Sustainable Campus Systems

Section 5: Sustainable Campus Systems

In 2007, TU committed to carbon neutrality by 2050. In 2017, the university renewed its commitment by becoming a signatory to America's Pledge on Climate Change.

In this Campus Master Plan, TU builds on its decorated legacy to environmental conservation, fiscal responsibility, and social justice by aligning its sustainability work to the United Nations Sustainable Development Goals. Engaging this global framework at Towson University empowers the campus community to think globally while acting locally.

5.1   United Nations Sustainable Development Goals

In September 2015, the United Nations (UN) General Assembly adopted the 2030 Agenda for Sustainable Development (General Assembly 70/1). The 2030 Agenda comprises 17 Sustainable Development Goals (SDGs) and 169 targets that provide a universal framework for the realization of human rights and environmental sustainability across a range of issue areas. The achievement of the UN SDGs requires engagement from all scales – individuals, businesses, institutions, and countries.

The 17 UN SDGs are:

SDG 1. End poverty in all its forms everywhere.

SDG 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.

SDG 3. Ensure healthy lives and promote well-being for all at all ages.

SDG 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

SDG 5. Achieve gender equality and empower all women and girls.

SDG 6. Ensure availability and sustainable management of water and sanitation for all.

SDG 7. Ensure access to affordable, reliable, sustainable, and modern energy for all.

SDG 8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment and decent work for all.

SDG 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.

SDG 10. Reduce inequality within and among countries.

SDG 11. Make cities and human settlements inclusive, safe, resilient, and sustainable.

SDG 12. Ensure sustainable consumption and production patterns.

SDG 13. Take urgent action to combat climate change and its impacts.

SDG 14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development.

SDG 15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

SDG 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels.

SDG 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Engaging the SDGs benefits the TU community in that the framework's systems approach helps students, faculty, and staff develop a well-rounded understanding of how local opportunities and challenges influence global conditions. The SDG framework also helps the campus community understand that success in addressing any one issue is interconnected

to achieving success in other issues. This intersectionality is critical to achieving a sustainable future at any scale and provides a shared nomenclature for the community to discuss the benefits of various physical, programmatic, and procedural investments.

UN Sustainable Development Goals at Towson University

As one of the nation's best regional public universities, Towson aims to accelerate its sustainability leadership by making quantifiable progress in strategic goals that align with the SDGs. Among other quantifiable goals, TU aims to achieve carbon neutrality (SDG 13); ensure education that serves all (SDG 4); increase waste minimization and diversion efforts (SDG 12); and integrate sustainability education throughout the curricula (SDG 4).

Engagement with the campus community revealed a series of clear sustainability-related priorities for the Campus Master Plan. The most pressing issues identified by the campus community include SDG 11 – Sustainable Cities and Communities, SDG 12 – Responsible Consumption and Production, SDG 7 – Affordable and Clean Energy, SDG 9 – Industry, Innovation, and Infrastructure, and SDG 13 – Climate Action.

All 17 UN Sustainable Development Goals are identified below in numerical order. Each includes a description of the goal's scope as well as a series of metrics or actions that could be adopted or taken at TU to mark progress and address the goal. Metrics have been aligned with external reporting frameworks including the Times for Higher Education Impact Rankings as well as the Association for the Advancement of Sustainability in Higher Education's Sustainability Tracking and Rating System (AASHE STARS) where appropriate. TU's sustainability work is not exclusive to the physical campus environment on which this Campus Master Plan focuses. While many aspects of sustainability have a built implication, others are more successfully advanced through policy, outreach, and academic initiatives. Links throughout this Sustainable Campus Systems chapter connect to other areas of the Campus Master Plan where sustainability-related content can be found as well as TU websites that highlight the contributions of entities on campus whose work can accelerate sustainability achievements in the context of the UN SDGs.

UN SDG 1 – No Poverty

UN SDG 1 focuses on ending poverty in all its forms everywhere across the globe. Poverty presents differently across scales. At the scale of the of our global community, extreme poverty is measured as the proportion of our human population that lives on less than $1.25 daily, but poverty lines vary by nation. In the United States, the U.S. Census Bureau also factors family size and the age of family members into its calculations of poverty.

The Times for Higher Education Impact rankings identify a number of quantifiable ways in which colleges and universities can address poverty both within their campus context and within their larger communities. The metrics below are adapted from that framework and should be considered by TU as ways to measure progress toward eradicating poverty:

- Admission and graduation rates of students who fall in the bottom 20% of household income in the State of Maryland.
- Availability of food, housing, transportation, and legal support services for students that empower them in completing university education.
- Partnerships in the broader community to support start-up business endeavors including mentorship programs, training workshops, and access to university facilities including libraries.

UN SDG 2 – Zero Hunger

UN SDG 2 aims to end hunger and food insecurity while improving nutrition and promoting sustainable agriculture. There are members of the Towson University community who experience food insecurity and programs are available to provide support. TU's FoodShare program helps students, faculty, and staff who may be experiencing food insecurity by providing a weekly grocery bag to those in need. Students with meal plans can also donate up to 2 unused meal swipes each week to the Food Insecurity Support Fund while others can support by making financial gifts to the Student Emergency Fund.

In addition to making food security programs available to the campus community, TU can quantify its contributions to ending hunger, improving nutrition, and promoting sustainable agriculture by:

- Measuring and reducing campus food waste both campus-wide and per capita.
- Providing education on sustainable food choices to the campus community.
- Increasing the availability of plant-forward, vegetarian, and vegan menus in campus dining facilities.
- Increasing campus-wide procurement of local, sustainable agricultural products.
- Increasing connectivity with the local agricultural community through research and curricular opportunities as well as farmer's markets and other vending opportunities.

UN SDG 3 – Good Health and Well-Being

UN SDG 3 strives to ensure people at all ages live in health and well-being. Globally, the UN has established metrics focused on reducing maternal and infant mortality, substance abuse, traffic fatalities, and environmental illness while promoting mental health and well-being. At TU, initiatives to support good health and well-being include the Smoke-Free TU Policy as well as mental and physical health care provided through the Counseling Center and Health Center. The implementation of this Campus Master Plan will increase physical mobility at TU regardless of physical ability.

This UN SDG is an area of strong existing success for TU based on standard metrics used to evaluate colleges and universities by the Times for Higher Education and AASHE STARS. In the context of those frameworks, TU should work to:

- Continue existing health and well-being programs.
- Identify metrics to measure the efficacy of existing programs – these may include the number of participants in existing programs, the frequency of offerings, or other measurements.
- Implement changes that increase the impact of existing programs and initiatives.
- Scale programs and service offerings commensurate with changes in the campus population's size, as well as the frequency and severity of the community's health needs.

