

MASTER PLAN GOALS

DEFINING STRATEGIES

PROGRAM ACCOMMODATION

CAMPUS SYSTEMS



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Virginia Tech as a Place

Master Plan Goals

1. Support the University Strategic Plan by providing for development of physical resources which accommodate the strategic vision and program directions articulated in the plan.
2. Preserve the core qualities of the campus while nurturing growth.
3. Plan for the long range highest and best use of the University's significant land assets.
4. Plan transportation and infrastructure systems to anticipate growth rather than react to demand.
5. While the master plan will propose solutions based on current data, it is understood that a plan should be a 'living' document and therefore allow for future change within its framework.
6. Celebrate the unique Virginia Tech Campus as PLACE.

Planning Drivers



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Master Plan Goals



Planning Drivers

Research: Plan for facilities and support space to increase research capacity to be competitive with Top 30 institutions (\$540M annual research expenditures target)

Access: Provide multi-modal campus access strategies. Provide appropriate parking and roadway infrastructure to support growth.

Infrastructure: Physical Plant steam capacity rapidly approaching critical levels. Chilled water rapidly approaching capacity. Storm water issues – Stroubles Creek identified as “Impaired Stream”. Mitigate flooding on campus.

Place Making: Maintaining and enhancing the historic character of the campus “walkable village”, while nurturing growth which embodies the best attributes of the existing campus. This includes the use of stone, traditional architectural elements and extending the existing campus spatial hierarchy.

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Strategic Plan: Key Points

Discovery: Increase the stature of Virginia Tech as a research university. The 2012 target is for \$540M in annual research expenditures.

Graduate Education: Increase the quality of the graduate programs. Increase graduate enrollment including 2,600 PhD students by 2012.

Undergraduate Education: Strengthen the quality of undergraduate instruction, including an increase in the number of undergraduates involved in research. The 2012 enrollment target is 22,500 undergraduate students including 3,000 who enter as transfer students.

Engagement: Expand professional education, respond to societal needs, create new strategic partnerships with the private sector.

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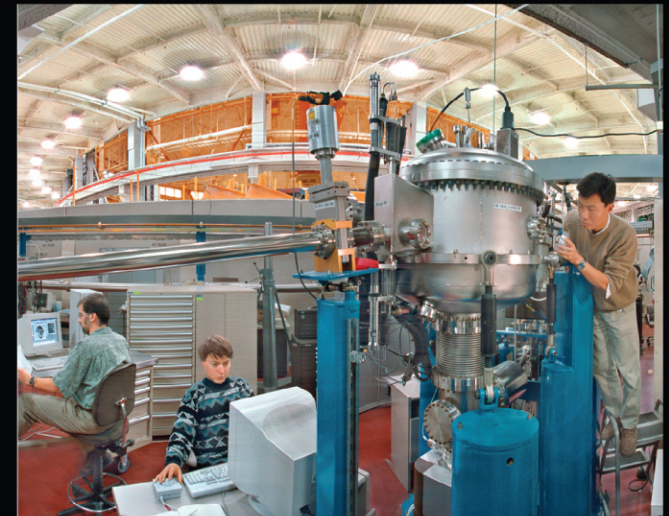
Virginia Tech as a Place

Benchmarking

In order to understand the physical space required to achieve the strategic goals, the master plan team conducted a benchmarking study against ten competitive and aspirant peer institutions. The institutions were evaluated on university academic space normalized to net square feet/student and net square feet/faculty. Additionally, several key performance factors were evaluated. The peer institutions benchmarked were:

Georgia Institute of Technology - Atlanta
 Michigan State University - East Lansing
 North Carolina State University - Raleigh
 Ohio State University - Columbus
 Pennsylvania State University - University Park
 Purdue University - West Lafayette
 Texas A&M University - College Station
 University of Arizona - Tucson
 University of Illinois at Urbana-Champaign
 University of Michigan - Ann Arbor
 University of Texas - Austin
 University of Wisconsin - Madison

Conclusions from the Benchmarking Study contributed to establishing a basis for the quantification and distribution of the Master Plan Program.



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Undergraduate

Goal: Enhance the quality of undergraduate programs, and endeavor to increase in the number of undergraduates involved in research.

Over the 2002-2003 academic year the Provost led a process to “realign” the then 8 colleges, allowing academic departments to reconsider where they would report. Five departments realigned college affiliations. The College of Arts and Sciences was merged with the College of Human Resources to form the College of Liberal Arts and Human Sciences and a new College of Science was formed

It is anticipated that undergraduate enrollment will see only slight growth over the next 10 years (primarily via transfer students).

Student Support

Enhancement of on-campus student support space continues to be a priority. Union and Dining space, particularly in the academic core area is in great need. Indoor and outdoor recreation areas are currently over utilized.

The 2005 housing facilities study recommended systematic upgrades to the existing housing stock, including air conditioning of the older residence halls. It is recommended that new residence hall space be constructed to provide swing space for renovations, as well as provide a variety of housing options.



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Research

Increasing funded research initiatives is a primary goal of the Strategic Plan. Research space totals 839,000 gross square feet with an additional 717,000 identified as teaching laboratories.

2003 research expenditures were reported at \$247 M. New research initiatives are planned to bring research expenditures over \$540 M by 2012.

The Virginia Tech Board of Visitors adopted a plan in 2005 to grow PhD enrollment by 900 students by 2012.

The developing Life Sciences District will create a new district of campus primarily focused on research initiatives. Additionally, the Corporate Research Center provides short-term lease space for new research programs.

Graduate Studies

Graduate studies will play a key role in enabling the University to reach its research goals. Recruitment and retention of quality graduate students is a core element of a strong graduate studies program. Quality academic and graduate support space is key to student recruitment and retention. In 2006, a new Graduate Life Center opened its doors in a facility previously occupied by the Donaldson Brown Hotel and Conference Center.



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Virginia Tech as a Place

Virginia Tech is one of the most spatially coherent campuses in the country today. The master plan endeavors to identify and preserve these spatial qualities.



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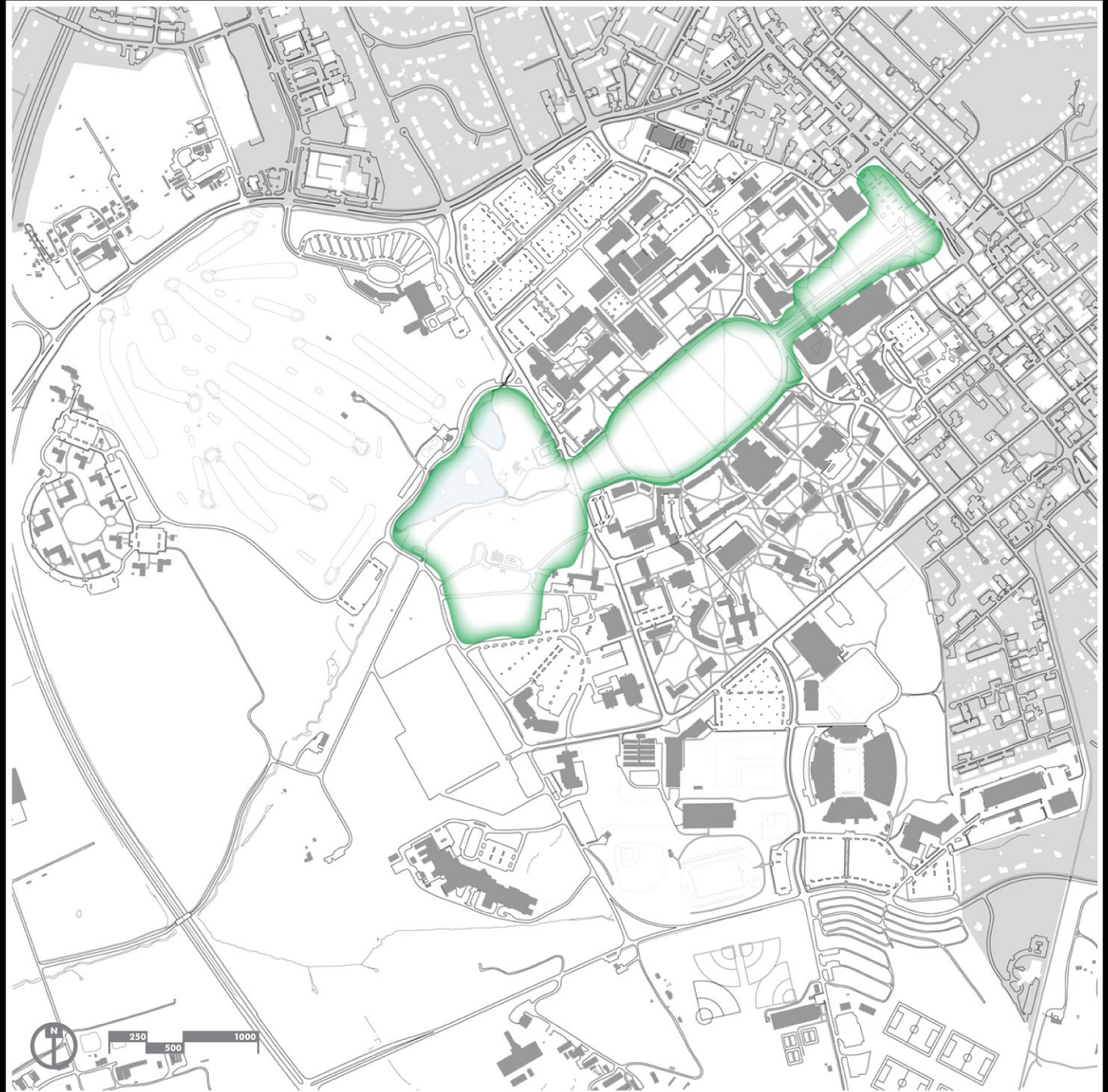
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Virginia Tech as a Place

Central to this coherency is the array of iconic spaces formed by the Alumni Mall, Drill Field, Duck Pond and the Grove which define an armature of formal open space.



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Virginia Tech as a Place

Most people think of campuses as a collection of its buildings.



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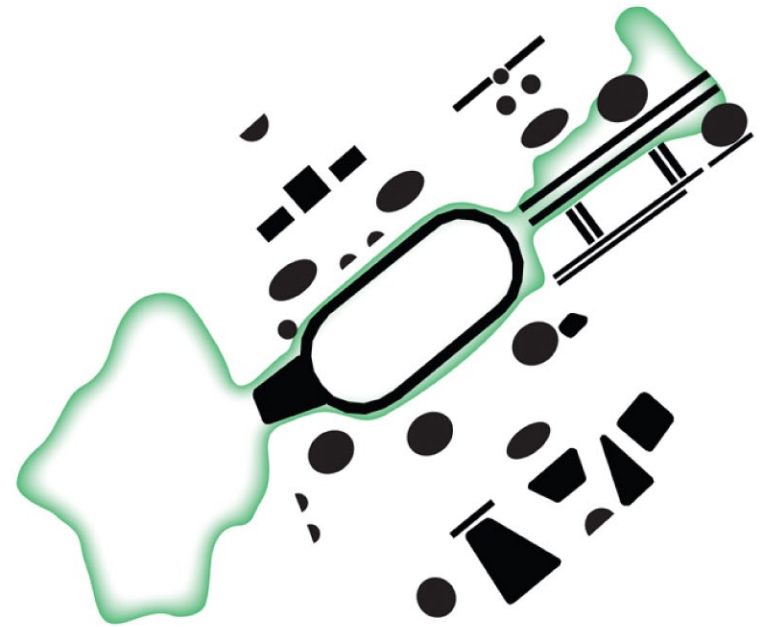
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Virginia Tech as a Place

Virginia Tech is also a collection of its
quadrangles and positive open spaces.



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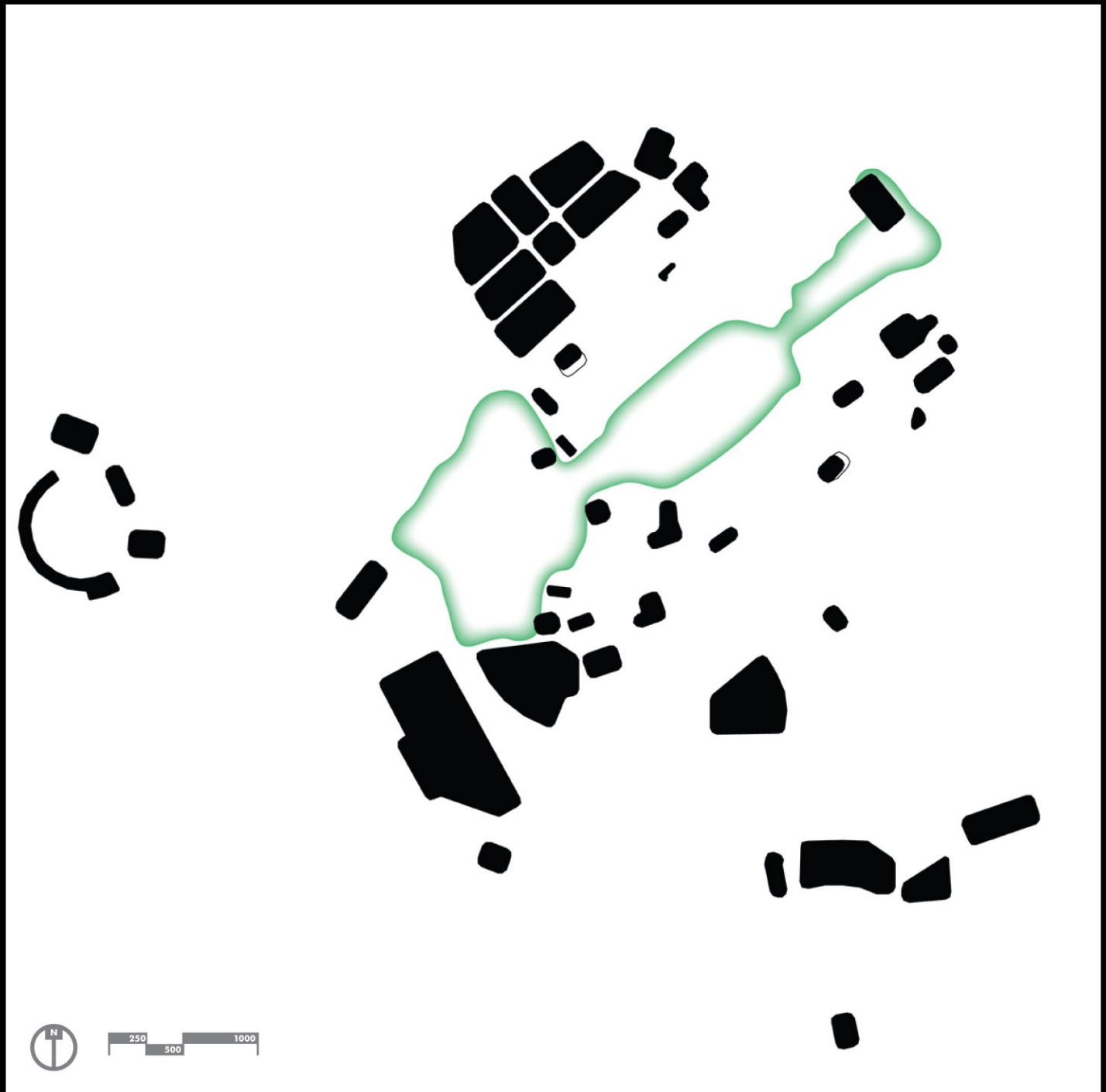
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As well as less positive open spaces,
primarily parking lots.



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And by addressing the vehicular and pedestrian networks that tie them together.



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Virginia Tech as a Place

With relation to origins.



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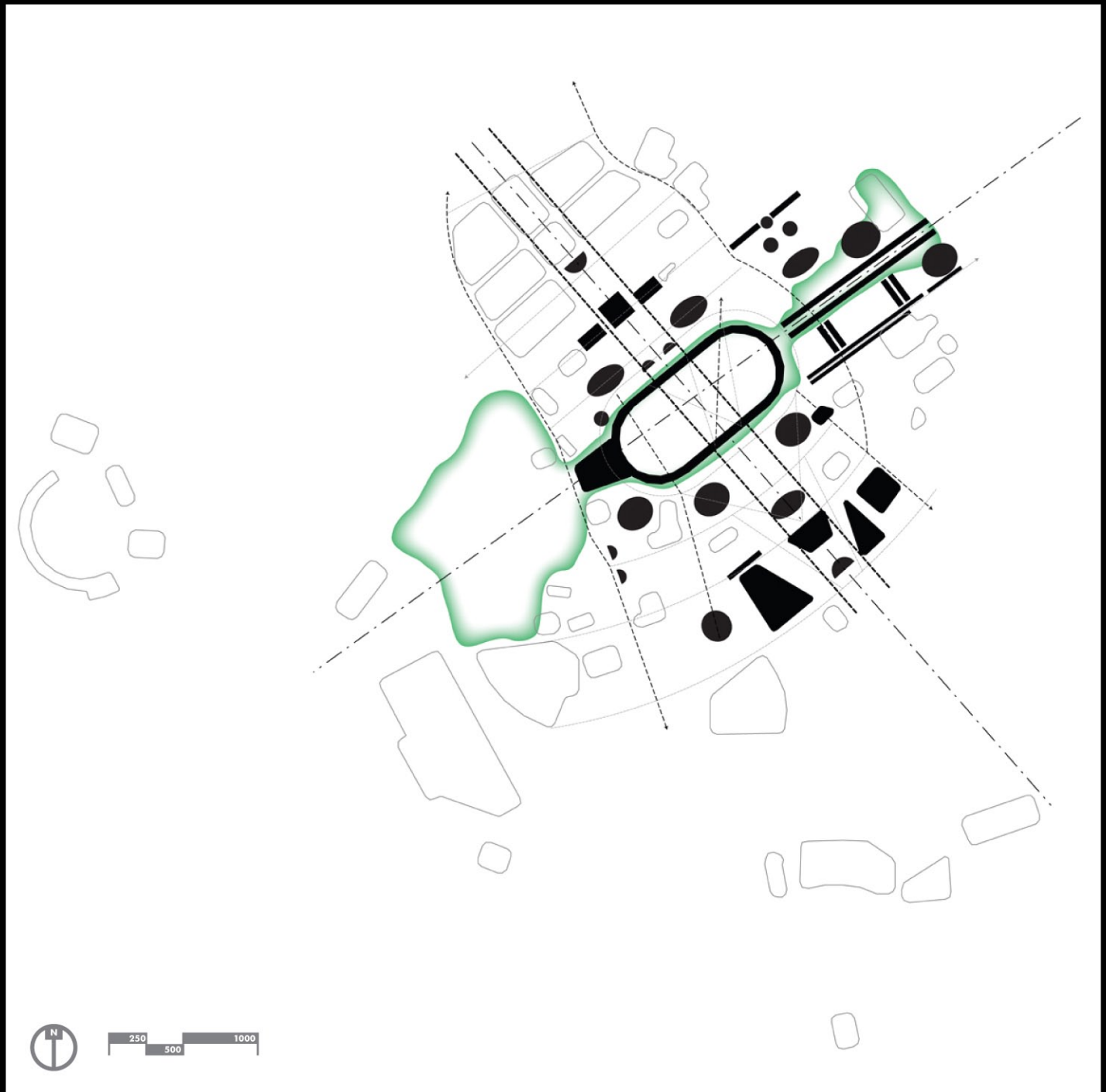
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Virginia Tech as a Place

And destinations.



