

STAFF RECOMMENDATION



M. Weil

NCPC File No. MP23

NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY MASTER PLAN UPDATE

100 Bureau Drive
Gaithersburg, Montgomery County, Maryland

Submitted by the United States Department of Commerce

November 26, 2009

Abstract

The United States Department of Commerce has submitted a Master Plan Update for the National Institute of Standards and Technology (NIST) campus located at 100 Bureau Drive in Gaithersburg, Maryland. The update is intended to prioritize projects to advance research initiatives, maintain facilities, support energy conservation and sustainability, and enhance the work environment. As part of the update, the Department of Commerce also included a Transportation Management Plan (TMP) and Programmatic Environmental Assessment (PEA).

Commission Action Requested by Applicant

Approval of Master Plan Update pursuant to 40 U.S.C. § 8722 (b)(1).

Executive Director's Recommendation

The Commission:

Approves the Master Plan Update for the National Institute of Standards and Technology, in Gaithersburg, Montgomery County, Maryland, as shown on NCPC Map File No. 3115.10(05.12)-28298.

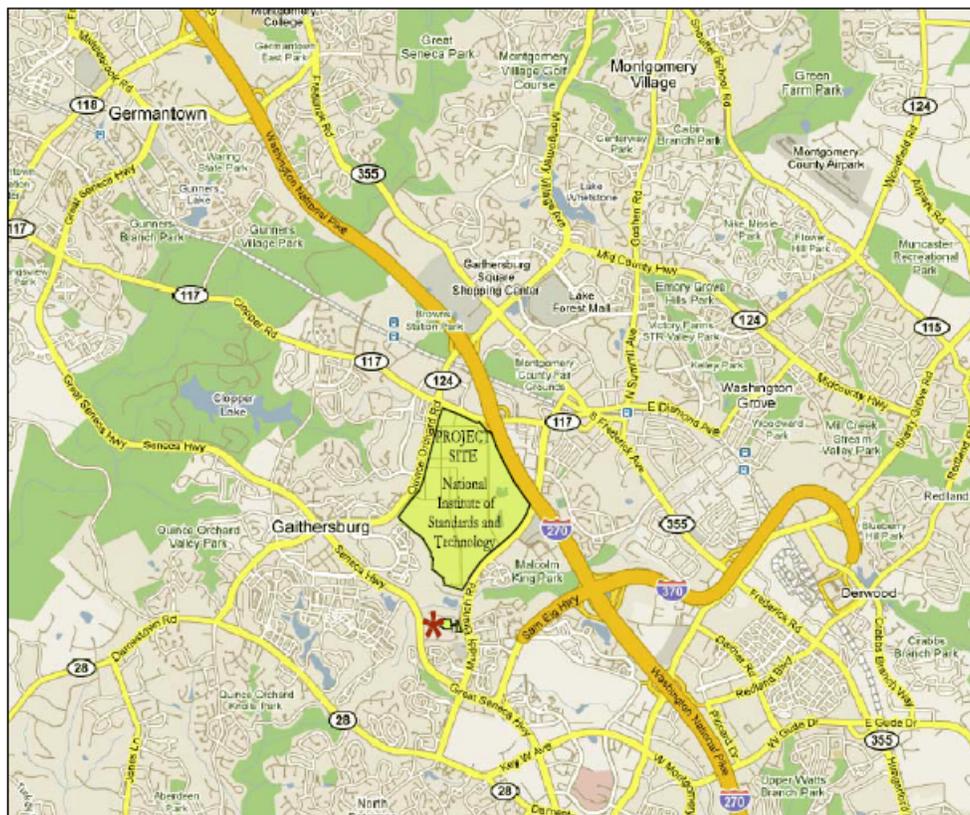
Commends the NIST for its ambitious transportation management plan and innovative water conservation effort that was awarded the 2009 U.S. Department of Commerce Environmental Stewardship Award.

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PROJECT DESCRIPTION

Site

The National Institute of Standards and Technology (NIST) Campus is located at 100 Bureau Drive, completely surrounded by the incorporated City of Gaithersburg, Maryland. The campus is comprised of approximately 235 hectares (581 acres) of land and is bounded on the west by Quince Orchard Road (MD Route 124), on the north by West Diamond Avenue (MD Route 117), on the east by I-270 and Muddy Branch Road, and on the south by Muddy Branch Creek Park and a residential development. The land uses in the immediate area are neighborhood commercial, “urban employment” (1-2 story office buildings), and medium-density residential uses across Quince Orchard Road, general commercial uses to the north, neighborhood commercial and medium-density residential neighborhoods to the east, and parkland and a mixed-use development to the south.



LOCATION MAP

The NIST campus is a suburban setting of buildings, roads and parking lots, surrounded by grass lawns, landscaped beds, manmade ponds and linear displays of a wide variety of native and ornamental trees. An area of mature forest exists on the western portion of the site, and a small wooded area is located in the northeast area, along I-270.