Beyond external reporting schemes, TU should work to advance the transportation and mobility recommendations of this Master Plan including the North South Campus Pedestrian Greenway. For more information on transportation and parking, see Section 5.5.

UN SDG 4 – Quality Education

UN SDG 4 works toward ensuring inclusive and equitable education opportunities for all while promoting lifelong learning which is intrinsically linked to the institutional goals of Towson University. Implementation of this Campus Master Plan in concert with Leadership for the Public Good: TU 2020-2030 Strategic Plan is anticipated to result in a more inclusive, equitable education environment for the campus community. The redevelopment of existing facilities and development of new facilities outlined in Section 4: Campus Development Plan will accelerate Towson University's academic and research endeavors.

Common metrics in this goal include:

- The availability of public access to educational resources, including libraries.
- The provision of public education events such as lectures, courses, or symposia.
- Engagement in the local K-12 academic community.
- The percentage of undergraduate and graduate courses that focus on or are related to sustainability.
- The percentage of departments that offer courses that focus on or are related to sustainability.
- The percentage of researchers whose work is focused on or related to sustainability.
- The percentage of departments who have research work focused on or related to sustainability.
- The proportion of students who are first-generation students.

UN SDG 5 – Gender Equality

UN SDG 5 intends to achieve gender equality and empower women and girls across the globe. Global targets in this goal include eliminating discrimination and violence against women and girls, including domestic abuse, as well as recognizing the value of unpaid care and domestic work that is disproportionately borne by women and girls.

Within colleges and universities, gender equality is evaluated on:

- The proportion of research work that is primarily authored by women.
- The application, acceptance, and completion rates for female students.
- The proportion of female students in areas where women are historically under-represented.
- The proportion of women receiving degrees.
- The availability of family leave policies that support an equitable distribution of unpaid care and domestic work within families.
- Gaps, and lack thereof, between men's and women's graduation rates.
- The availability of reporting infrastructure and processes to address discriminatory actions or experiences.

UN SDG 6 – Clean Water and Sanitation

UN SDG 6 primarily addresses the availability and management of potable water and sanitation services for all. While Towson University does not currently face issues of potable water scarcity, it does face an environment in which sanitary sewer fees are increasing. Endeavors to conserve potable water and reduce the volume of water sent to the sanitary sewer system are likely to see increasingly favorable payback periods because of this costing environment.

To accelerate Towson University's potable water stewardship, TU should:
- Ensure building-scale metering of potable water consumption to support consumption accountability and more immediate awareness of maintenance issues.
- Calculate per capita water consumption to support education and outreach efforts to the campus community.
- Continue to advance low-flow fixture upgrades in existing buildings and install such fixtures in all new buildings. This aligns with the University's LEED certification requirements.
- Continue to prioritize the installation of native and adapted species in landscapes to minimize water demand for irrigation.
- Investigate alternative sourcing for irrigation water including stormwater cisterns, condensate collection, and greywater systems.

UN SDG 7 – Affordable and Clean Energy

UN SDG 7 addresses the accessibility, affordability, and reliability of clean energy. Clean energy comes from renewable sources such as solar, wind, and geothermal and does not burn fossil fuels such as oil or natural gas. Towson currently uses energy from a variety of sources including the on-campus Central Utility Plant, electricity that is generated off-campus, and electricity that is generated on-campus using solar panels. Towson University voluntarily purchases 60% of its electricity from clean, renewable sources including wind and solar. In alignment with its commitment to carbon neutrality, Towson will work towards purchasing 100% of its purchased electricity from renewable sources by 2030.

The Times for Higher Education Impact Rankings, AASHE STARS, and the United Nations share similar metrics and action items within the overall goal of affordable and clean energy that implementation of this Campus Master Plan will advance:
- Complete deep green retrofits in existing buildings that increases their energy efficiency.
- Increase the percentage of purchased electricity that is sourced from clean, renewable sources.
- Continue to audit existing buildings and implement low-cost measures to reduce energy consumption.
- Continue to monitor and maintain existing campus energy generation and use systems to extend the service life of equipment as practical.

While there are buildings at TU that are stand-alone facilities, many are connected to the Central Utility Plant. Because the Central Utility Plant is designed to use multiple fuel types including natural gas, all buildings connected to the Central Utility Plant have some portion of their energy load met by fossil fuels. To advance its commitment to clean energy and carbon neutrality, TU anticipates all new construction will have standalone system capacity, be fully electric, and be solar ready in alignment with existing policy. Scope for projects that will be connected to the existing utility loop will

include a steam to hot water heat exchanger to reduce impact. All major renovations to projects connected to the existing utility loop will maintain these connections for redundancy and resiliency.

The proposed near-term projects in Section 4.6: Campus Development Plan remove four buildings (Linthicum, Lecture, Prettyman, and Scarborough Halls) from the campus utility loop and comprehensively renovate another three (Smith, Stephens, and Van Bokkelen Halls) to standalone capacity. The long-term electrification of the remaining buildings on the utility loop and others using natural gas will enable TU to achieve carbon neutrality on Scope 1 emissions with minimal use of carbon offsets.

TU generates renewable electricity on campus with approximately 4,000 existing solar panels that produce over 1.5 MWh annually. New construction and major renovation projects will be evaluated individually to understand their ability to support new on-site solar installations. New construction and major renovation projects will be made solar-ready and TU will continue to evaluate on-site and off-site locations for additional solar photovoltaic systems.

For more information on how Towson will accelerate its stewardship of energy-related resources, see Section 5.2 and Section 8.

UN SDG 8 – Decent Work and Economic Growth
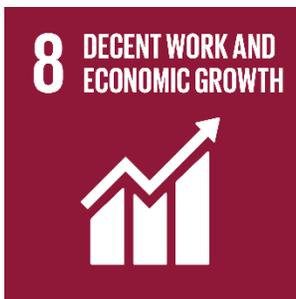
UN SDG 8 promotes sustained, inclusive, and sustainable economic growth as well as productive employment and decent work for all. TU has two roles in advancing this goal: the university itself employs a significant number of people in a wide variety academic, operational, and administrative roles and university education supports students in obtaining better economic opportunities.