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Virginia Tech as a Place

These, along with the Hokie Stone building exteriors and collegiate gothic architecture, exemplify the core qualities of Virginia Tech



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Virginia Tech as a Place

These, along with the Hokie Stone building exteriors and collegiate gothic architecture, exemplify the core qualities of Virginia Tech

Design Tenets

1. The dominant exterior building material will continue to be the local dolomite limestone (Hokie Stone) set in a random ashlar pattern.
2. New building placement should help define outdoor campus space.
3. Building heights should primarily range from two to four stories, appropriate in scale with the adjacent outdoor spaces.
4. Building design should complement the character of the core campus architecture, integrating simple building massing with simply ordered and well articulated facades.
5. The architectural and landscape guidelines from the 1994 Campus Master Plan Update will continue to be used to provide general guidance in future development of architecture and landscapes.



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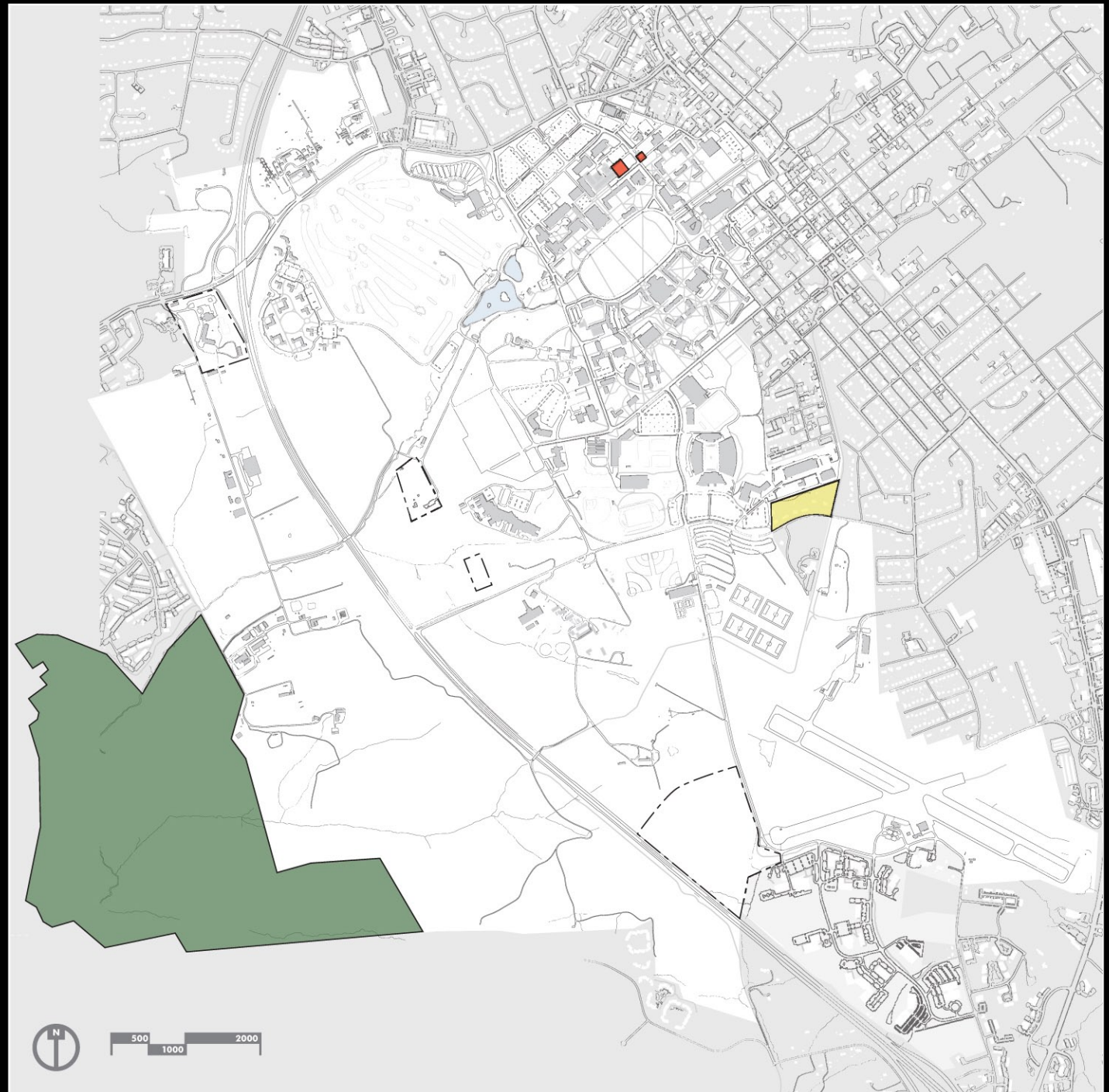
Virginia Tech as a Place

■ Acquisition underway (within current campus boundaries)

■ May be considered for acquisition to clarify campus boundaries

■ Heth property (may be acquired to support long term growth strategy)

For the first time in the last several planning cycles, the University is considering the significant use of land beyond the core campus in addition to infilling the core. The Virginia Tech Foundation has acquired over 300 acres, The Heth Farm, as an expansion of the west campus, and may consider limited acquisitions filling in key areas adjacent to the core campus.



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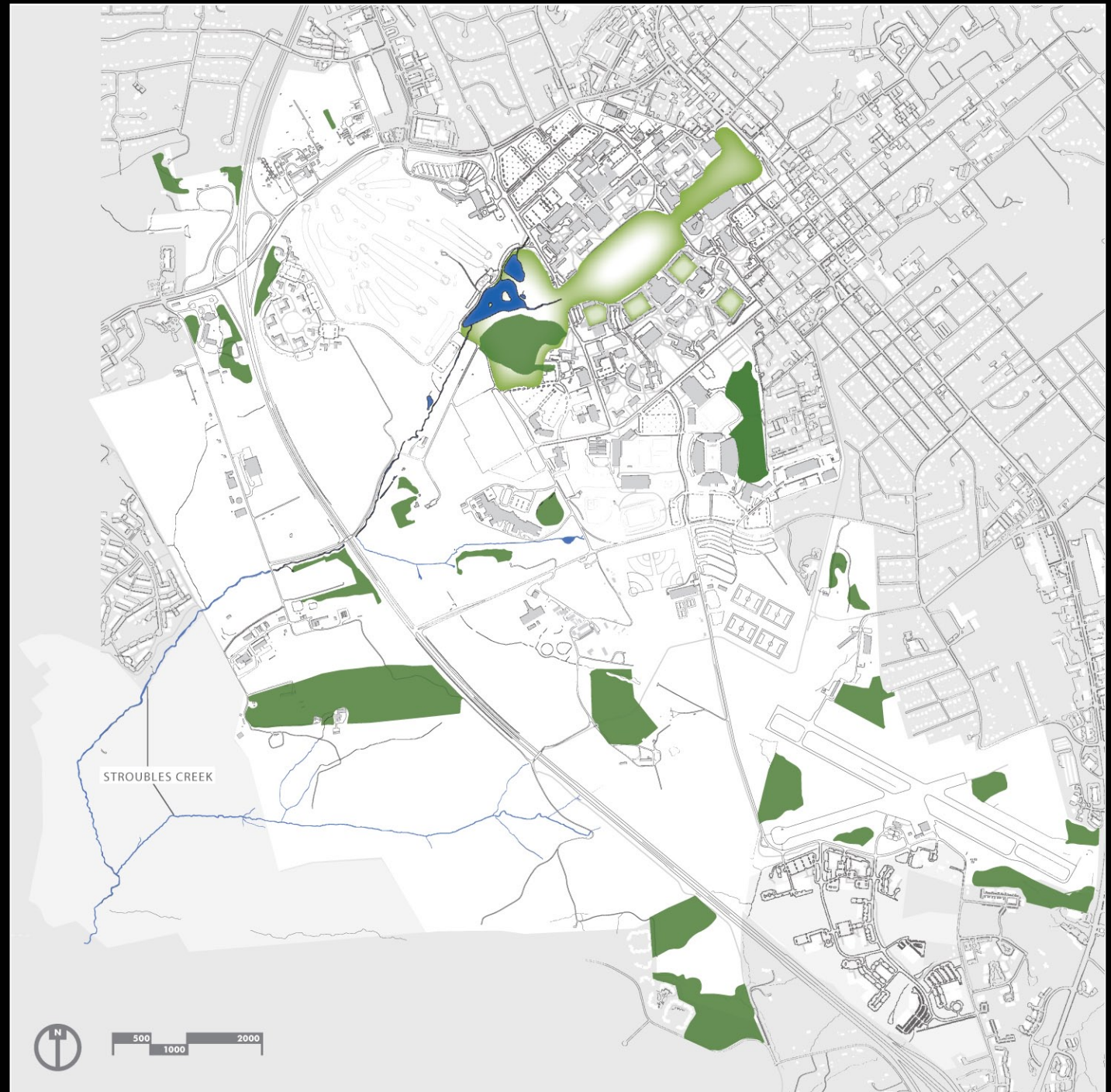
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Virginia Tech as a Place

- Greenspace
- Forested Areas

The University and the Town of Blacksburg share a drainage basin that flows through Stroubles Creek. Stroubles Creek has been designated an impaired body of water by the State. Future planning needs to embody sustainable land use practices and development patterns to preserve key assets and key drainage ways such as the Duck Pond, Drill Field, and wooded areas like the Grove.



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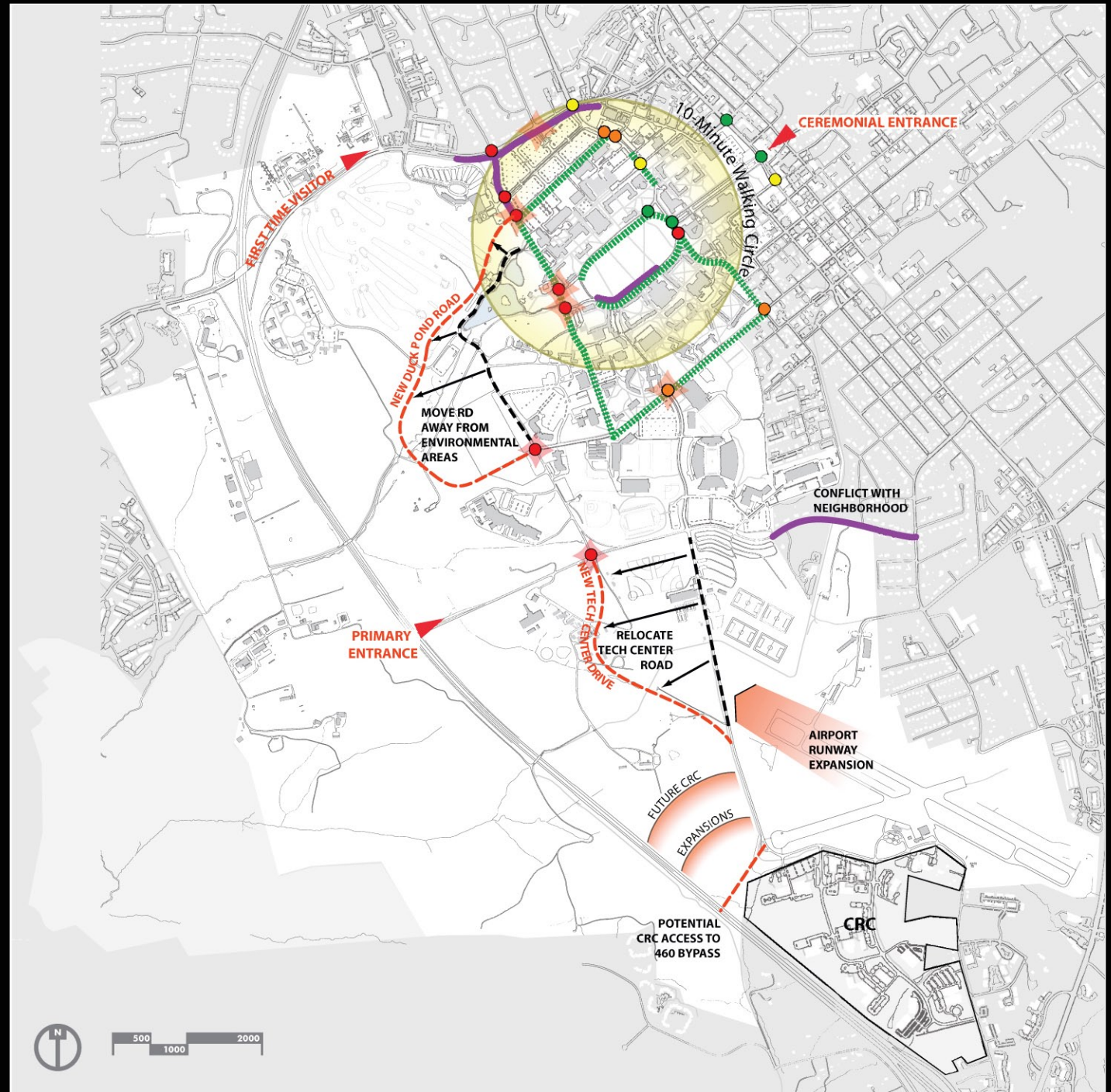
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Virginia Tech as a Place

- Observed Congestion
- - - - Pedestrian/Vehicular Conflict
- ◆ Problem Intersection
- B Level of Service - Good
- C Level of Service - Adequate
- D Level of Service - Poor
- F Level of Service - Failing



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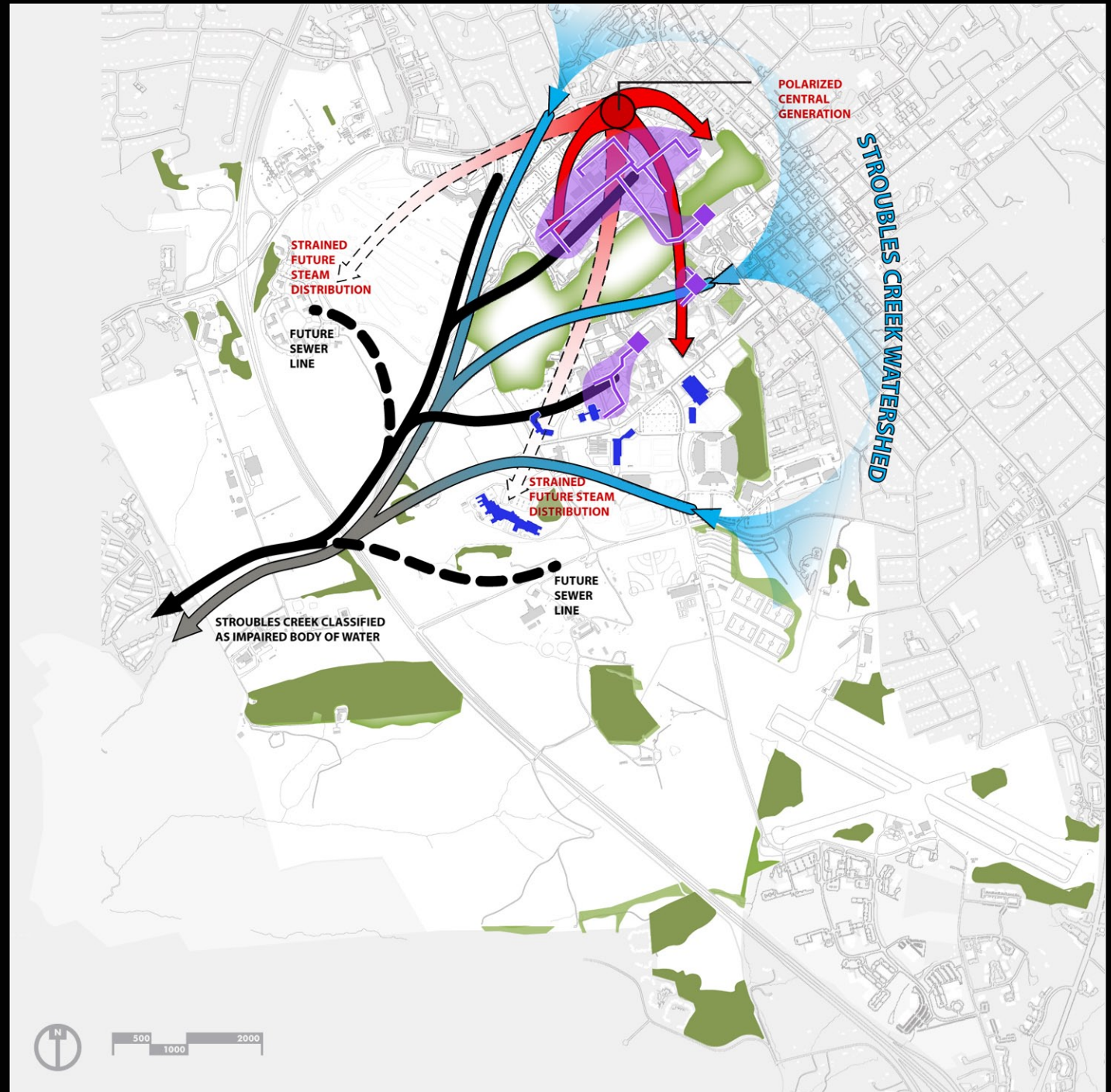
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Virginia Tech as a Place

- Existing Steam
- Existing Sanitary Sewer
- Existing Stormwater
- Existing Chill Water Loop
- Stand-alone Chill Water Systems
- Greenspace
- Forested Areas



