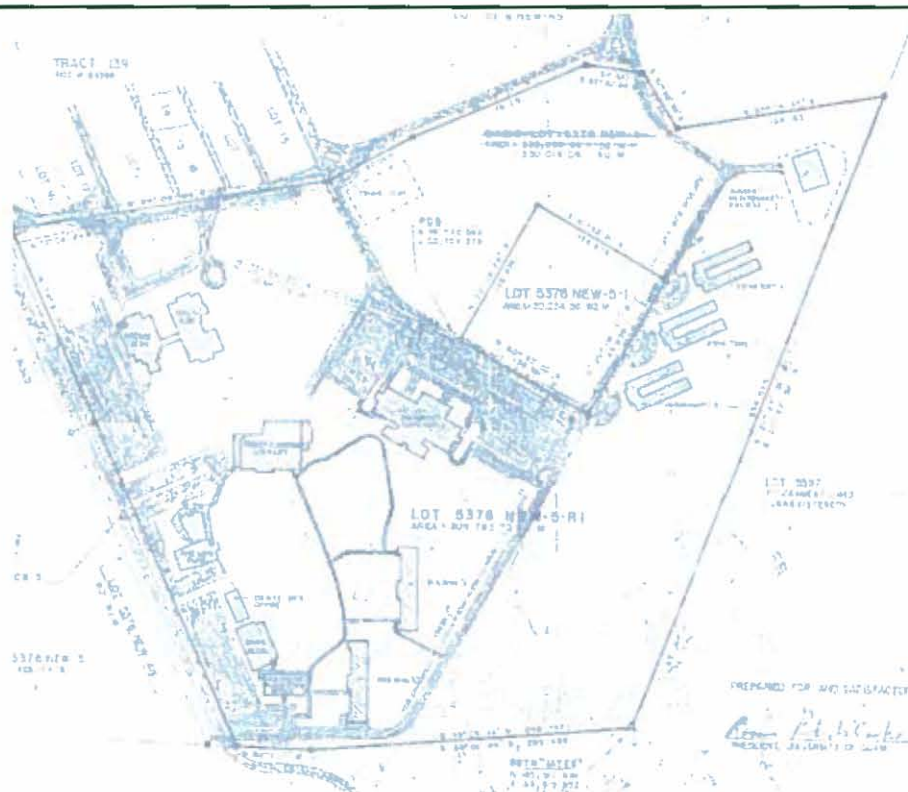
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SETBE



TRMA
Tanguchi Ruth Makio Architects

ACKNOWLEDGEMENTS



*Vision 2025 Concept Plan (right).
1979 Survey Plan (below).*



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UNIVERSITY OF GUAM VISION 2025



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THE SETTING



INTRODUCTION

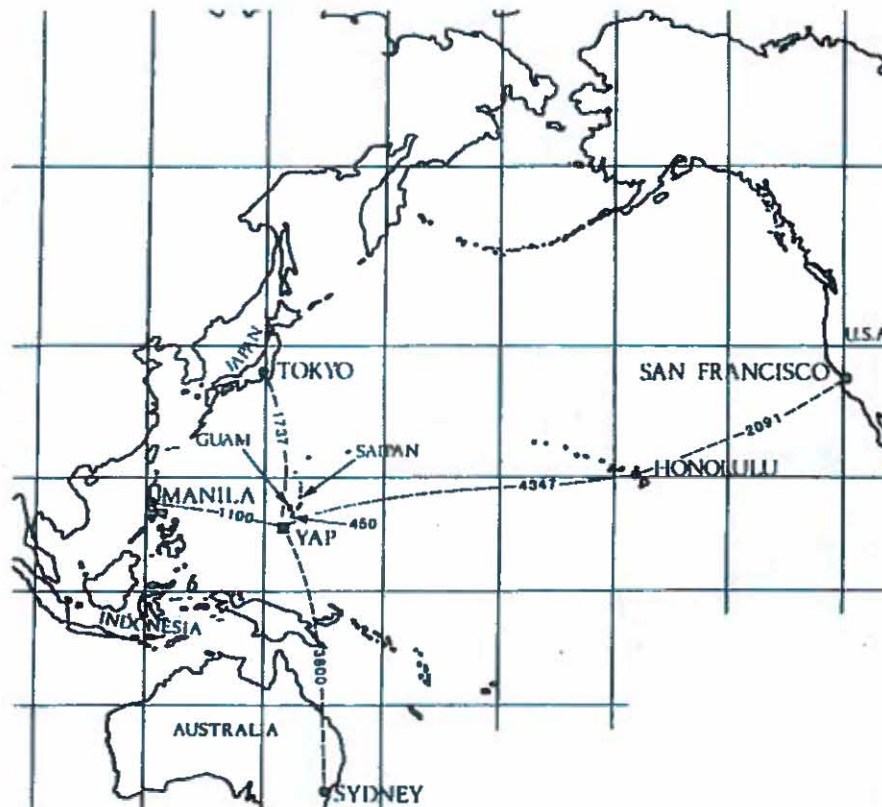
The University of Guam's Physical Campus Evolution is necessary for meeting the core commitments of its mission. Four core commitments are critical to the University's mission:

- Enhance Academic Quality
- Enhance Student Success, Enrollment Growth, Retention and Institutional Visibility
- Promote its Land-Grant Mission and Community Engagement
- Strengthen Institutional Efficiency and Effectiveness

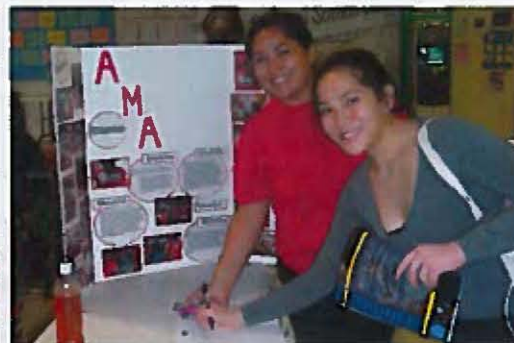
The Mangilao campus started in 1960 with a classroom building and a library. The current campus is significantly larger, as evidence of the University's 60 years of providing the facilities necessary for the accomplishment of its Core Commitments. A surge of growth occurred during the 1970's through the 1990's.

VISION 2025

The Vision for the University of Guam in the year 2025 is a regional institution of higher learning and research supported by a 21st century campus that fosters the mission: Ina, Diskubre, Setbe—"To enlighten, To discover, To serve"



THE SETTING



The University's capacity to meet its Core Commitments hinges on its physical facilities, which need to respond to 21st century needs. Technology is evolving at a rapid pace making constant upgrades a necessity. Shifts in the economy result in the growth or shrinking of current academic programs, or the creation of new programs altogether. Educational environments are transforming with more emphasis being placed on collaboration and experiential learning. Sustainability, once an innovative idea, is now a key aspect of today's global culture. All of these factors set the stage for the current and future needs of the University's faculty and students.

Vision 2025 lays out the University's response to 21st century needs together with the goals of its strategic initiatives. The physical facilities planned in Vision 2025 would accommodate the projected population of 6,000 students and the corresponding faculty increase, while aiming to ensure that the University physically grows with uninterrupted and continually upgraded instructional and service capabilities. Infrastructure and facility upgrades would support the learning activities of today's students and faculty while providing flexibility for future modification. Vision 2025 maps a University that is the natural choice for Guam and the region; a UOG Green campus that creates, inspires, generates, and develops the sustainable culture of Guam and the region; and a University that leads change for Guam and the region as the nexus for information exchange, open discussion, and collaboration.

THE SETTING



The Micronesia Area Research Center is one of the University's four Centers of Excellence.

COMMUNITY ENGAGEMENT

The University's commitment to community engagement is crucial to the goals of Vision 2025. The University is at the forefront of an area with economical potential, the Mangilao Educational Economic Zone. The University is situated in the vicinity of growing residential areas, the Guam Community College, one high school, public services, and numerous small businesses. The University is the catalyst for maximizing and developing the Mangilao Educational Economic Zone.

Additionally the University regularly serves as a venue for community events and activities. The University hosts programs for high school education, professional development, and other public services. Beneficial impacts to the community would result from the University's increased capacity for community engagement.



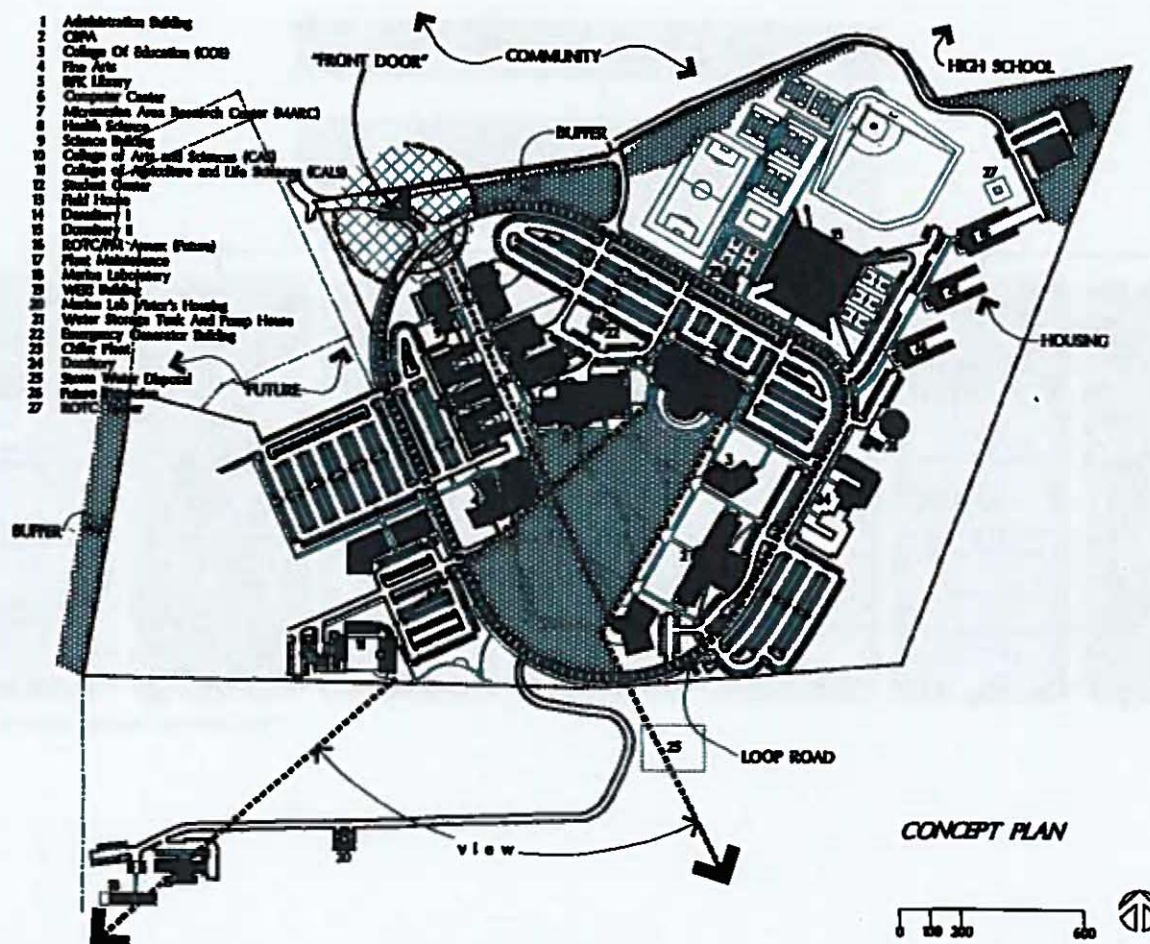
The University of Guam, Guam Community College, and George Washington High School are three components of the Mangilao Educational Economic Zone.



The Field House is regularly used for community events and activities in addition to its academic support function.

THE SETTING

Vision 2025 Concept Plan (right).
The 2000 Concept Plan (below).



THE MASTER PLAN

The University's Physical Master Plan is critical to achieving Vision 2025. The Master Plan provides the framework for new campus buildings and open spaces, mapping out the holistic development of facilities and infrastructure. Master Planning efforts were originally initiated in 1987, and was last updated in the year 2000. The Master Plan is focused primarily on the development of the Mangilao campus. Many of the planning principles outlined in the previous Master Plan are still applicable today. Vision 2025 builds on these principles, repackages them for flexibility, and infuses it with current University goals and needs.

Vision 2025 Planning Principles

1. Support the Institutional Strategic Plan
2. Address Critical Needs
3. Maximize Space Utilization and Flexibility
4. Promote and Enhance the Campus Pedestrian Experience
5. Support Community Engagement
6. Utilize Sustainable Development

The Vision 2025 Planning Principles are a framework of actions that extend from the University's core commitments and strategic initiatives to serve its students, faculty, and the community.

THE SETTING



The Campus Gateway along University Drive is comprised of various projects including the development of Presidents' Grove, the Graduate Dormitory, and the Administration Building.

PLANNING PRINCIPLES

Vision 2025 encompasses the principles of the previous Master Plan update. The planning principles of the 2000 update identified specific goals to accomplish, such as creating a "campus front". In contrast, Vision 2025 establishes a general framework for future development that includes the specific goals of the original principles. For example, the creation of the Campus Gateway is a component that contributes to the overall campus pedestrian experience. A general framework sets over-arching planning goals and key outcomes while maintaining flexibility for future updates and responses to changing student, faculty, and support needs.



*Principles from previous planning efforts.



THE SETTING

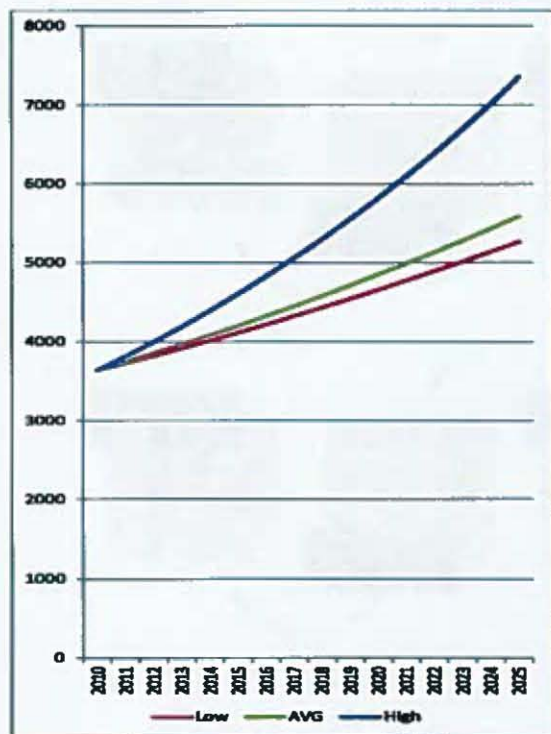
The Student Services Center is one of the lead-in projects of Vision 2025. The Student Services Center will improve campus life and will be the home of various service offices currently scattered through the campus.



GROWTH PROJECTIONS

Vision 2025 is based on growth similar to the projections used for the previous master plans. A student enrollment of 7,000 students was targeted with the previous update. Current projections show that a student population of 6,000 students is a reasonable target at a 3-percent average yearly growth rate. A range of low-high growth scenarios projects a student population of 5,000 - 7,000 students by the year 2025.

To address the rapidly evolving technology and teaching methods, the Vision 2025 campus will also provide the technological infrastructure to accommodate for the increase in distance education and online courses offered.



Low, average, and high enrollment projections.



THE SETTING



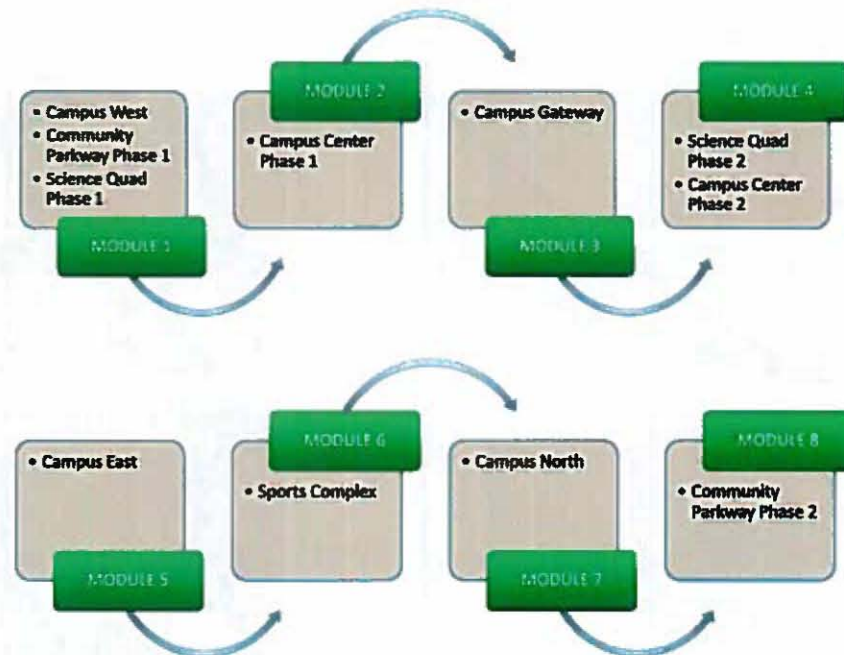
The Science Quad will link the Academic Core to Dean Circle and will create a pedestrian way that showcases the renovated Fine Arts Building, No. 14 in the image.

GRADUAL GROWTH

Design modules map the sequential physical development of the campus. Vision 2025 outlines 8 design modules that are based on the current planning principles. Each module consists of multiple projects grouped together to gradually grow the campus based on the following criteria:

- Urgent Need
- Campus Safety and Security
- Institutional Visibility
- Logical Construction Sequence
- Current Growth Projections
- Academic Program Changes
- Smart Growth and Sustainability

The design modules are intended as holistic responses to these criteria, consisting of the development of campus infrastructure and open space that would be done simultaneously with building projects.



2025 Campus Vicinity Plan.



EVOLUTION OF VISION 2025

Vision 2025 is intended to be the basis for the University of Guam's physical growth over the next decade and beyond. The Vision maps the growth through this span of time, but periodic evaluation remains necessary to ensure the plan's effectiveness. The Vision should be revisited and updated as the University's Institutional Strategic Plan evolves in order to meet the future needs of Guam and the region.

Conceptual image of the Campus Gateway.



EXISTING BUILDINGS

1. Dean Circle
2. Fine Arts
3. Science Building
4. Dormitories
5. Reserve Officers' Training Corps (ROTC) and Dormitory
6. Student Center
7. Health Science
8. Marine Lab
9. Administration Building
10. Field House
11. Water and Environmental Research Institute (WERI)
12. Tan Siu Lin Building (RFK Memorial Library)
13. Computer Center
14. Micronesia Area Research Center (MARC)
15. Warehouses A and B
16. English Language Institute (ELI)
17. School of Education (SOE)
18. College of Liberal Arts and Social Sciences (CLASS)
 - Humanities and Social Sciences (HSS)
 - English and Communications (EC)
 - Lecture Hall
19. Agriculture and Life Science (ALS)
20. Staff Housing
21. Plant Maintenance
22. Jesus and Eugenia Leon Guerrero Building
 - School of Business and Public Administration (SBPA)
 - Executive Offices



Aerial overlay of the campus boundary.



The University main campus is comprised of multiple land use zones over 280-acres of land. The University owns several properties within and outside of the main campus as identified in The Property and Facility Inventory Booklet:

Property #2 Lot 5376 NEW-3 (Dean Circle)
22 acres

Property #3 Lot 4 Block 2 Tract 144 (ELI Property)
¼ acre

Property #4 Lot 5376 NEW- R1 (Academic Facilities)
83 acres

Property #5 Lot 5376 NEW-5-1 (Field House)
5 acres

Property #6 Lot 5397 (Conservation Area)
168 acres; Shared ownership with the Government of Guam.