NIST Campus – Aerial View

The existing natural features of the property include meadows, mature forested areas, intermittent streams and emergent wetlands. The meadows contain many native grasses, and wildflowers dominate the southwestern part of the campus. Watercourses begin around two manmade ponds and their associated wetlands in the eastern portion of the campus. These drain southeastward, as part of the Muddy Branch Creek watershed, towards the Potomac River. The forested wetland/floodplain and emergent wetland, which run from the center of the property toward the southwest, are also connected with a tributary of the Muddy Branch Creek. There are no 100-year floodplains mapped within the boundaries of the NIST campus.

The existing land use consists of support space buildings, laboratories, site infrastructure, parking lots, roads, and open space. NIST has 55 buildings (3.44 million square feet) and other structures on its main campus, which remains largely unchanged since its completion in the early 1960s, with the exception of several building additions.



Main Administration Building



Building 202

The campus is surrounded by an eight foot high chain link fence punctuated by 6 gates. Gates A, B, C & F are open between 7:00 A.M. and 6:30 P.M., Monday through Friday. Controlled out of hours access is available through the main entrance (located on the northside of campus), manned by NIST security forces. Gate D is closed and Gate E is temporarily open for construction.



Quince Orchard Road at Gate C

Background

The Commission approved the current master plan in 1972, and several projects that were proposed through the master plan, were never constructed due to a lack of funding. These projects are as follows:

1. *Expansion of Building #101*: An addition of office space to the north side of the Administration Building located in the north-east part of the campus.
2. *(2) Expansions of Building #202*: Additions to west and south sides of Engineering Mechanics research facility, located in the center of the campus along Center Drive.
3. *Expansion of Building #233*: An addition to the west side of the Sound laboratory building, located on the north-west part of the campus near Gate C.
4. *Expansion of Building #236*: An addition to the west side of the Special Projects research facility, located at the south part of the campus.
5. *Expansion of Building #245*: An addition to the east side of the Radiation Physics research facility, located at the center of the campus along Center Drive.
6. *(2) Expansions of Building #301*: Additions to the west and north sides of the Supply and Plant office and storage building located on the west part of the campus.
7. *Addition to Building #303 (NCPC File No. 6860, July 14th, 2008)*: The proposed addition of 2,200 SF will house a fire department hazardous materials vehicle to protect it from the elements. The structure will be constructed of brick masonry to resemble the existing building and will be built on existing paved area located on the west side of building #303.
8. *Expansion of Building #304*: Addition to Instrument Shops research facility located on the north-west part of the campus.
9. *(3) Laboratory and Research Buildings 'E', 'F' & 'G' (near Gate A)*: These are new laboratories which will be located on the north part of the campus near Gate A.

The following projects are currently under construction or their construction was intended to start in 2009:

1. *Expansion to Building 235 (NCPC File No. 6778, October 15th, 2007):*

i. *New replacement Cooling Tower:* The new cooling tower is a three-cell mechanical draft hybrid tower which will replace an old tower scheduled for demolition. The new tower is designed to reduce visible water vapor plume that is discharged from such tower operations and will have more efficiency overall. The tower will not be visible from any off-site residential location.

ii. *Compressor Building south of Building # 235:* This infrastructure upgrade building will be located just south of the existing compressor building and is designed to match existing construction. The proposed building is approximately 1,200 SF and will house pumps and compressors.

iii. *Cooling Pump Building west of Building # 235:* This D-Wing Pump Room will include removal and/or relocation of utilities and penetrations through walls to create room for the installation of new neutron guide systems and shielding.

iv. *New Substation west of Building # 235:* The New Electrical Substation is an infrastructure upgrade and will be located to the north of the existing cooling tower. It will consist of exterior network transformers, switchgear and related equipment.

v. *Expansion to Building#235:* The proposed project includes two additions to the building: a 33,000 square foot Technical Support building with connecting lobby and a 16,000 square foot Guide Hall.

2. *Addition to Building #302:* Proposed expansion is approximately 2,000 SF and is designed to match the existing building's type, construction and architecture. Building #302 produces chilled water, steam, and compressed air which are supplied throughout the NIST campus. The new addition will accommodate a new 3,500 ton refrigeration unit, primary chilled water pumps, free cooling system, and any associated support equipment.

3. *Cooling Tower Building #317:* The proposed cooling tower is approximately 960 SF in size. This work includes design of a 3,500 ton cooling tower with a 2,000 ton free cooling system. This new tower shall be designed to accommodate expansion to an ultimate size of two 3,500 ton cooling towers and like-sized condenser water pumps.