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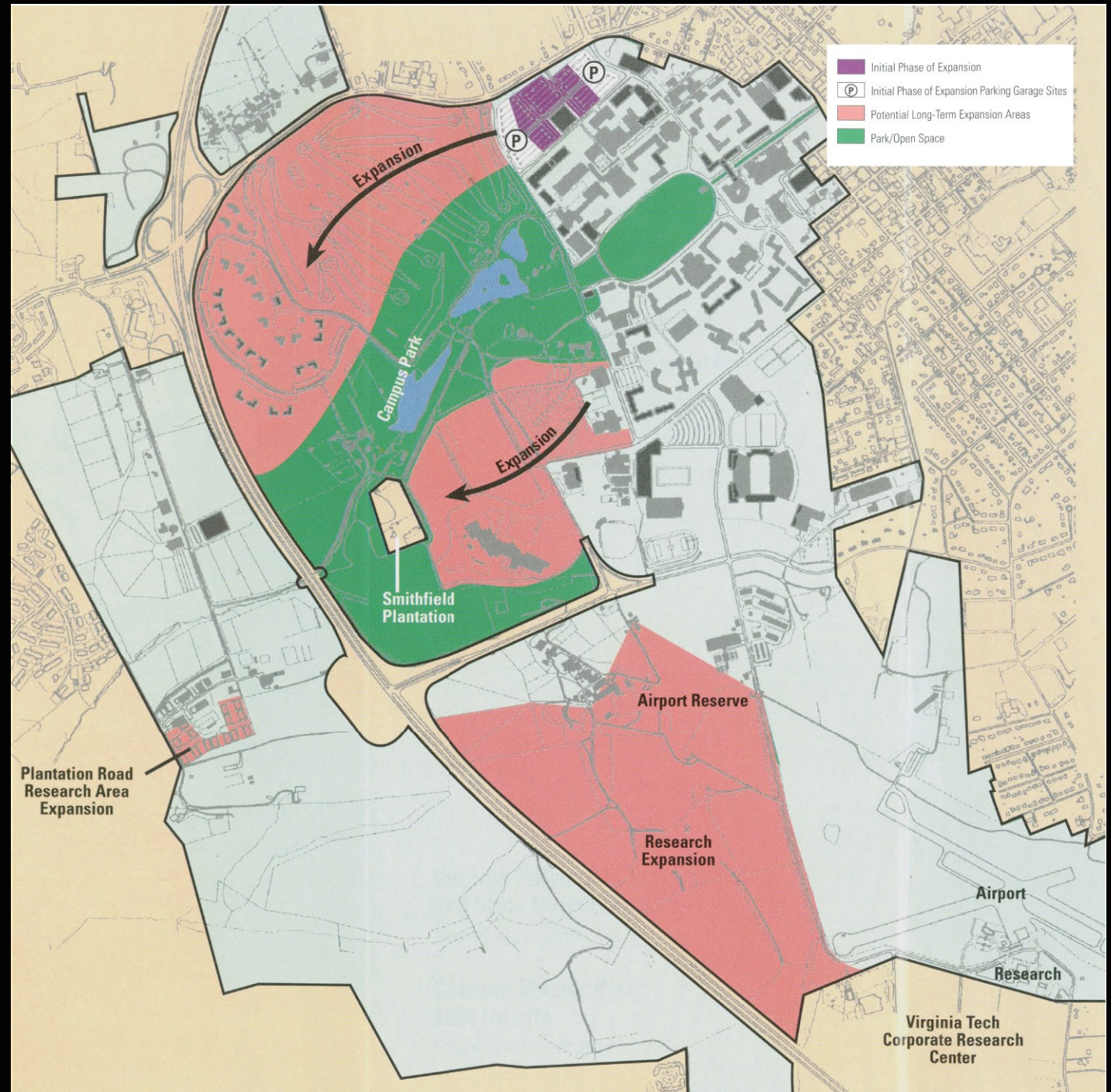
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Virginia Tech as a Place

From 1994 Master Plan Update:

The 1994 Master Plan Update continued the infill strategies of the previous plan. The plan also called for future expansion to the west while preserving a central natural landscape along the Stroubles Creek corridor.



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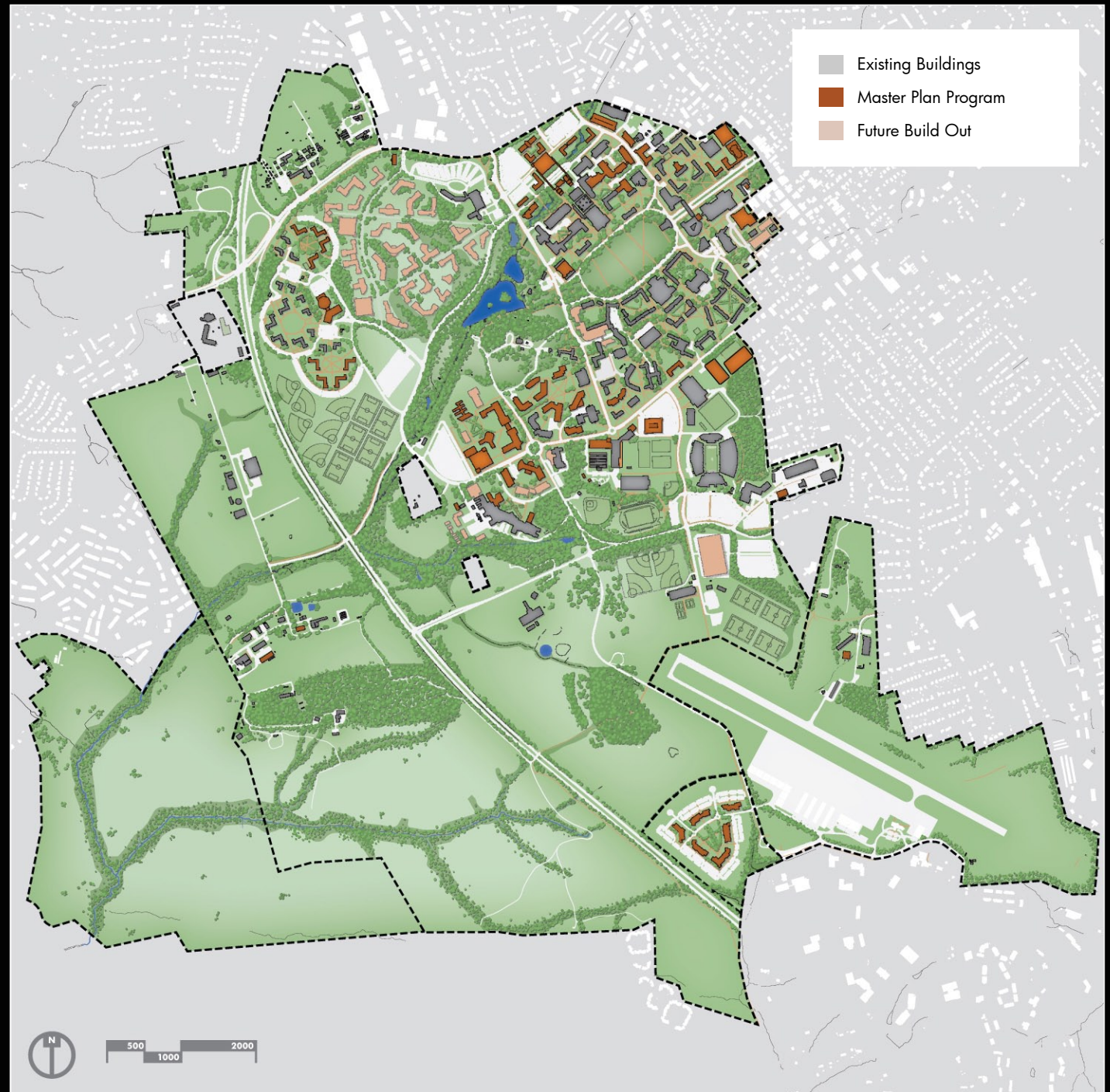
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Virginia Tech as a Place

The 2006 Master Plan continues patterns of infill to achieve ideal densities in the core district. This plan implements western expansion of the campus by proposing the Life Science District in the ten-year horizon, and preserves the golf course as a future district and land bank. The master plan also codifies and designates the environmental and cultural greenway as a significant reservation of lands, waterways, tree stands, and cultural landmarks for future generations and "best management practices" of sustainable land use. Finally, this plan allows for the growth of the airport, CRC, the core campus, and fulfills objectives of the master plan for Blacksburg and, most importantly, aligns with and helps to implement Virginia Tech's strategic vision.



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Defining Strategies

Land Use | Short Term

Land Use | Long Term

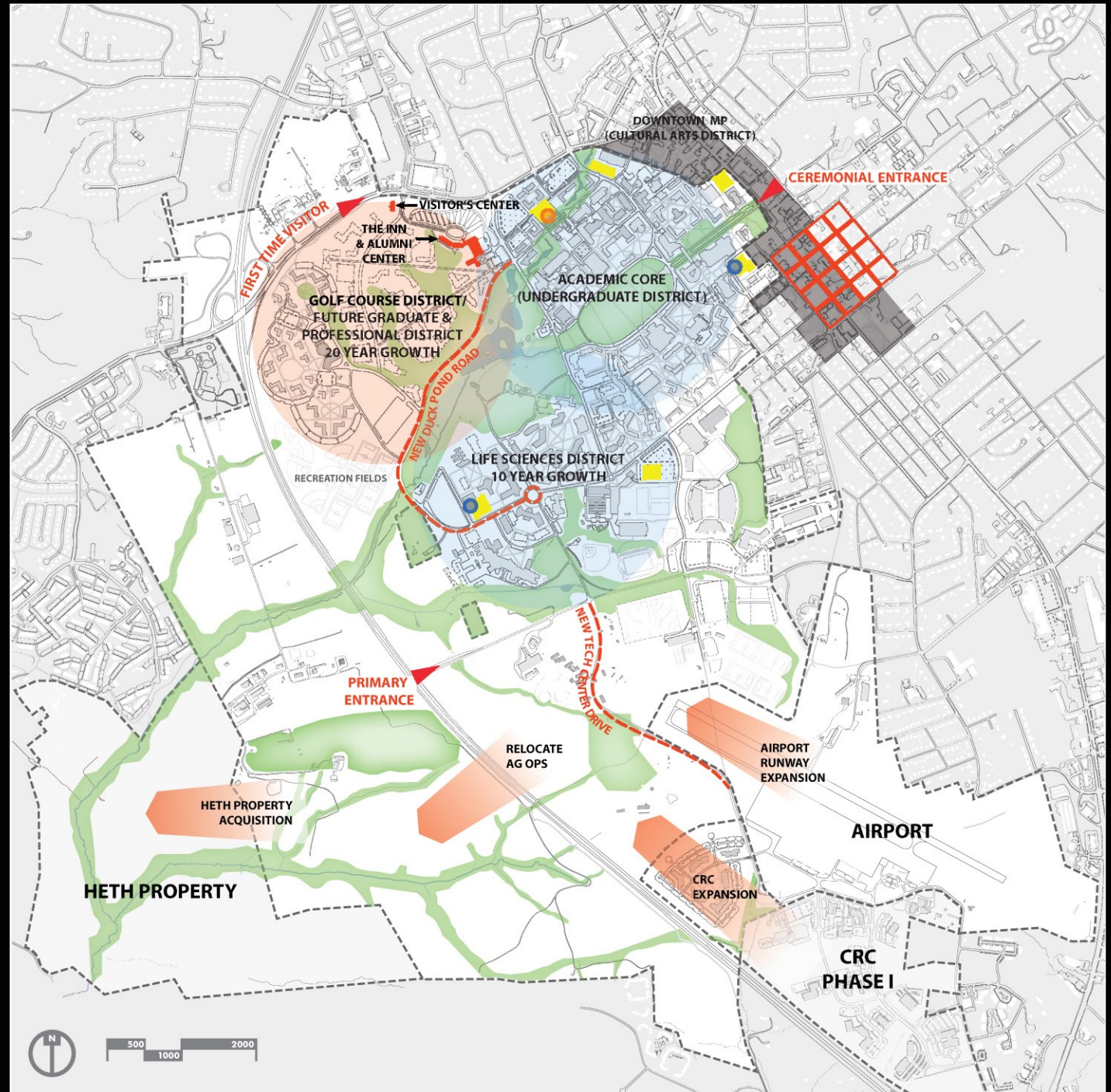
CRC

Town Gown

Stormwater/Sustainability Study

- Environmental and Cultural Greenway
- District Circles
- Parking Structures
- ▶ Campus Entry Points
- New Roads
- Transit Center
- Physical Plant

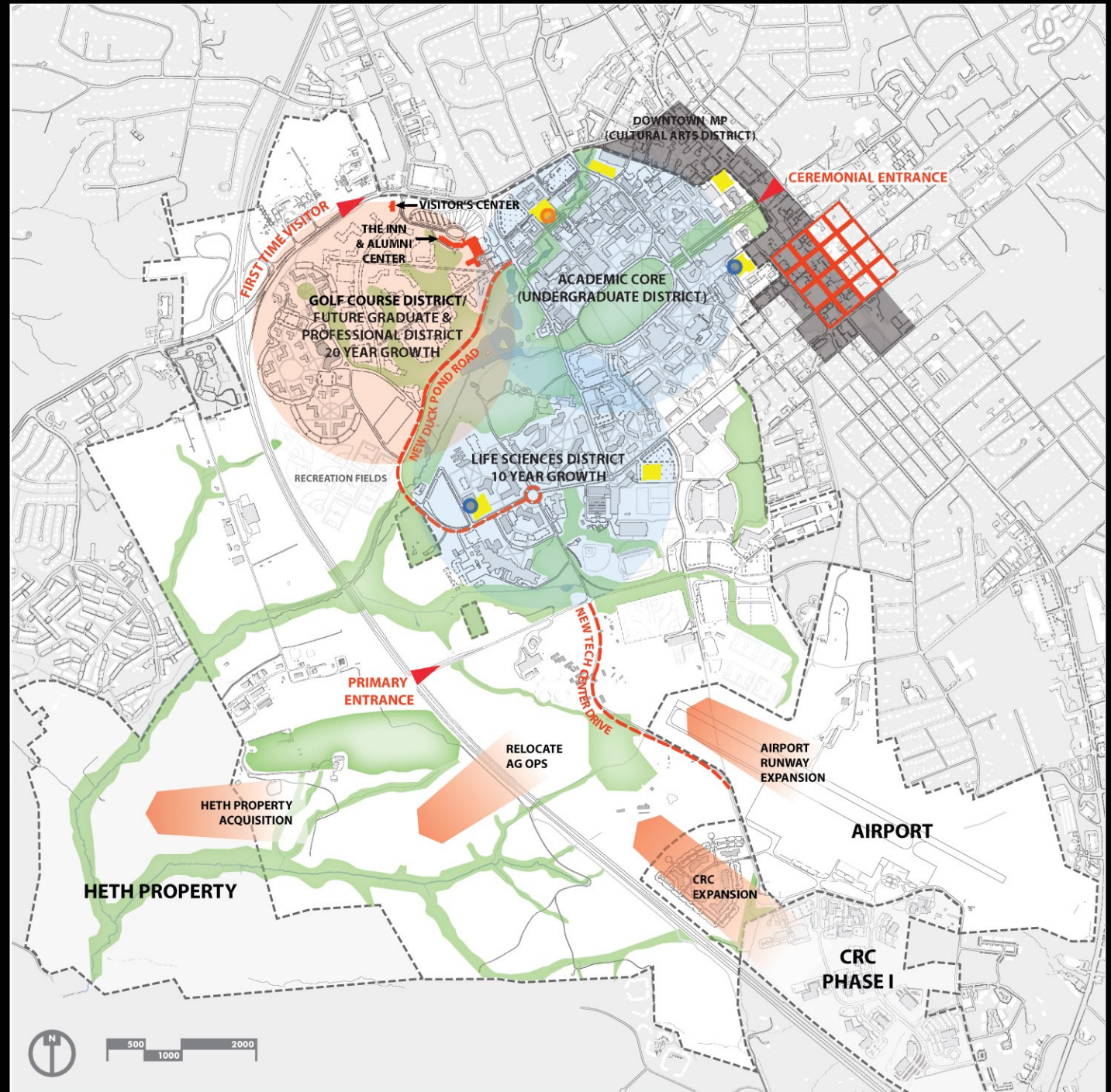
The campus will be developed as three discreet but interlocked districts. The first is the historic academic core surrounding the Drill Field. The second, which will see significant new development over the 10 year period, is the Life Sciences District extending to Vet Medicine. The third is



the Golf Course District, a future district supporting graduate and professional studies, may be developed in the 10-20 year period and should be seen as a land bank. Each of these districts are designed to facilitate the pedestrian use with 10 to 15 minute walking distances.

Key entrances to the campus are associated with each district including a historic and formal entrance from the east on the Alumni Mall. From the Town of Blacksburg and the region beyond, the South Gate Drive entrance from the Route 460 By Pass provides access to the Life Sciences District, athletic facilities, the Virginia Tech Corporate Research Center, the airport, and the balance of campus. Finally, the Price's Fork Road entrance from the Route 460 By Pass is to be emphasized as the main first time visitor's entrance to the campus, including the future Virginia Tech Visitor's Center, the Inn at Virginia Tech, the Alumni Center, the campus, and the Town of Blacksburg beyond.