Property #7 Lot 5372-3A (Undeveloped)
10 acres

Properties #2 through #7 make up the main campus. Properties #2, #4, and #5 are in the "R-1" one-family dwelling zone. Properties #3 and #7 are in the "R-2" multiple dwellings zone. Property #6 is in the "A" Agricultural zone. There is private property adjacent to Property 3 and north of Marine lab that future development must consider. Vision 2025 anticipates that these private properties will not be acquired by University in the Immediate future.



Various properties make up the main campus of the University.

PLANNING PRINCIPLES



The theater in the Fine Arts Building is outdated and in need of immediate upgrades to enhance the image of the University and meet functional needs.

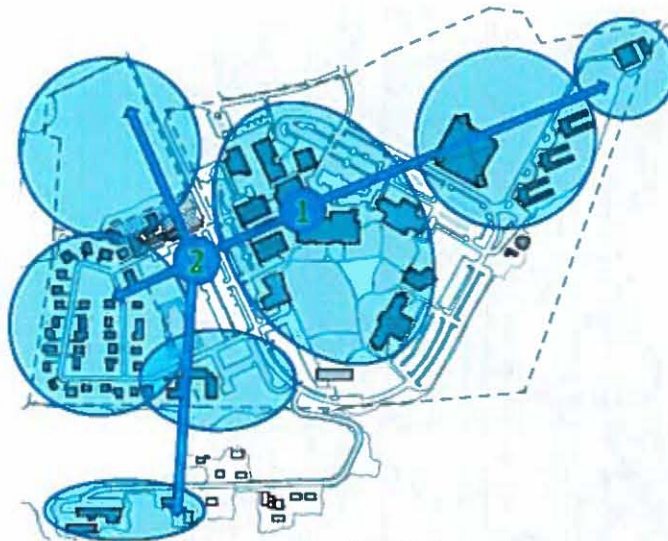
1. **Support the Institutional Strategic Plan**

One of the primary purposes of the Physical Master Plan is to support the University Strategic Plan. The University will evolve in its response to paradigms, technological advancement, and the needs of Guam and the region. As the Institutional Strategic Plan develops, the Physical Master Plan must also develop to ensure that physical facilities are in place to support the University students, faculty, and community.

2. **Address Critical Needs**

Critical and priority projects are necessary to initiate and support future development with the goal of enhancing campus life and academic quality. These include:

- a. Computer Center and Network Upgrades
- b. Creation of Additional Classroom / Office Space for Shared Use
- c. Dormitory Upgrades
- d. Renovate / Demolish Facilities Over 40-Years Old
- e. Enhance Campus Safety and Security



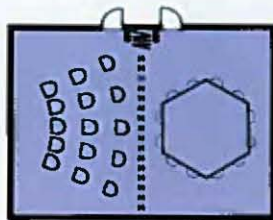
Information technology upgrades will provide the backbone for future buildings.



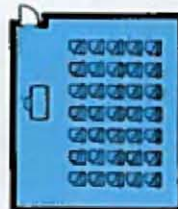
Warehouses A and B (top) along with the Science Building (above) are buildings that are at the end of their useful life.

PLANNING PRINCIPLES

Utilization of fixed / moveable wall partitions offers flexibility for spatial configurations to suit needs.



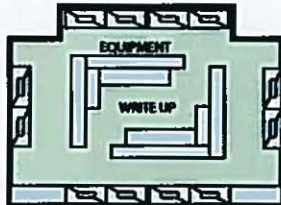
FLEXIBLE SEMINAR ROOM



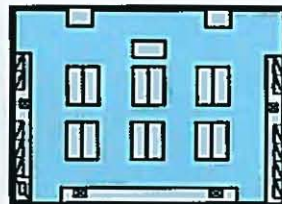
35 STUDENT CLASSROOM



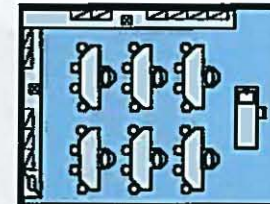
Collaborative learning space.



RESEARCH LAB



SCIENCE LAB



TEACHING LAB

Typical instructional spaces.

3. Maximize Space Utilization and Flexibility

The provision of learning, research, and office space is necessary to academic quality. Utilization of physical facilities to their full potential is of utmost importance to the University. New development should:

- Anticipate a typical classroom size of 35 students.
- Utilize folding partitions where appropriate to allow adjacent classrooms to be combined into a larger space. Partitions should have a Sound Transmission Coefficient (STC) rating greater than 40.
- Provide shared classroom space large enough to allow multiple seating configurations.
- Provide office space for faculty / staff.
- Provide research space.
- Provide necessary technological infrastructure and support spaces including communication rooms, convenience outlets, and telecom / data outlets where necessary.

PLANNING PRINCIPLES



A pleasant sidewalk that enhances sense of place and the pedestrian experience.

4. Promote and Enhance the Campus Pedestrian Experience

Increased student activity will enhance sense of place and encourage social interaction while providing environmental and health benefits. These improvements also provide the opportunity to unify the campus in terms of spatial relationships and building characteristics. New development should:

- a. Provide covered and uncovered accessible walkways throughout the campus.
- b. Enhance crosswalks.
- c. Accommodate multiple types of pedestrian activity.
- d. Create street frontage and encourage pedestrian activity along streets.
- e. Maintain a continuous covered path connecting parking lots/structures and buildings throughout the campus.
- f. Define major open spaces, green links, and outdoor gallery spaces.
- g. Include pedestrian lighting.
- h. Incorporate landscaping and site furniture.
- i. Incorporate way finding and building signage.
- j. Incorporate transit stops.
- k. Establish a building material palette.
- l. Increase Safety and Security.



The covered walkway leading past MARC encourages pedestrian travel, but ends at the campus quad.



The image (above left) evokes the design intent for Presidents' Grove, which would enhance the campus entrance.



PLANNING PRINCIPLES

The Triton Engagement Center will house CEDDERS, TADEO, The Cancer Research Center and an office for the World Health Organization.



5. **Support Community Engagement**

Community engagement is at the core of the University's mission. It is necessary for the University to uphold its level of service to the community. New development should:

- a. Enhance major venues utilized for community events.
- b. Enhance facilities for community service programs.
- c. Provide new venues and facilities for primary use to support community-oriented program activities and student life. These facilities may have a secondary use as a means for income generation.
- d. Consider partnerships with community entities for the potential relocation of community-oriented programs currently housed on campus.



The Fine Arts Building renovation will include space for the Isla Center for the Arts currently located at Dean Circle.



The RFK Library located in the Tan Siu Lin Building (above) along with the Small Business Development Center located in the Jesus and Eugenia Leon Guerrero Building (SBPA) are community resources.



The University Field House is host to many large events for the community including high school graduations, concerts and sporting events.



A diagram showing a house with a green roof and a large blue cylindrical water storage tank. Red numbered circles (1-8) indicate key components: 1. Rainhead/downspout; 2. First-flush diverter; 3. Filter; 4. Pump; 5. Pressure regulator; 6. Main distribution pipe; 7. Tap/faucet; 8. Water meter. The title "Rain Harvesting" is at the top right.

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PLANNING CONSIDERATIONS

The Campus Gateway is strengthened with the development of Property #7.

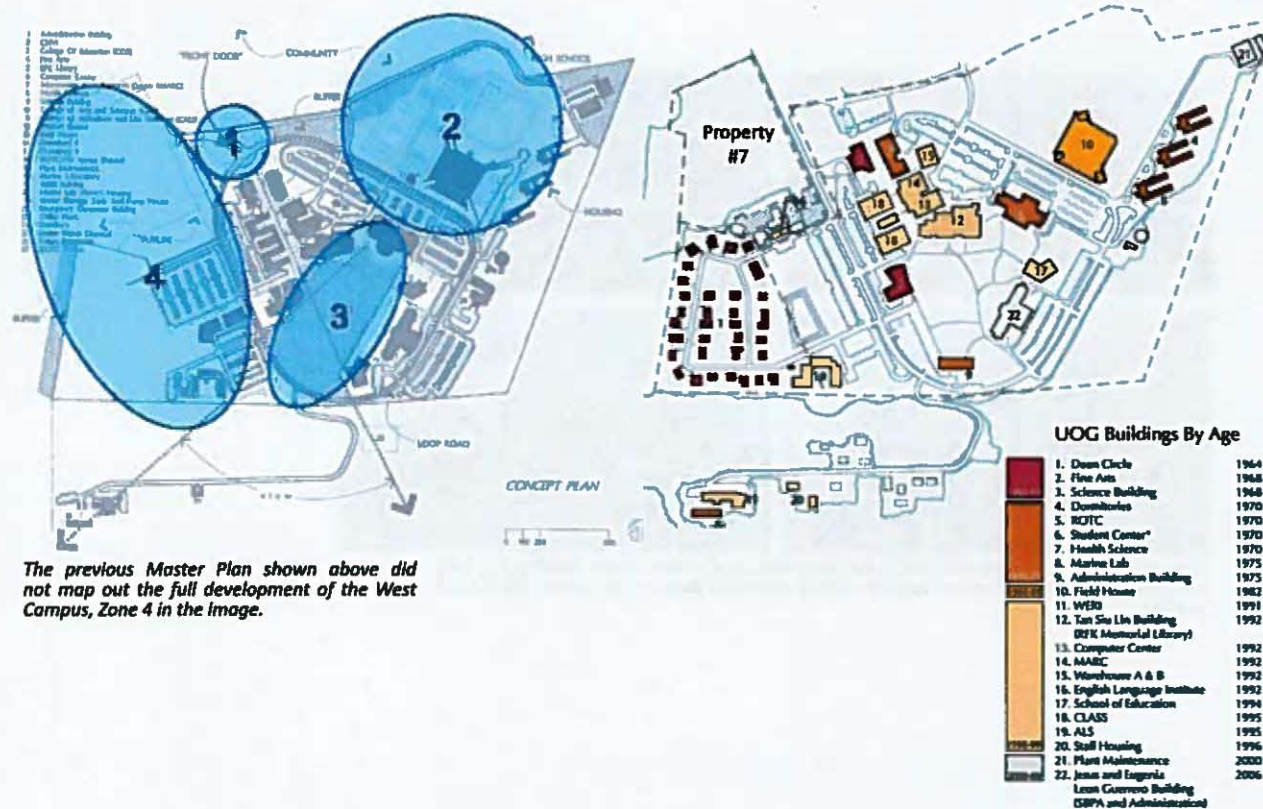


THE WEST CAMPUS

Vision 2025 updates the Physical Master Plan, mapping out development of Property #7 and Dean Circle. The previous update focused development around the campus gateway, academic core, the sports complex, and a connection to the ALS building. Vision 2025 evolves these concepts with expanded development planned for Dean Circle and Property #7. These areas offer the potential for a community-oriented zone at the perimeter of the campus core that further enhances the University's community engagement functions.

EXISTING BUILDINGS

The University's campus was built over a period of nearly 50 years. One of the oldest buildings—the Fine Arts Building—was constructed in the 1960's. The Student Center is one of several structures built during the 1970's. The Micronesia Area Research Center and the Computer Center, and expansions for the Tan Siu Lin Building (RFK Memorial Library) were completed during the 1990's. Construction of the Humanities and Social Sciences building and the English and Communication building were also completed during the 1990's. The Jesus and Eugenia Leon Guerrero Building (S8PA) is the newest building on campus.



The previous Master Plan shown above did not map out the full development of the West Campus, Zone 4 in the image.

PLANNING CONSIDERATIONS



The Jesus and Eugenia Leon Guerrero Building is the newest building on the campus.

BUILDING AGE

Building age plays a crucial role as the campus evolves to meet 21st Century needs. Today's growing needs for energy efficiency and technology render the oldest campus buildings a challenge for supporting academics and environmental awareness. The evolution of collaborative learning environments forces an evaluation of the effectiveness of the older classroom facilities. Inflexible facilities amplify the challenge of responding to growth. Concerns with campus safety in conjunction with all of these factors push the older facilities closer to the end of their useful life.



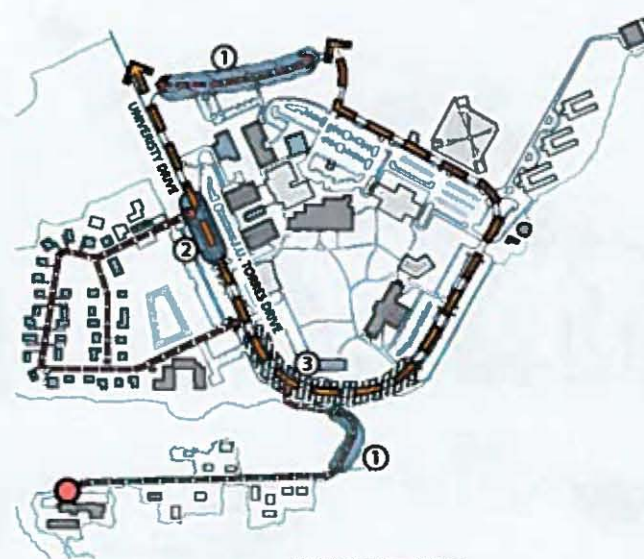
Buildings constructed during the 1990's: the Humanities and Social Sciences Building (top left); the English and Communications Building (above); Education Building (top right); and the ALS Building.

PLANNING CONSIDERATIONS

A roundabout is an effective means to reduce vehicle speed, and provide opportunity for signage, landscape features and other university icons.



Areas that present vehicular flow issues: the bend of J.U. Torres Road (top) and Presidents' Lane (above).



Vehicular Conditions

1. Poor Road Conditions
2. Traffic Bottleneck at Entry to Dean Circle
3. Lack of Traffic Calming Devices

ROADWAYS and TRAFFIC

University Drive is the primary thoroughfare to the campus from Route 10. The intersection of University Drive and Presidents' Lane demarcates the entrance to the campus. At Presidents' Lane, University Drive becomes J.U. Torres Road which travels through the campus looping around the southern end, and then leads back to the Field House. Dormitory Lane is the access road that leads from J.U. Torres Road to the dormitories and the Plant Maintenance Facility. On the western side of the campus, Alstom Circle is the primary access road to Dean Circle from J.U. Torres Road.

Improvement to vehicular circulation is needed to solve issues that currently affect traffic flow. Traffic bottlenecks occur along J.U. Torres Road at the intersections with Presidents' Lane and Alstom Circle. At Presidents' Lane, traffic is stalled by vehicles turning left to access the eastern side of the campus. At Alstom Circle, a pedestrian crosswalk often halts traffic during peak hours. The southern bend of J.U. Torres Road is a location where vehicles tend to accelerate. The bottlenecks and speeding can be mitigated with the provision of auxiliary roads and traffic calming measures.

PLANNING CONSIDERATIONS

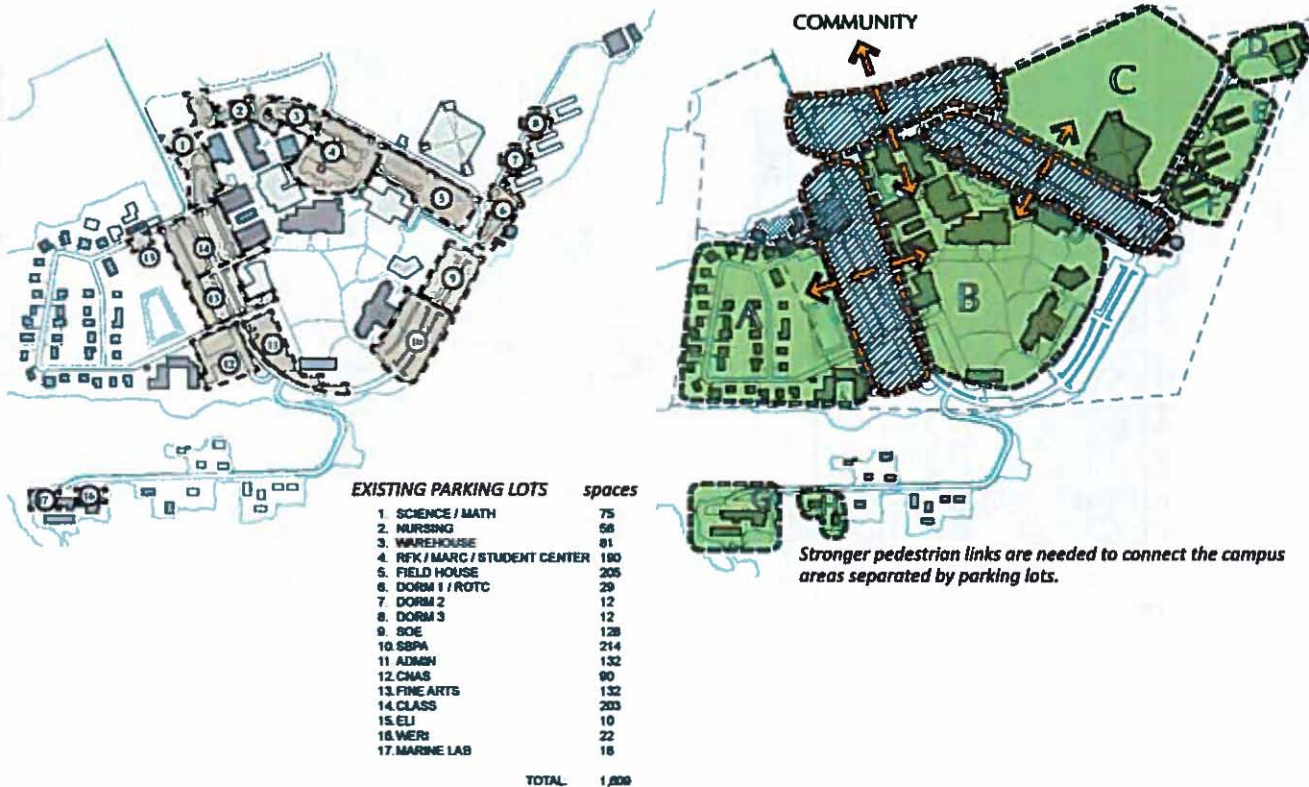


The parking lot between the Student Center and the Field House is an ineffective pedestrian link.

PARKING

Approximately 1,600 parking spaces are available at the University campus. Majority of the parking is located within convenient distance of the campus buildings. Accessible parking spaces are available for campus buildings however the Dean Circle houses remain an accessibility issue. This is a significant problem for the CEDDERS programs that utilize a majority of these structures. The University has recently made some provisions for scooter parking.

Vision 2025 takes a more sustainable approach to campus parking from the previous Master Plan update. The previous Master Plan identified the provision of approximately 1,900 parking spaces, accomplished with surface parking and based on a student to vehicle parking ratio of 2:1. Vision 2025 encourages a more sustainable campus parking strategy that utilizes parking structures to maintain green space, and the assignment of priority parking spaces for carpools and low-emission vehicles. It stresses alternative transportation such as bicycles and convenient pedestrian access.



Stronger pedestrian links are needed to connect the campus areas separated by parking lots.

PLANNING CONSIDERATIONS

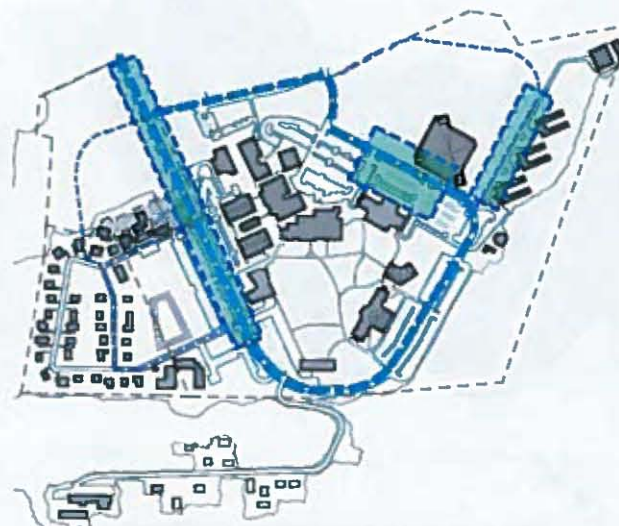
The street can be transformed utilizing paving variations and outdoor furniture to emphasize pedestrian activity.