NIST is a non-regulatory federal agency within the U.S. Department of Commerce that advances measurement science, standards, and technology, and has utilized its current headquarters campus for research since 1962. The campus houses laboratories for physics, information technology, chemical science, electronics and electrical engineering, materials, and building and fire research. Although NIST has recently constructed new laboratory space through its Advanced Measurement Laboratory and Advanced Chemical Sciences Laboratory, the majority of its research is still conducted in 1960's-era buildings, which are no longer able support NIST requirements.

As a result the “American Recovery and Reinvestment Act” of 2009, NIST is planning to implement a number of new buildings, additions to buildings, and infrastructure upgrades. These projects are primarily consolidations and replacements of obsolete facilities. No increase in staffing or traffic volumes is anticipated with these projects. The emphasis for the future will be the revitalization of existing buildings, primarily the General Purpose Laboratories and other research facilities.

Transportation

Regional access to NIST is provided primarily by I-270, which intersects both West Diamond Avenue and Quince Orchard Road at Exits 10 and 11, respectively, within a half mile of the campus. Other major routes providing regional access include: I-370 (Sam Eig Highway); Route 355 (Frederick Road/Rockville Pike); Route 28 (West Montgomery Avenue/Darnestown Road); Route 119 (Great Seneca Highway); Route 117 (West Diamond Avenue/Clopper Road); and Route 124 (Quince Orchard Road).

The Maryland Transit Administration operates MARC train service to Gaithersburg on the Brunswick Line, connecting Union Station in the District of Columbia to Frederick, MD and Martinsburg, WV. Two MARC stations, Gaithersburg and Metropolitan Grove, are located within one mile of NIST’s main entrance.

The Washington Metropolitan Area Transit Authority (WMATA) provides Metrorail service to the Shady Grove station, located approximately five miles from NIST. Metro operates express bus service (routes J7 and J9) between Bethesda and Gaithersburg, with service to the I-270, Exit 11, Park & Ride Lot, approximately a quarter-mile from the NIST campus.

Montgomery County operates Ride-On bus service in proximity to NIST, with a total of 13 Ride-On bus stops located along the roadways surrounding NIST, including:

- Two stops at the Main Entrance (routes 71 and 78);
- Ten stops along Muddy Branch Road (route 54); and
- One stop on Quince Orchard Road (route 56), near Gate D

Ride-on Routes 71 and 78 are located along West Diamond Road, providing service between the Shady Grove Metro Station and the Kingsview Park & Ride lot. Additionally, Ride-On Route 54 provides service between Lakeforest Mall and the Rockville Metro Station, with stops on Muddy Branch Road and twice-daily access directly onto the NIST campus, with a stop at the Administration Building.

NIST provides supplemental shuttle service between the Shady Grove Metrorail Station and its campus. The service runs between the station and NIST campus at 15 and 45 minutes past the hour, between 6:45 A.M. and 5:45 P.M, Monday through Friday. The shuttle departs from the front of the NIST Administration Building (#101) on the hour and half hour, between 7:00 A.M. and 6:00 P.M, during the business week. Internally, the NIST Grounds (campus) Shuttle runs a continuous 15-minute loop around the campus between 7:00 A.M. and 6:30 P.M, Monday through Friday. NIST also operates a shuttle between its campus and the MARC Station.

Proposal

The United States Department of Commerce has submitted a Master Plan Update for the NIST campus in Gaithersburg to prioritize projects to advance research initiatives, maintain facilities, support energy conservation and sustainability, and enhance the on-campus work environment. The key planning principles and objectives for the Master Plan Update are as follows:

- Construct future development projects to meet NIST's highest priority strategic needs;
- Minimize impact on surrounding communities;
- Prioritize projects to advance research initiatives, maintain facilities investment, support energy conservation and sustainability, and enhance the work environment;
- Enhance security measures on the campus;
- Help NIST to meet its ongoing mission and strategic goals.

There is no new net growth in population planned at the NIST campus and the proposed future projects include limited new facilities, replacement facilities, and additions to existing research facilities. There are twenty-two master plan projects for the campus, which are categorized as the following:

- a. Eleven future projects are part of NIST's current master plan but not yet implemented. The use and location of these projects have been previously approved by NCPC;
- b. Four projects are proposed new additions/extensions/renovations of existing facilities (*master plan update projects*);
- c. Seven projects are new buildings/facilities (*master plan update projects*).

The future new projects are included in the master plan update (approximately 115,000 square feet) and have not yet been approved by NCPC:

- *Child Care Center Building #320*: The proposed child care center, located between Gates B & C, will replace the existing facility and accommodate 154 children. The new child care center will be approximately 23,000 SF and will be designed to meet LEED Silver certification.