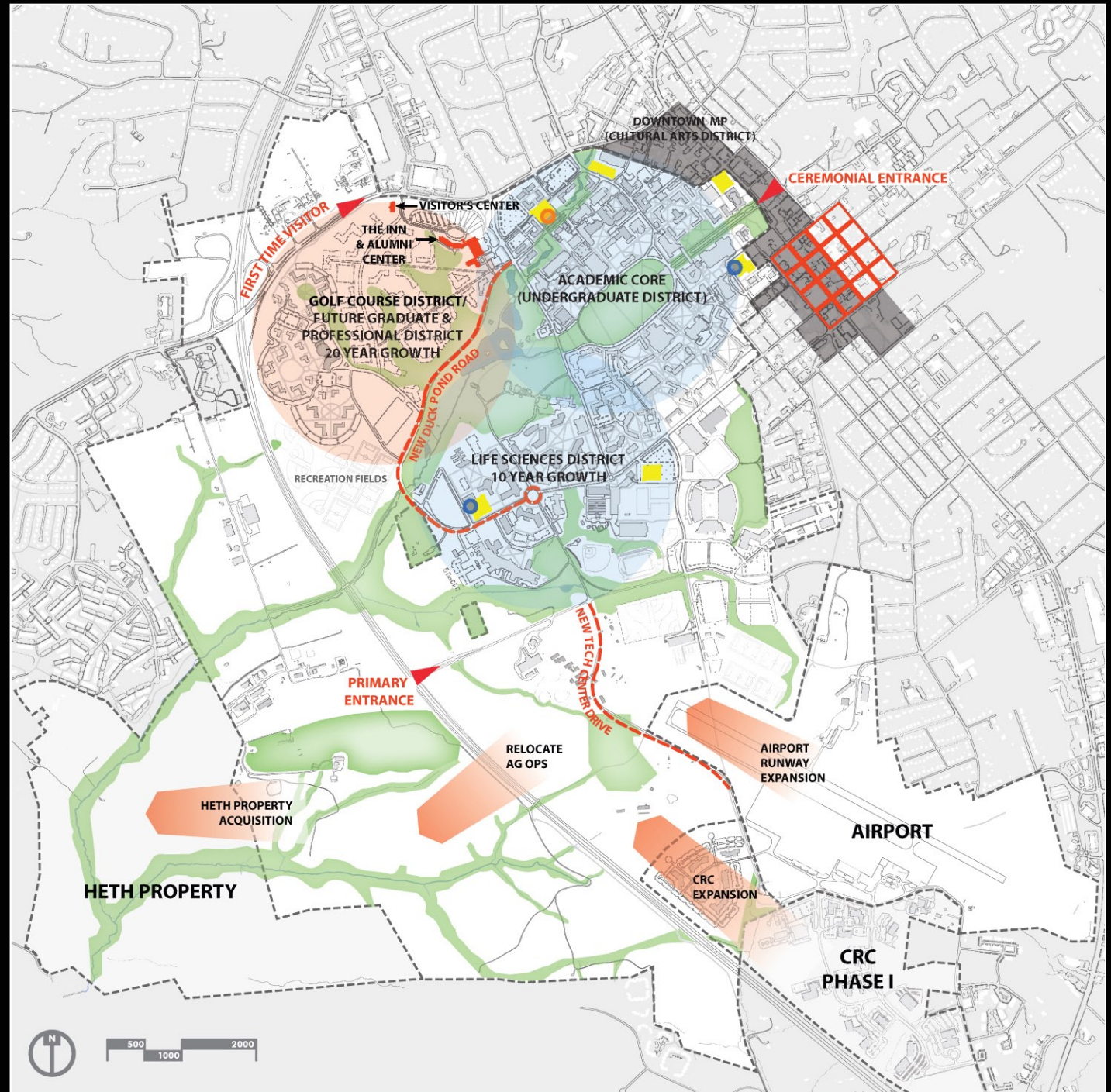
The master plan accommodates a shared planning agenda with the Town of Blacksburg in developing a cultural district around the town/gown interface. The plan also accommodates the proposed expansion of the airport and the phased expansion of the Corporate Research Center, requiring the relocation of agriculture operations and the relocation of Tech Center Drive to a new alignment



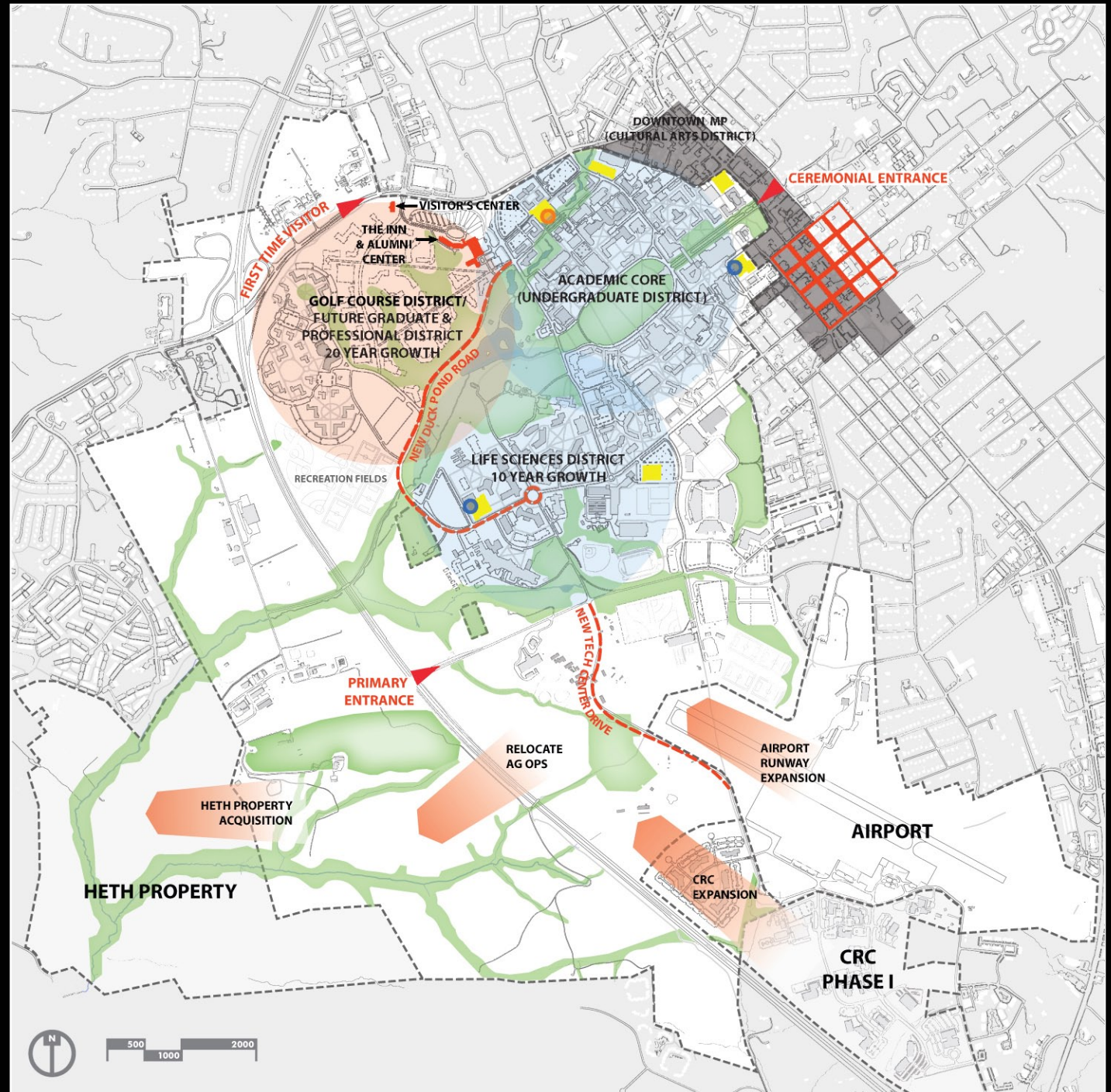
with Duck Pond Drive. The acquisition of the Heth property to the west may accommodate some displaced agriculture operations in the short term, and guarantees long term land assets for future development.

A major strategy to be employed is to embrace sustainable land use planning in the interest of resolving, to the greatest degree possible, flood plain and water quality issues related to Stroubles Creek and the shared Town of Blacksburg/Virginia Tech drainage basin. The plan does this by creating an "environmental and cultural greenway" that protects campus drainage ways, addresses stormwater quality and quantity issues and integrates key forested areas and cultural assets that are at the very heart of Virginia Tech, such as the Drill Field, Duck Pond and Grove. The plan also proposes to daylight the north branch of Stroubles Creek in its passage through parking lots north of the academic core.

In addition, the plan proposes the realignment of Duck Pond Drive to connect to Perry Street thereby integrating the Life Sciences District with the academic core and future Golf Course District. This alignment will facilitate the relocation of Blacksburg Transit's hub from the Drill Field to a transit center located on Perry Street and to be coordinated with a long term structured parking initiative that will



allow the University to build as many as six parking structures over the next 10-20 years. This roadway realignment will also reduce the amount of vehicular traffic on West Campus Drive, thereby enhancing the pedestrian connection to the Core Campus District and will also reduce the pollutant load to the Duck Pond and Stroubles Creek by establishing a green buffer zone between the road and the pond.



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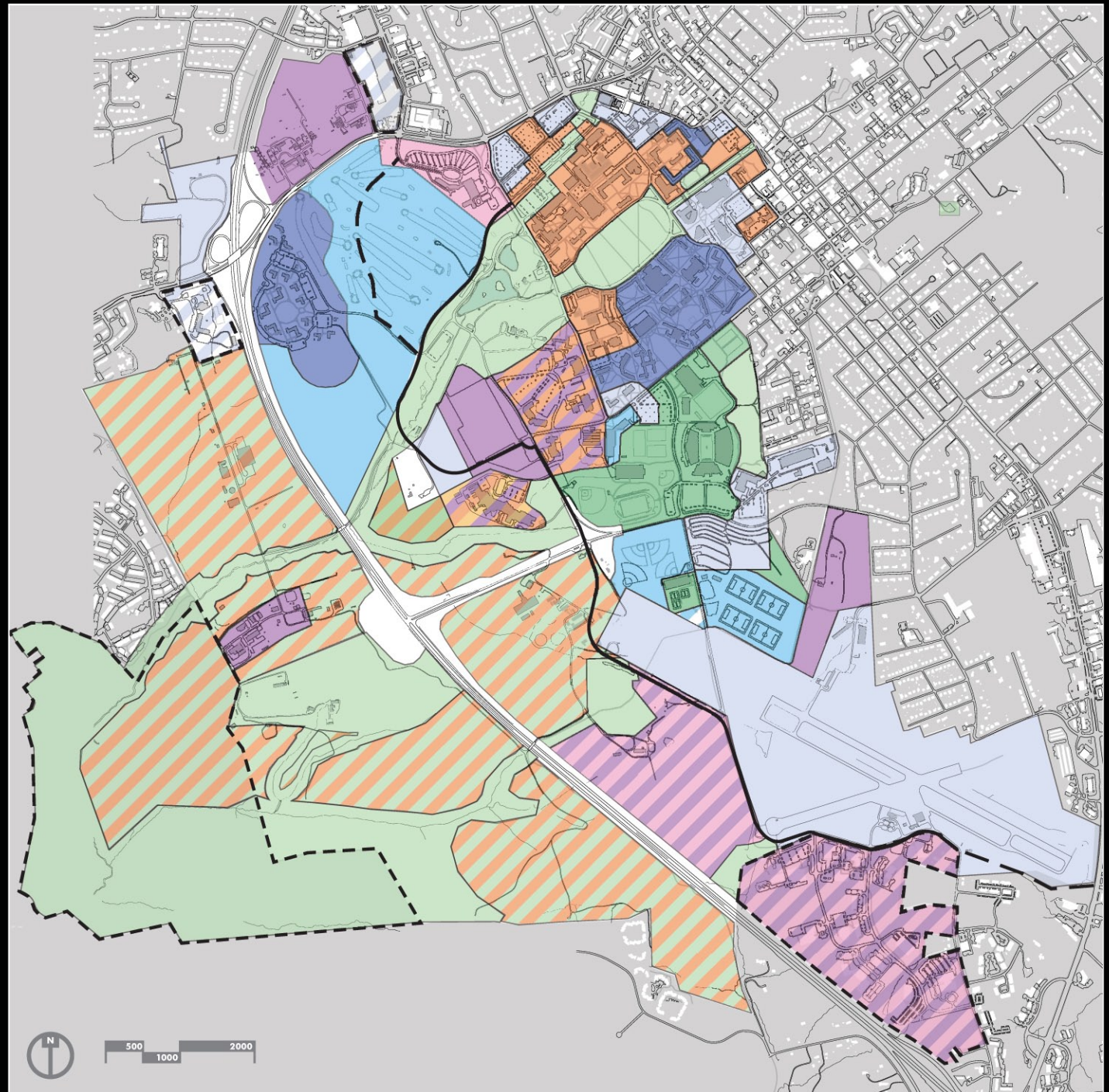
CRC

Town Gown

Stormwater/Sustainability Study

Academic	Athletic
Research	Recreation
Clinical	Support
Residential	Greenway
Outreach	

The Primary Program accommodation will occur in two areas; the Life Sciences District, and the northern expansion of the Core Academic Campus. Short-term development will have minimal impact on existing agricultural lands east of the bypass. Any land development should minimize environmental impact and should support the storm water strategies outlined in this document. The Golf Course will serve as a land bank for the short-term development strategies.



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Land Use | Long Term

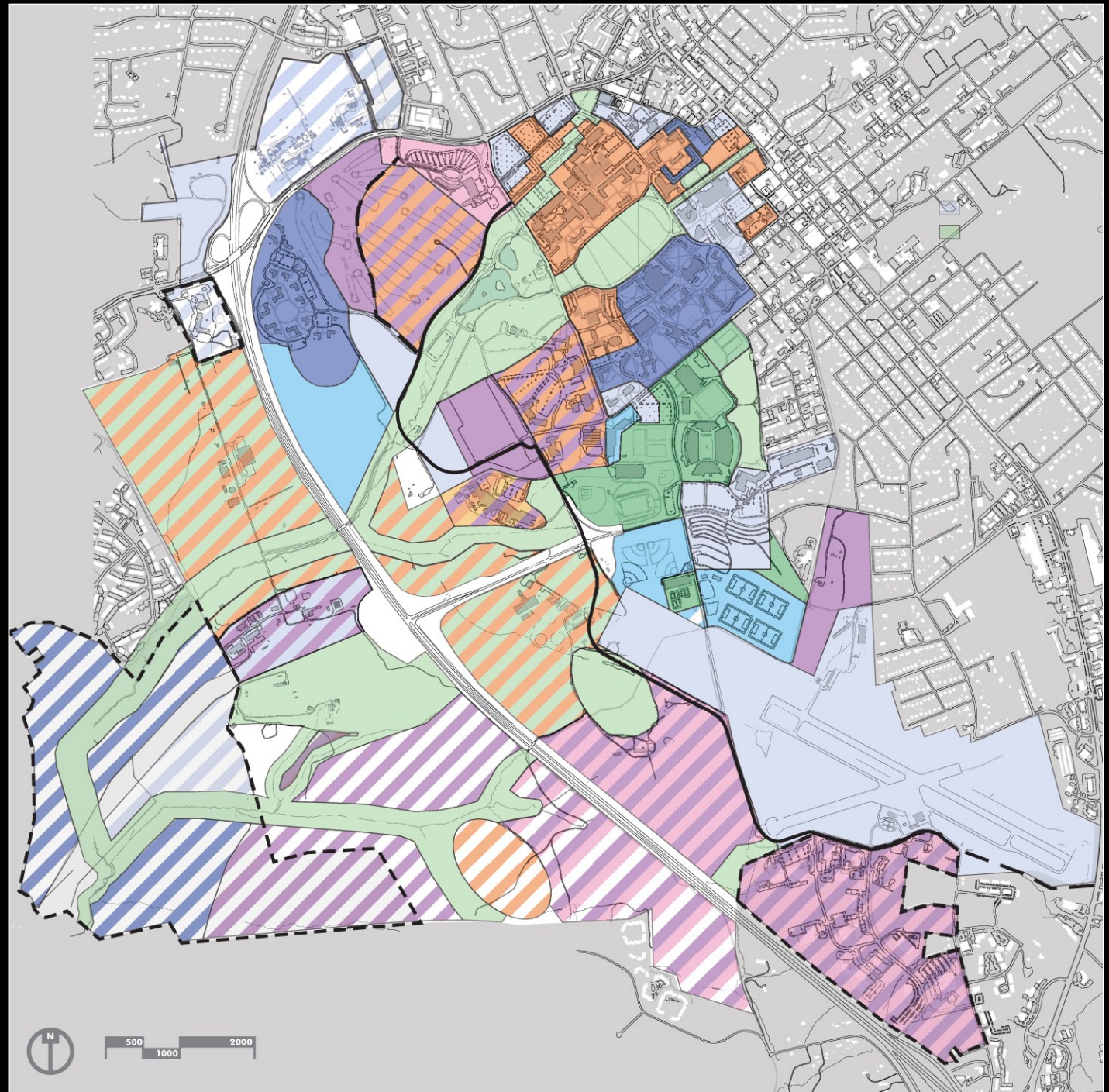
CRC

Town Gown

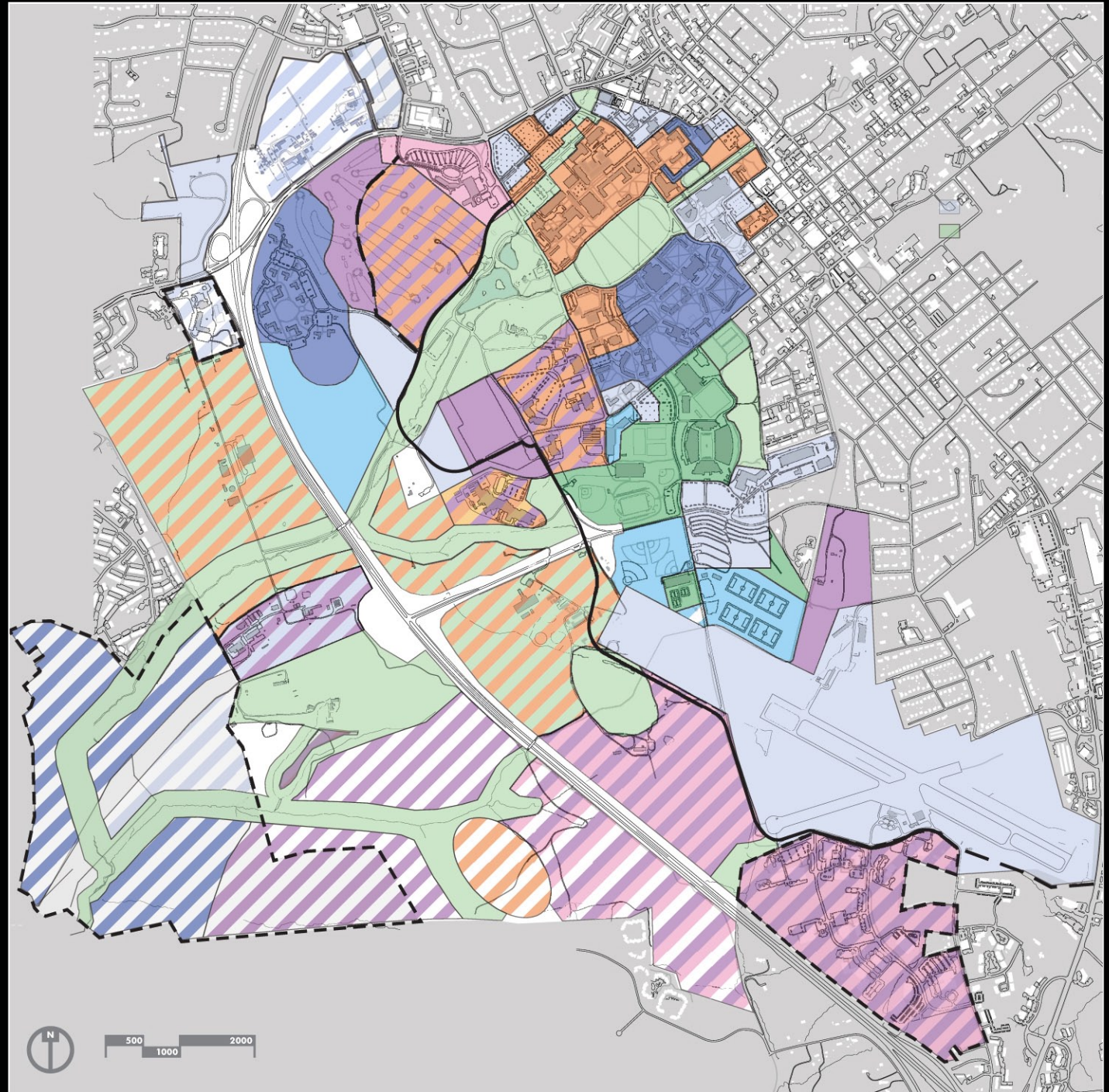
Stormwater/Sustainability Study

Academic	Athletic
Research	Recreation
Clinical	Support
Residential	Greenway
Outreach	

Long term land use strategies will expand campus development toward the 460 By Pass. Agricultural land use east of 460 will, over time, relocate west of the bypass and to other areas. The Golf Course land will be developed as the third walkable district of the campus. Land development should minimize environmental impact and should support the storm water strategies outlined in this document. The Heth Property will be developed to support the University community in the



longer term. In addition, the university will explore redevelopment opportunities for key parcels which may include mixed-use and public/private partnership opportunities. For example, the university land west of Old Glade Road and north of Prices Fork Road may present a unique opportunity for redevelopment in the future..