To advance work in this area, TU should consider:
- Analyzing the compensation offered to all university staff and faculty to understand its relationship to a living age in the State of Maryland.
- Analyze the compensation offered to all university staff and faculty to ensure pay scale equity among genders.
- Recording the proportion of graduates who successfully obtain job placements within 6 months of graduation.
- Analyzing the proportion of all staff and faculty who are on contracts of more than 24 months.

UN SDG 9 – Industry, Innovation, and Infrastructure

UN SDG 9 addresses the resiliency of infrastructure such as energy and water utilities, wi-fi, and shared amenities in the face of enivonmental hazards such as extreme heat, winter storms, and flooding, as well as non-environmental hazards such as campus emergencies and pandemics.

At Towson, advancement toward UN SDG 9 includes improvements to energy and transportation infrastructure addressed in Section 5.2 and Section 5.5, as well as the development of shared innovation spaces to nurture creative and

critical thinking, entrepreneurial skills, and innovation among students and employees. Providing shared access to technology enabled classrooms and collaboration spaces is also critical to advancing TU's progress in UN SDG 9. See Section 4.5 for more information.

UN SDG 10 – Reduced Inequalities

UN SDG 10 acknowledges inequalities that exist within and among countries and aims to reduce them. At a global scale, the United Nations' targets within this goal focus on bridging existing inequalities between developing and developed nations. At TU, the Office of Inclusion & Institutional Equity's Diversity Strategic Plan, A More Inclusive TU – Advancing Equity and Diversity, demonstrates an ongoing commitment by the institution to build capacity around diversity, equity, and inclusion to embed that work into everything that happens in the university community. Assessment happens regularly and adjustments are anticipated in response to the changing context of TU's community. This Campus Master Plan has been developed in alignment with the goals of TU's diversity, equity, and inclusion work and its implementation will increase equitable access to campus amenities.

UN SDG 11 – Sustainable Cities and Communities

UN SDG 11 addresses the inclusivity, safety, resilience, and general sustainability of our built environment and has been identified as a critical goal for advancing sustainability at TU in the next decade. TU will work to advance mutually beneficial partnerships across departments on campus and within its surrounding communities as part of its commitment to advancing sustainability. This work will build from existing efforts by students, faculty, and staff that make a positive difference.

To accelerate its development of a sustainable campus environment, Towson University should:
- Continue to achieve at minimum LEED Silver on all new campus buildings; LEED Gold should be understood as an achievable stretch goal on many projects.
- Investigate strategies to integrate third-party certification of existing buildings into the curriculum. Providing a LEED Lab or similar class could provide meaningful professional experience to students while simultaneously supporting the university in optimizing the operation of its existing facilities.
- Continue to prioritize pedestrian connectivity ahead of vehicular connectivity.

For more information on how Towson will continue developing safe, affordable, accessible, and sustainable transportation systems, see Section 5.5.

As a public institution, Towson University celebrates the engagement of its campus community in the development of the physical campus environment. The development of this plan is itself a manifestation of this goal in action – hundreds of members of the campus and neighboring communities engaged in virtual focus groups, surveys, and other feedback opportunities to influence this work. To further advance toward the aspirations of this goal, regular engagements with sustainability-focused students, faculty, and staff should be hosted to ensure the implementation of the Campus Master Plan maintains its alignment with TU's sustainability objectives.

UN SDG 12 – Responsible Consumption and Production

UN SDG 12 addresses material streams and the volume of materials produced, consumed, and disposed of in our communities. The TU community identifies waste minimization and diversion as critical to advancing sustainability at TU in the next decade. TU began its recycling program more than three decades ago and currently boasts a campus-wide recycling rate of more than 40%. To keep pace with many of its peer institutions, Towson University will develop a waste minimization plan that embraces zero waste principles.

Metrics within waste minimization are consistently standardized across third-party reporting frameworks and include:
- Percentage of goods and materials sourced from more sustainable supply chains. This is typically broken down into multiple procurement streams and may include specific targets for individual supply chains including food and beverages, electronics, cleaning and janitorial supplies, and office paper purchasing.
- Annual municipal waste generation in tons both across the entire university community as well as per capita.
- Annual municipal waste diverted from landfill across the entire university community as well as per capita.
- Annual construction and demolition waste generation across the entire university community.
- Annual construction and demolition waste diverted from landfill across the entire university community.
- Existence and enforcement of policies that minimize single-use goods, particularly plastics.
- Existence and enforcement of responsible consumption and production language in contracts with university vendors including food service operators.

To advance toward waste minimization and diversion targets, TU should consider:
- *Waste audits.* Engaging the campus community in high-visibility waste audits with well-publicized data can increase awareness about the impact of individual behaviors on campus waste diversion outcomes.
- *Developing a waste minimization plan.* TU's material stream is complex and includes municipal waste, construction and demolition debris, durable goods such as furniture, hazardous waste such as lab chemicals, and organic wastes from foodservice enterprises and landscape maintenance. Supported by data from waste audits, a waste minimization plan would allow TU to more deeply investigate strategies to reduce the volume of waste generated on campus.
- *An Extended Producer and User Responsibility Policy.* Developing, adopting, and implementing such a policy would support procurement efforts that prefer goods and materials that contribute to a circular economy.

While those actions are under consideration, TU will already be taking active steps to reduce waste production and maximize landfill diversion. Section 4.4 identifies a number of existing buildings that are slated for significant improvements. Reinvesting in these assets elongates their useful life and keeps significant volumes of construction waste from landfill. Renovation is a waste minimization strategy. TU is also in the process of deploying universal waste infrastructure across campus. Training the campus community in one repeatable set of waste-related behaviors that can be used across campus is more likely to successfully increase waste diversion than training the community in multiple waste-related behaviors.

UN SDG 13 – Climate Action

UN SDG 13 aims to combat climate change and its impacts by advancing strategies that reduce Scope 1 and 2 greenhouse gas emissions as well as comprehensively inventorying and offsetting Scope 3 emissions. Greenhouse gases, sometimes abbreviated as GHG, are gasses that trap heat in the atmosphere and contribute to climate change. TU is committed to achieving carbon neutrality by 2050 and has already made significant advancements in reducing its GHG emissions in the last decade through major lighting upgrades and increased investment in ongoing commissioning efforts. Higher efficiency HVAC systems have also been installed to replace aging equipment.