COMPLETE STREETS

One of the primary goals of Vision 2025 is transforming the roadways and parking into elements that connect the campus rather than divide it. There are potential areas along J.U. Torres for commercial space fronting the street, pedestrian plazas, and other enhancements for pedestrian activity. These elements will reinforce the key open spaces envisioned with Vision 2025 enhancing the sense of place for the University campus.

Completing the street requires provisions for alternative transportation and encouraging street activity. There is the potential for a bicycle lane to be developed along the existing campus roadways. The University has two transit stops located on J.U. Torres Road and near the Field House, which are also locations where street activity can potentially be maximized.



There is potential for developing a continuous bicycle lane around the campus. The University has initiated the provision of bicycle racks on campus to encourage bicycle use.

Areas where street activity can potentially be maximized include J.U. Torres Road and the roadway between the Student Center and the Field House.

PLANNING CONSIDERATIONS



Presidents' Grove is a major open space element that contributes to the Campus Gateway.

OPEN SPACE

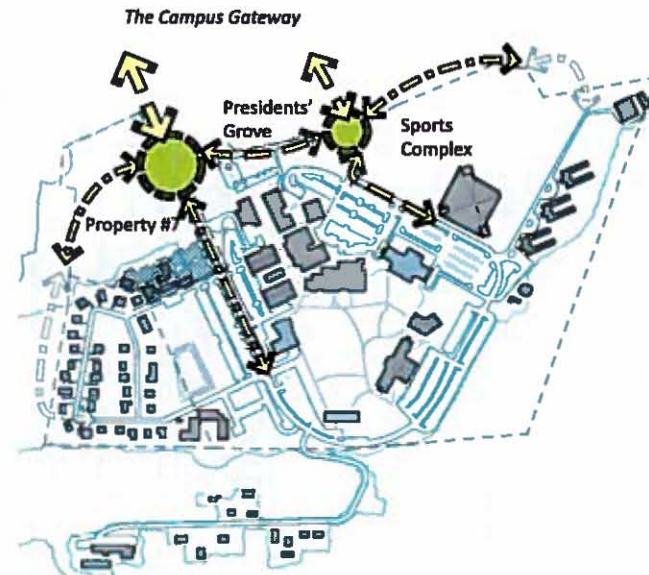
The development of open space is necessary to enhance pedestrian activity and improve campus vitality and the on-campus student experience. The 2000 Master Plan identified four major open zones to develop:

1. The Campus Front
2. The Sports Complex
3. The Central Lawn
4. Open Space for Future Development (Dean Circle and Property #7)

Development of the Campus Front has commenced with the designation of Presidents' Lane and the initial planting of Yoga trees for Presidents' Grove. The Sports Complex is currently being planned, and continues to be used for weekend community sporting events. The Central Lawn continues to function as a major gathering area for campus activities and events, such as Charter Day. The University's plans for a Graduate Dormitory, the Triton Engagement Center, and facilities for Professional International Programs and CNAS Research will transform Dean Circle and presently undeveloped Property #7. The existing ponding basin is also a space that should be reclaimed in order to maximize the full potential for development in the West Campus.



Vision 2025 builds on the four open space developments outlined in the previous Master Plan. Reclaiming the Ponding Basin adjacent to Dean Circle, Zone 4 remains a goal in Vision 2025.



Property #7 is linked with the Presidents' Grove and the Sports Complex to create a strong border and entrance to the campus.

PLANNING CONSIDERATIONS

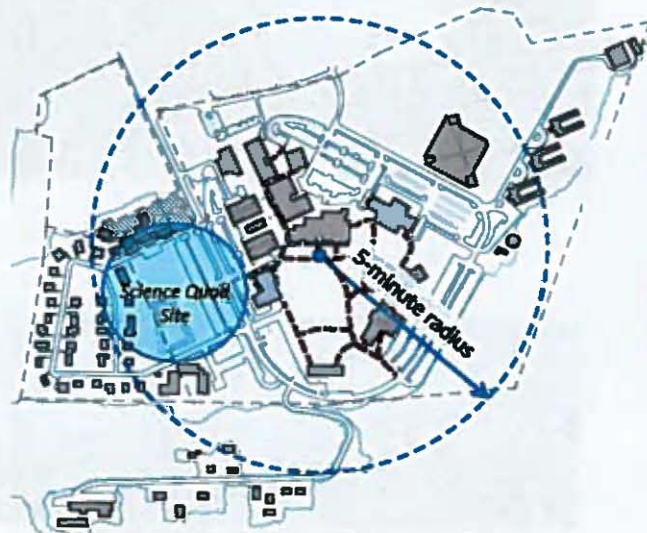
The Science Quad is intended to connect the West Campus back to the Academic Core.



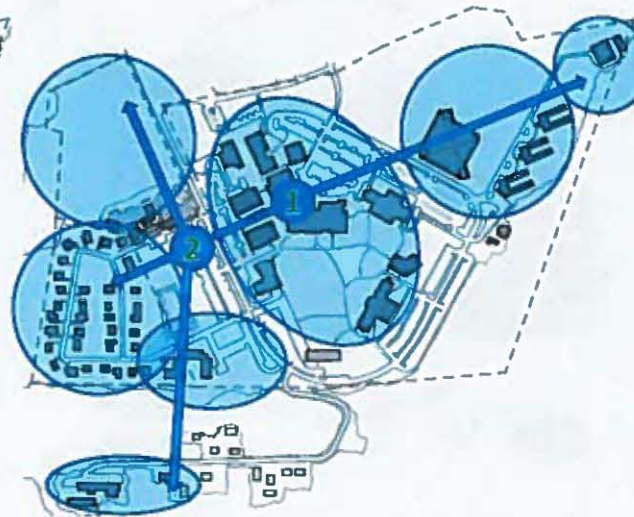
OPEN SPACE

Vision 2025 capitalizes on the potential development of Property #7 for the Campus Gateway. The property anchors the west end of Presidents' Lane and is linked by Presidents' Grove to the Sports Complex. This gateway would be a major open space that physically delineates the campus border and signifies arrival to the University.

Vision 2025 also introduces a Science Quad to the campus open space. The Science Quad is proposed at the parking lots to the west of J.U. Torres Road and would extend towards the edge of the Dean Circle houses. The Science Quad would reclaim the percolation basin, and would also create a hub for the Information and Technology Resources Center, providing a single connection point for new development and system upgrades on the western side of J.U. Torres Road. The area identified for the Science Quad is located within the five-minute walking radius from the center of campus making it the optimal location for continuing the campus open space experience across J.U. Torres Road.



The site for the Science Quad highlighted in blue is within a five-minute walking radius from the center of campus.



Development of the Science Quad would extend the capability of the Computer Center (1) with the creation of a network hub (2) that is the central connection point for new buildings planned for Campus West.

PLANNING CONSIDERATIONS

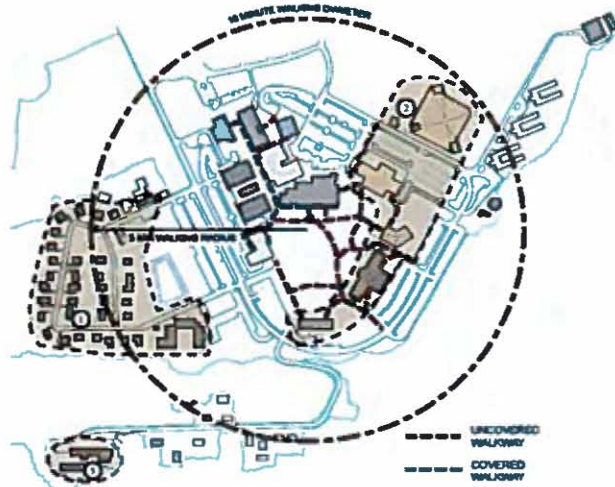


Walkway Canopies can reinforce the definition of campus open spaces and serve as an element that unifies the campus while encouraging pedestrian travel.

PEDESTRIAN ACTIVITY

Additional covered walkways are necessary to encourage pedestrian activity. Existing covered walkways start from the Tan Siu Lin Building (RFK Library) and extend north to the Science Building and west to the Fine Arts Building. There are no covered walkways connecting the opposite side of the Campus Quad. The lack of covered walkways is a larger issue for pedestrian travel to the ALS Building, Dean Circle, and the Field House, which are further away.

Vision 2025 provides additional covered walkways with the intention that these structures serve multiple functions. A system of covered walkways provides cover to campus buildings while defining major open spaces. The covered walkways can also utilize photovoltaic panels to power lighting for pedestrian activity, parking lots / structures, and buildings. Green roofs may be incorporated at covered walkways where they are located adjacent to buildings. The walkways would be wide enough to serve as exterior gathering spaces, sloped enough to prevent accumulation of debris and strong enough to withstand typhoons. The walkways themselves would also include provisions for campus infrastructure such as water, electricity, and data lines.



Dean Circle, the Field House and the other buildings on the east of the Main Quad cannot be accessed by a covered walkway.



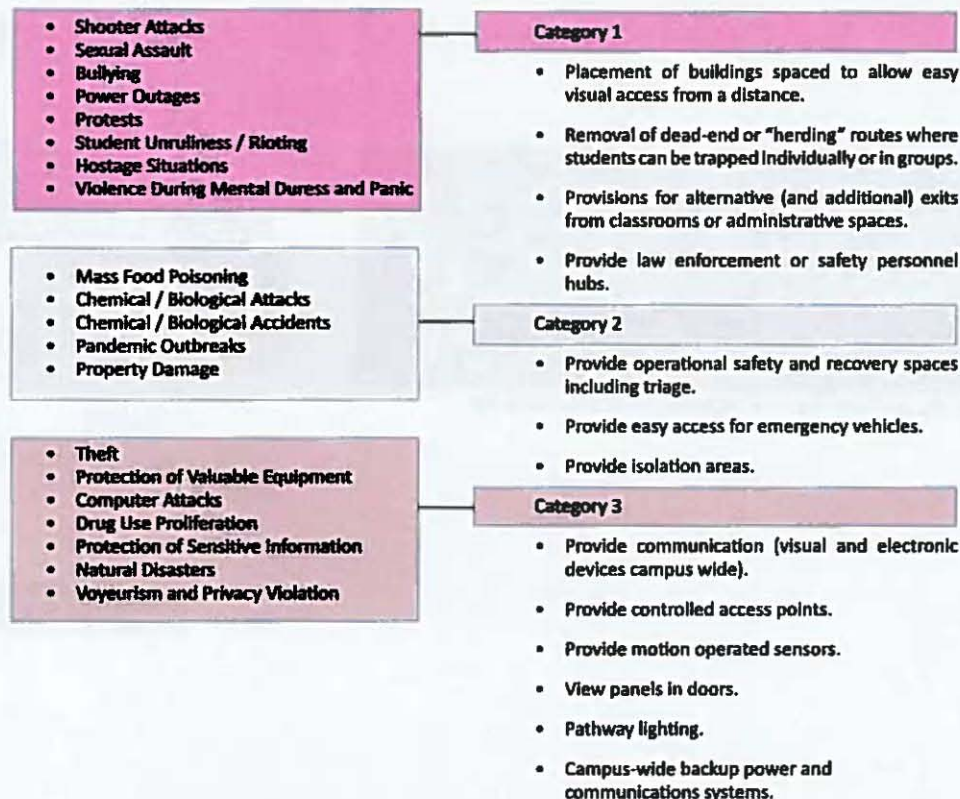
A covered walkway (top) leads from the Fine Arts Building and the Library to the Science and SNHS buildings. The Jesus and Eugenia Leon Guerrero Building (SBPA) (above) incorporates a covered walkway into the building design.

An example of an emergency communication hub.

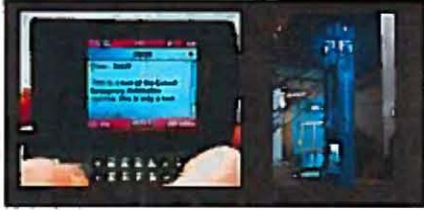


CAMPUS SAFETY AND SECURITY

The University campus is a small city, and requires a similar approach to planning for safety. A campus is a place where diverse populations meet, reside, shop, learn, research, and play - often 24 hours a day. Unfortunately, they are also subject to a wide range of risks. There are three general categories that need to be considered as described at left.



PLANNING CONSIDERATIONS



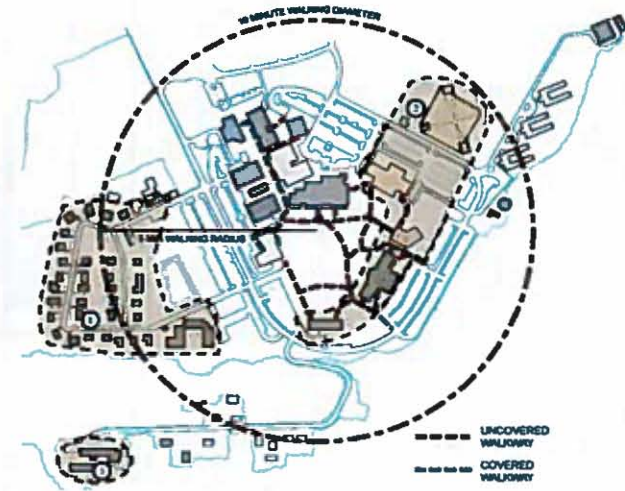
The means for emergency announcements should be considered along with the provision of campus emergency phones.

CAMPUS SAFETY AND SECURITY

Additional safety considerations are part of Vision 2025 to increase the security and sense of well-being of the campus. The campus security office will be located in the Student Services Center building and will be designed as the central hub for campus emergency and life safety systems. Open space improvements will also be programmed to enhance safety with provisions for campus emergency phones—"blue lights"—and additional lighting for increased nighttime visibility. Appropriate barriers will be utilized at steep cliff side areas where planned activities are close to vertical drops. Building designs will encourage window placement and other measures to mitigate potential "blind-spots." Upgrades for building access systems will be a key consideration in building designs.



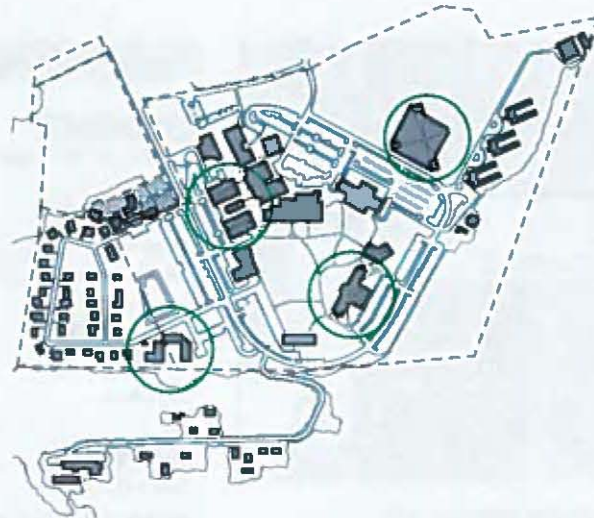
The Student Services Center will house the central security hub.



Emergency communication devices should be located throughout the campus along the pedestrian paths, parking lots, and in isolated areas or campus blind spots.

PLANNING CONSIDERATIONS

Buildings should incorporate the use of clerestories and other architectural devices to maximize day-lighting and provide sun shading.



Buildings should be considered for energy audit implementation:

1. ALS
2. HSS, EC, and the Lecture Hall
3. Jesus and Eugenia Leon Guerrero Building (SBPA)
4. Field House

SUSTAINABILITY CONSIDERATIONS

- Irrigate with rainwater / grey water
- Reduce reliance on the automobile
- Utilize sun shading devices
- Utilize energy efficient building systems and components
- Utilize energy efficient appliances and equipment

SUSTAINABILITY

Vision 2025 incorporates sustainable design features into the overall campus development. New buildings are intended to achieve LEED certification. The Campus itself can be pre-registered for compliance with LEED criteria, which would serve as a template for future projects. Existing buildings not scheduled for major renovation should undergo a comprehensive energy audit. Materials from buildings scheduled for demolition should be diverted from landfills, salvaged, and reused in new projects when appropriate.

New work should utilize sustainable building systems. Utilization of energy efficient building components and photovoltaic panels will decrease power demand. Provision of "Green Roof" systems will reduce the heat-island effect. Enhanced building shells will mitigate solar heat gain and reduce the energy load required for air conditioning.

Buildings that are not scheduled for renovation or demolition should undergo energy audits to evaluate their energy efficiency.

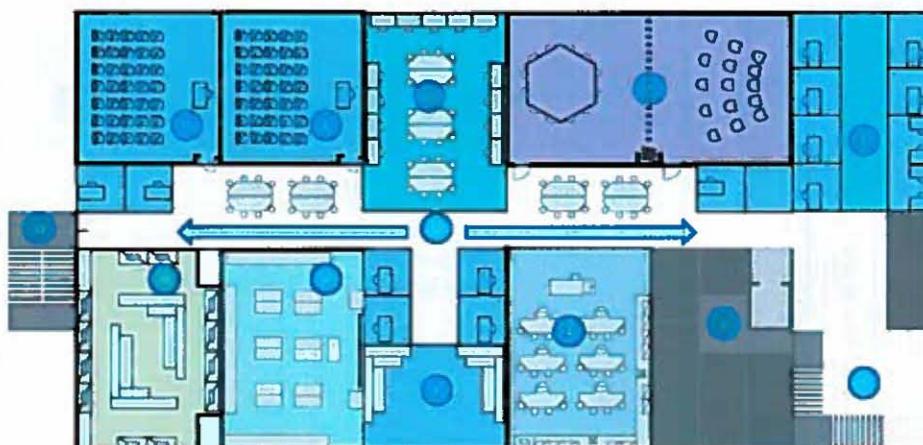
PLANNING CONSIDERATIONS



Learning environments are evolving into spaces that can support collaborative activity and experiential learning.

SPACE PLANNING

Space planning for new buildings is based on a 1,200 square foot space module that accommodates multiple configurations for learning and office space. New buildings will be combinations of these various spaces. The combination would allow facility use to be maximized and provides learning space that can be shared by all University departments. With the use of folding partitions, two of the space modules can be combined to create larger spaces similar to seminar rooms used currently by the University. Using a mix of spaces also provides the opportunities to transform the typical building corridor into learning streets or informal learning areas where learning can continue and student collaboration can occur. The placement of offices in corridors would help increase student – instructor interaction while providing a means for additional monitoring of the corridor.



PROTOTYPE

1. Entrance Lobby
2. Service Core
3. Office Suite
4. Science Lab
5. Seminar Room
6. Science Prep Room
7. Computer Lab
8. Science Lab
9. Classroom
10. Research Lab with Office Space
11. Classroom
12. Corridor / Collaboration Zone

A prototypical classroom building developed using the 1,200SF module. This example shows ten modules of programmable space (for classrooms/offices/labs) per floor. The programmable space does not include utility / circulation space.