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Land Use | Short Term

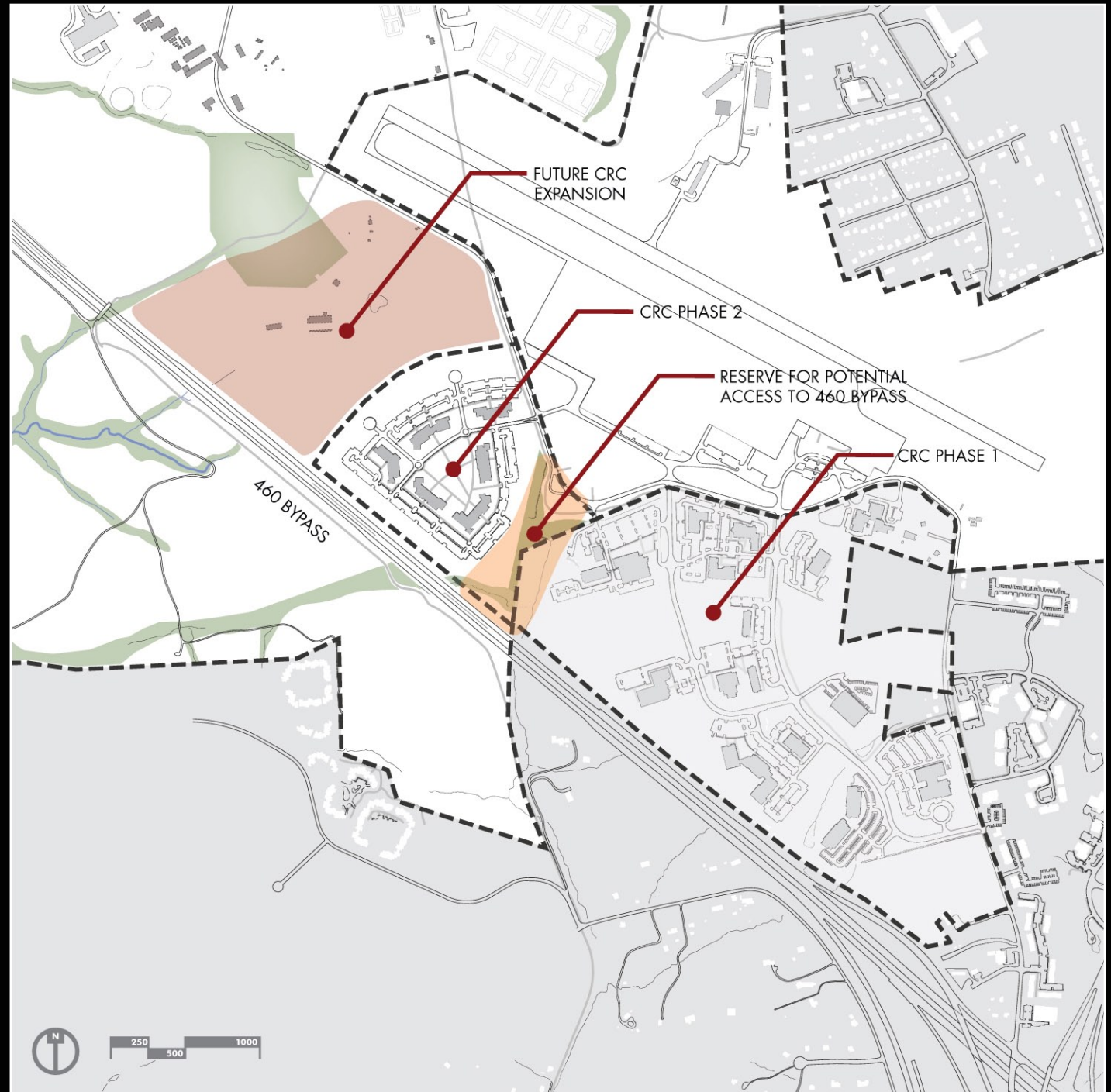
Land Use | Long Term

CRC

Town Gown

Stormwater/Sustainability Study

Virginia Tech organized an affiliated corporate research park in the 1980's. Today the Virginia Tech Corporate Research Center (VTCRC) has 675,000 square feet of space in 19 buildings on 120 acres. Phase I total capacity is approximately 1,000,000 square feet. The VTCRC plays a crucial role not only in its outreach and economic development roles but in providing short-term space for research and academic program needs. Phase II of the CRC is planned for adjacent property north of the current park. Additional adjacent land is earmarked for future phases.



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Defining Strategies


Land Use | Short Term

Land Use | Long Term

CRC

Town Gown

Stormwater/Sustainability Study

-  Existing Virginia Tech & Town of Blacksburg Arts Facilities
-  New Virginia Tech Arts Facilities

Virginia Tech and the Town of Blacksburg have always enjoyed a symbiotic relationship with a small college town feel. In 2001, the Town of Blacksburg, with the participation of Virginia Tech, prepared a "Master Plan for Downtown." One of the major tenets of that master plan was to create a Cultural District in downtown adjacent to the campus. This campus master plan endorses that concept and proposes the construction of an arts center to include an art gallery, a large performance venue, and parking



structure. Components of visual and performing arts academic programs will move to Henderson Hall to which a black box theater will be added. These facilities add to those in Squires, the Old Armory, and Lyric Theater to anchor the Cultural District. The campus master plan also identifies an additional parking garage site at the intersection of College Avenue and Otey Street which may support activities in the proposed cultural district.



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Land Use | Short Term

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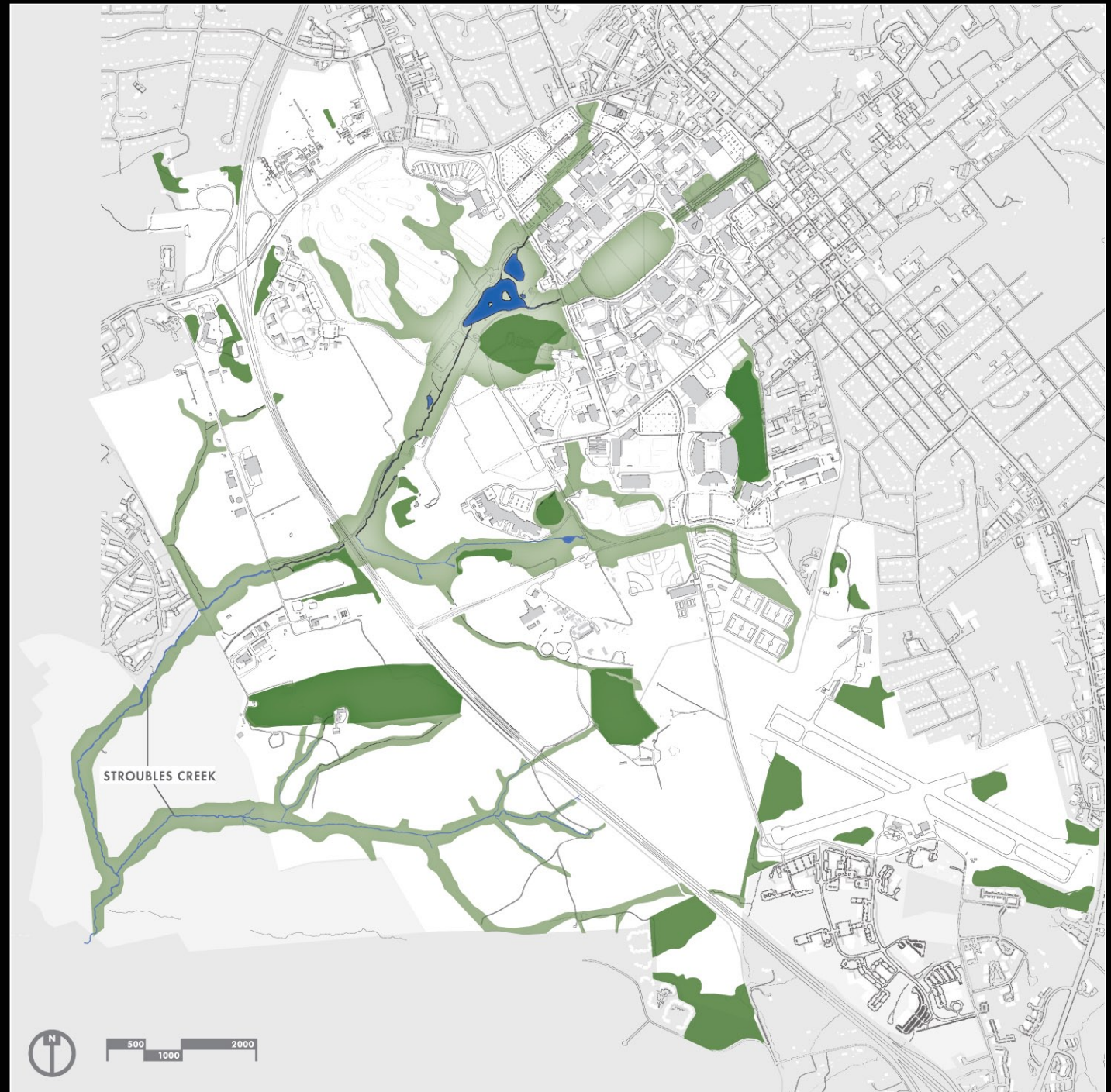
CRC

Town Gown

Stormwater/Sustainability Study

-  Environmental Greenway
-  Forested Areas

Early in the planning process, issues related to stormwater management, flood plains, and water quality prompted an additional sub-study of the drainage shed shared by Blacksburg and Virginia Tech. This study proposes the creation and preservation of an environmental corridor along the Stroubles Creek drainage ways, linking the University's critical environmental and cultural assets together in a no-build zone, the "Environmental and Cultural Greenway."



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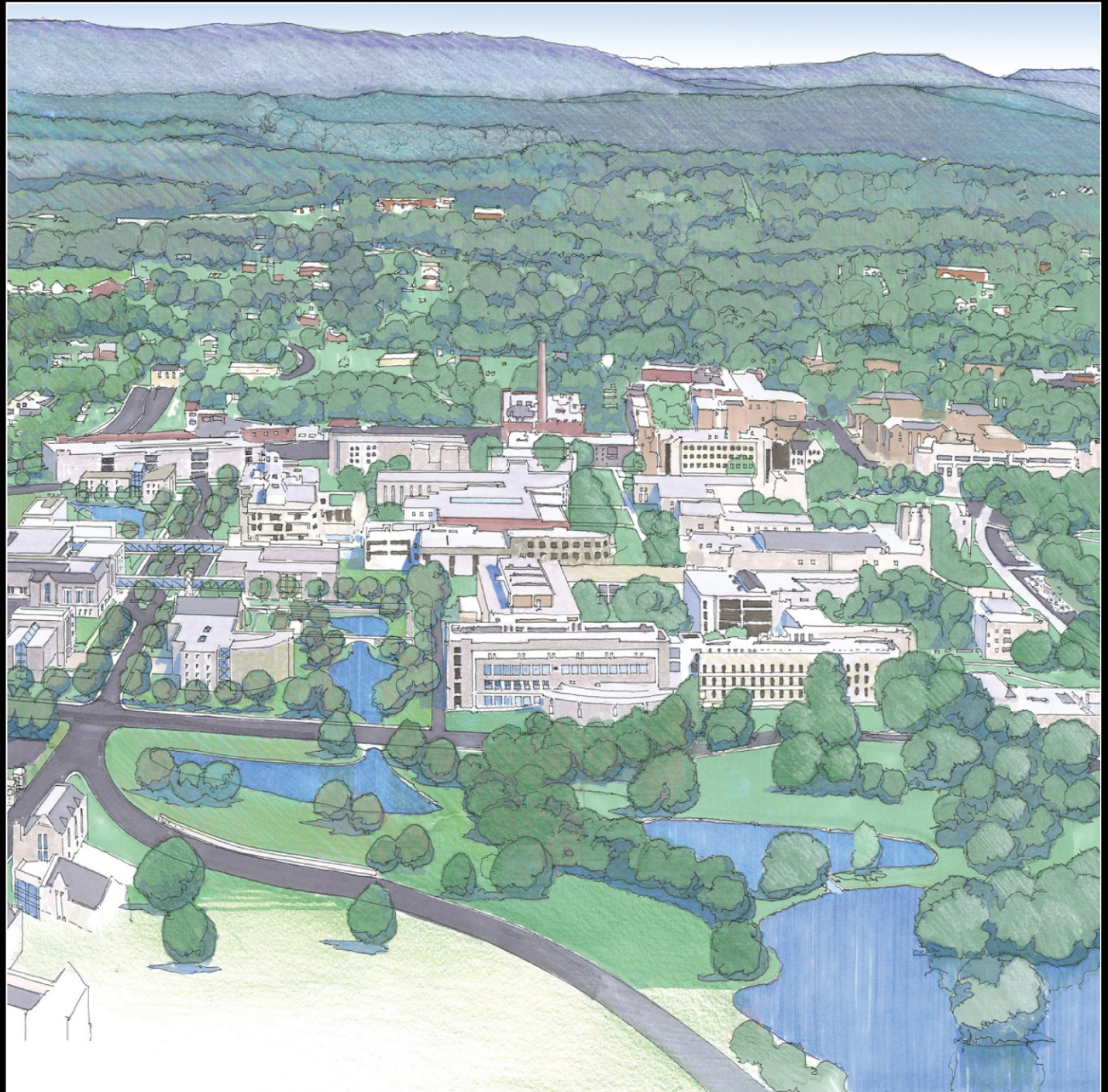
Land Use | Long Term

CRC

Town Gown

Stormwater/Sustainability Study

A major implementing strategy of the "Environmental and Cultural Greenway," is the day-lighting of Stroubles Creek and resolution of the flood plain from the Duck Pond to Price's Fork Road through the parking lots north of the academic core. Day-lighting Stroubles Creek will improve water quality downstream and further define the boundaries of the flood plain, thereby allowing development of new buildings and green spaces in these parking lots in the future. This will provide additional proximate building sites as well as positive open spaces to expand the academic core.



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Location

District Plan

Academic Core District

Life Science District

Campus Perimeter

Existing FAR

Future FAR

Data

- Existing Buildings
- Master Plan Program
- Future Build Out
- Environmental Greenway

The Master Plan program is distributed primarily within the northern area of the Academic Core District while completing the development of the Life Sciences District. Additionally, the Master Plan provides a framework for infrastructure and roadway development beyond the 10 year program in the Golf Course District.



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Life Science District

Campus Perimeter

Existing FAR

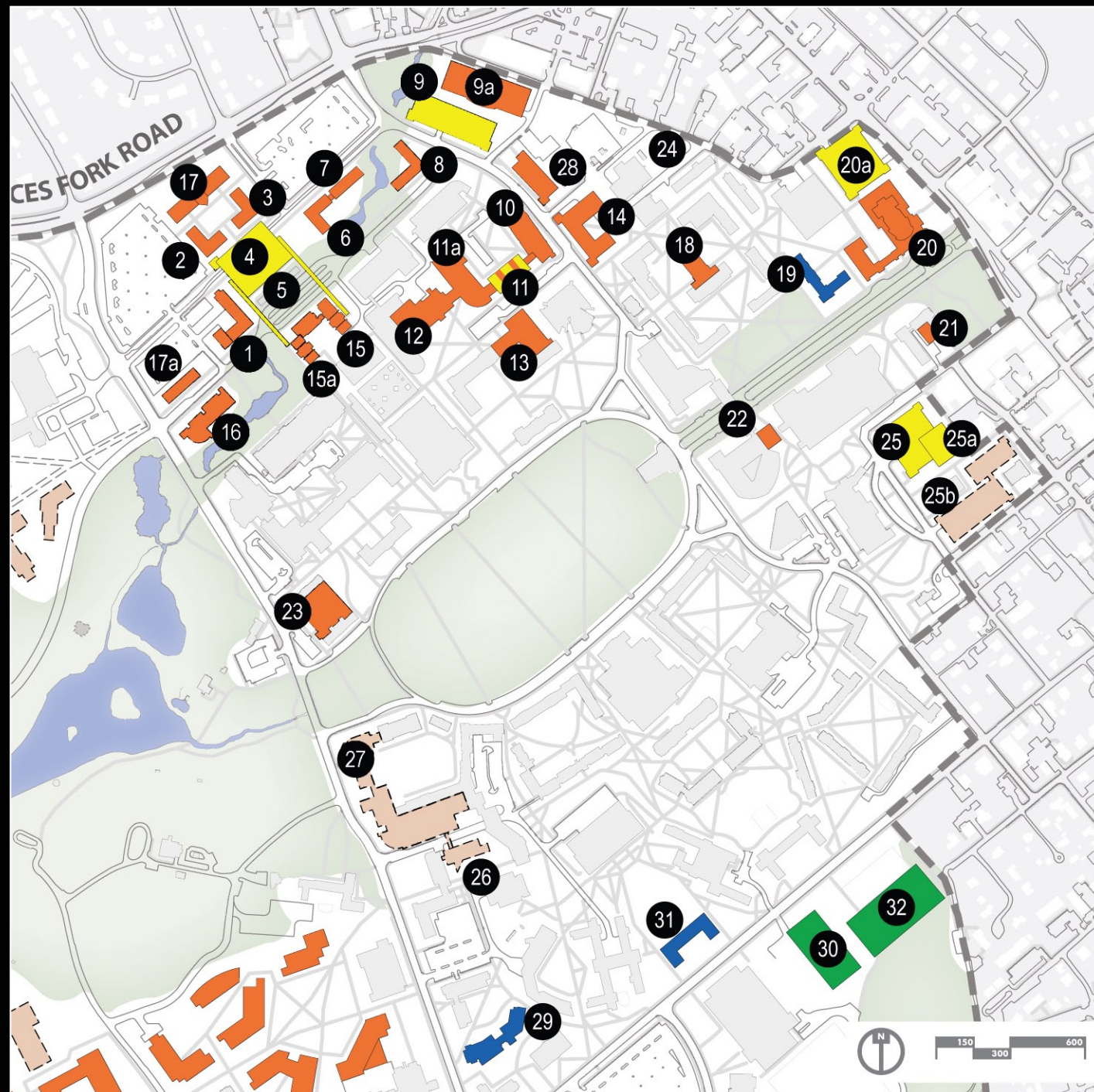
Future FAR

Data

- Academic
- Athletic/Recreation
- Residential
- Support
- Existing Buildings
- Future Build Out
- Environmental Greenway