Greenhouse Gas Emissions Over Time
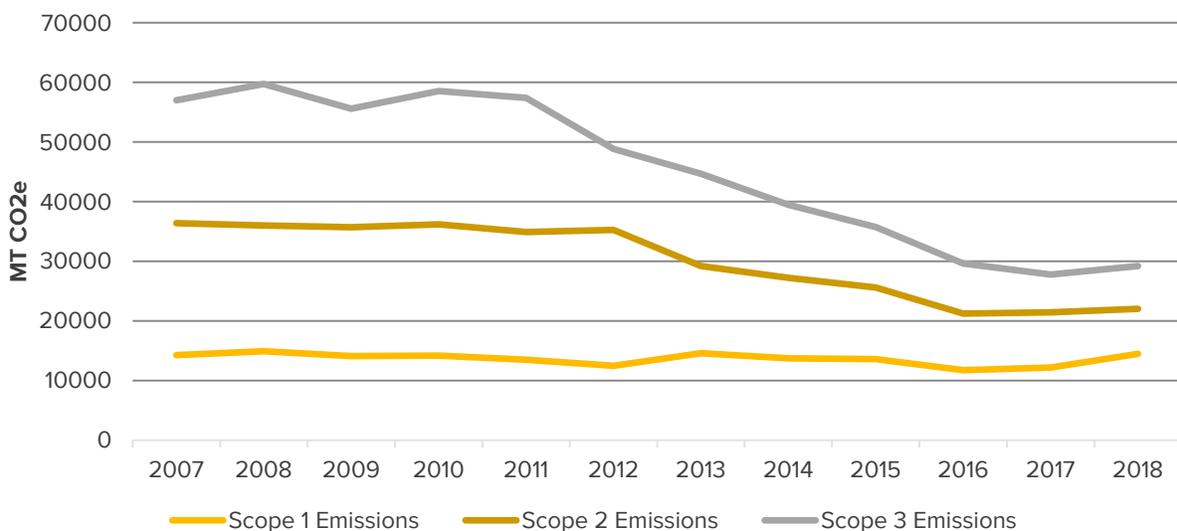
Metrics related to climate action are reasonably standardized across the Times for Higher Education Impact Rankings, AASHE STARS, and the United Nations. TU is already tracking data in this topic area including:

- Annual GHG emissions both aggregated together and separated into Scope 1, Scope 2, and Scope 3 emissions. Emissions are measured in metric tons of CO_2 equivalent (MT CO_2e).

TU is committed to achieving carbon neutrality by 2050. Towson University will need to undertake a comprehensive approach to reducing and offsetting emissions to achieve this commitment. While all actions required to achieve neutrality cannot be predicted, TU should anticipate:

- Continuing to invest in strategies that reduce the energy consumption of existing buildings.
- Continuing to develop high-efficiency new buildings.
- Sourcing 100% of its electricity from clean, renewable sources. This is directly linked to UN SDG 7.
- Planning for electrification of campus buildings and fleet vehicles.
- Exploring strategies to reduce commuting by single occupancy vehicle to reduce Scope 3 emissions including support for electric vehicles, transit incentives, and other opportunities. See Section 5.5.
- Investigating the viability of a university air travel offset fund.
- Exploring reputable offset programs, aligned with campus research where possible.

Recommendations in Section 5.2 will also contribute to reductions in greenhouse gas emissions.

UN SDG 14 – Life Below Water

UN SDG 14 addresses aquatic ecosystems and aims to conserve oceans, seas, and marine resources. Towson University is located within the Chesapeake Bay watershed and is mindful of its impact on downstream ecosystems. More information on TU's Stream and Wetland Restoration work and Stormwater Management practices can be found in other portions of the Campus Master Plan.

Every institution has a unique relationship to its aquatic ecosystem and at TU, the biggest positive impact on aquatic ecosystems can be made through reducing and appropriately managing stormwater runoff. To preserve the health of downstream aquatic ecosystems TU should:

- Continue to plant native and adapted plan species that have greater stormwater retention capacity than turf grass lawns. These working landscapes provide aesthetic value while simultaneously supporting ecosystem health.
- Continue to restore streams and wetlands on campus.
- Minimize stormwater contaminants through the continued use of integrated pest management practices that reduce the use of chemical pesticides and fertilizers.

UN SDG 15 – Life on Land

UN SDG 15 focuses on protecting, restoring, and promoting the sustainable use of terrestrial ecosystems including sustainably managed forests and reversal of land degradation and biodiversity loss. This Campus Master Plan's process primarily anticipates development on previously developed sites that will allow the institution's more natural areas to be maintained in future. Recommendations on Woodland Management are particularly aligned with advancement of this goal.

TU can advance its relationship to its terrestrial ecosystem by:

- Continuing to prefer native and adapted plant species in campus landscapes.
- Continuing to avoid invasive species and removing any such plant communities that appear on campus.
- Supporting soil health by following the Campus Master Plan's Soil Erosion recommendations.

UN SDG 16 – Peace, Justice, and Strong Institutions
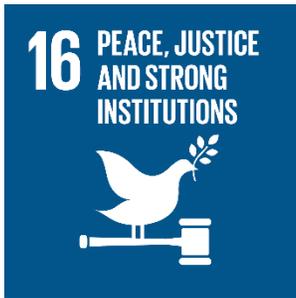
UN SDG 16 specifically addresses the role anchor institutions such as TU play in their broader communities. The goal promotes peaceful and inclusive societies that provide accessible, accountable governance structures at all levels. The development of this Campus Master Plan included engagement with hundreds of campus and community stakeholders which increases collective buy-in on its goals and implementation. Every member of the TU community has a role to play in the application of this plan.

TU can continue to advance its role as a strong institution through efforts that:
- Elevate underrepresented voices.
- Increase participatory decision-making in the campus community.

UN SDG 17 – Partnerships for the Goals

UN SDG 17 acknowledges that no one entity at any scale has all of the tools and skills necessary to create a sustainable world and encourages partnership to advance progress in all of the other goals. TU is a strong institution with many assets to offer in partnership to its surrounding community through the BTU. It is also part of the larger University System of Maryland and the national community of colleges and universities.

TU can accelerate is partnerships by:
- Implementing recommendations of this Campus Master Plan that encourage engagement with the broader Towson, Maryland community.
- Building connections across campus for interdisciplinary research and scholarship.
- Engaging regional and national dialogues about sustainability to share successes and lessons learned.
- Mentoring organizations for whom Towson University is an aspirant peer.

5.2   Utility Infrastructure & Energy

Baseline Objectives for Future Projects

All newly constructed buildings shall have standalone system capacity, be fully electric, be solar ready in alignment with existing policy, and consider connecting to the existing utility loop for redundancy where proximate. Scope for such loop-connected projects would include a steam to hot water heat exchanger.