SPACE MODULE CONFIGURATIONS

Classroom Type 1

Science Lab (35+ students) 1,200 SF

Classroom Type 2

Classroom (35+ students) 700 SF
Office Space (2 x 100 SF ea) 200 SF

Computer Labs

40 Stations 1,200 SF
30 Stations 700 SF

Offices

Type 1-Open Offices
Work Area (16 x 40 SF ea.) 640 SF
Conference Room 140 SF
Circulation / Storage 420 SF
Type 2-Office Suite
Private Offices (100 SF x 6) 600 SF
Staff Area 200 SF
Circulation / Storage 400 SF

Research Lab

Laboratory Space 680 SF
Office Space 280 SF

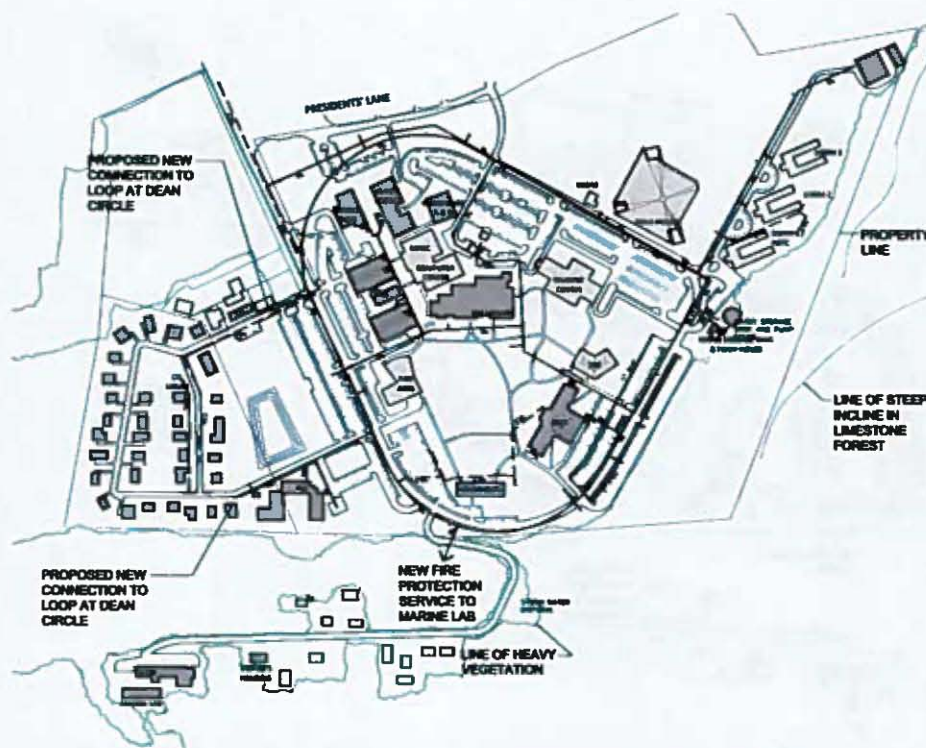
CAMPUS INFRASTRUCTURE

Existing water lines, fire hydrants, storm water collectors are located at the Presidents' Grove site.



WATER SYSTEM

The University Campus has a 500,000-gallon water storage tank located east of the Field House. This tank is fed by an 8-inch waterline, equipped with an 8-inch water meter that is connected to an existing 8-inch Guam Waterworks Authority's (GWA) mainline near the Campus entrance. Next to the tank is a pump house building that houses three (3) sets of duplex packaged booster systems. Each booster system set is comprised of a 20 and 40 Horsepower (HP) pumps. The 20-HP is for domestic use and the 40-HP is for fire fighting. The packaged booster systems are equipped with programmable controllers and flow sensors. These programmable controllers and flow sensors allow the operator to run the system in "Automatic Mode" to provide and maintain required flows and pressures on varying flow conditions.



Water is distributed campus-wide through an 8-inch looped system located along J.U. Torres Road. In addition, 6-inch distribution lines serve the inner core of the campus, connecting along the north, south, and west corridors. The waterlines are pressurized by the packaged booster system. In addition, stub-outs were provided to serve future development in the Dean Circle area.

Improvements/Upgrades

Water Storage and Pumping Facilities:

1. The existing booster pumps (both for domestic and fire-fighting) appear to be in good working condition and are adequate for future/proposed components of the Master Plan.
2. At full Master Plan development, the Campus is expected to double its daily water demand. Depending on University's desire on water storage reserve, a new water storage tank of the same size as the existing tank may be needed.

Water Distribution:

1. The existing 8-inch water distribution line around the Campus is adequate for both domestic and fire-fighting needs of the existing and the proposed components of the master plan.
2. Provide water distribution lines to the area west of the Campus, commonly known as "Dean Circle", to serve proposed developments in this area.

CAMPUS INFRASTRUCTURE



A rainwater catchment system (far left) can be included in building designs for wastewater use; and submerged vegetated bed septic systems are an alternative method for on-site wastewater treatment.

WASTE WATER SYSTEM

- a. Existing facilities within the Main Campus are served by gravity sewer lines of various sizes that converge near the road that leads to the Marine Laboratory. From that point, the wastewater flows westward, along the south property, to the GWA's system. This existing GWA line is a 12-inch diameter pipe and appears to be adequate to serve the existing and proposed components of the Master Plan.
- b. Marine Laboratory, which is located south and approximately 95 feet lower in elevation than the Main Campus, is currently served by a septic tank/leaching field system. This type of wastewater disposal is no longer allowed under current GWA and Guam EPA guidelines. Sewage from Marine Laboratory can be pumped to the nearest gravity south of the Main Campus or a submerged vegetated bed septic system can be used as an alternative solution.

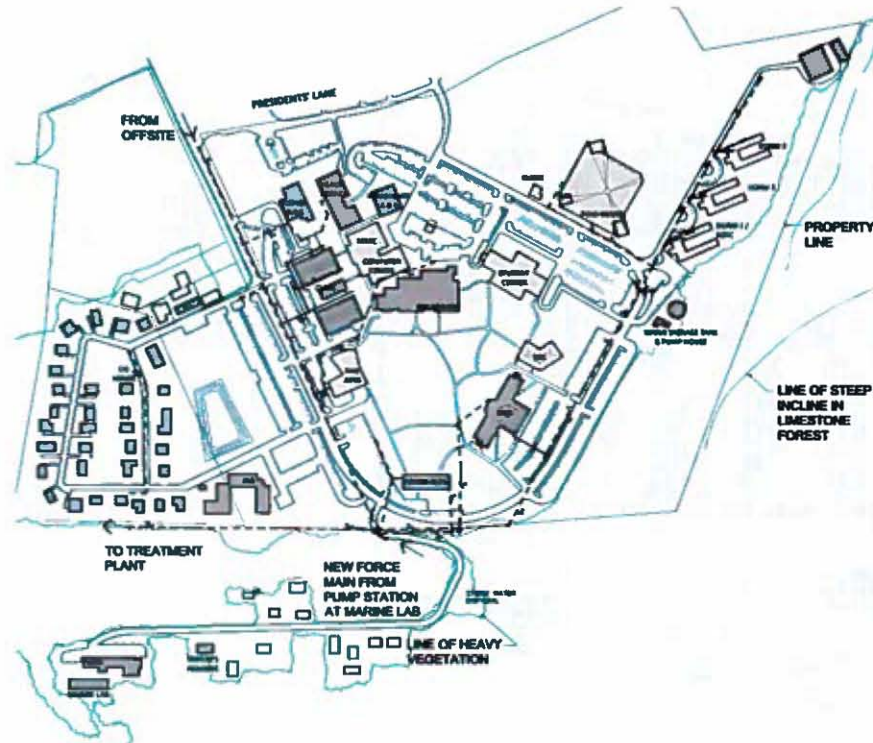
Improvements/Upgrades

Collection and Conveyance:

1. New service laterals and lines serving the proposed new buildings. No other improvements or upgrades necessary on existing GWA sewer line serving the Campus.

Marine Laboratory Sewer System:

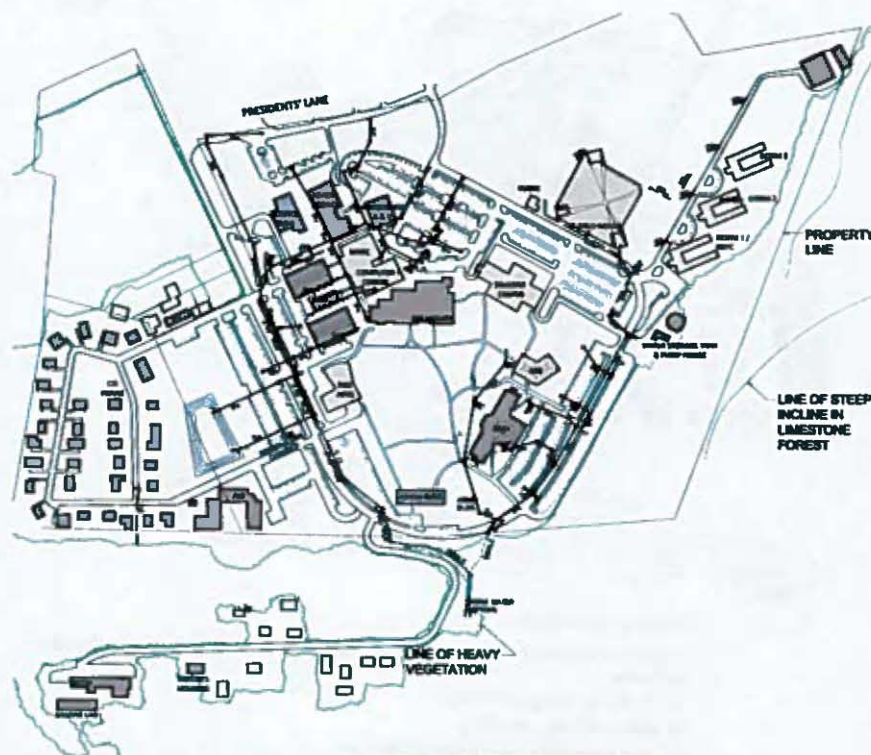
1. Construct a new sewer lift station and force-main line.
2. The new sewer lift station shall incorporate an emergency generator and be designed and constructed in accordance with GWA's standards.
3. The new force-main line will discharge to the existing gravity sewer line located along the University's south property line.



Campus wastewater is collected and directed westward along the south edge of the campus.

CAMPUS INFRASTRUCTURE

Utilization of permeable surfaces will mitigate the effect of development on the existing storm water drainage system.



Majority of the campus storm water is diverted to the sinkhole for disposal under a UIC permit. The existing ponding basin near Dean Circle is utilized for some storm water disposal.

Improvements/Upgrades

Central and East Side:

1. No upgrades are necessary to the existing drainage system.
2. Provide collection and conveyance system for future development. Connect to the nearest existing drainage system.
3. Rainwater harvesting is recommended.
4. Maximize on-site percolation for groundwater recharge and focus on low impact development stormwater management strategies.

Western Side:

1. Provide collection and conveyance system by means of field inlets/catch basins, drainage manholes, and underground drainage pipes.
2. Maximize on-site percolation for groundwater recharge and focus on low impact development stormwater management strategies.
3. Construct central percolation basins or develop clusters of localized shallow depression for stormwater disposal.

STORM WATER SYSTEM

- a. Central and East Side: The main University Campus has an area of about 115 acres. Approximately 71 acres (62%) of the area, central and eastern side, is being served by an existing drainage system comprised of a network of underground pipes, field inlets/catch basin, drainage manholes, and drainage ditches. A sediment basin ends the system along the Marine Laboratory access road south of the Campus. Its main purpose is to trap debris and sediment that may be present in the runoff. During major storm events or heavy rainfall, the sediment basin is expected to overflow and allow stormwater to drain to the nearby sinkhole. Discharge to the sinkhole is allowed by Guam EPA under a UIC Well Permit.
- b. West Side: The remaining campus area, equivalent to about 44 acres (38%), do not have existing drainage systems and are not draining to or tied in to the existing drainage system that leads to the sink. This includes Dean Circle and Property #7. These areas drain to shallow localized depressions and some to the open percolation basin across from the existing ALS Building.

CAMPUS INFRASTRUCTURE



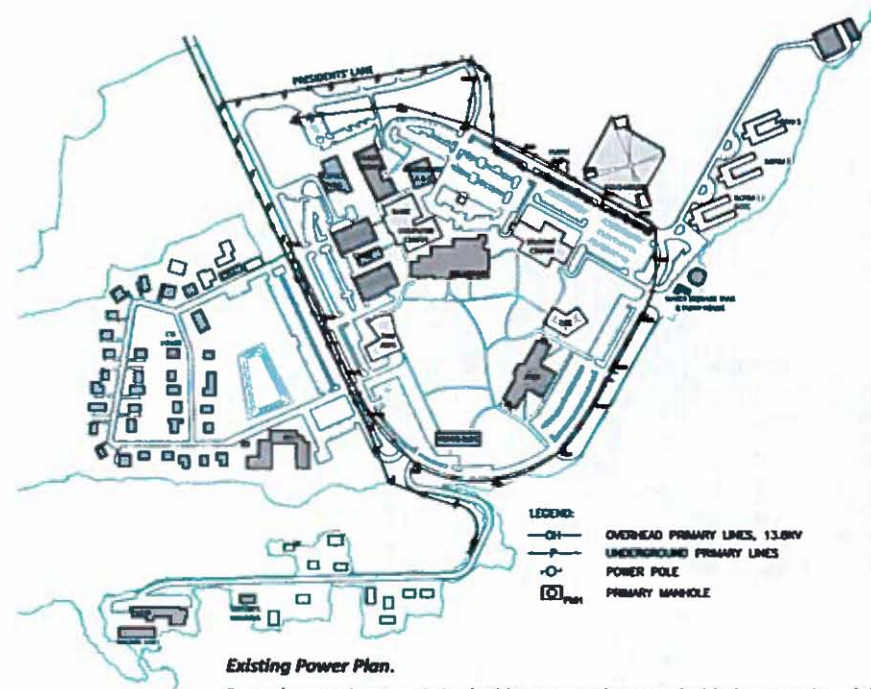
Overhead utility lines disrupt the ocean view.

POWER SYSTEM

Existing primary service to the University Campus is served by GPA Overhead Distribution feeder at 13.8 kV. The Overhead Feeder runs along University Drive and extends towards the Marine Lab and WERI. The GPA Feeder branches at the intersection to Presidents' Lane and extends to the University Field House and towards the Plant Management Office. A portion of the 13.8 kV distribution system was converted underground during the construction of the CLASS Buildings. The Master Plan for power distribution developed by EMCE in 1994 includes 2 underground feeder systems. Transition from Overhead to Underground occurs at the power pole near the intersection of University Drive and Presidents' Lane. A second point of connection from the existing Overhead Feeder to the Underground system is planned at the east end of Presidents' Lane.

The University has implemented Renewable Energy strategies by installing solar powered street lights around the campus. Photovoltaic panels have been installed on the roof of the Center for Island Sustainability (CIS). Another project to install a grid-tied photovoltaic system at the Education Building is on-going.

Improvements / Upgrades
1. Provide utility connection to the underground system.
2. Provide a new pad mounted switch gear.
3. Provide emergency generators for facilities.



Existing Power Plan.

Secondary services to existing buildings are underground with the exception of the following:

- a) Buildings along Dean Circle
- b) Administration Building
- c) Supplemental Power to the Fieldhouse

Only a few buildings are provided with Generator back-up support. These include:

- a) Computer Center
- b) Micronesia Area Research Center (MARC)
- c) Tan Siu Lin Building (RFK Library)
- d) Jesus and Eugenia Leon Guerrero Building (SBPA)
- e) Marine Lab / WERI

CAMPUS INFRASTRUCTURE

Upgrades to the existing Computer Center will be supplemented with the network hub planned at the Science Quad.



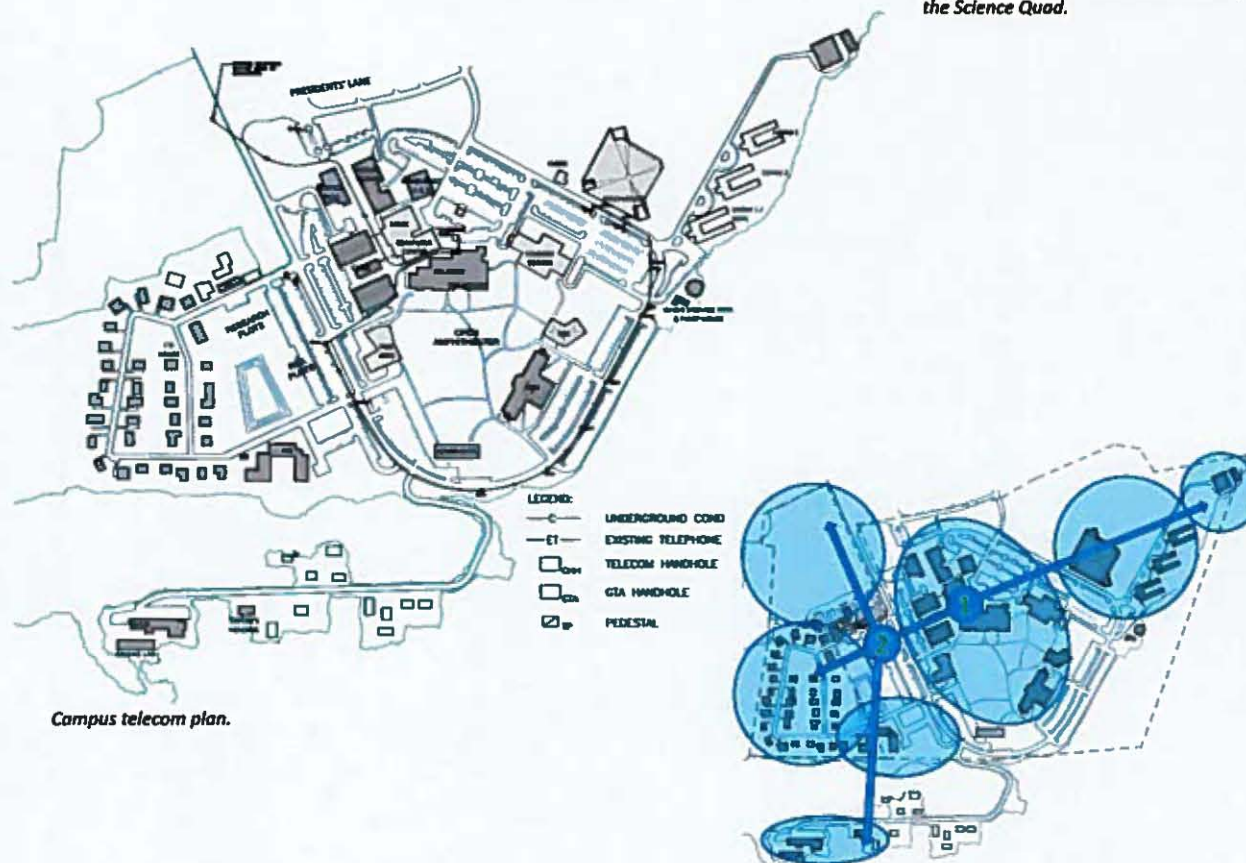
TELECOM and NETWORK SYSTEMS

Existing telephone service is provided by GTA. Underground cabling originates from a pedestal along University Drive near the Presidents' Lane Intersection and connects to a PABX system at the RFK Library. New underground conduits have been installed along a few sections of University Drive.

Existing cable TV service is provided by overhead cables installed on GPA utility poles. Underground conduits intended for cable TV use have been installed along a few sections of University Drive.

Underground conduits intended for fiber optic cabling for networking have been installed along a few sections of University Drive. Conduits are provided to interconnect Campus buildings to the Computer Center.

A network hub is planned for the Computer Center 2 building, which will serve as the connection point for Campus West.



Campus telecom plan.

Development of the Science Quad would extend the capability of the Computer Center (1) with the creation of a network hub (2) that is the central connection point for new buildings planned on the western side of the campus.

DEVELOPMENT MODULES

A rendering of the Triton Engagement Center.