12 REFER TO ACADEMIC CORE DISTRICT SPREADSHEET TO VIEW PROGRAM ACCOMMODATION DATA

CAMPUS MASTER PLAN UPDATE 2006



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District Plan

Academic Core District

Life Science District

Campus Perimeter

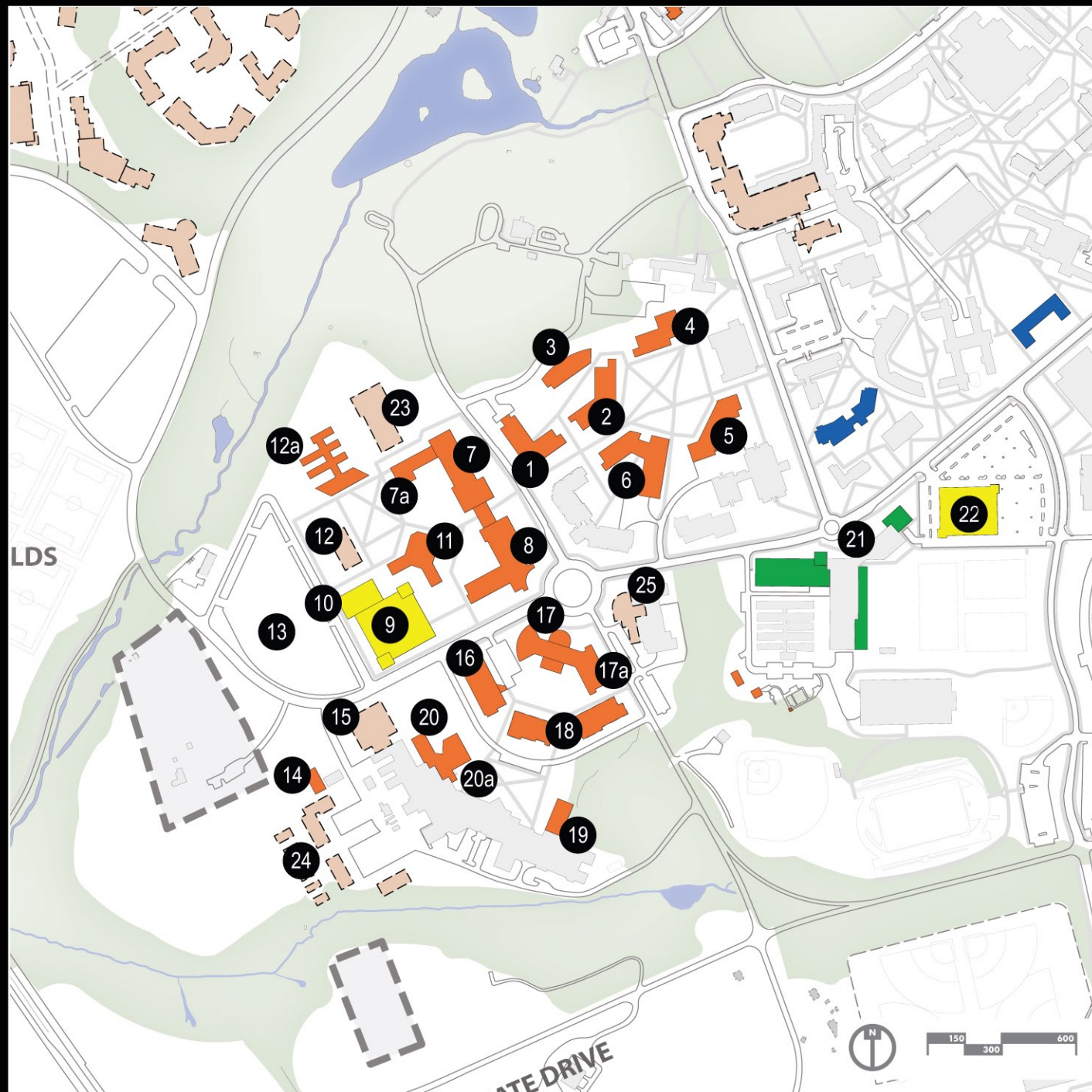
Existing FAR

Future FAR

Data

- Academic
- Athletic/Recreation
- Residential
- Support
- Existing Buildings
- Future Build Out
- Environmental Greenway

12 REFER TO LIFE SCIENCES DISTRICT
SPREADSHEET TO VIEW PROGRAM
ACCOMMODATION DATA



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Life Science District

Campus Perimeter

Existing FAR

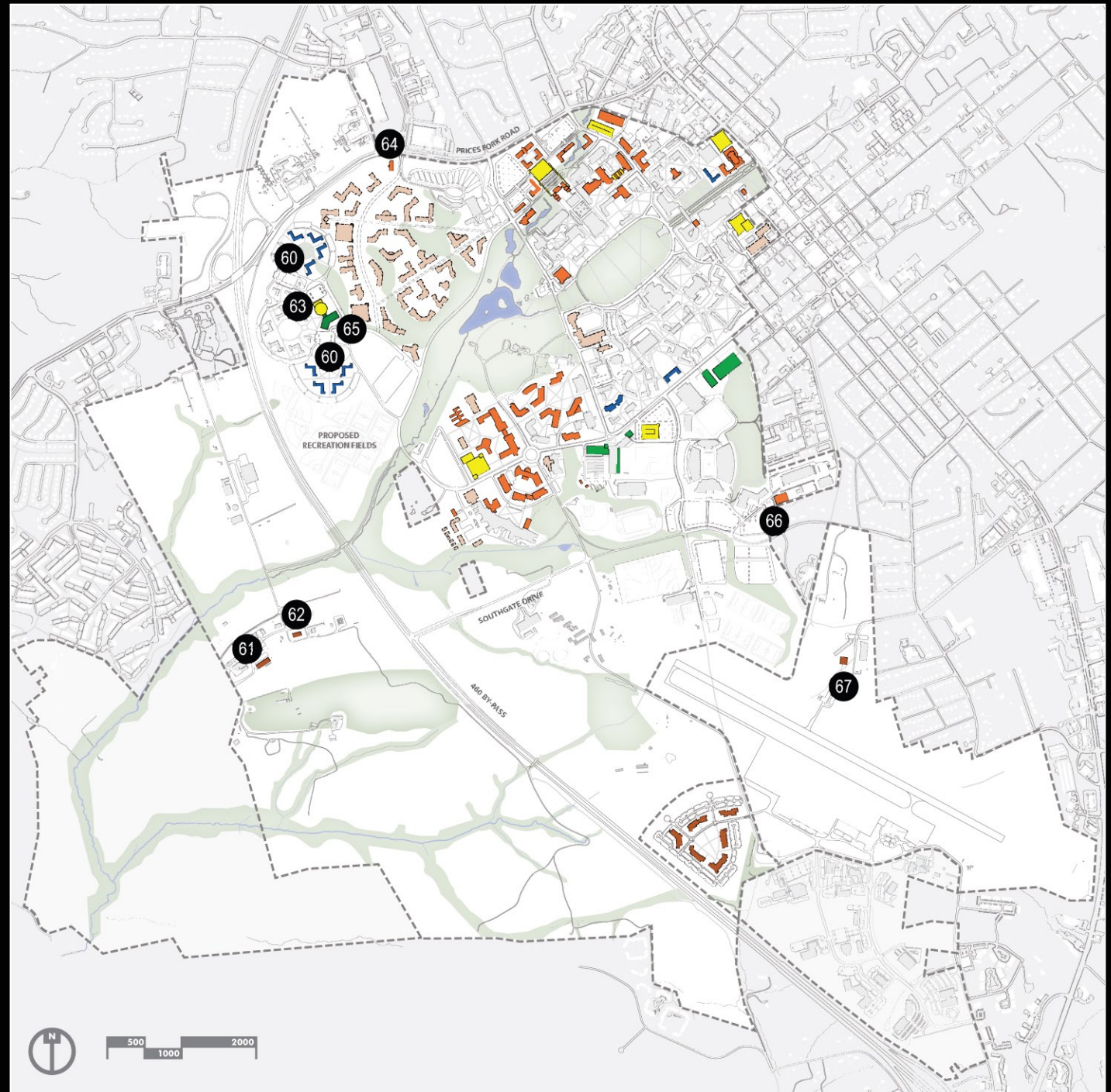
Future FAR

Data

- Academic
- Athletic/Recreation
- Residential
- Support
- Existing Buildings
- Future Build Out
- Environmental Greenway

12 REFER TO CAMPUS SITES SPREADSHEET TO VIEW PROGRAM

CAMPUS MASTER PLAN UPDATE 2006



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Location

District Plan

Academic Core District

Life Science District

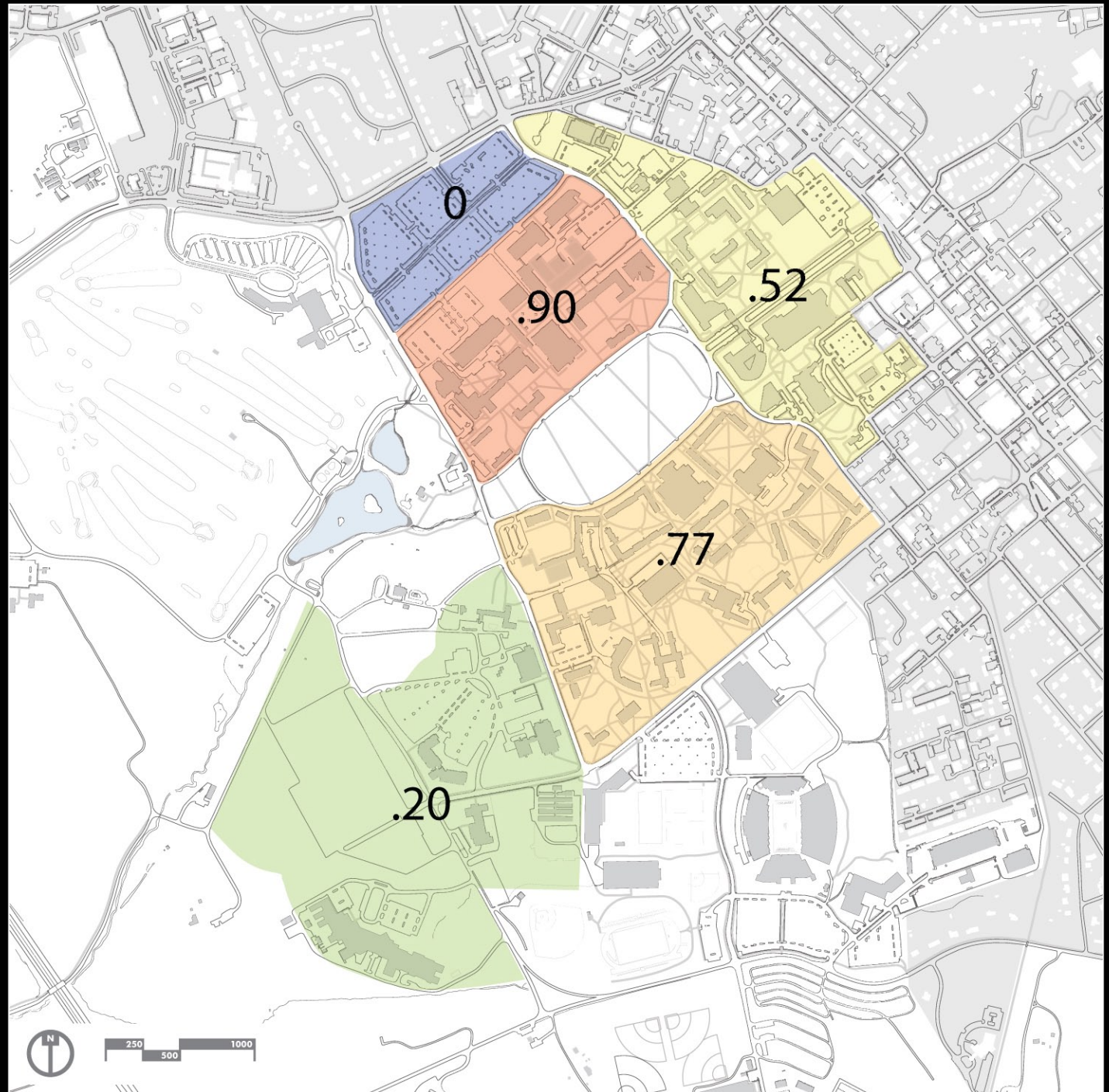
Campus Perimeter

Existing FAR

Future FAR

Data

FAR stands for Floor Area Ratio, which is a simple ratio comparing total land area to total building area. The defining core qualities of the campus are best expressed by the existing campus in densities ranging from approximately 0.7 to 1.0 FAR. The existing FAR vary greatly throughout the campus indicating additional infill potential in all districts of the campus particularly along the eastern and northern sections of the Academic Core District and throughout the entire Life Sciences District.



MASTER PLAN GOALS

DEFINING STRATEGIES

PROGRAM ACCOMMODATION

CAMPUS SYSTEMS

Location

District Plan

Academic Core District

Life Science District

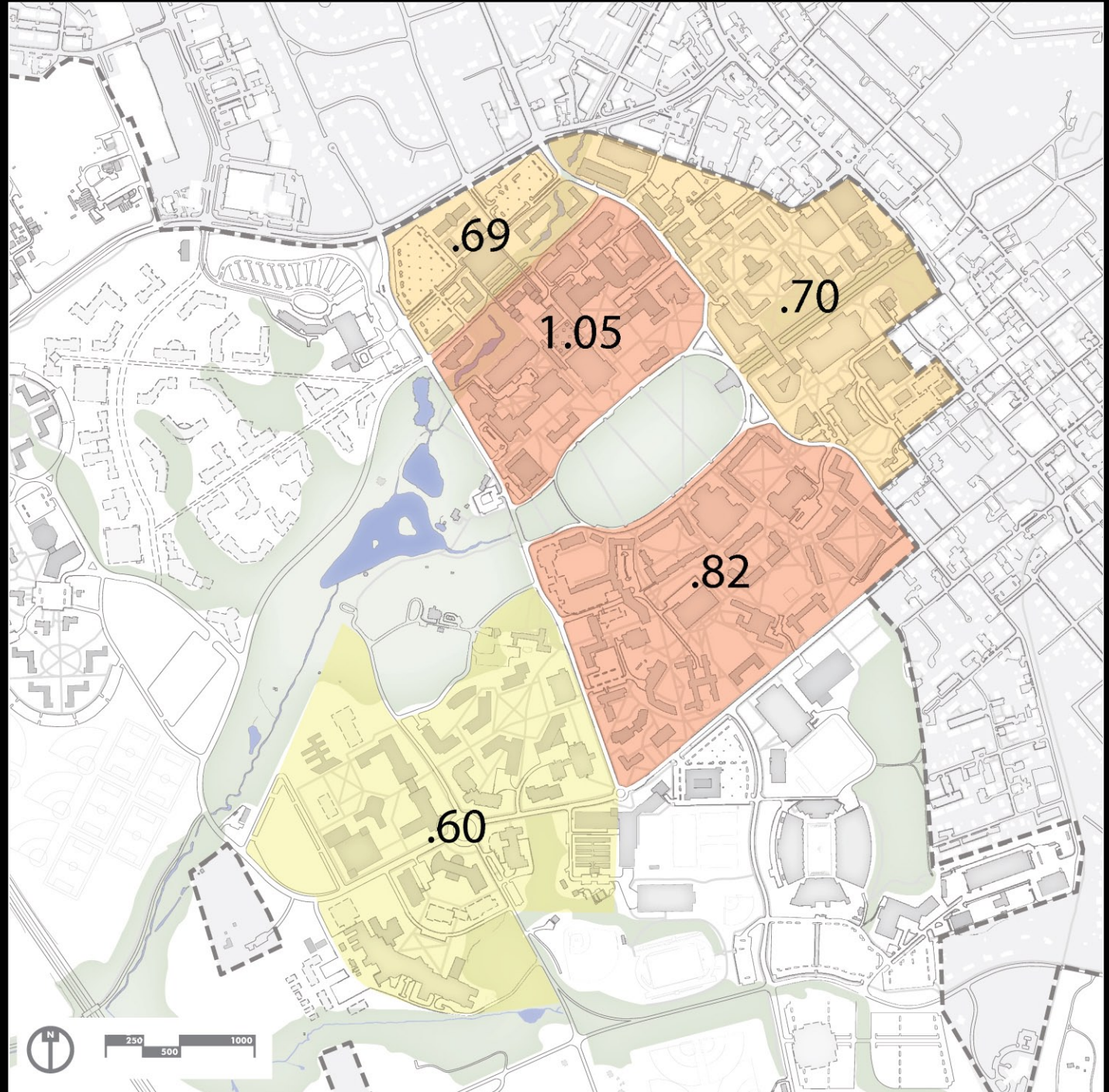
Campus Perimeter

Existing FAR

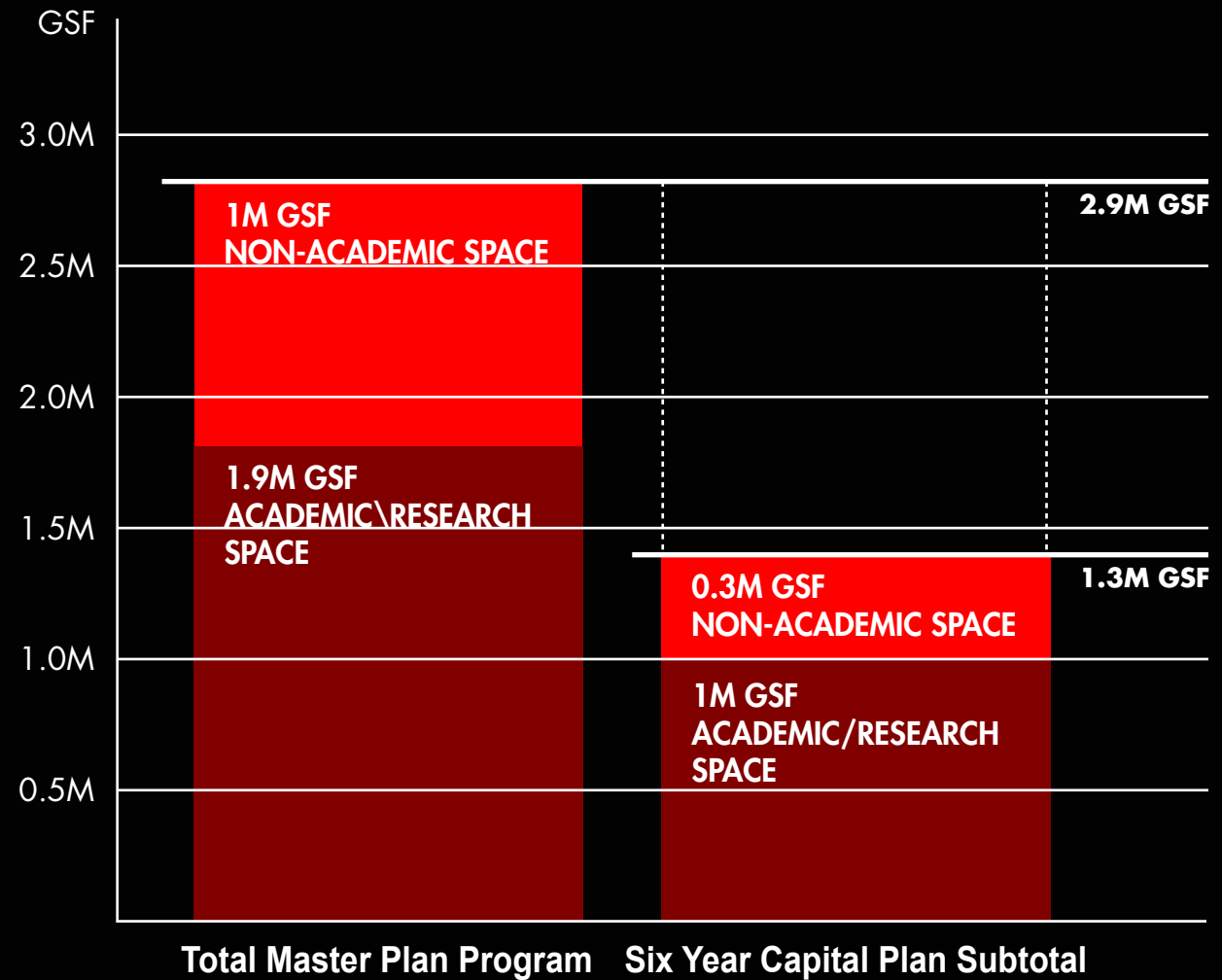
Future FAR

Data

FAR stands for Floor Area Ratio, which is a simple ratio comparing total land area to total building floor area. Proposed development brings all districts FAR closer to the desired density of approximately 0.7 to 1.0 FAR.