Future Planned Child Care Center

- *Logistics Consolidation Addition to Building #301*: The warehouse addition on the south end of building #301 will be a 20,000 SF addition, with a 5,000 SF mezzanine. In addition, there will be a concrete, fenced-in, lay-down area on the southside of the addition that will be 20,000 SF in area, with a minimum covered area of 10,000 SF. This facility will be designed with LEED certification requirements taken into consideration.
- *Robot Test Facility Building #207*: This new facility will be located to the south of Building #245. The area will be between 5,000 and 15,000 SF of floor space for development, fabrication, and testing, and will replace the existing Robot Test Facility.
- *Combined Fire and Police Emergency Services Building #318*: The facility will be located between buildings #301 and #233, near Gate C for easy access. The size of the facility will be approximately 17,000 SF and large enough to accommodate a joint police/fire station with sufficient apparatus space for the ambulance, pumper, brush truck and HAZMAT vehicle.
- *National Structural Fire Resistance Laboratory Addition (NSFRL)*: This new facility will be an addition to Building #205, which has a similar mission. The size of the new addition is approximately 20,000 SF and was originally envisioned when building #205 was constructed.

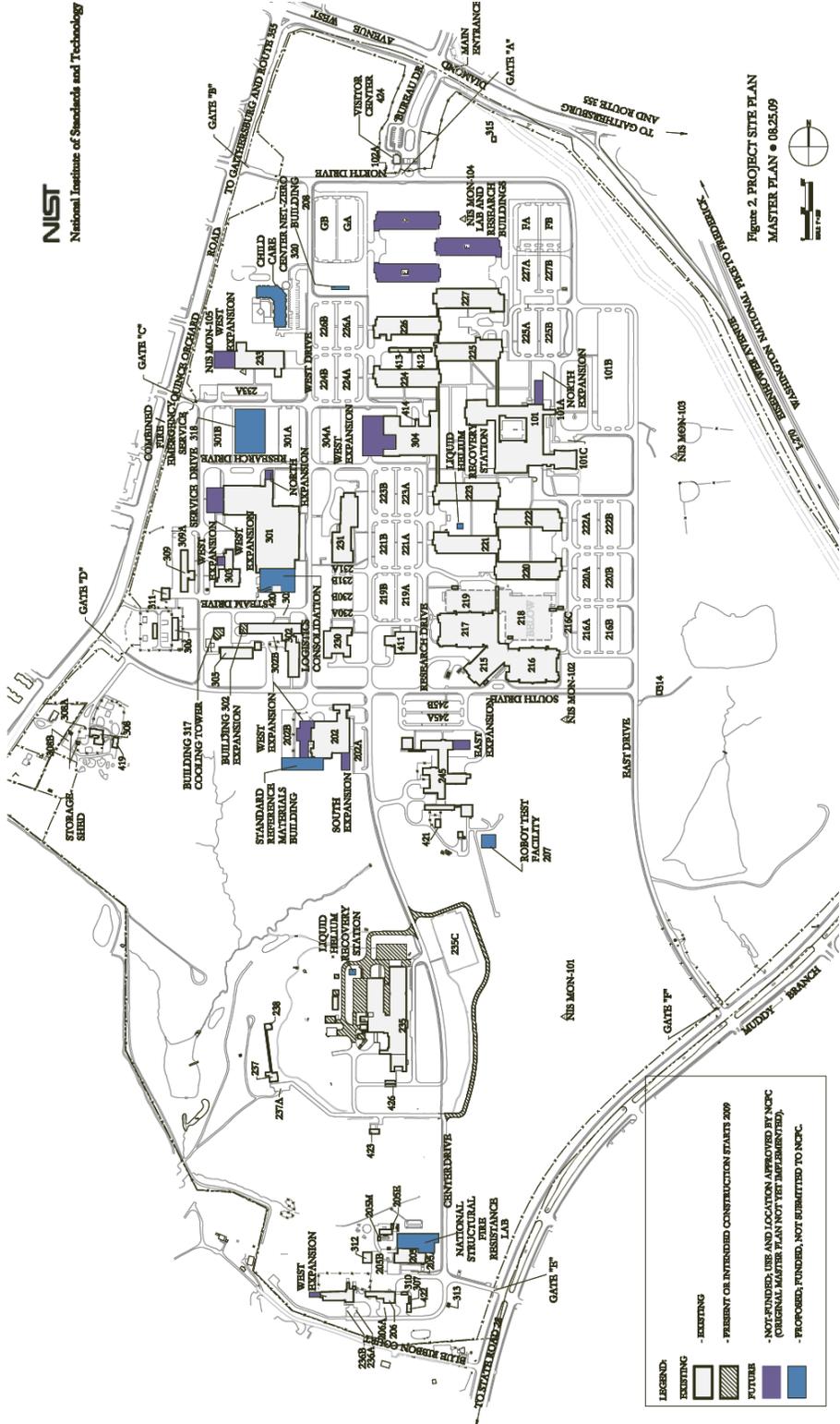


Future Planned Building 205, Fire Research Laboratory

- *Standard Reference Material Addition to Building #202*: The proposed facility is a warehouse addition to receive bulk quantities of materials delivered to Building #202. The addition will be approximately 20,000 SF and designed to match the existing building's type, construction and architecture.
- *Net Zero Energy Test Facility Building #208*: This will be a new building located on the northside of the campus near parking areas 226A & 226B, in the proximity of Building #226, for monitoring purposes. The Net-Zero-Energy Residential Building (NZEB) is a 2,500 SF, two-story, test facility that will be constructed as a residential-style building.