Vision 2025 comprises of eight design modules. The modules are based on the planning principles along with other criteria for establishing project priorities, such as construction sequencing. The modules are also organized to create the following campus zones:

- The Gateway.
- West Campus.
- East Campus.
- The Sports Complex.
- The Community Parkway.

The development modules outline a cohesive group of projects that function as complete “parts” of the campus and simultaneously create a sense of place while responding to functional needs. Each project within a module is an action in accomplishing the planning principles and the overall goals of Vision 2025.



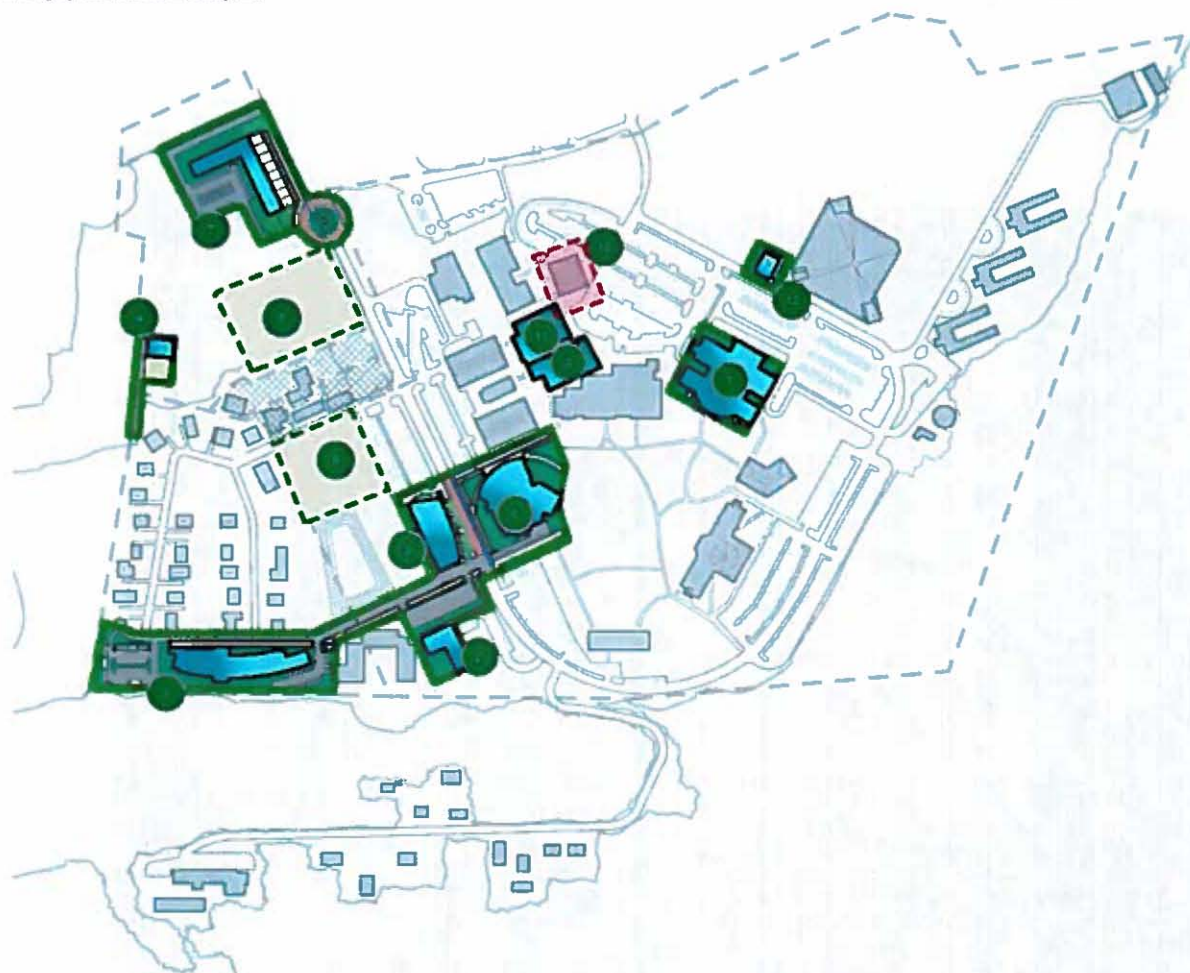
DEVELOPMENT MODULES



A rendering of the Fine Arts Complex.

MODULE 1 PROJECTS

1. Student Services Center
2. Engineering Science Annex
3. Computer Center Upgrades
4. CNAS Secure Research Facility
5. Triton Engagement Center
6. Fine Arts Complex
7. Graduate Dormitory Phase 1
8. Temporary Parking
9. Classroom Building 1 - Science
10. Warehouses A and B Demolition
11. MARC Expansion
12. KUBRE Facility



DEVELOPMENT MODULES

A rendering of the Engineering Science Annex. The Annex is the first phase in the University's development of an Engineering School.



GENERAL PROJECT DESCRIPTIONS

STUDENT SERVICES CENTER	ENGINEERING SCIENCE ANNEX	COMPUTER CENTER UPGRADES	CNAS SECURE RESEARCH FACILITY
- One-Stop Location - EMSS and Financial Aid Office - Student Organizations - Common Dining Area with Food Vendors - Student Meeting and Socializing Space - EEO / ADA and Title IX Office - Security - Graduate Studies	3 Classrooms 4 Science Labs 1 Computer Lab - Faculty Offices - Conference Room - Administration Area - Student Project Room	- New Infrastructure - Additional space for existing servers / communication equipment and for new equipment - Office / Workspace - Lobby / Reception Area - Computer Lab / Seminar Room - Meeting / Conference Room - Classroom - Copy Room 3,000SF 2nd Floor Programmable Space	2 Modules
TRITON ENGAGEMENT CENTER	FINE ARTS COMPLEX	GRADUATE DORMS	CLASSROOM BLDG. 1--SCIENCE
- CEDDERS - TADEO - Cancer Research Center - WHO - Conferencing Center	- Theatre - Music 2D and 3D Art - ISLA Center for the Arts	Phase 1 - Total 80 Bedrooms – Either Single or Double Occupancy 2-Bedroom Suite Configuration 1st Floor Commercial Space 10,000SF Along University Drive - Pedestrian Plaza along University Drive - New Water Tank and Pump - Parking for 60 Cars	20 Modules - Sample Configuration 14 Instructional Labs / Classroom Type 1 4 Research Labs with 8 Private Offices 2 Office Suites—2 Staff and 6 Private Offices, Each
MARC Expansion 2nd Floor Expansion Approximately 4,000SF assignable area			

MODULE 1 Planning Considerations

- Dean Circle houses, utilized by CNAS and TADEO, on the Triton Engagement Center site will be demolished. TADEO, and other tenants, need temporary relocation until the Triton Engagement Center is constructed.
- Dormitory facilities are needed prior to the renovation of the existing dorms.
- MARC anticipates that additional archive storage space is necessary by 2015.
- Classroom Building 1 will house the programs currently at the Science Building and Warehouses A and B.
- Additional space will be available at the Health Science Building and the Field House once the Student Services Center is complete.
- Dean Circle houses vacated by CEDDERS can be utilized for interim classroom or office space. Programs in the Fine Arts Building need to be relocated prior to the building's renovation, and include specialized uses such as drawing / painting / ceramics studios and music classrooms. The Dean Circle houses may be appropriate for these uses.
- KUBRE Facility will initially be constructed to serve as classroom space. The facility may also be converted for sports activity use in the future.
- Temporary Parking will be provided to accommodate modifications to existing parking lots.

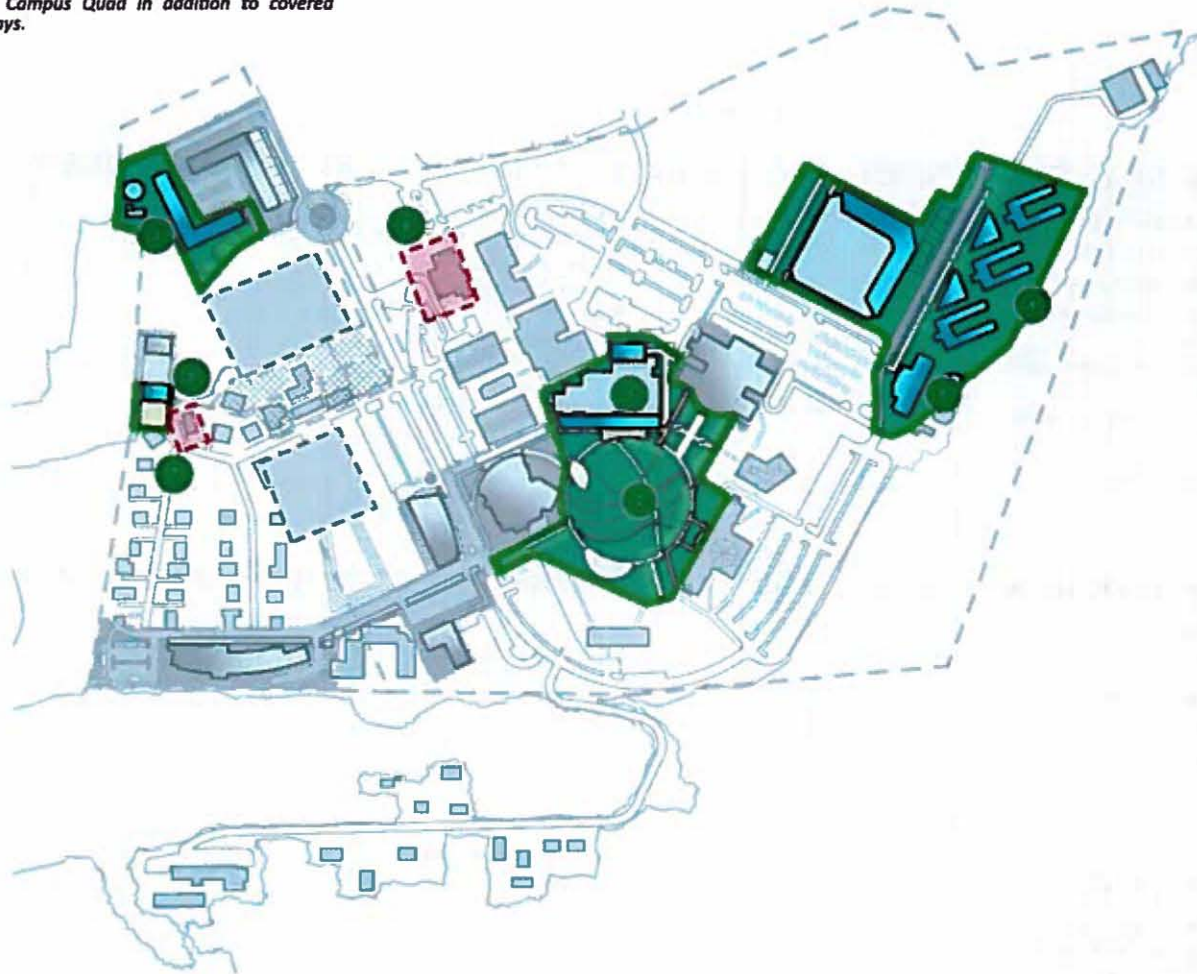
DEVELOPMENT MODULES



A series of terraces are planned improvements to the Campus Quad in addition to covered walkways.

MODULE 2 PROJECTS

1. RFK Library Expansion
2. Campus Quad Improvements
3. Graduate Dormitory Phase 2
4. Undergraduate Dormitory Renovations; Field House Expansion
5. CNAS Secure Research Facility
6. Science Building Demolition
7. House #15 Demolition
8. Multi-Purpose Building (Dormitory / Classroom)



DEVELOPMENT MODULES

Renovation to the RFK Library would occur prior to the Campus Quad improvements.



GENERAL PROJECT DESCRIPTIONS

LIBRARY EXPANSION	GRADUATE DORMS	UNDERGRADUATE DORMS	MULTI-PURPOSE BUILDING
- Shared Activities with MARC - Additional Group Meeting Rooms with Separation from Quiet Reading Areas 40 Staff 8 Work Study 2 Librarians 24-hr Room 32 People Capacity - Proper Location of Staff Lounge - Conference Room	Phase 2 - Total 96 Bedrooms – Either Single or Double Occupancy 2-Bedroom Suite Configuration - Dormitory / Classroom / Multi-Use Building	- Convert 2nd Floor Units to Suite Configuration = Total 22 Bedrooms - Renovate 1st Floor Traditional Dorm Units = 34 Bedrooms - Upgrade of Common Restroom / Shower Facilities	- Accommodate an Estimated 100 Students - Classroom to Accommodate (100) Students - Storage Space - Capacity and Flexibility to Accommodate Language Training
	CNAS SECURE RESEARCH FACILITY 2 Modules	Provide Additional Laundry Facilities and Common Space for Studying, Recreation, Social Interaction	- Laundry Facilities - Multi-Purpose Room - Kitchen / Dining Facility - Recreation Room
	CAMPUS QUAD IMPROVEMENTS - Covered Walkway Construction - Landscaping - Performance Area	- Upgrade Building Access Control - Construct Dining Hall - Construct Recreation Room	- Physical Therapy Room - Physical Therapist Staff Office and Storage Room - Medical / Nurse Examination Room - Medical / Nurse Staff Office and Storage - Dorm Facility Managers Office - Dorm Facility Staff Offices / Reception Lobby

MODULE 2 Planning Considerations

- A recreation room and dining hall are needed for the dormitories. This is depending on the capacity of use that the Student Services Center can afford dorm residents.
- The Field House is one of the most prominent campus buildings that visitors see. It is a major venue for community events. Improvements to the Field House will benefit dorm life as well.
- The library expansion will include the provision of space for MARC's public information functions.
- The Multi-Purpose Building (Dorm / Classroom) can be designed to accommodate short term visitors for various activities, such as English Adventure Programs, English Language Training, or sports activities.
- The existing Campus Quad is centrally located and used for outdoor University functions. The new circular form will enhance interaction and will provide an opportunity for outdoor performances. A covered walkway will provide shade and encourage pedestrian activity. Through the architectural and landscape design, the new Campus Quad will become an iconic feature of the University campus.

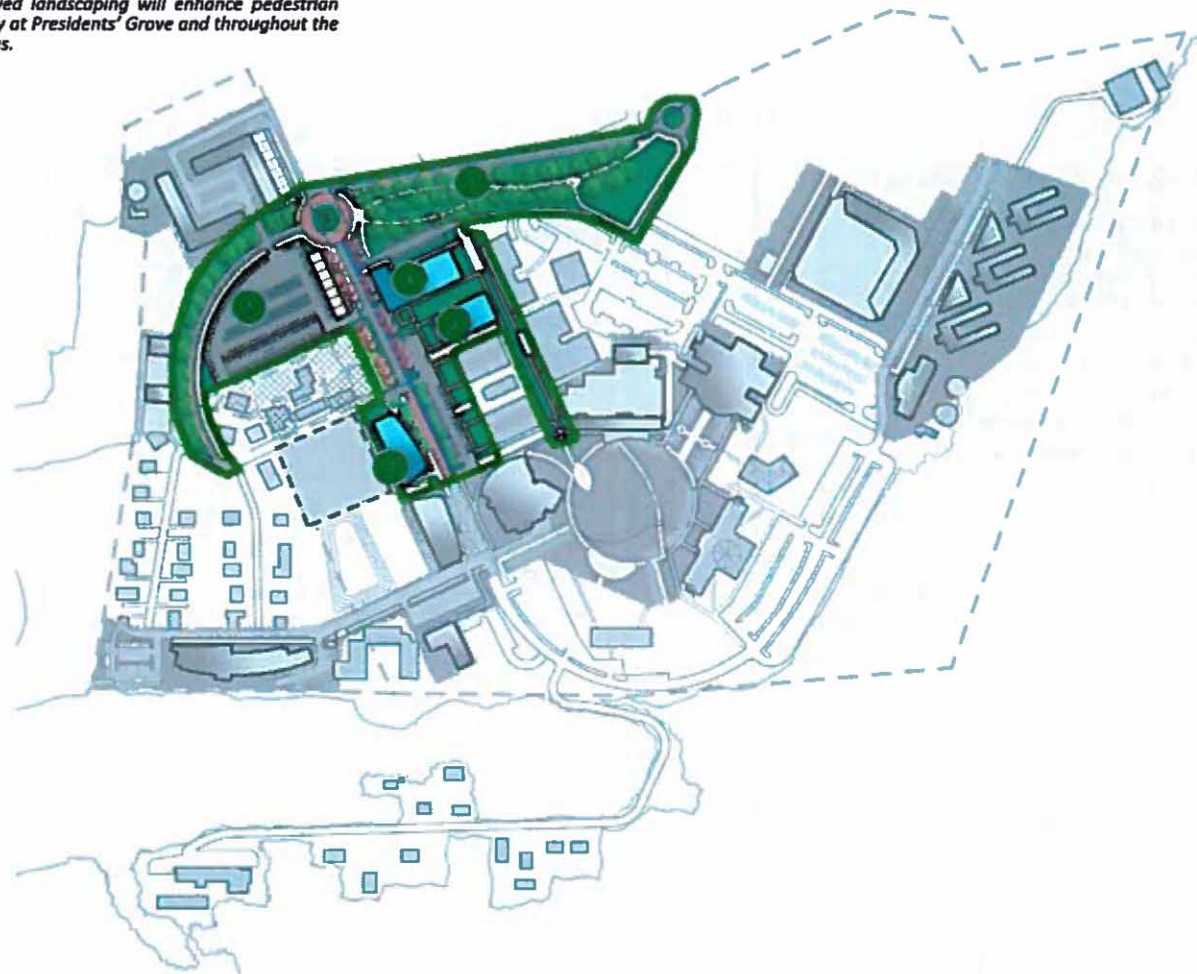
DEVELOPMENT MODULES



MODULE 3 PROJECTS

1. Presidents' Grove Improvements
2. Computer Center 2
3. Classroom Building 2
4. Administration Building
5. Parking Structure A / Commercial Space

Benches and other site furnishing combined with improved landscaping will enhance pedestrian activity at Presidents' Grove and throughout the campus.



DEVELOPMENT MODULES

Awnings incorporated on buildings can be used in conjunction with covered walkways to enhance pedestrian activity.



GENERAL PROJECT DESCRIPTIONS

COMPUTER CENTER 2	CLASSROOM BLDG. 2	ADMINISTRATION BLDG.
• Computer Lab 60 Workstations • Testing / Seminar Lab 60 Workstations • 1 Instructional Computer Lab 30 Workstations • Secure Network Hub Support Space and Shop • Office Suite • 7 Classrooms • 3 Office Suites	• 20 Modules • Sample Configuration: 14 Instructional Labs / Classroom Type 1 • 4 Research Labs with 8 Private Offices • 2 Office Suites—2 Staff and 6 Private Offices	• Large Cashier and Support Services Reception Area • Consultation Rooms • Bulk Printing Room • Records Storage • Executive Offices on 2nd Floor • Central Atrium Space • Conference Room • Business Office • Human Resources Office



MODULE 3 Planning Considerations

- Computer Center 2 is intended to be the information technology hub for the Western Campus projects.
- Parking Structure A is a 3-story parking structure with commercial space and a pedestrian plaza along J.U. Torres Road.
- Additional space at the Jesus and Eugenia Leon Guerrero Building (SBPA) will be available once the Administration Building is constructed.
- The parking lot adjacent to the HSS and EC Buildings will be converted to a pedestrian link connecting the Administration and Fine Arts buildings with additional landscaping and covered walkways.