Academic/Research and Non-Academic Space



MASTER PLAN GOALS

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Location

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Academic/Research &

Non-Academic Space

Master Plan Program

Academic Core District

Life Sciences District

Campus Perimeter

Note:

The goal of accommodating over 1.3 M gross square feet of research space is achieved by combining the space in the "Research Labs" category with a percentage of space in the "Office & Conference" and "Study" categories.

Master Plan Program

Existing Academic/Research Space Inventory **3,694,861 GSF**

New Academic Space

Classrooms	132,433	SF
Research Labs	915,385	SF
Office & Conference	651,336	SF
Study	178,045	SF

New Academic/Research Space **1,877,199 GSF**

Total Academic/Research Space **5,572,060 GSF**

Existing 'Other' Space Inventory **3,635,736 GSF**

New 'Other' Space

Special Use	62,500	SF
General Use	158,571	SF
Support Facilities	369,185	SF
Health Care	33,750	SF
Residence Facilities	377,750	SF

New 'Other' Space **1,001,756 GSF**

Total 'Other' Space **4,637,492 GSF**

Total New Space (Academic/Research & Other) **2,878,955 GSF**

Total Space **10,209,552**

MASTER PLAN GOALS

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Master Plan Program

Academic Core District

Life Sciences District

Campus Perimeter

Program Accommodation

Note: All quantities are approximate in Gross Square Feet

Academic Core District		MP Program				Beyond Program	TOTAL
BLDG	Function	2006-08	2008-10	2010-12	Beyond 6 yr plan		
1	Engineering Computational Instruction	61,000					
2	Academic Building				48,000		
3	Academic Building				48,000		
4	Parking Structure I - 1,000 cars	0					
5	Transit Center/ Northwest Student Union Dining		87,400				
6	Engineering Comp. Science I		77,200				
7	Engineering Comp. Science II			77,200			
8	Academic Building				53,600		
9	Parking Structure II - 1,200 cars				0		
9A	Surge Space Building #1	Existing					
10	ICTAS I	99,400					
11	Academic and Student Mixed Use			65,000			
11A	Academic Replacement Building				76,500		
12	Academic Replacement Building				85,500		
13	Academic Replacement Building					54,000	
14	Academic Replacement Building					84,000	
15	New Architecture Bldg. 1 (BC)		37,000				
15A	New Architecture Building #2					48,000	
16	Classroom Building	61,000					
17	Academic Student Mixed Use				68,000		
17A	Academic Building					68,000	
18	Lane Hall Renovation / Addition			40,300			
19	Upper Quad Residence Hall					81,000	
20	Performing Arts Center				90,000		
20A	Parking Structure - 600 cars						
21	Henderson Hall Addition	8,600					
22	Newman Library Addition	5,000					
23	Replace center section of Davidson	51,000					
24	Campus Heat Plant	0					
25	Parking Structure - 600 cars				0		
25A	Regional Chiller Plant				20,000		
26B	Parking Structure - Alternate Building Site						
26	Academic Infill opportunity					60,000	
27	Academic replacement building					120,000	
28	Surge Space Building #2	60,000					
29	New Residence Hall #1	92,300					
30	Basketball Practice Facility	46,000					
31	New Residence Hall #2	80,000					
32	Indoor Football Practice Field	120,000					
	Demolition of Randolph - phased			-83,000	-83,000		
	Demolition of rear of Holden			-36,000			
	Demolition of Femoyer			-36,000			
	Demolition of Ctr. Davidson				-36,000		
	DEMOLITION TOTAL	0	0	-161,000	-119,000	0	-274,000
DISTRICT TOTALS		684,300	201,600	27,500	274,600	363,000	1,551,000

MASTER PLAN GOALS

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Master Plan Program

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Program Accommodation

Note: All quantities are approximate in Gross Square Feet

Life Sciences District		MP Program					
BLDG	Function	2006-08	2008-10	2010-12	Beyond 6 yr plan	Beyond Program	TOTAL
1	ICTAS II	77,000					
2	Sciences Research Lab	93,000					
3	Sciences Research II		92,300				
4	Academic Building				51,000		
5	Research				73,500		
6	Natural Resources Lab			92,300			
7	Research				100,000		
7A	Research				92,000		
8	Research				144,000		
9	Parking Garage - 1,200 cars			0			
10	Chiller Plant - Phase I		39,000				
11	Instrumentation Center				48,000		
12	Research					80,000	
12A	Plant Growth Facility				42,000		
13	New surface lot - 1,200 cars		0				
14	Large Animal Teaching Facilit		20,000				
15	Vet. Med Hospital Addition					25,000	
16	Sciences Research Lab II / Trans		92,300				
17	HABBI	93,000					
17A	Research				84,800		
18	Research				172,000		
19	Vet. Med. Faculty Offices				24,000		
20	Vet Med. Instruction Addition	31,000					
20 A	NIH Research Facility	16,300					
21	Recreation, Counseling, Clinic Space	43,000					
22	Parking Struct. @ Cassell lot -1200 cars						
23	Research					100,000	
24	CMMID Replacement					30,000	
25	Addition to Food Sciences	30,000					
DISTRICT TOTALS		383,300	243,600	92,300	232,800	598,500	235,000
							1,550,500

Location

Data

Academic/Research &

Non-Academic Space

Master Plan Program

Academic Core District

Life Sciences District

Campus Perimeter

Program Accommodation

Note: All quantities are approximate in Gross Square Feet

Campus sites		MP Program					
BLDG	Function	2006-08	2008-10	2010-12	Beyond 6 yr plan		TOTAL
60	S pecial Purpose Housing IV				72,000		
61	Architecture Research Facility	7,500					
62	Hazardous Materials Facility		40,000				
63	Oak Lane Commons Bldg			20,000			
64	Visitors and Admissions Center	18,000					
65	Indoor Rec Facility	80,000					
66	Admin. Serv. Bldg./New Police Facil.	55,600					
67	CNS S torage Facility			20,000			
DISTRICT TOTALS		161,100	40,000	40,000	72,000	0	313,100

MASTER PLAN GOALS

DEFINING STRATEGIES

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The Master Plan proposes transportation and infrastructure systems that will anticipate growth rather than reacting to demand. Current critical conditions include central steam and chilled water capacity and distribution, as well as stormwater quality and quantity issues.



MASTER PLAN GOALS

DEFINING STRATEGIES

PROGRAM ACCOMMODATION

CAMPUS SYSTEMS

Circulation

Roadways

Parking

Transit

Pedestrian Circulation

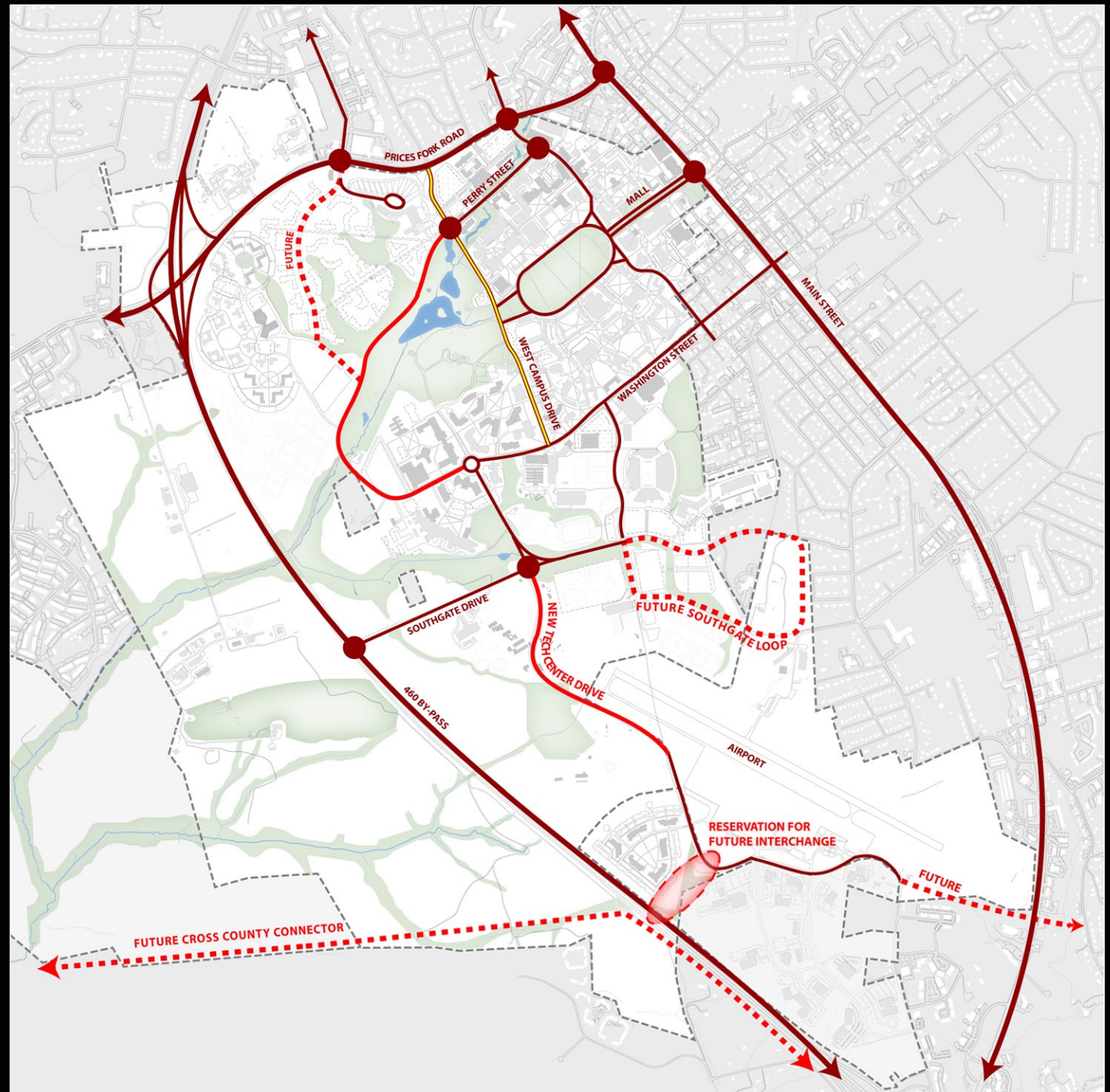
Bike Routes

Infrastructure

Utilities

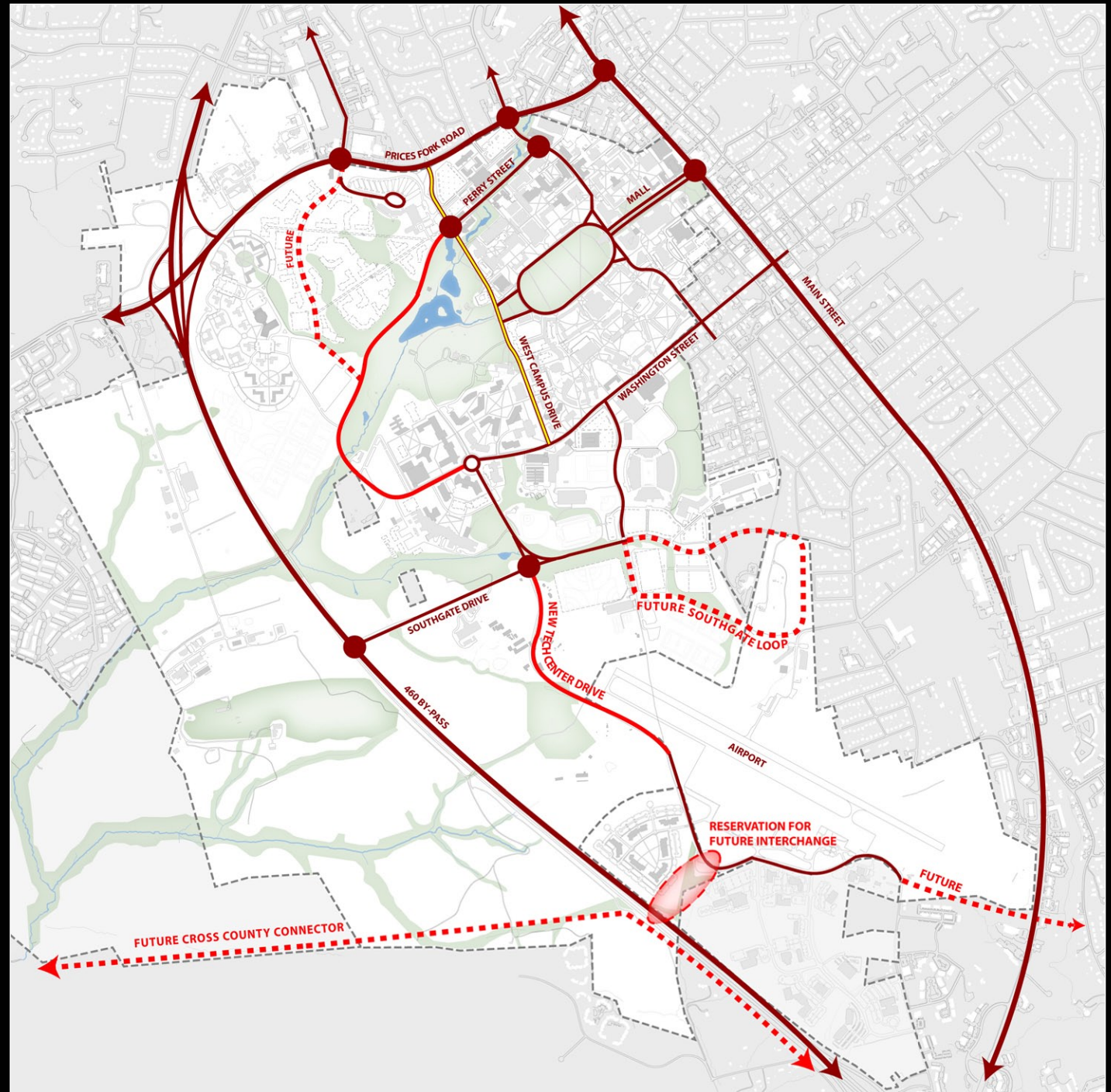
- Existing Major Roads
- New Road Segments
- - - Future Roads
- Traffic Calming
- Intersection Improvements

Proposed roadway systems will provide for future growth as well as mitigate existing traffic issues. Primary 10-year strategies involve the relocation of Duck



Pond Drive from Washington Street to Perry Street to create a system of streets providing a western perimeter route for the campus, while enhancing the pedestrian connections from the Life Sciences District to the Academic Core District. This proposed system of streets will reduce loads on West Campus Drive. Additionally, traffic calming strategies should be implemented to further reduce loads on West Campus Drive. The second primary short-term strategy involves the realignment of Tech Center Drive to Duck Pond Drive in order to allow for the airport runway expansion.

Future long term strategies include a connection from Price's Fork Road through the future Golf Course District to the proposed realigned Duck Pond Drive. At the south end of campus, a future connection between Tech Center Drive and Main Street should be considered. Regional traffic plans call for a cross county connector that potentially ties to the campus, however this connector should not connect to South Gate Drive but to a point further south at or beyond the boundary of campus with provisions made for airport access from the Route 460 By Pass.