- *Liquid Helium Recovery Station:* The project consists of two helium recovery systems and the recovery network serving the system(s). The first system will be located next to the NCNR, Building #235 and the second will be located between the General Purpose Laboratory Buildings #221 and #223. The footprint required for each station is approximately 30 ft x 40 ft.
- *Replacement of Cooling Tower at Building #305:* The proposed cooling tower will be similar to cooling tower #317 described above, and will replace an existing one with a more efficient tower.
- *Truck Inspection Facility* (Not shown on maps, location to be determined): The Inspection site will use a large pad to accommodate up to three trucks at a time, with a maintenance protection shelter enough to cover two lanes (two vehicles). In addition a small guard house will store the detection equipment and provide climate control for the security clerk while waiting for vehicles to arrive.
- *General Purpose Laboratories (GPL's) Renovations:* The GPLs comprise seven research and measurement laboratory buildings and total 1.2 million SF, one third of NIST Gaithersburg's space inventory. These labs house the majority of NIST research and measurement work. The GPLs renovation is planned as a multi-year, multi-phased program. Each building will be vacated and renovated in its entirety which is substantially more cost effective than piecemeal partial renovations.

NIST
National Institute of Standards and Technology

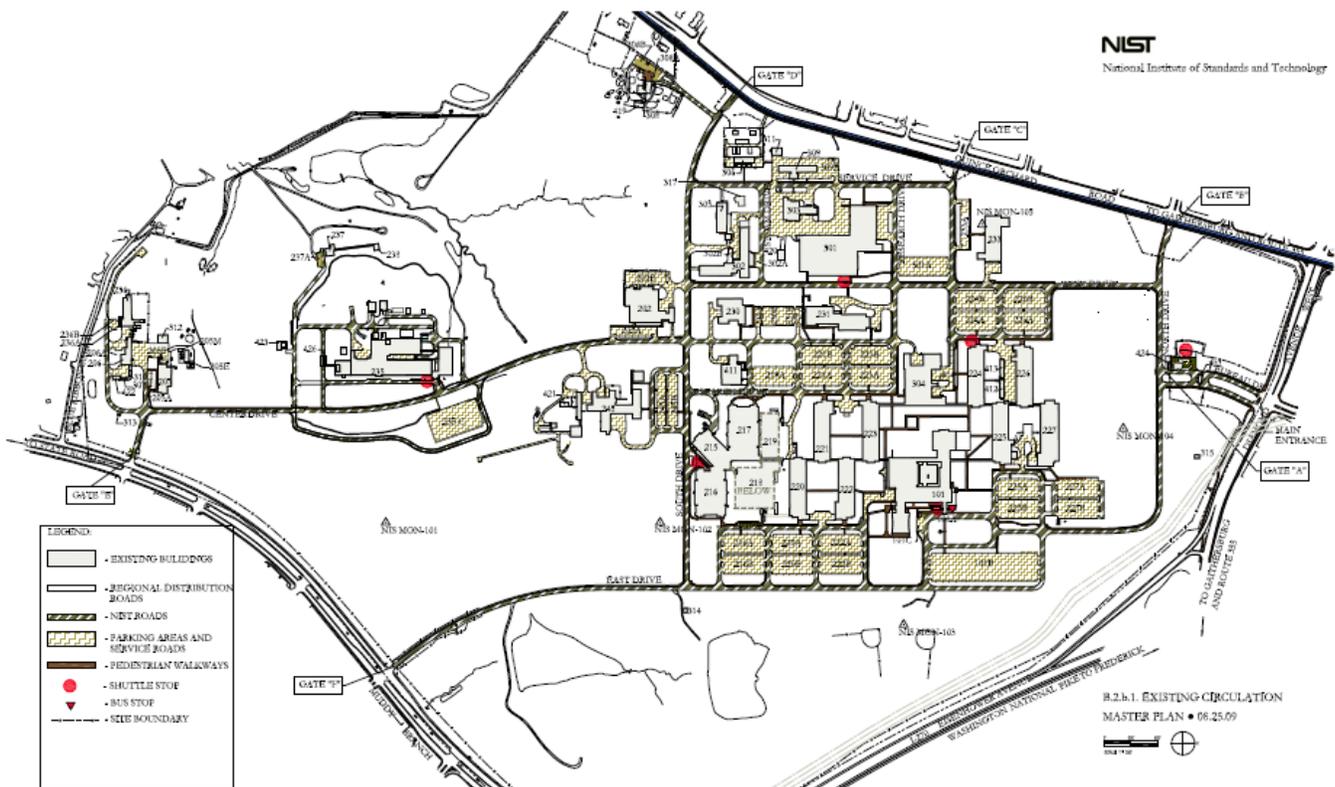


The existing research-focused development is aligned along a north-south axis, and the administrative-focused development is aligned along an east-west axis. The north-south axis is surrounded by parking and bounded by research support functions, facility/site maintenance,

physical plant and other ancillary research support facilities. A majority of the future planned development is located in the northern and northwestern portions of campus, as shown in the map above.