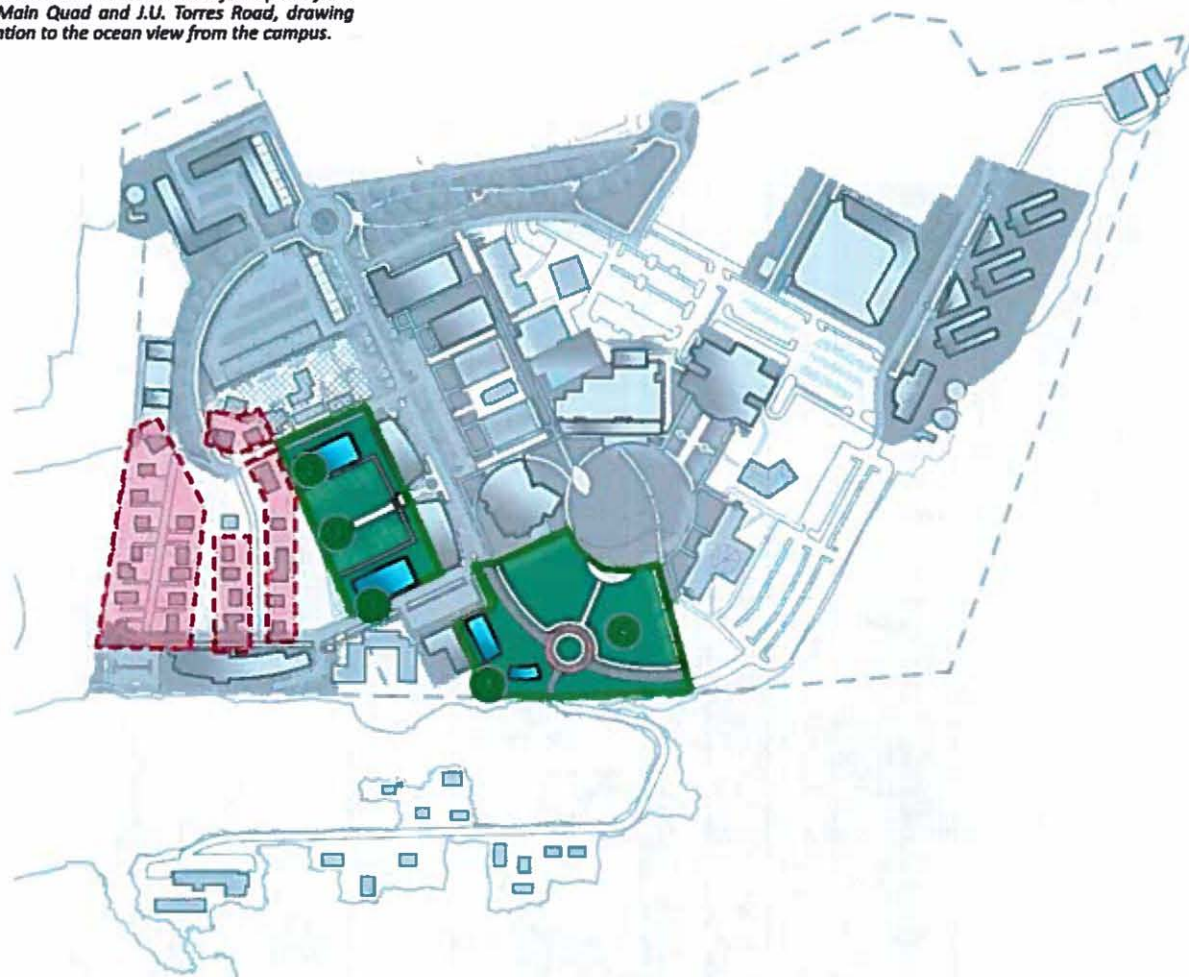
DEVELOPMENT MODULES



The roundabout can serve as a focal point from the Main Quad and J.U. Torres Road, drawing attention to the ocean view from the campus.

MODULE 4 PROJECTS

1. Classroom Building 3—Math
2. Classroom Building 4
3. Science Quad Exterior Improvements / Parking Structure D
4. Campus Quad Exterior Improvements
5. Future Structures—WERI Facility and Reflection Point



DEVELOPMENT MODULES

A view of the ocean from the Main Quad.



GENERAL PROJECT DESCRIPTIONS

CLASSROOM BLDG. 3—MATH	CLASSROOM BLDG. 4	WERI Facility	REFLECTION POINT
20 Modules - Sample Configuration: 14 Instructional Labs / Classroom Type 1 4 Research Labs with 8 Private Offices 2 Office Suites—2 Staff and 6 Private Offices	20 Modules - Sample Configuration: 14 Instructional Labs / Classroom Type 1 4 Research Labs with 8 Private Offices 2 Office Suites—2 Staff and 6 Private Offices	- Lab Space - Classroom / Office Space	Landscaped Open Air Pavilion Venue

MODULE 4 Planning Considerations

- An underground parking structure will be developed with Classroom Buildings 3 and 4.
- Dean Circle houses scheduled for demolition.

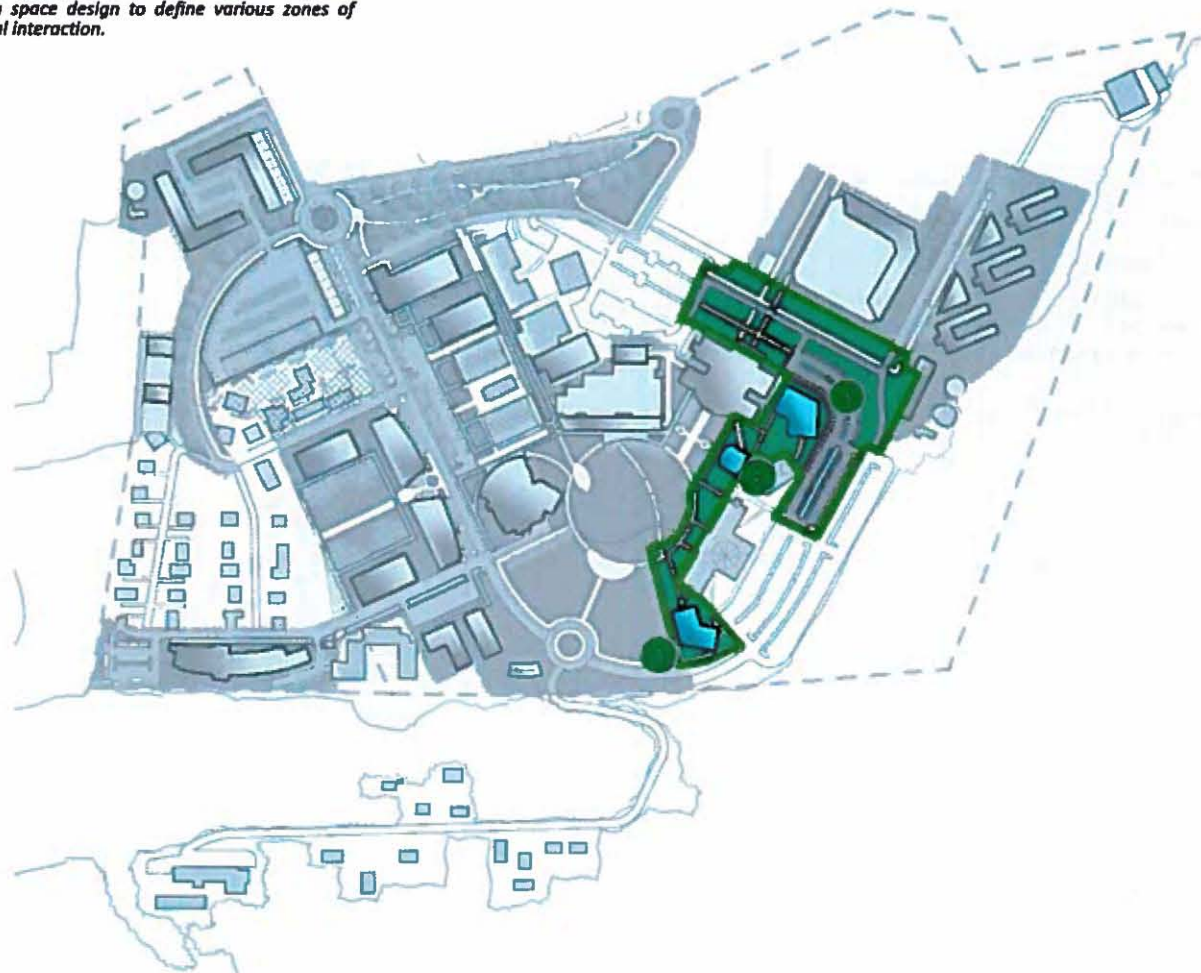
DEVELOPMENT MODULES



Secondary gardens can be incorporated into open space design to define various zones of social interaction.

MODULE 5 PROJECTS

1. Classroom Building 5—Education
2. Classroom Building 6—SOE Expansion
3. Classroom Building 7—SBPA Expansion

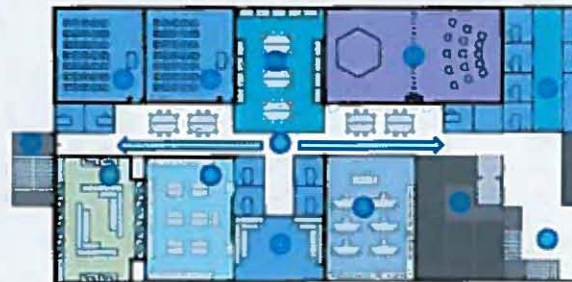
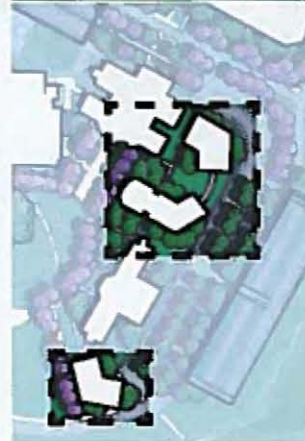


Module 5 completes the eastern edge of the Main Quad defined by the Jesus and Eugenia Leon Guerrero Building (SBPA) and School of Education buildings.



GENERAL PROJECT DESCRIPTIONS

CLASSROOM BLDG. 5 EDUCATION	CLASSROOM BLDG. 6 SOE EXPANSION	CLASSROOM BLDG. 7 BUSINESS and PUBLIC ADMIN
14 Modules	5 Modules	14 Modules



Prototypical classroom building developed using the 1,200SF module. This example shows ten modules of programmable space (for classrooms/offices/labs) per floor. The programmable space does not include utility / circulation space.

MODULE 5 Planning Considerations

- A pedestrian link will connect the Field House and Sports Complex back to the campus.
- Temporary parking will initiate the future access road that loops around the Sports Complex and will be programmed with bollards to restrict vehicle travel.
- Exterior Improvements will incorporate a transit stop.

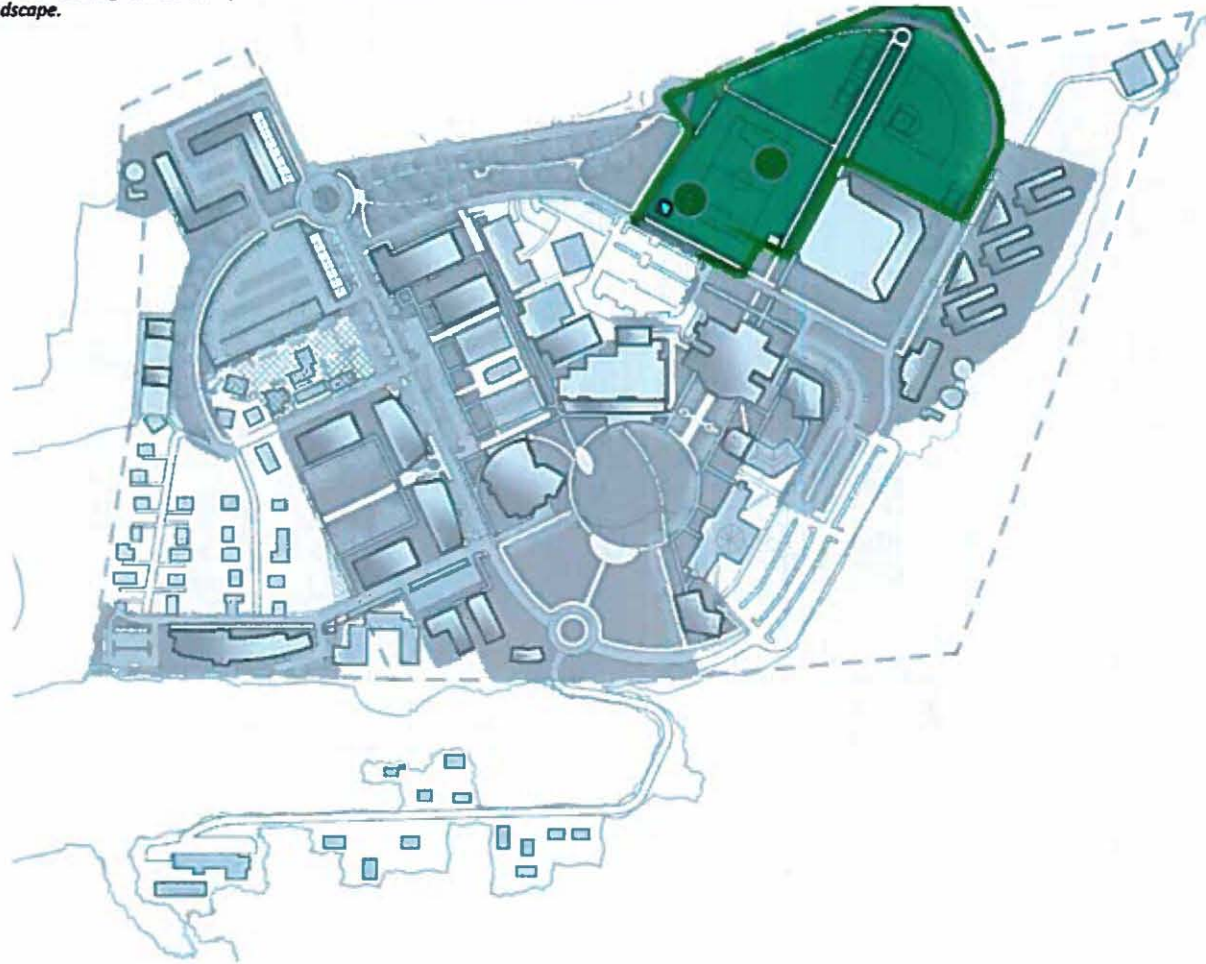
DEVELOPMENT MODULES



Spectator seating can be incorporated into the landscape.

MODULE 6 PROJECTS

1. Sports Field Construction and Exterior Improvements
2. ROTC Rappelling Tower



DEVELOPMENT MODULES

Sports fields and courts should be bordered with landscaping.



GENERAL PROJECT DESCRIPTIONS

SPORTS FIELDS and COURTS	EXTERIOR IMPROVEMENTS	
• Soccer / Football • Baseball • Volleyball • Tennis • Basketball • Practice Field • Night Time Lighting • Spectator Seating (covered and uncovered) • Concessions Kiosks • Ticket Booth • P/A System • Power and Water provisions.	• Lighted Walking Path • Park Benches • Picnic Pavilion • Bicycle Parking • Stormwater Drainage	

MODULE 5 Planning Considerations

- Exterior improvements will include the development of the new access road and shared parking spaces. Sidewalks will be provided with lighted bollards. Site furnishings and picnic canopies will be provided at open green areas.
- Field construction will include fences, lighting, and storm water drainage.

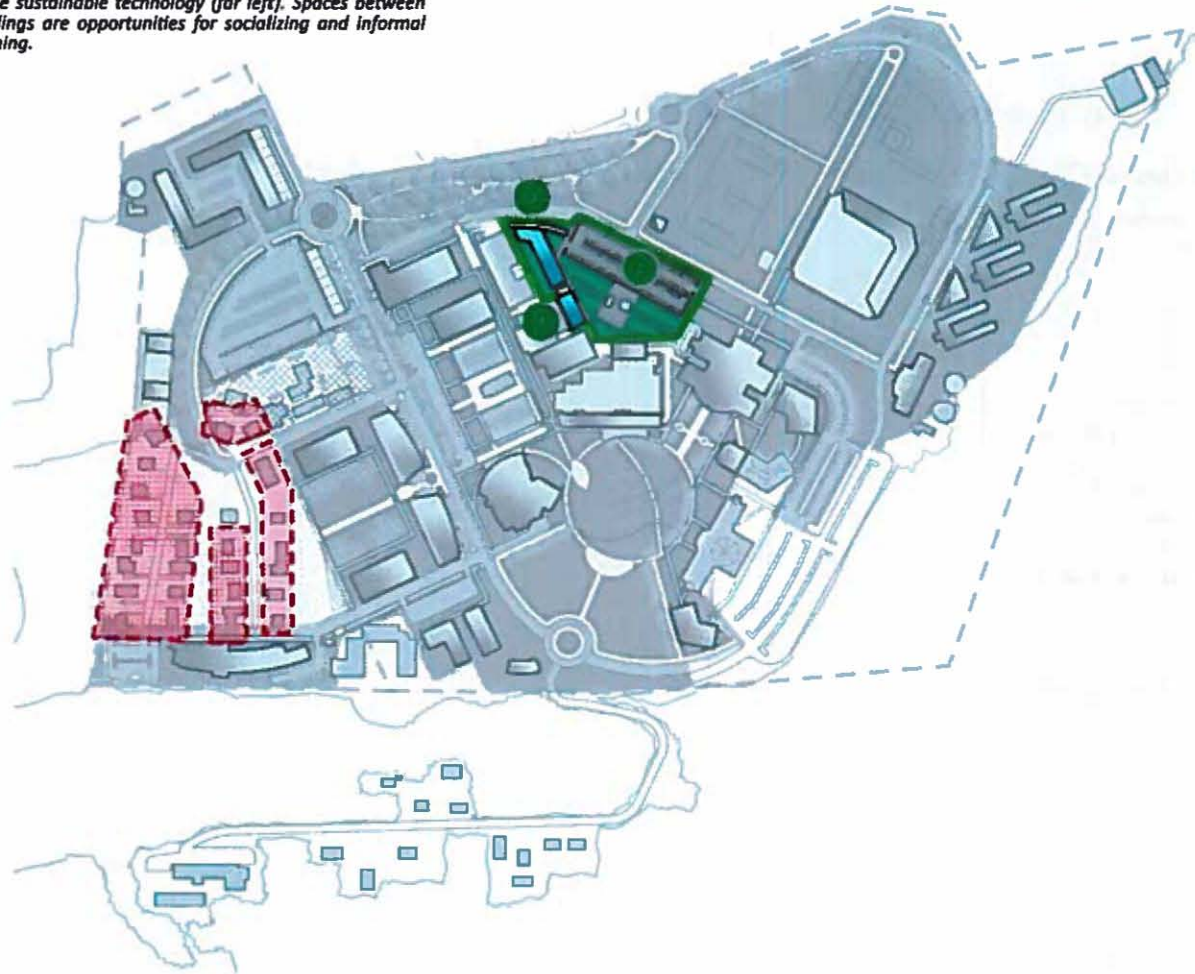
DEVELOPMENT MODULES



The parking structure can contribute to place making and utilize sustainable technology (far left). Spaces between buildings are opportunities for socializing and informal learning.

MODULE 7 PROJECTS

1. MARC Expansion
2. Parking Structure B
3. Classroom Building 8 - SNHS Expansion



DEVELOPMENT MODULES

Courtyards can be created between buildings to enhance sense of place.

GENERAL PROJECT DESCRIPTIONS

MARC Expansion	SNHS Expansion	PARKING STRUCTURE B
2-Story Addition 7,000 SF (total assignable area) 2-Story Addition (3,000 SF total assignable area) (between MARC and COMP CENTER)	2-Story Addition 6,000 SF (total assignable area) - Courtyard	3-story Parking Structure - Parking Spaces = 460 Cars



MODULE 7 Planning Considerations

- MARC's repository needs may be mitigated with the repository capabilities of the planned Guam Museum.
- The Parking Structure will be located between MARC and the Sports Complex. The new 3-Story structure will link the north campus to the Sports Complex through landscaping and covered walkways. The new structure will provide for community parking for public events at the Sports Complex and Field House.