All major renovations shall remain connected to the loop where applicable for redundancy, add system capacity at the building scale to support standalone operations, and be electrified as much as possible and designed for future full electrification. For future project impacts on utility loads, please see Section 8: Utilities & Infrastructure Analysis.

If first cost prevents the baseline objectives from being achieved on an individual project, then new construction buildings may consider eliminating connections to the existing utility loop for redundancy, and major renovations to buildings that are currently connected to the utility loop may consider eliminating the ability to allow standalone

operations. Because a portion of the existing utility loop's needs are met with fossil fuel combustion, however, it should be noted that additional connections to the existing utility loop will require future electrification in order to meet TU's carbon emissions goals and lengthen the timeline to carbon neutrality.

Systemwide Objectives

The campus wide building automation system, Automated Logic Controls, currently extends to all campus buildings for electric metering and provides some level of building temperature controls for the majority of campus. TU should continue expanding Automated Logic Controls to all systems except those where the age of systems or replacement schedule merits deferral.

While the existing campus loop is currently dependent on natural gas, it offers an opportunity as a redundant system that supports campus resiliency in the event of an electrical supply failure. The system also supports the continued use of historic buildings for which the costs of electrification outweigh the benefits. The campus loop should be maintained as a primary system for historic buildings and as a redundant system for renovated buildings in the Academic Core.

Upgrades to TU's utility and energy infrastructure will support the community in meeting its energy demands with clean, renewable energy sources. Because plans are being made to invest more heavily in electrification, utility and energy infrastructure upgrades are a critical part of Towson's path toward carbon neutrality.

Opportunities exist to upgrade the campus loop and central utility plant that involve varying degrees of cost and benefit:

Efficiency Upgrades to Existing Central Utility Plant
These can range from nozzle upgrades to entirely new, higher-efficiency and higher-capacity boilers. These upgrades provide important efficiency improvements if the Central Utility Plant is to be maintained as a redundant campus system for resiliency. Improvements to the steam plant will have among the largest impacts on campus-wide emissions. Note that many upgrades will have long paybacks due to the low natural gas rates associated with this system.

New Electrified Central Utility Plant
This high-cost opportunity would position TU to fully electrify historic buildings currently on the campus loop that are not candidates for standalone systems, but it would still require some building-specific upgrades to transition from steam to hot water as well as new low temperature hot water piping. Existing chilled water piping could be utilized. Geothermal could be implemented as a renewable source for hot and chilled water. A new Central Utility Plant could be sized just for the buildings reliant on the utility loop, or to also provide redundancy for all connected buildings.

Campus Utilities Mapping

In order to evaluate Towson University's future development footprint, it is useful to incorporate utility information into the analysis process. Campus utilities branch and layer significantly, with underground storm drains, sanitary lines, water lines, electric conduits, telecommunications duct banks, and steam routes all intersecting or crossing at various elevations and angles. A composite base map was developed with as much utility information as possible to inform master plan decision-making.

The Towson University campus, like most college settings, has locations where underground utilities are especially congregated. For planning and budgetary purposes, it is useful to highlight areas where piping is particularly "clustered" underground. It is also noteworthy to identify areas where utility alignments happen to be oriented in a manner that might make future development more onerous. Such exercises are helpful at a master planning level, with the understanding that some existing utilities may be undersized if more detailed, project-specific design efforts reveal the

need to increase capacities. Campus planners may determine that an area slated for expansion might introduce unusual site development costs because the area is uncommonly congested underground. When merged with CAD-based utility line composites, the 2021 Campus Master Plan imagery informs planners regarding the degree of difficulty anticipated as utility lines may need alteration, re-alignment, or abandonment in order to realize grand campus visions.

To assess how proposed building projects might interact (or overlap) with existing campus utilities, the planning team compiled an electronic "CAD" base with utility linework. Once this base was established, designers were able to superimpose the master plan and begin identifying areas where significant utility adjustments might be required to accommodate development projects. Designers made every attempt to collect comprehensive campus information for master planning purposes, however, as individual projects develop, Towson University will need to conduct thorough utility investigations and surveying to confirm utility alignments, sizes, invert elevations, and activity status prior to construction.

The diagram below depicts the master plan's proposed buildings and the existing utilities (black lines) weaving throughout campus. Even at this scale, it is informative to see how utility corridors emerge across Towson University's landscape.
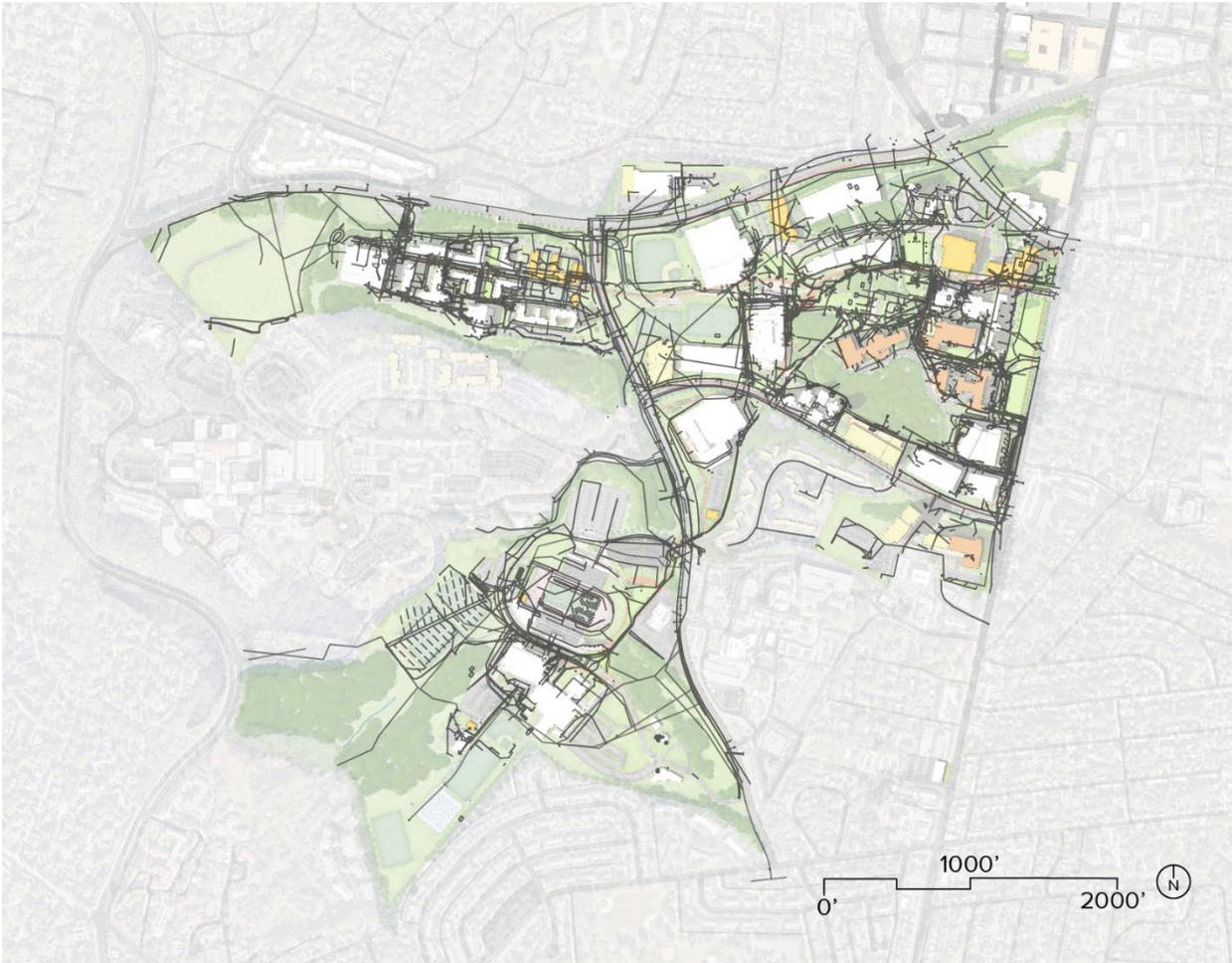
Campus Utilities