Parking

The NIST campus currently provides a total of 3,446 parking spaces for employees, the disabled, motorcycle, government vehicles, reserved, emergency vehicles, short-term and visitor uses. A total of 2,395 parking spaces are provided for general employee parking, or reserved for particular employees. Fifty spaces are designated as handicapped, 37 spaces for short-term parking, and 326 spaces reserved for visitors. NIST designates reserved carpool/vanpool parking spaces in close proximity to a number of buildings, to reward carpool commuters with convenient parking locations, and to provide visible encouragement to other commuters to consider carpool and vanpool commuting.



NIST Campus – Existing Parking

Surface parking is provided throughout the campus. Although parking structures are preferred for most campuses, surface parking is utilized to limit vibrations and the effects of those structures on the strictly-controlled environments found in the various research laboratories. All proposed parking was approved by NCPC, and the number of future designated employee spaces falls within the recommended NCPC Comprehensive Plan Guideline of 1:1.5, based on NIST's suburban location beyond 2,000 feet of Metrorail.

There are currently 3,596 federal and non-governmental employees working on-campus, and future employment and parking demand levels are assumed to remain constant based on projected NIST needs.

Transportation Management Plan (TMP)

The NIST 2009 Master Plan Update outlines a variety of long-term goals for development to modernize the agency, and reducing employee dependence on single-occupant vehicle trips is one of its primary goals. As such, the Transportation Management Plan (TMP) seeks a reduction of single-occupant vehicle (SOV) commuters by over eight percent, for an overall future SOV mode share of 60 percent by 2020.

The NIST TMP also outlines a number of strategies to achieve NIST's alternative commuting goals, as follows:

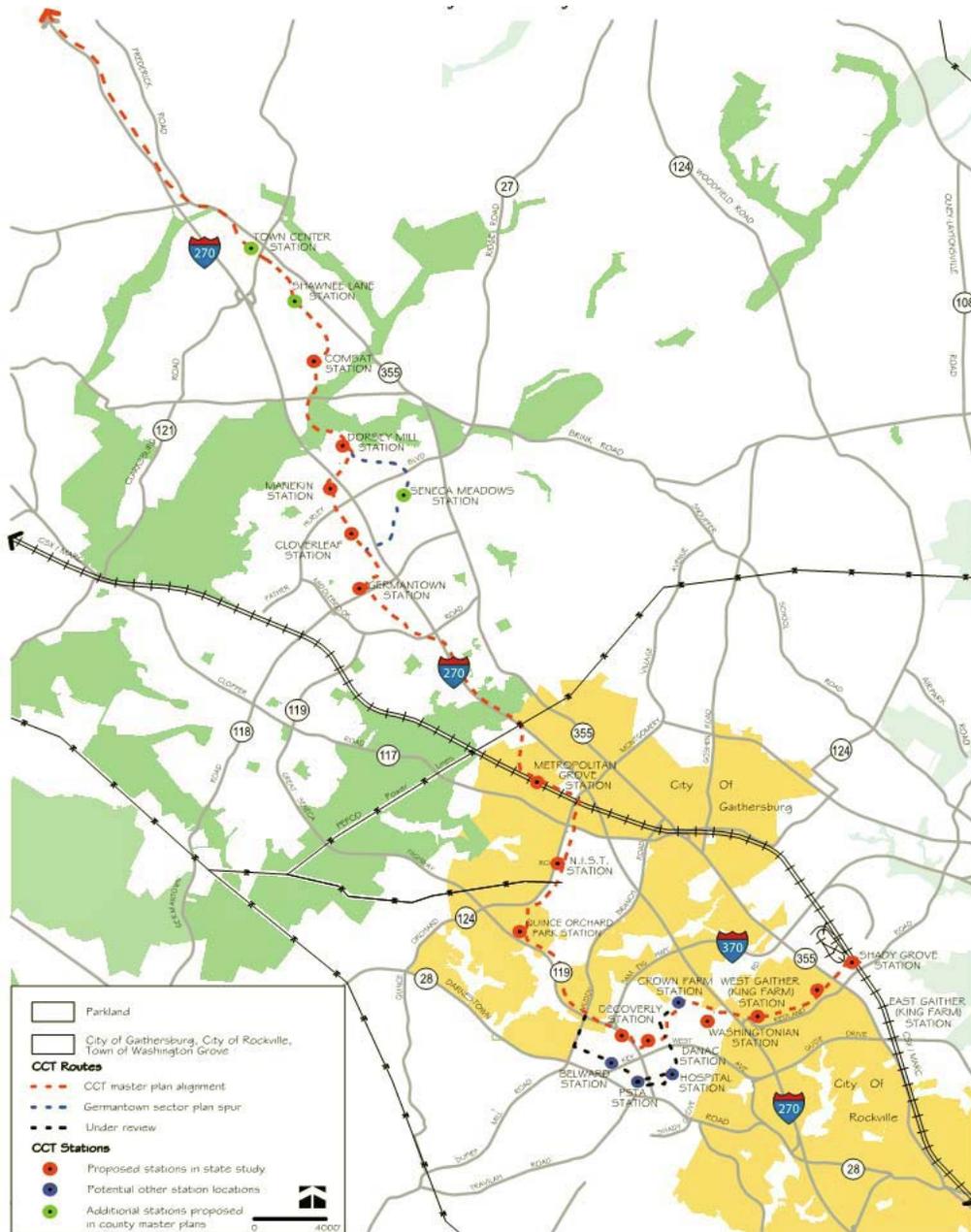
- Designate a Transportation Coordinator with clear responsibilities for coordinating, marketing, and evaluating the effectiveness of the NIST TDM programs (presuming sufficient funding is available to support this staff position);
- Create a centralized NIST website with information on NIST's transit and TDM programs; links to Commuter Connections and Montgomery County Commuter Services; links to local bicycle advocacy sites and groups; and contact information for the Transportation Coordinator;
- Continue coordination with Montgomery County and the Maryland Department of Transportation regarding the Corridor Cities Transitway, and explore options for expanded bus service to NIST;
- Improve pedestrian access through evaluating and upgrading deficient sidewalks; installing new crossing treatments; extending internal walkways to the external pedestrian system; and opening Gate B for all-day pedestrian access;
- Improve bicycle infrastructure, including bicycle lanes or sharrows on roadways and wider pathways/multi-use paths;
- Provide secure bicycle parking at most buildings; provide shower and changing facilities in new buildings; inventory abandoned bikes on racks and remove them if they are not claimed;
- Expand telecommuting and flexible schedule options;
- Coordinate with the Maryland Department of Housing and Community Development to provide benefits to employees through the state's Smart Keys for Employees program.