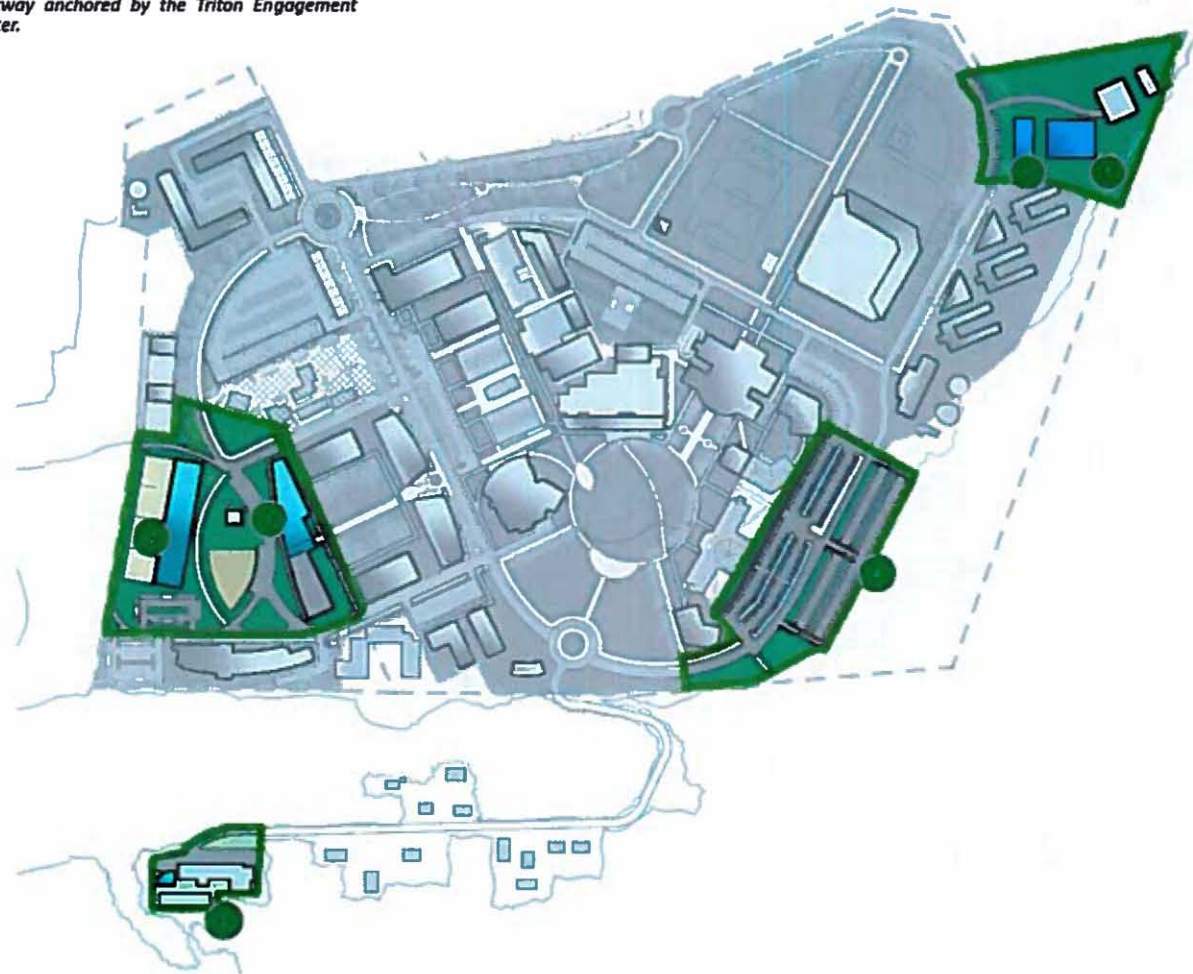
DEVELOPMENT MODULES



Module 8 Projects complete the Community Parkway anchored by the Triton Engagement Center.

MODULE 8 PROJECTS:

1. Professional and International Programs (PIP) Facility / Covered Parking
2. CNAS Research Facility
3. Marine Lab Expansion
4. Parking Structure C
5. Waste/Recyclables Collection and Transfer Facility
6. Records Repository Facility



DEVELOPMENT MODULES

The Center for Island Sustainability model home is a showcase point along the Community Parkway.



GENERAL PROJECT DESCRIPTIONS

PIP BUILDING	CNAS RESEARCH BUILDING	MARINE LAB EXPANSION	REPOSITORY BUILDING
1st Floor = 6 Modules; 2nd and 3rd Floors = 26 Modules - Professional and International Programs (PIP) - Center for Island Sustainability (CIS) - English Language Institute (ELI) - UOG Endowment - Emeritus Hall	14 Modules 4 Exterior Research Plots 100'x100' 1-Story Structure	- Conversion of WERI Space - Public Outreach / Extension office - Exterior Improvements for Safety and Security - Horizontal Drilling for New Saltwater Intake Pipe - Additional Storage / Support Space	2-Story 10,000 SF Assignable Area
			WASTE COLLECTION AND TRANSFER FACILITY 15,000 SF (Gross Area)

MODULE B Planning Considerations

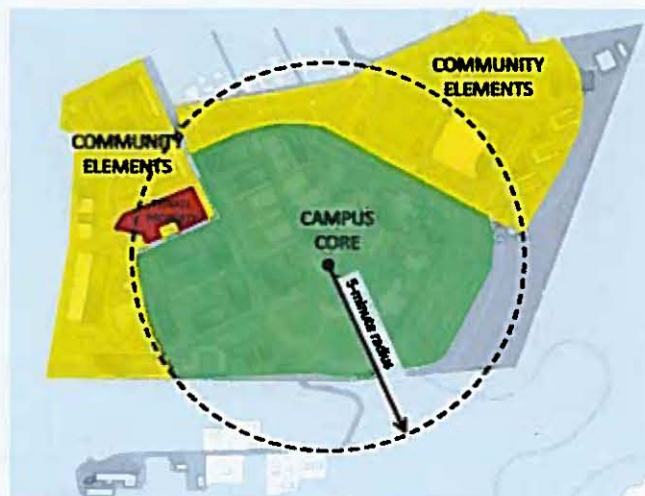
- The PIP Facility will also house CIS, ELI, UOG Endowment, and Emeritus Hall.
- Marine Lab's expansion will include horizontal drilling for a new saltwater intake pipe.
- Parking Structure C is a 2-story parking structure that can accommodate 500 cars.





Building Key

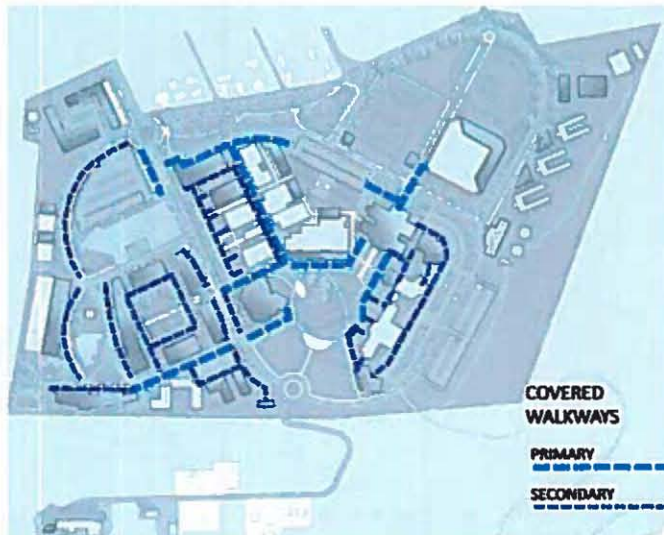
1. Graduate Dormitory / Commercial Area
2. Presidents' Grove
3. Administration Building
4. Parking Structure A / Commercial Area
5. Classroom Building
6. Classroom Building - SNHS
7. Classroom Building - SNHS
8. Parking Structure B
9. MARC
10. Computer Center
11. Classroom Building - HSS
12. Lecture Hall - CLASS
13. Classroom Building - EC
14. Fine Arts Building
15. Tan Siu Lin Building (RFK Library)
16. Student Services Center
17. Field House
18. Classroom Building - SOE
19. Classroom Building - SOE
20. Jesus and Eugenia Leon Guerrero Building (SBPA)
21. Classroom Building - SBPA
22. Parking Structure C
23. Classroom Building - CNAS
24. Computer Center 2
25. Classroom Building
26. Classroom Building - CNAS
27. PIP Facility / Covered Parking
28. CIS House
29. Research Facility - CNAS
30. Secure Research Facility
31. Triton Engagement Center
32. Classroom Building - CNAS
33. Engineering Science Annex
34. WERI Facility
35. Reflection Point
36. Undergraduate Dormitory / ROTC
37. Undergraduate Dormitory
 - a. Recreation Room
 - b. Dining Hall
38. Plant Maintenance
39. Waste Collection Facility
40. Records Repository
41. Faculty Housing
42. Marine Lab
43. Multi Purpose Building
44. ROTC Rappelling Tower
45. KUBRE Facility
46. Science Quad / Parking Structure D



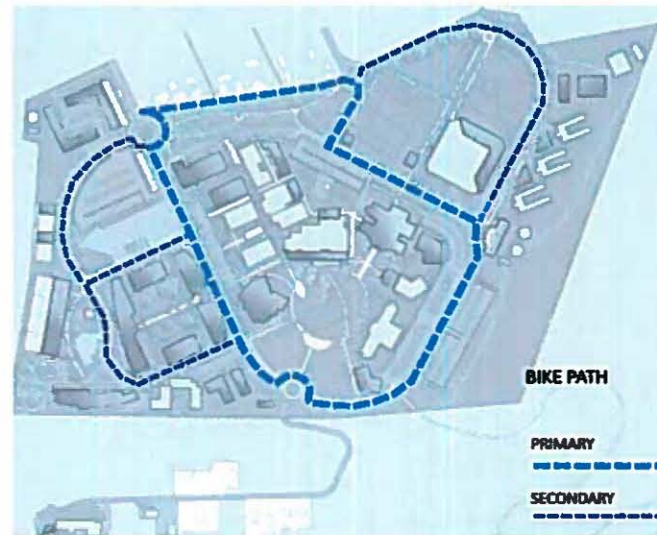
Community Elements are kept along the perimeter of the Campus Core.



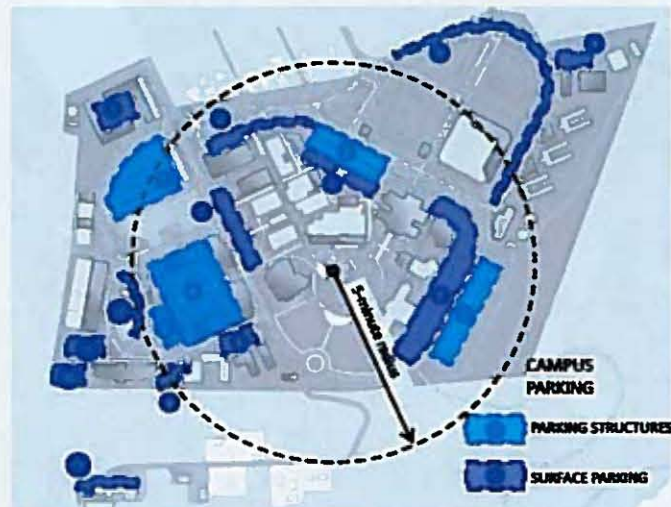
The Campus Quad is the central point where primary pedestrian paths converge.



Primary covered walkways define the Campus Quad and extend to the Campus Gateway, the Sports Complex and the Community Parkway. Secondary covered walkways extend to the Campus Facilities.

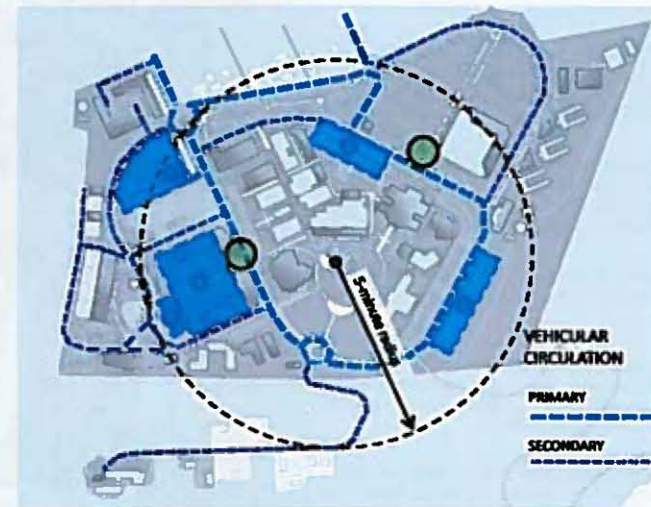


The primary route for the bike path follows J.U. Torres Road and loops around back to Presidents' Lane. Secondary bike paths travel around the perimeter of the Sports Complex, the Science Quad, and along the Community Parkway.



Parking Lot	Spaces	Parking Structure	Module	Spaces
Lot 1	60	1 - Structure A	3	840
Lot 2	120	2 - Structure B	7	460
Lot 3	160	3 - Structure C	8	500
Lot 4	60	4 - Structure D	4	460
Lot 5	120	5 - Covered Parking (PIP)	8	40
Lot 6	330			
Lot 7	70			
Lot 8	40			
Lot 9	30			
Lot 10	30			
Lot 11	50			
Lot 12	50			
Lot 13	40			

Total 1,160



Primary flow for vehicular travel follows the existing campus roads. Secondary roads are intended to provide alternate routes to bypass high traffic areas to mitigate bottlenecks. Roundabouts are utilized to slow vehicles and provide focal points at key campus locations. Existing transit stop locations coincide with the connection points to the Sports Complex and the Science Quad.

LANDSCAPING

- ① The "Big G" marks the entry to the University of Guam Campus located on a mounded round-about with shrubs and flowering groundcover. The round-about will include special pavement to highlight it as a main entry.
- ② Presidents' Lane is a meandering campus pathway through a grove of Yoga Trees that gives the North Campus a defined but organic edge.
- ③ Huneke Trees (straight trunk, 6'-8' branch clearance required) line University Avenue and soften the streetscape containing decorative pavers, tree grates, and outdoor seating in order to create a pedestrian oriented space for campus events.
- ④ An Outdoor Amphitheater is created through a series of seating terraces that follow the existing topography. Medium trees define the boundary of the space. Palms accentuate the open space and highlight the surrounding buildings.
- ⑤ A stage is located at the base of the Amphitheater and highlighted and centered with Medium Trees and Palms on either side.
- ⑥ The Science Quad is an open space filled with Large Trees to provide shade and create an outdoor classroom environment for the surrounding Science Buildings. A parking structure beneath the Quad will provide 460 parking stalls.
- ⑦ The CIS Community Garden is a dedicated space within the University of Guam campus to provide horticulture demonstrations and plant displays.
- ⑧ An open parking area will utilize pervious pavement and other LID strategies to minimize stormwater runoff.
- ⑨ Existing and new Dormitory Buildings will be given landscape renovations that include native fruit trees and vegetables in a sustainable garden setting.
- ⑩ The UOG Sports Complex features an informal landscape treatment to provide shading and screening.



0 150 250 500
SCALE 1" = 250' - 0"

SUGGESTED PLANT PALETTE**TREES:**

BOTANICAL NAME	CHAMORRO NAME	SIZE
Casuarina equisetifolia	Gagu	Large
Ochrosia mariannensis	Langiti	Medium
Tournefortia argentea	Hunek	Small
Aglaia mariannensis	Mapunao	Medium
Thespesia populnea	Binalo	Medium
Cordia subcordata	Niyoron	Medium
Pandanus fragrans	Kafo	Medium
Hernandia sonora	Nonak	Large
Guamia mariannae	Palpal	Medium
Mammea odorata	Chopak	Large
Pandanus dubius	Pahong	Medium
Intsia bijuga	Ifit	Large
Acacia auriculiformis	Acacia	Large
Cerbera dilatata	Chiute	Small
Elaeocarpus joga	Yoga	Large
Premna obtusifolia	Ahgao	Medium
Guettarda speciosa	Panao	Medium
Hibiscus tiliaceus	Pago	Small
Bikfia mariannensis	Gausall	Shrub
Nelsperma oppositifolia	Fagot	Large
Calophyllum inophyllum	Daok	Large
Artocarpus mariannensis	Dokdok	Large
Tristiropsis obtusangula	Faniok	Large
Acacia mangium	Dodog	Large
Clusia rosea	Autograph	Medium
Ficus prolixa	Nunu	Large

Notes:

- It is recommended that the University of Guam consider developing a committee to oversee all campus landscaping and planting protocol.
- Landscaping will be implemented simultaneously with the Design Module build-out.
- Trees shall be coordinated with existing and planned site utilities.

SUGGESTED PLANT PALETTE (CONTINUED)

PALMS:

BOTANICAL NAME

Chrysalidocarpus lutescens
 Livistonia chinensis
 Phoenix roebellenii
 Pritchardia pacifica
 Rhaps excelsa
 Wodyetia bifurcata

COMMON NAME

Areca Palm
 Chinese Fan Palm
 Dwarf Date Palm
 Fiji Fan Palm
 Rhaps Palm
 Foxtail Palm

COMMENTS

SHRUBS:

BOTANICAL NAME

Allamanda cathartica
 Alpinia purpurata
 Alpinia spp.
 Bougainvillea spp.
 Carissa grandiflora
 Codiaeum variegatum
 Cordyline fruticosa
 Ficus microcarpa var. crassifolia
 Gardenia taitensis
 Hedychium coronarium
 Hedychium flavescens
 Heliconia spp.
 Hibiscus spp.
 Ixora spp.
 Monstera deliciosa
 Philodendron selloum
 Plumbago capensis
 Scaevola sericea
 Strelitzia reginae

COMMON NAME

Allamanda
 Red Ginger
 Pink Ginger
 Bougainvillea
 Natal Plum
 Croton
 Ti Plant
 Natal Plum
 Tiare Gardenia
 White Ginger
 Yellow Ginger
 Heliconia
 Hibiscus varieties
 Ixora
 Monstera
 Philodendron
 Plumbago
 Nanaso
 Bird of Paradise

Dwarf variety only

Low Maintenance varieties only

High pH tolerant varieties only



SUGGESTED PLANT PALETTE (CONTINUED)**GROUND COVERS:****BOTANICAL NAME**

Ipomoea pes-capre
 Liriope spicata
 Liriope muscari
 Microsorium scolopendria
 Ophiopogon japonicum
 Ophiopogon japonicum 'nana'
 Ruellia ciliosa
 Vitex rotundifolia
 Wikstroemia uva-ursi
 Zoysia spp.