For individual utilities diagrams, diagrams for each proposed near-term project highlighting potential utility difficulties and opportunities, and projected future loads, please see Section 8: Utilities & Infrastructure Analysis.

5.3   Land Management

Towson University has been a thoughtful and responsible steward of the university's natural environment and resources and has demonstrated an above-average commitment to sustainability via campus infrastructure, activities, and initiatives. TU is committed to being at the forefront of sustainable development as the campus grows through innovative environmental practices and programs that promote awareness and educate students, faculty, and staff.

Soil Erosion

The Campus Master Plan recommends woodland management on slopes, including supplemental plantings, forestation and reforestation, that will help stabilize slopes and reduce erosion. Additionally, suggested stream restoration measures, riparian enhancements, and stormwater management best management practices (BMPs) will have a major impact on reducing erosion. Defined pedestrian paths and reductions of mowed areas by conversion to native and adapted landscaping and habitat areas/pollinator gardens will reduce overall soil compaction.

Woodland Management

As identified in Section 3, approximately 6.94 acres are currently in a Forest Conservation Act (FCA) Easement bank, which TU can debit from to satisfy future forest conservation mitigation needs on projects. Upon review of the proposed near term development, the University has sufficient banked area to cover the projected near term growth, including approximately 4.71 acres of buffer.

For the near term planned development, this suggests there is not a pressing need for Towson University to actively place additional woodlands into easement; however, the planning for some future action is warranted for long term planned development. It is still recommended that there is greater planning flexibility realized by continuing to address forest mitigation on a project-by-project basis as opposed to pursuing an approved forest conservation master plan.

Based on woodland assessment and analysis, TU should consider the following actions:
- Update and/or re-inspect existing forest stand delineations to better understand forest age, composition, and health.
- Continue to develop and implement the goals and targets as identified in the 2019 TU Campus Tree Care Plan.
- Continue to manage invasive species, ensure the health of native stands, and reforest areas as identified/needed. Such efforts and programs shall also support carbon neutrality strategies that quantify offsets for forest resources.
- Identify and implement strategies for afforestation and reforestation in targeted zones to increase overall forest stock on campus with emphasis to areas that will be seen by students, faculty, and staff to help build awareness.

For more information, see Section 9: Natural Resource Management.

Climate Commitment

Woodland management also factors strongly into the University's Climate Action Plan (CAP), in particular related to potential carbon offsets that can be tracked and documented related to forest conservation areas, forest management, and opportunities for afforestation and reforestation. A focused assessment of this offset potential was conducted as part of this master plan update. Based on the assessment, the following recommendations were developed:

- As much as the budget allows, and land is available, afforesting and reforesting areas of campus is recommended and increases available ecological habitat. Students could be involved in forestation efforts providing opportunity for climate action and sustainability education.
- Developing an improved forest management plan for all existing/future Towson University forest resources is also recommended. If budget is not available to manage all forested areas, limited implementation of the plan to certain areas of campus could be an option.

Stream and Wetland Restoration

Towson has a strong history with pursuing stream restoration and the incentive to continue finding opportunities has increased in recent years due to Chesapeake Bay restoration targets and new regulatory guidance.

One project on the horizon, as identified in Towson University's Phase II MS4 Restoration Activity, is the restoration of Towson Run (portion west of Osler Dr, 1,300 linear feet). This stream restoration effort will allow the university restore their impervious area to the maximum extent practicable (MEP) allowing them to potentially achieve a restoration credit of 39 acres. In addition to stream restoration, opportunities exist to restore and repair lined drainage conveyances along the west side of Osler Drive and north of the Residence Tower. These locations lend themselves well to retrofitting into a regenerative stormwater conveyance (RSC). RSCs help improve ecological conditions along linear flow paths by slowing down and filtering flows, while often times restoring these ephemeral drainage systems back to the headwater streams that they once were.

For more information, see Section 9: Natural Resource Management.

Stormwater Management

As described in Section 3, planning for stormwater management is a significant component of the Campus Master Plan. Environmental Site Design (ESD) practices will need to be applied throughout the campus to manage stormwater in terms of both quality and quantity. Because of the number of individual facilities that will ultimately be required throughout the campus, the potential impact to the campus open space is significant. It is therefore critical to manage not only the quantity and quality of the stormwater, but also the aesthetics and functionality of the facilities themselves. One way to address stormwater management for the Campus is to create an Institutional Master Plan (IMP). An IMP is a MDE-approved, long-term master plan developed to address stormwater management on an overall watershed basis. Developing an IMP is an elective. The master plan analysis recommends implementing an IMP due to the amount of existing stormwater facilities and the future projects that may require stormwater facilities.

6 CLEAN WATER AND SANITATION

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Efforts to maintain and improve Towson's stormwater management and restoration of streams and wetlands are aligned with UN SDGs 6 and 14 which address access to healthy, potable water for both human and aquatic ecosystems.