The TMP is designed to complement key elements from other regional transportation master plans. A key planning principle for the federal government, Montgomery County, and City of Gaithersburg, is to promote a balanced and multi-modal transportation network to reduce auto dependency and improve air quality for the National Capital Region. NIST has long recognized the need to implement a comprehensive package of transportation demand management measures in support of local alternative transportation modes. The NIST Transportation Management Plan is designed to provide a comprehensive set of TDM measures and strategies, as well as an institutional framework that will ensure their continued implementation and monitoring.

External Transportation Improvements

The Maryland Transit Administration (MTA) is currently planning a new 14-mile transit line to connect the Shady Grove Metrorail Station with the “Commercial Satellite” (COMSAT) facility, located south of Clarksburg, Maryland, adjacent to I-270. This planned facility was developed as part of the ongoing Maryland Department of Transportation (MDOT) and MTA’s I-270/U.S. 15 Corridor Study, known as the Corridor Cities Transitway (CCT). The proposed CCT will be either light-rail transit (LRT) or bus rapid transit (BRT), and as part of the project, there will be a dedicated bicycle path constructed parallel to the line, along the westside of the campus.

The CCT is included in the Washington region’s 2007 Comprehensive Long Range Plan and Transportation Improvement Program (TIP), scheduled for completion by 2020. Based on the draft 2009 Gaithersburg West Master Plan, the CCT alignment would connect the Shady Grove Metro Station, the proposed Life Sciences Center (located just south of NIST), the NIST campus, the Metropolitan Grove MARC Station, and points north. The Maryland State Highway Administration would acquire right-of-way along Quince Orchard Road from property currently owned by NIST, to construct the CCT facility.



Source: Montgomery County Planning Department
Potential Future Corridor Cities Transitway Alignments

Future Development

Planned future projects would reinforce and progress the existing research-focused, north-south development axis, both toward the northside and southside of the campus. The new buildings, building additions, and future renovations at NIST are being designed to incorporate environmentally-responsible (LEED) building concepts. NIST desires the campus character to reflect its commitment to sustainability, both in its function and architecture. Opportunities to

express sun shading, day-lighting, active/passive solar concepts, and sustainable materials will augment the general regionalized modern character of the buildings.