COMMON NAME

Beach Morning Glory
 Liriope
 Variegated Liriope
 Lauae Fern
 Mondo Grass (Regular)
 Mondo Grass (Dwarf)
 Ruellia
 Pohinahina
 Akia
 Zoysia / Centipede Grass Hybrid

SUGGESTED PLANT PALETTE (CONTINUED)

FRUITS AND VEGETABLE PLANTINGS:

<u>BOTANICAL NAME</u>	<u>FRUIT COMMON NAME</u>	<u>CHAMORRO NAME</u>	<u>BOTANICAL NAME</u>	<u>FRUIT COMMON NAME</u>	<u>CHAMORRO NAME</u>
MUSACEAE			MYRTACEAE		
Musa spp.	Banana	Aga	Psidium guajava	Guava	Abas
CARICACEAE			Syzygium cumini	Java Plum (Jambolan)	Limboy
Carica papaya	Papaya	Papalla	Syzygium malaccensis	Malay Apple (Mountain apple)	Makupa
ANACARDIACEAE			Syzygium samarangense	Wax Apple (Mountain Apple)	Makupa
Mangifera indica	Mango	Mangga	Eugenia uniflora	Surinam cherry	
Spondias purpurea	Spanish plum	Sineguelas	OLEACEAE		
RUTACEAE			Ximenia americana	Sour Cherry	Piut
Citrus mitis	Calamondin lemon	Kalamansi	ARECACEAE		
Citrus paradisi	Grapefruit	Hahet-magas	Areca catechu*	Betel-Nut*	Pugua*
Citrus aurantifolia	Kusai lime	Lemon lime	PANDANACEAE		
Citrus limon	Lemon	Lemon-reat	Pandanus dubius	Pandanas/Screw pine	Pahong
Limonia aurantifolia	Lime (Local)	Lemon-chena	PASSIFLORACEAE		
Triphasia trifolia	Limeberry	Lemon-de-chena	Passiflora edulis	Passion fruit	Passion fruit
Citrus aurantifolia	Mexican/Keylime	Lemon-adamelong	BROMELIACEAE		
Citrus sinensis	Orange	Kahet	Bromelia ananas	Pineapple	Pina
Citrus grandis	Pummelo	Kahet-magas	PUNICACEAE		
Citrus aurantium	Sour Orange	Lalangha	Punica granatum	Pomegranate	Granada
Citrus reticulata	Tangerine	Lalanghita	FABACEAE		
COMBRETACEAE			Pithecellobium dulce	Cuamenchiti	Kamachele
Terminalia catappa	Pacific Almond	Tailsai	SAPOTACEAE		
ANNONACEAE			Manilkara zapota	Chicle	Chiku
Annona reticulata	Custard Apple	Anonas	Chrysophyllum cainito	Star apple	Cainito
Annona squamosa	Sweetsop (sugar apple)	Atis	EUPHORBIACEAE		
Annona muricata	Soursop	Laguana	Phyllanthus acidus	Otaheite Gooseberry	Iba
LAURACEAE			TILIACEAE		
Persea americana	Avocado	Alegeta	Muntingia calabura	Panama Cherry	Mansanita
MORACEAE			OXALIDACEAE		
Artocarpus altilis	Breadfruit	Lemai	Averrhoa bilimbi	Pickle Tree	Pikul
Artocarpus mariannensis	Seeded Breadfruit	Dokdok	Averrhoa carambola	Star Fruit (Carambola)	Billimbis
Artocarpus heterophyllus	Jackfruit	Langka			

*The University of Guam prohibits the practice of chewing Betel-Nut on campus.



SUGGESTED PLANT PALETTE (CONTINUED)**FRUITS AND VEGETABLE PLANTINGS:**

<u>BOTANICAL NAME</u>	<u>FRUIT COMMON NAME</u>	<u>CHAMORRO NAME</u>
MALPIGHIACEAE		
Malpighia punicifolia	Barbados cherry	
FLACOURTIACEAE		
Flacourtia indica	Governor's plum	
RHAMNACEAE		
Ziziphus mauritiana	Indian Jujube	Mansana paotake
BIXACEAE		
Bixa orellana	Annato (Lipstick plant)	Achote
MORACEAE		
Morus nigra	Mulberry	
Ficus carica	Fig	
FABACEAE		
Tamarindus indica	Tamarind	Kalamendo
Moringa oleifera	Drumstick-tree	Moronggaie
COMBRETACEAE		
Terminalia catappa	Pacific Almond (Yellow, big)	Talisai
Terminalia littoralis	Pacific Almond (RED, small)	Talisai Ganu
RUBIACEAE		
Coffea arabica	Coffee	
Coffea robusta		
MALVACEAE		
Theobroma cacao	Cacao	

LANDSCAPING

SUGGESTED PLANT PALETTE IMAGERY

TREES:



Gagu



Langiti



Hunek



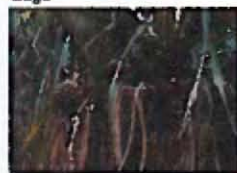
Mapunao



Binako



Niyoron



Kafo



Nonak



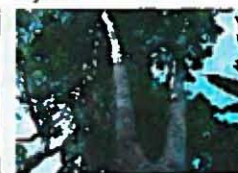
Palpai



Chopak



Pahong



Ifiti



Acacia



Chiute



Yoga



Ahgeo



Panao



Pago



Fagol



Daok



Dokdok



Fanlok



Gausell



Dodog



Autograph



Nunu

SUGGESTED PLANT PALETTE IMAGERY

PALMS



Areca Palms



Chinese Fan Palm



Fiji Fan Palm



Pygmy Date Palm



Rhaps Palm



Foxtail Palm

LANDSCAPING

SUGGESTED PLANT PALETTE IMAGERY

SHRUBS:



Dwarf Alamanda



Red Ginger



Bougainvillea



Natal Plum



Croton



Red & Green Ti



Tiare Gardenia



White Ginger



Yellow Ginger



Red Leaf Heliconia



Hibiscus



Ixora



Monstera



Philodendron



Plumbago



Neruo



Bird of Paradise

SUGGESTED PLANT PALETTE IMAGERY

GROUND COVERS



Beach Morning Glory



Mondo Grass



Liriope



Kahlia



Ruellia



Pohinahina



Aklis



Zoysia / Centipede Grass Hybrid

LANDSCAPING

PROHIBITED PLANT LIST

The University of Guam campus prohibits any plant species that is considered "invasive" and/or "restricted".

An "invasive species" is defined as a species that is non-native to the ecosystem and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Disturbances from urbanization, fire, agriculture have allowed the establishment of alien species within native communities on Guam. Once established, the alien plants may smother and displace the native species in an invasive manner, ultimately preventing their re-establishment.

Certain species may be restricted due to their excessive maintenance requirements, aggressive root systems, or pest and rodent harboring problems. The coconut palm is restricted for various reasons such as maintenance, coconut fall damage, and because they are being attacked by the Coconut Rhino Beetle, an invasive insect recently introduced to Guam. Plants listed in the table below are prohibited from the UOG campus due to their invasive or aggressive qualities.

TREES:

BOTANICAL NAME

Babusa spp
Brassaia actinophylla
Chrysophyllum oliviforme
Citharexylum spinosum
Dendrocalamus spp.
Eucalyptus globulus
Ficus macrophylla
Ficus microcarpa (retusa)
Grevillea robusta
Hedyclium gardnerianum
Melaleuca quinquenervia
Nerium oleander
Paraserianthes falcataria
Phylloscachys spp.
Prosopis pallida
Psidium cattleianum
Roselia spp.
Schinus terebinthifolius
Spathodea campanulata

COMMON NAME

Bamboo
Octopus Tree
Satin leaf, Satinwood
Fiddlewood
Bamboo
Blue Gum
Moreton Bay Fig
Chinese Banyan
Silky Oak
Kahili ginger
Paperbark
Oleander
Albezia
Bamboo
Kiawe
Strawberry Guava
Firecracker
Christmas berry
African Tulip Tree

REASON FOR RESTRICTION

Aggressive
Invasive
Invasive
Invasive
Aggressive
Invasive
Invasive
Invasive, aggressive
Invasive
Invasive
Invasive
Invasive
Invasive
Poisonous
Invasive
Aggressive
Invasive
Invasive
Invasive



PROHIBITED PLANT LIST (CONTINUED)**PALMS**

<u>BOTANICAL NAME</u>	<u>COMMON NAME</u>	<u>REASON FOR RESTRICTION</u>
Cocos nucifera	Coconut Palm	Host for Coconut Rhino Beetle
Heterospathe elata	Sagisi Palm, Patma Brava	Invasive

SHRUBS:

Ligustrum lucidum	Oriental Privet	Invasive
Ligustrum sinense	Chinese Privet	Invasive

GROUND COVER:

Asystasia gangetica	Asystasia	Invasive
Epipremnum pinnatum	Pothos	Invasive
Lantana montevidensis	Lantana	Invasive
Lonicera japonica	Honeysuckle	Invasive
Passiflora suberosa	Passion Fruit	Invasive
Sphagneticola trilobata	Wedelia	Invasive
Thunbergia grandiflora	Bengal Trumpet	Invasive
Tradescantia spathacea	Oyster Plant/Moses in the bulrushes	Invasive
Thunbergia	Laurel Leaved Thunbergia	Invasive

Table 2. Student Growth Projections by Department(2010 – 2025)

Growth Rate / Department	2010	2015	2020	2025
Low (2.5%/Yr)				
CLASS	333	377	426	482
CNAS	382	432	489	553
EMSS	1,122	1,269	1,436	1,625
SBPA	751	850	961	1,088
SNHS	326	369	417	472
SOE	709	802	908	1,027
Average (2.9%/Yr)				
CLASS	333	384	443	511
CNAS	382	441	508	587
EMSS	1,122	1,294	1,493	1,723
SBPA	751	866	1,000	1,153
SNHS	326	376	434	501
SOE	709	818	944	1,089
High (4.8%/Yr)				
CLASS	333	421	532	673
CNAS	382	483	610	772
EMSS	1,122	1,418	1,793	2,267
SBPA	751	949	1,200	1,517
SNHS	326	412	521	659
SOE	709	896	1,133	1,432

Table 3. Estimated Classrooms by Department (2025)

Department	Courses Per Student	Course Hours per Week	Growth Scenario		
			Low	Average	High
CLASS	4	3	7	7	9
CNAS	4	3	8	8	11
EMSS	1	2	4	4	5
SBPA	4	3	15	16	21
SNHS	4	3	6	7	9
SOE	3	4	14	15	20
Total			53	57	74

CALCULATION ASSUMES

- Typical classroom size is 35 students
- Typical hours of instruction from 8am to 7pm ; Monday through Friday, with early morning Saturday classes.

APPENDIX B

LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN (LEED) OVERVIEW

Green building practices can substantially reduce or eliminate negative environmental impacts and improve existing non-sustainable design, construction and operational practices. The United States Green Building Council (USGBC) established a LEED Green Building Rating System™ for New Construction (NC). The LEED Green Building Rating System is a voluntary, consensus-based, market-driven building rating system based on existing proven technology. It evaluates environmental performance from a whole building perspective over a building's life-cycle, with definitive standards for what constitutes a "green building." The LEED rating system is based on accepted energy and environmental principles and strikes a balance between known established practices and emerging concepts. It is a performance-based system where credits are "earned" for satisfying criterion designed to address specific environmental impacts inherent in the design, construction, operations, and maintenance of a building. Different levels of green building level certification are awarded based on the total credits earned. LID design practices as proposed in this master plan could be used to earn LEED points in the Sustainable Sites and Water Efficiency categories.

LEED SUSTAINABLE SITES STRATEGIES - UNIVERSITY OF GUAM

Sustainable Sites Prerequisite 1: Construction Activity Pollution Prevention

All projects developed within the University of Guam campus seeking LEED certification will require an Erosion and Sedimentation Control (ESC) Plan as a prerequisite. LID strategies such as temporary or permanent landscaping, mulching, vegetated channels, earth dikes, sediment traps, and sediments basins should be considered in the ESC Plan. Other erosion control Best Management Practices (BMPs) should also be considered in the ESC Plan.

Sustainable Sites Credit 6.1: Stormwater Management. Quantity Control

The intent of Sustainable Sites (SS) Credit 6.1 is to limit the disruption of natural hydrology by reducing impervious cover, increasing on-site infiltration, and managing storm water runoff. LID components such as Bio-Infiltration areas and Low Area/Passive Irrigation both serve to increase on-site infiltration and manage storm water runoff. Impervious areas are minimized to simple building footprint, sidewalks, and minimal parking.

Sustainable Sites Credit 6.2: Stormwater Management. Quality Control

The intent of SS Credit 6.2 is to reduce or eliminate water pollution by reducing impervious cover, increasing on-site infiltration, eliminating sources of contaminants, and removing pollutants from storm water runoff. This credit is potentially applicable through LID practices such as Infiltration Trenches and Bio-Infiltration Areas that serve to increase infiltration and remove pollutants.

Sustainable Sites Credit 7.1: Heat-Island Effect – Non-Roof

The intent of SS Credit 7.1 is to reduce heat islands (thermal gradient differences between developed and undeveloped areas) to minimize impacts on the microclimate and human and wildlife habitat. Option 1 of this credit (provide a combination of shade, paving materials, or open grid system for 50 percent of the hardscape) is the most appropriate for the University of Guam Campus. Option 2 requires a minimum of 50 percent of the parking spaces be placed under cover, which may not be feasible for the University of Guam campus.



LEED WATER EFFICIENCY STRATEGIES - UNIVERSITY OF GUAM**Water Efficiency Credit 1.1: Water Efficient Landscaping – Reduce by 50 percent**

Reduce potable water consumption for irrigation by 50% from a calculated mid-summer baseline case.

Reductions shall be attributed to any combination of the following items:

- Plant species factor
- Irrigation efficiency
- Use of captured rainwater
- Use of recycled wastewater
- Use of water treated and conveyed by a public agency specifically for non-potable uses

Water Efficiency Credit 1.2: Water Efficient Landscaping – No Potable Water Use or No Irrigation

The intent of Water Efficiency (WE) Credit 1.2 is to eliminate the use of potable water, or other natural surface or subsurface water source available on or near the site for landscape irrigation. Temporary irrigation may be installed during construction so the plants can be established, but it will be removed after the establishment period of one year.





LOW IMPACT DEVELOPMENT OVERVIEW

Low Impact Development (LID) is a storm water management and land development strategy that emphasizes conservation and use of on-site natural features integrated with engineered small-scale hydrologic controls to more closely mimic pre-development hydrology. The LID strategy uses "source-control" technology where it controls water at the source – both rainfall and storm water runoff. LID is a decentralized system that distributes storm water across a project site in order to replenish groundwater supplies rather than sending it into a system of storm drain pipes and channelized networks that control water downstream towards a large storm water management facility. The LID approach promotes the use of building roofs, parking lots, and other horizontal surfaces to convey water for either groundwater recharge or reuse. LID can help to reduce expenditures on piped or channelized conveyance systems and large retention basins because a fundamental LID technique is to provide storage and treatment on-site before runoff builds up in significant quantities. LID's main objective is to integrate infrastructure, architecture, and landscape to create a balanced, hydrologically functional and sustainable site.

The overall goal of LID is to develop the site so that its post-development hydrological conditions are as close to its pre-development conditions as possible. Auxiliary storm water drainage will be provided to supplement LID.

LID DESIGN PRINCIPLES

The following LID Design principles shall be applied to the University of Guam campus facilities:

- Protect the Guam Aquifer from contamination. Quality of runoff must be acceptable for groundwater recharge.
- Maintain groundwater recharge rates.
- Runoff should be treated, stored, and infiltrated into the ground as close to the source as possible.
- During future site development, disturb only the smallest area necessary to perform current activities and reduce erosion and off-site transport of sediment.
- Conserve natural drainage patterns and sensitive environmental features, and minimize erosion, sediment loss, and soil compaction.
- Re-vegetate the site with plant species that are native to Guam, as soon as possible after disturbance.
- Protect and retain existing vegetation to decrease concentrated flows, maintain site hydrology, and control erosion.
- Minimize imperviousness to the extent practicable.
- Develop and implement inspection and maintenance procedures to ensure landscapes are maintained to avoid water quality impacts.
- Design should be based on minimizing construction costs.
- Design should be based on minimizing long-term maintenance costs.
- Landscape plant palette should match surrounding native forest palette as much as practicable.
- No potable water shall be used for landscape irrigation. However, a temporary 1-year irrigation system is acceptable for plant establishment.

LOW IMPACT DEVELOPMENT STRATEGIES

The following LID strategies and storm water management measures were selected based on their ability to effectively protect natural drainage features, reduce runoff quantity, and improve runoff quality on the University of Guam campus. These management practices are considered "better site techniques" that are intended to reduce the total effective impervious area, and better distribute and infiltrate runoff.

- **SHALLOW INFILTRATION BASINS**

Shallow Infiltration Basins are graded depressions that collect runoff from a small area. They are typically sized for the 1 and 2-year storm event. Shallow Infiltration Basins are proposed adjacent to Campus buildings, designed to receive and accommodate storm water runoff coming from the buildings.

- **INFILTRATION TRENCH**

Infiltration Trenches are trenches that have been backfilled with stone or aggregate. These trenches collect runoff during a storm event and release it into the soil by infiltration. Infiltration Trenches are intended to accommodate the heavy runoff that cannot drain fast enough in the adjacent shallow basin. Typically, the Shallow Infiltration Basins will also have an Infiltration Trench to provide water quality control and peak flow attenuation. During construction, care should be taken to avoid excessive compaction of soils around the trenches and accumulation of silt around the Infiltration Trench, thus reducing its effectiveness.

- **LOW AREA / PASSIVE IRRIGATION STRIP**

The Low Area / Passive Irrigation Strip is an elongated basin that is designed to accept runoff from campus sidewalks and walkway areas and passively irrigate landscape trees and other plants in the strip.

- **PARKING LOT DRAINAGE**

The grading within the University of Guam campus parking lots should sheet-flow into the landscape pockets within or adjacent to the lots. These landscape pockets are intended to be Bio-Infiltration Areas which are native landscaped areas that filter runoff through a well-drained soil mixture. If the parking lot edges are to be curbed, they will have openings in them to allow runoff to drain directly into the Bio-Infiltration Areas.

- **BIO-INFILTRATION AREAS**

Future and existing parking lots at the University of Guam should accommodate Bio-infiltration areas which accepts storm water runoff from the surrounding paved area. There should not be any curbs around the Bio-infiltration areas; but if curbs are necessary, they should have curb openings to allow the runoff to drain into the planting pockets. A typical Bio-infiltration section includes a 3-inch mulch layer over a layer of Bio-infiltration soil consisting of 30 percent sandy loam, 30 percent sand, and 40 percent organic compost. A soil percolation test on the undisturbed, underlying soil should be performed to determine the depth of the Bio-infiltration soil. The Bio-Infiltration soil depth should be 24-inches if the percolation rate is more than 1-inch per hour. If it is less than 1-inch per hour, the depth should be 36-inches. The landscape plants within the Bio-Infiltration area would consist of a mix of native shrubs and ferns.

- **TREE CONSERVATION**

Based on aerial and recent photos of the University of Guam campus, there are existing native trees on site. These trees shall be protected during all future construction.



LOW IMPACT DEVELOPMENT STRATEGIES (CONTINUED)

• **NATIVE AND DROUGHT TOLERANT PLANT PALETTE**

Utilizing native plants in the landscape design has many advantages. Native plants are not only beautiful and practical, but also beneficial to the environment. Native plants require less water (except during establishment), chemical pesticides, fertilizers and overall maintenance. Native plants are also an important part of Guam's biological and cultural heritage. In addition, native plants often provide shelter and food for native wildlife.

The University of Guam campus shall be planted with native and/or drought-tolerant tropical plants appropriate for the campus location and setting. The list of approved native and non-native drought tolerant plants is provided in the Landscape Plant Palette section of this Master Plan.

Fruit and vegetable plants are appropriate in sustainable or community garden settings on the campus, such as near the dormitories or in outdoor classroom areas. The list of approved native fruit and vegetable plants appropriate for sustainable or community gardens is provided in the Landscape Plant Palette section of this Master Plan.

To ensure that plants in their native habitat are protected and perpetuated, native plants intended for the UOG campus should only be acquired from nurseries, growers and landscape contractors that are familiar with the laws and ethics associated with the cultivation of native plants. All native plants selected must be grown on Guam using seeds or cuttings collected from indigenous plant species located on Guam. Non-native plants should be sourced from Guam and grown on Guam to the maximum extent possible. Non-native plants from off-island should be avoided to the maximum extent possible.