Achieving better stormwater management on campus advances the university toward its sustainability goals.

As each project occurs, the design process will still need to evaluate the stormwater management requirements even with an IMP in place. Project designers should evaluate which ESD practices are most appropriate for the site, such as green roofs, micro-bioretention areas, and vegetated swales. It will be critical to refine the IMP / concept design to integrate the stormwater facilities into the overall site, landscape, and even architectural design, rather than develop in a manner where the facilities appear to be afterthoughts.

For more information, see Section 9: Natural Resource Management.

5.4   Campus Landscape

Landscape / Open Space Considerations

The diverse scale, character, and uses of outdoor spaces within a university campus adds to the richness of the college experience. These outdoor spaces can span from active campus greens to intimate building courtyards, and it is the variety of these experiences that make the campus memorable. Most importantly, diverse space types allow for diverse activities, including spaces to exercise and interact with nature, as well as spaces for outdoor learning and community building.

The goal for open space at Towson University is to create a diverse greenway system that supports active campus life and community. Enhancing existing open spaces such as the Glen, while incorporating new open spaces like quads and plazas, will link the campus together and allow for an assortment of flexible programming and use. Hierarchy, variety, connectivity, and accessibility are imperative elements for linking the campus together.

Plazas

As seen in recent developments like the new University Union, plazas should be designed to engage with the surrounding context and foster both inward and outward interactions with adjacent infrastructure. Plazas along Towson Way, specifically, should be designed as social hubs that urge students to interact with one another and sometimes blur the lines of activity and circulation. Blending these uses can be achieved through space activators like furnishings, canopies, lighting, planting, and water features while still accommodating a variety of programmed activities and events. Furnishings in plazas should be a combination of fixed and movable to define spaces and allow for flexibility. Water features, monuments, and art installations can enrich the character of a plaza, act as a meeting spot or photo opportunity, and allow for quiet moments of reflection and relaxation.

New University Union addition from Towson Way

Quads

As previously mentioned, a long-term vision for the University includes a new sloped green space stretching from Cook Library down to the University Union. The inclusion of this green will accessibly traverse substantial topographic change, accentuate views through the campus, and bridge gaps between divided areas. Using a combination of flat lawns and sloping hillsides of planting, lawn, seating, or other landscape, the green can strategically and subtly mitigate grade change to create spaces and places for prospect and refuge. Due to the scale, orientation, and surrounding context, it is important to consider the microclimates that can exist in such a green space. Opportunities for sun and wind protection, as well as a sense of enclose and safety within the green, will give users choices in deciding how they would like to use the space based on the current conditions. As previously noted, it is vital to not only consider the connectivity of users across and through open spaces, but also how the open spaces engage with their surrounding context. Building facades fronting the green should feel like front doors with clear connections and entries, while natural edges should rely on the transitional woodland typology.

Glen Arboretum

The Glen Arboretum is one of the most significant open spaces on campus and greatly contributes to natural system components near the campus core. With its proximity to the North South Campus Pedestrian Greenway, there is an opportunity to integrate this resource more fully into campus life.

Within the Glen, accessible paths are a primary need that will allow everyone to enter and enjoy the arboretum. The creation of least one accessible path would enable the Glen to be increasingly utilized as part of academic coursework and would better position the Glen Arboretum Board to solicit funding for further improvements. Sediment and erosion control are also concerns of the Board, as is the continued caretaking of historical assets including structures and paths initially constructed in the 1930s as part of the Works Progress Administration.

Glen Arboretum with Smith Hall in background

New development and renovations around the Glen have the potential to accentuate views and engage with the landscape in environmentally conscious and sustainable ways. In addition to the creation of an accessible trail(s), overlooks and signage can educate visitors about the beauty and benefits of the natural area. When any work nearby is completed, care should be taken to preserve mature trees, especially noteworthy or officially recognized trees.

Activators

Campus activators are inviting outdoor furnishings or special interactive outdoor elements that entice people to stop and enjoy the exterior spaces. The recent implementation of colorful furnishings in open spaces like the Beach and Chapman Quad has been successful and, while currently unique to those spaces, could be implemented at other key locations throughout campus to establish consistency and identity. Special furnishings such as seating pockets, oversized swings, and hammock groves transform everyday activities into unique experiences. In addition to furnishings, art installations can serve as a unifying element between the many diverse nodes of campus. Scattered throughout the greenway, art pieces can act as wayfinding, gathering, or experiential features that attract users to the space. Towson University should consider creating a funding source for long term management and maintenance of art that may be installed throughout campus.

Students using colorful chairs in West Village Quad

Occupancy of open spaces during off-peak times is often challenging but can be overcome by creating four-season spaces that allow for sunlight and warmth in cooler months, provide shade in warmer months, and offer cover during weather events. The University should consider solar comfort when renovating existing open spaces and implementing new open spaces. Fire pits, misters, canopies/trellises, and light fixtures can all contribute to increasing and enhancing year-round use.

Planting

The University should continue to prioritize native plants throughout campus. Introducing trees and understory species that are reminiscent of the Towson University color palette is also recommended, specifically at gateways, signage and

monument locations, and athletic facilities. Planting selections should account for seasonal color in high traffic and visibility locations. At gateways and significant signage areas, trees with yellow, or similar, fall foliage is recommended to create natural, vibrant branding for the campus. This recommendation could also be continued throughout the North South Campus Pedestrian Greenway to create a golden ribbon of color the acts as natural wayfinding for the campus community.

Landscape Typologies

Landscape typologies at Towson University are broadly identified as cultivated or natural landscapes. While typically very different in character and appearance, connecting and weaving these typologies together celebrates the diversity of the landscape and appeals to a variety of users. Continuing to embrace these typologies is critical for the success of the North South Campus Pedestrian Greenway and the greater campus community. Reference to Section 6.4 of the Design Guidelines for additional detail about landscape typologies.

Preserving and increasing biodiversity in Towson's campus landscape is in alignment with UN SDG 15 which addresses the conservation of land-based ecosystems. As the region continues to urbanize, TU's landscaped oasis becomes an increasingly important landscape connector for local flora and fauna.