PROJECT ANALYSIS

Executive Summary

The proposed Master Plan Update provides a well developed and programmatic approach to meet the challenges and requirements related to transforming the NIST campus into a more modern, environmentally-sensitive campus. The Department of Commerce should be commended for developing a master plan update that will advance research initiatives, maintain facilities, support energy conservation and sustainability and enhance the work environment, and for their outreach and coordination with affected parties.

CONFORMANCE

Comprehensive Plan for the National Capital

The proposed Master Plan Update is not inconsistent with the Federal Elements of the Comprehensive Plan for the National Capital, and particularly conforms to the following goals and policies of the Federal Workplace and Transportation Elements of the plan:

- Encourage federal employees to rideshare, including the use of carpools, vanpools, privately leased buses, public transportation, and other multi-occupant modes of travel;
- Permit and encourage telework by federal employees where it will benefit the federal government and the public;
- Permit and encourage variable work schedules for federal employees where it will benefit the federal government and the public;
- Give priority to carpool and vanpool parking over that for single-occupant vehicles;
- Provide parking for disabled persons in accordance with federal law;
- Consider locating federal workplaces near a variety of housing options to benefit employees. Priority should be given to locations that are easily accessible for employees to walk, bike, or take public transportation to commute between home and work;
- Federal agencies should operate on-campus circulators on federal campuses with multiple federal buildings;
- Federal agencies should fund Metrorail station to workplace shuttles if inadequate transit connections are not otherwise present.

The Master Plan Update conforms to the travel demand management policies of the Comprehensive Plan with a well-developed Transportation Management Plan that includes commitments for extensive use of public transportation and limitations on employee parking to meet the recommended Comprehensive Plan ratio of 1:1.5 for suburban areas beyond 2,000 feet

of Metrorail. The plan also includes other incentives to reduce the use of single occupancy vehicles as previously discussed in the “Transportation Management Plan” section of this report.

NIST has plans to hire an Employee Transportation Coordinator (ETC) in the near future and has set ambitious Commuter Mode Choice goals as shown in the following table from their TMP.

Commuter Mode Choice Goals

Commuter Mode	Percent Share	
	2008	2020
Passenger Vehicle	68.3%	60%
Transit (Bus, Train, NIST Shuttles)	14.9%	20%
Rideshare (carpool/vanpool)	6.6%	10%
Bicycle	2.4%	4%
Walk	1.7%	3%
Motorcycle/Other	6.1%	3%
Total	100.0%	100%

Source: NIST Administrative Division Transportation Survey, May 2008

Additionally, NIST has committed to review and revise its TMP per NCPC requirements.

National Environmental Policy Act (NEPA)

A programmatic environmental assessment (PEA) was completed in accordance with the National Environmental Policy Act (NEPA). Based on the analysis of baseline conditions and anticipated impacts from planned improvements, the PEA resulted in a “Finding of No Significant Impact” (FONSI).

NCPC does not have independent NEPA responsibility for federal projects outside the District of Columbia.

National Historic Preservation Act (NHPA)

The Maryland Historical Trust (MHT) has reviewed the Master Plan Update and in its opinion, “construction of the proposed labs and stormwater retention pond at the NIST will have no effect on National Register eligible historic properties, including archeological sites and historic structures.” The MHT believes the project areas have a low potential for containing significant cultural resources due to prior disturbance, environmental setting, and modern construction.

NCPC does not have independent Section 106 responsibility for federal projects outside the District of Columbia.

CONSULTATION

The Master Plan Update has been referred to affected agencies through the Maryland State Clearinghouse for review and comment. The Maryland Department of Planning determined the

proposed project to be generally consistent with their plans, programs, and objectives. Comments from other agencies are as follows:

Maryland Department of Transportation

No comments were received from the Maryland Department of Transportation.

Maryland Department of the Environment

Biological Consultation letters were sent to the US Fish and Wildlife Service and the Maryland Department of the Environment for the review of potential impacts to Threatened, Endangered and/or Special Status Species, as a result of this master plan update. Historic and recent correspondences confirmed that there are no Threatened, Endangered or Special Status Species that inhabit the NIST campus.

Maryland Historical Trust

Historical Consultation Letters were sent to the Maryland Historic Trust and the Montgomery County Historic Preservation Office for review of potential impacts to historic properties as a result of this project. While no response has been received to date, previous correspondence and an automated search on multiple historic databases indicate that there are no historic resources on the NIST Gaithersburg campus.

Montgomery County

No comments were received from Montgomery County.

Montgomery County Planning Department - Maryland National Capital Park and Planning Commission in Montgomery County

No comments were received from the Montgomery County Planning Department – Maryland National Capital Park and Planning Commission in Montgomery County.

Maryland Department of State Police

No comments were received from the Maryland Department of State Police.

Maryland Departments of Natural Resources and Business and Economic Development

No comments were received from the Maryland Department of Natural Resources or the Maryland Department of Business and Economic Development.