Streetscape Considerations

As Towson University's reach and connectivity constantly evolves and more housing opportunities become available in surrounding neighborhoods such as downtown Towson, the need for streetscape enhancements is obvious. Currently, many of the streetscapes connected to the campus feature sidewalks immediately adjacent to streets and are devoid of landscape buffers. Exploring opportunities to create more comfortable pedestrian connections with planting buffers, canopy trees, and underground utilities may provide safer connections and identity for the campus. Enhancements seem most necessary along Burke Avenue and York Road to provide safe passage for students and users connecting to Downtown Towson, as well as along Osler drive from West Campus to South Campus. In association with the proposed College of Business development, the streetscape along York Road has the opportunity to be transformed by adjusting topography, relocating utilities underground, and installing a double allee of trees to announce Towson University to the York Road corridor. Additional plantings can be used in key locations to distinguish pedestrian and vehicular entrances.

As alternate transportation methods such as bicycles and scooters become more prevalent, incorporating bike infrastructure will likely reduce pedestrian, cyclist, and vehicular conflicts while promoting active transportation that supports health and well-being for those who are able. The campus bike loop proposed around the Academic Core and Campus Life Center is one such strategy. Additional bike infrastructure options are outlined in Section 11: Bike Plan.

Refer to Section 6.4 of the Design Guidelines for typical streetscape guidelines.

Gateways and Boundary Markers

Gateways are important transition points between the surrounding community and the campus to provide a sense of arrival and orientation for visitors. As described earlier, the University has implemented the main entrance gateway at Towsontown Boulevard and University Avenue. The Master Plan proposes a hierarchy of gateway treatments that utilize the design elements and materials of this main entrance to different degrees and scales, as appropriate, to establish a unified image. Gateways are divided into five categories, as described below and illustrated in Section 6, Design Guidelines:

Legend

○ Primary Gateway

◌ Secondary Gateway

⚬ Tertiary Gateway

○ Pedestrian Gateway

○ Non-Gateway Campus Marker

<u>Primary:</u>
The main entrance at Towsontown Boulevard and University Avenue is the only primary gateway. Other gateways, as described below, will utilize the same design aesthetic and materials, however, to a lesser degree so that this entrance maintains its prominence.

<u>Secondary:</u>
Secondary gateways are located at Towsontown Boulevard and Osler Drive, Osler Drive and Auburn Drive, and Cross Campus Drive and York Road. These gateways should include wall elements, piers, signage, and landscape to reinforce the identity established at the main entrance described above.

<u>Tertiary:</u>
Tertiary entrances are more numerous. The design of each should include signage and wall or pier elements, depending upon the unique characteristics of each location.

<u>Pedestrian Only Gateways:</u>
While all gateways need to respond to both vehicular and pedestrian traffic, some gateways will be for pedestrians only.

<u>Non-Gateway Campus Markers:</u>
In addition to physical gateways, markers are/will be located at two intersections to identify the campus. These include Cross Campus Drive and Osler Drive, and Charles Street and Towsontown Boulevard.

Landscape Elements

Landscape elements include site furniture, lighting, signage, special features, paving, and walls. The Campus Master Plan continues to emphasize a primary palette of landscape elements to unify the campus. Beginning with the first development projects in the West Village, the University has successfully incorporated unified standards throughout the campus since its last master plan. Proposed development projects included in this Master Plan should continue that tradition in selecting site furnishings, lighting, signage, and paving. Unique designs should still be considered, however, for special places within the campus where an individual identity is important and unity with the rest of the campus is not critical. Landscape elements are described in detail in Section 6: Design Guidelines.

Example of existing site furnishings

5.5   Transportation and Parking

This section features capital improvement projects and recommendations for operational changes that are synchronized with the goals, land use, and growth forecasts presented in other sections of this Campus Master Plan. Together, these recommendations are intended to create a transportation network in and around the campus that effectively serves Towson University, its neighboring institutions, and local residents.

The elements of the campus vision with the most significant impact on the transportation system are the university's desire to become a more pedestrian friendly campus and to shift parking from the Academic Core and Campus Life Center to South Campus. Proposed new on-campus housing also affects the transportation system. Based on proposed new construction and divestment, total on-campus housing would grow from 5,910 beds today to 6,260 beds by 2035, over a 5.9% increase. With an enrollment increase of slightly more than 8.3% and an on-campus housing increase of

5.9%, a slightly higher percentage of students would be living off campus and may drive or use shuttle services rather than walk to class on a daily basis. By 2035, the campus proposes to increase the existing parking supply from 7,589 spaces to approximately 7,674 spaces – an increase of 85 spaces.

The transportation goals of the Master Plan are two-fold:
1. Accommodate Towson's expansion goals in an environmentally responsible and cost-efficient manner; and
2. Reduce demand for personal automobiles and create a more pedestrian-friendly campus by:
     a. Establishing a hierarchy for close and remote parking; and
     b. Providing incentives for alternative modes of travel.

Guiding Principles

Guiding principles arising from these goals include:

TU's transportation strategy prioritizes compact, active mobility for members of the community who are physically able while supporting equitable access to campus amenities. Active transportation advances TU toward UN SDG 3 which addresses physical health as well as UN SDG 11 which addresses walkable communities.

1. Improve vehicular, pedestrian, and bicycle wayfinding systems for first-time visitors.
2. Maintain existing parking supply/demand ratios to meet the needs of increased residential and commuter populations while minimizing the number of new spaces created.
3. Minimize the construction of new parking in the Academic Core by replacing most of the parking spaces "lost" to construction in South Campus and West Village.
4. Mitigate major points of vehicular/pedestrian/bicycle conflict on campus and design pedestrian/bicycle/vehicular/loading access to new buildings so as to separate these uses as much as possible.
5. Improve safety and amenities for both pedestrians and bicycles on campus, particularly within the Academic Core.
6. Improve pedestrian safety and connections to off-campus destinations.
7. Improve the efficiency and convenience of campus shuttle services to and from South Campus parking areas and West Village.
8. Maximize opportunities to share resources and coordinate strategic planning efforts with neighboring institutions for traffic and parking improvements through the Towson Five partnership.

More information on Transportation and Parking is available in Section 10: Transportation and Parking.

Bicycling

Vision
To create a campus environment that is comfortable for bicycling, to encourage more bicycling on campus and the surrounding community, and to obtain League of American Bicyclists certification as a Silver-level bicycle friendly campus.

Goals
- Equity – Ensure all people have access to mobility choices to reach their intended destinations
- Engineering – build more dedicated bicycling infrastructure
- Education – Provide information to help people feel more comfortable and confident in biking
- Encouragement – Promote bicycling related events and activities on campus and in the community
- Evaluation – Develop metrics and continue to collect information to assess progress

More information on Bicycling is available in Section 11: Bike Plan.