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Utilities

Academic Core:

Displaced	1,800 +/-
Demand	700 +/-
New Parking	3,400 +/-
Net Gain	900 +/-

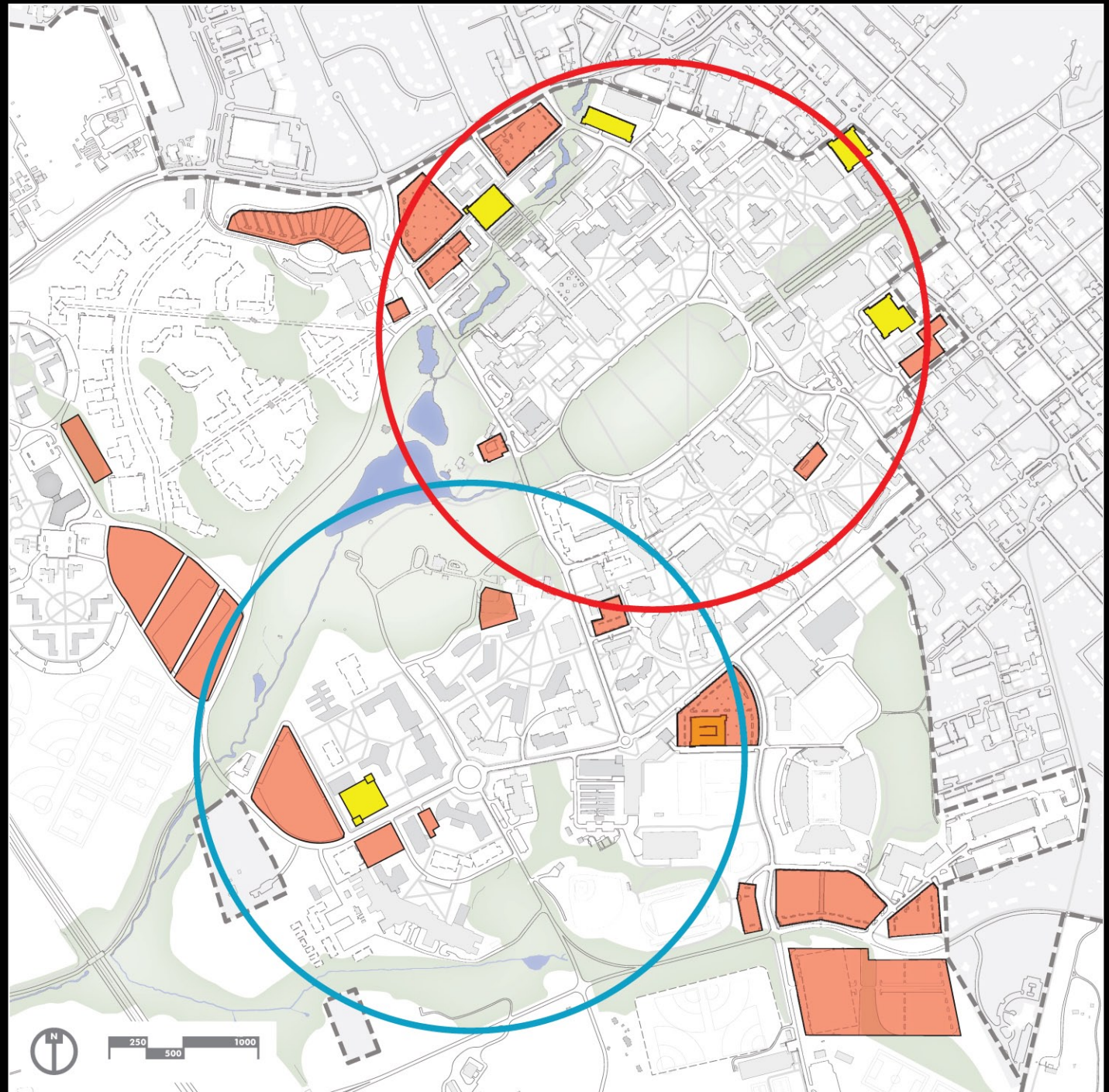
Life Sciences District:

Displaced	3,200 +/-
Demand	1,200 +/-
New Parking	4,800 +/-
Net Gain	400 +/-

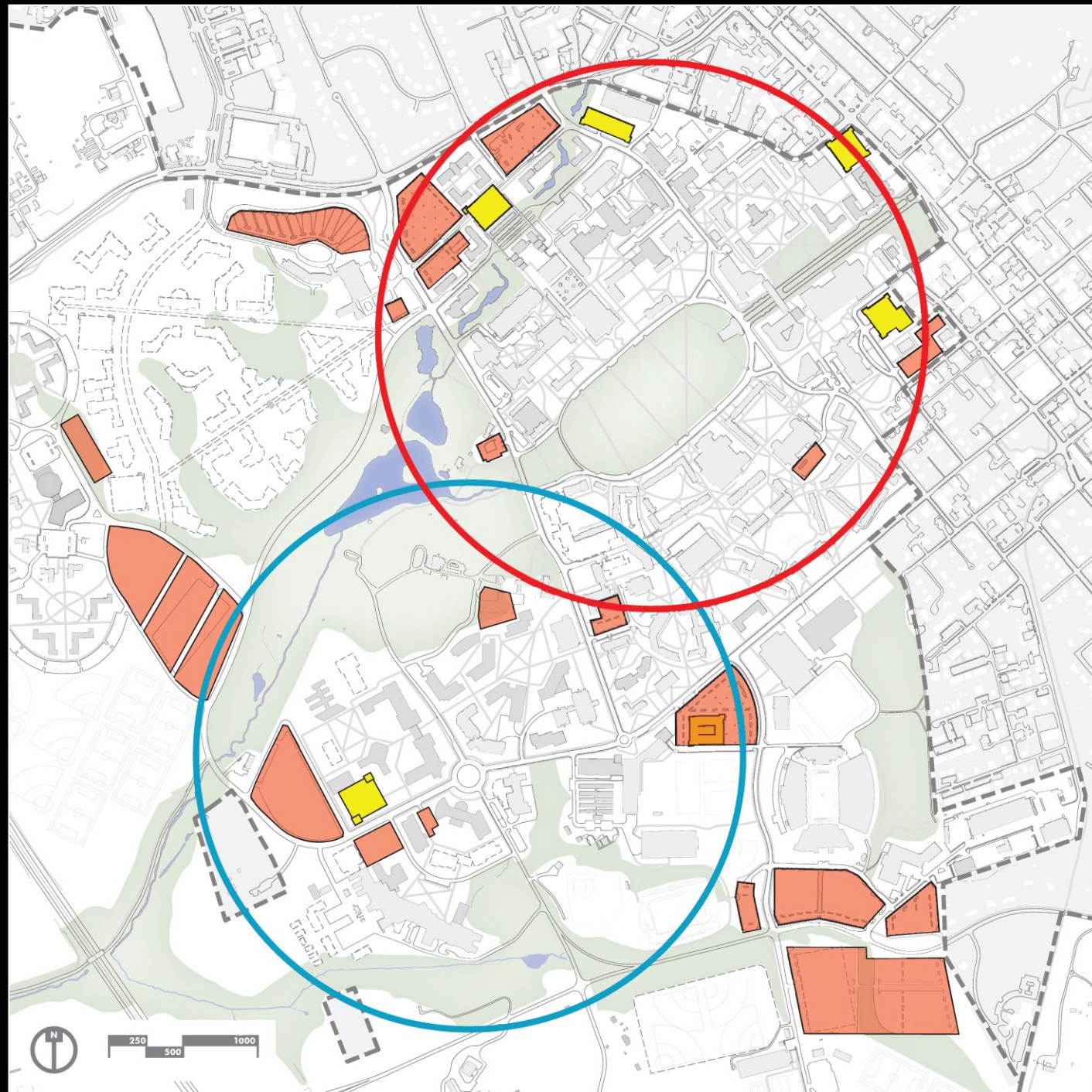
■ Parking Structures

■ Parking Lots

As indicated in the core qualities analysis, parking lots currently account for a



significant percentage of university land use. Proposed parking strategies provide for parking consolidation in perimeter areas serving each district. Consolidation of parking will require construction of as many as six parking structures and will facilitate the redevelopment of several surface parking lots as green quadrangles.



MASTER PLAN GOALS

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Pedestrian Circulation

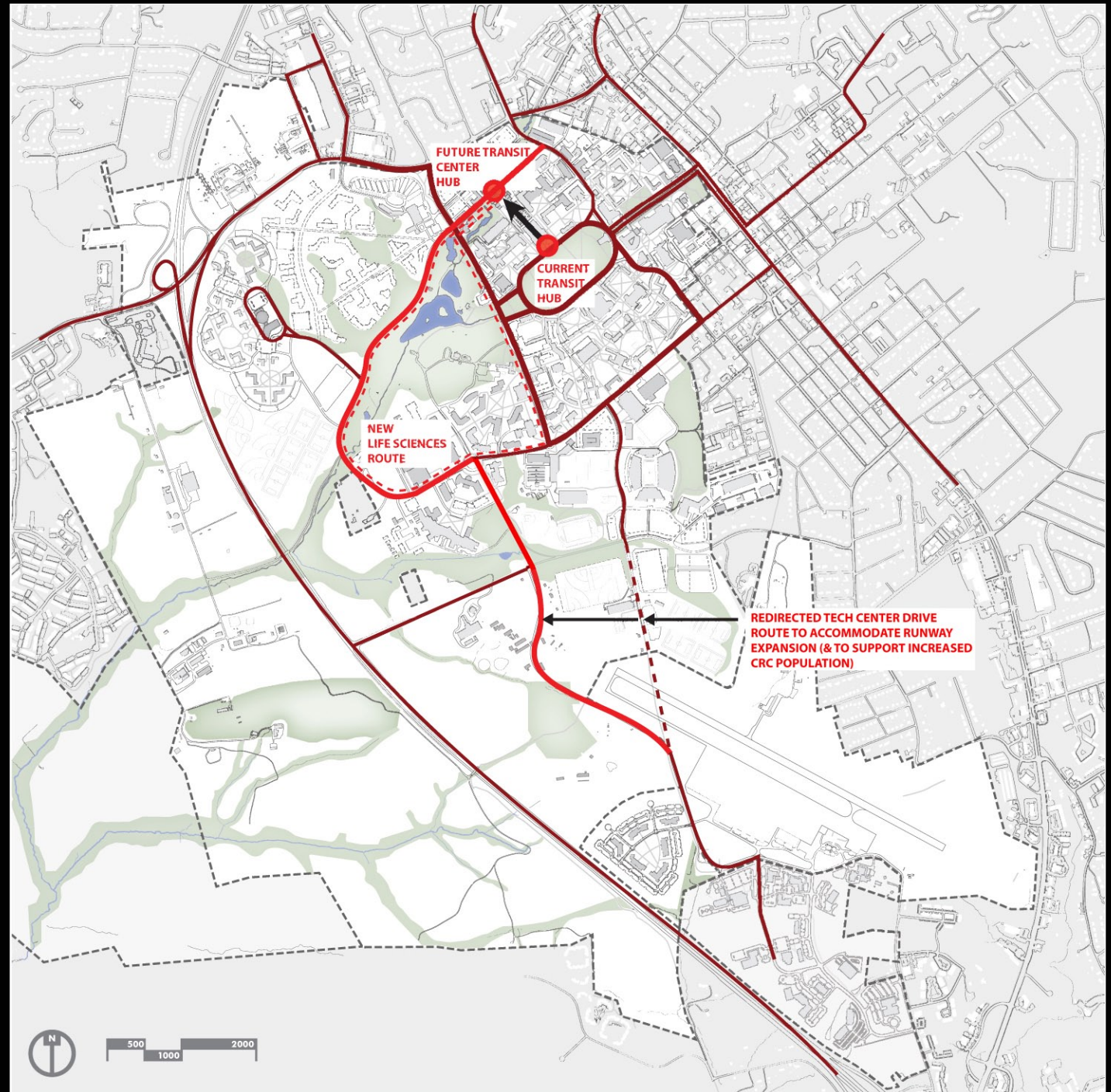
Bike Routes

Infrastructure

Utilities

- Existing Route
- Proposed Route
- - - Redirected Route
- Transit Hub

With roadway realignments it is recommended that the hub for Blacksburg transit be moved from the Drill Field at Burruss Hall to a transit center on Perry Street north of the academic core and that bus traffic be removed from the Drill Field as part of this initiative. Other minor route reconfigurations will be necessary in association with road realignments.



MASTER PLAN GOALS

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Circulation

Roadways

Parking

Transit

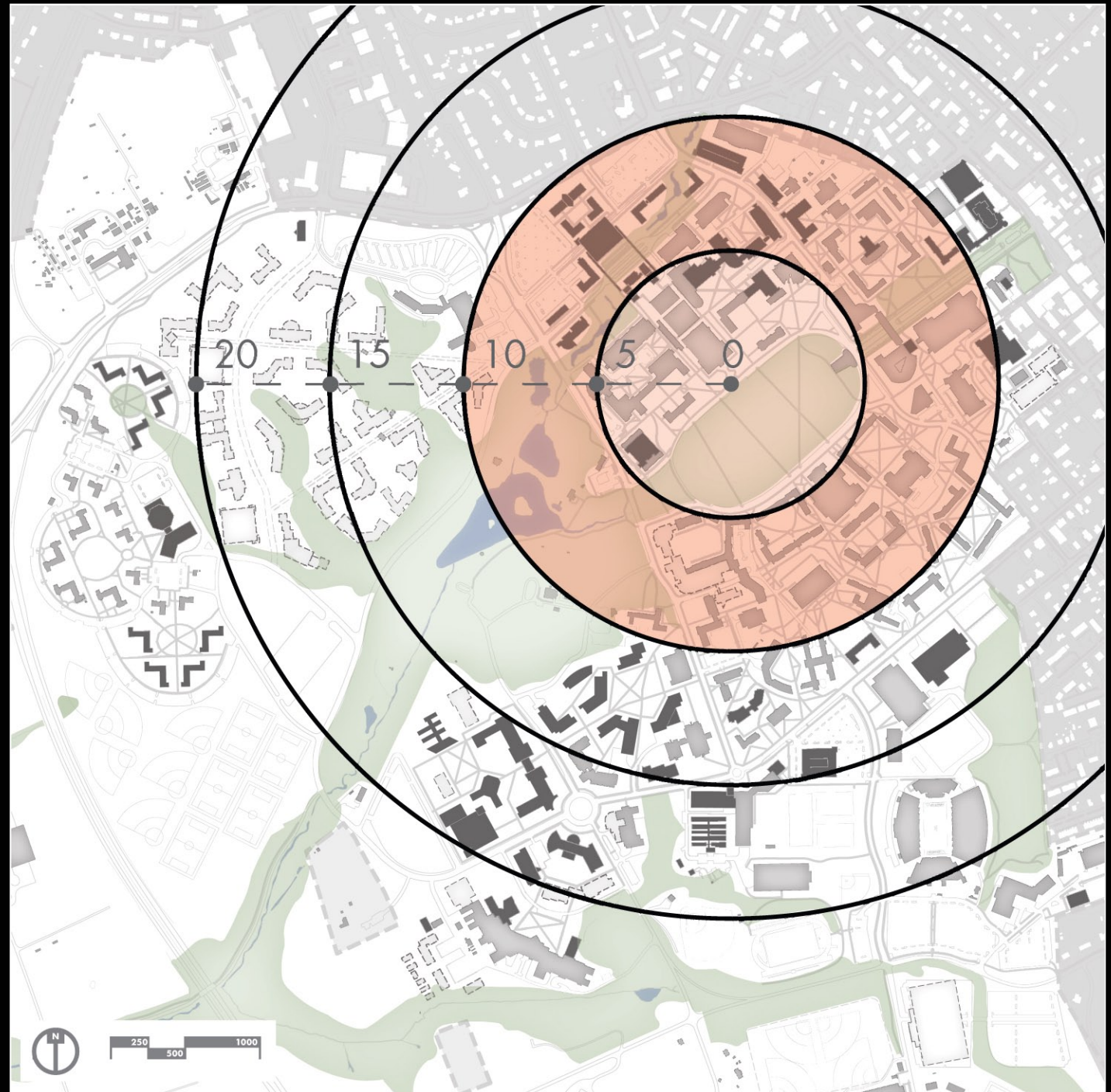
Pedestrian Circulation

Bike Routes

Infrastructure

Utilities

Great campuses are pedestrian places. Virginia Tech's Academic Core District is a walkable village defined by the 15 minute class change schedule and the distance a pedestrian can walk in 10-15 minutes.



MASTER PLAN GOALS

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Pedestrian Circulation

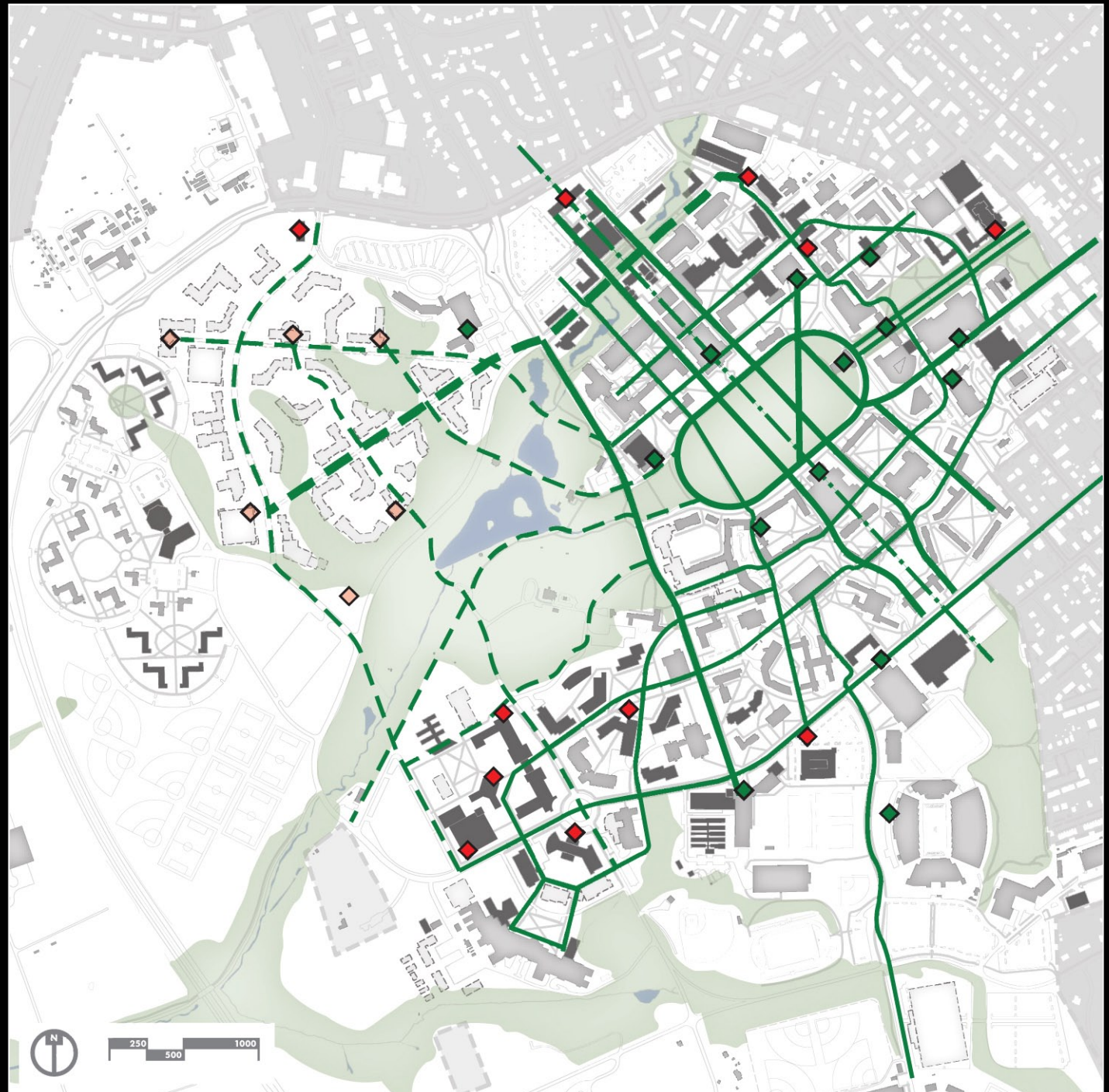
Bike Routes

Infrastructure

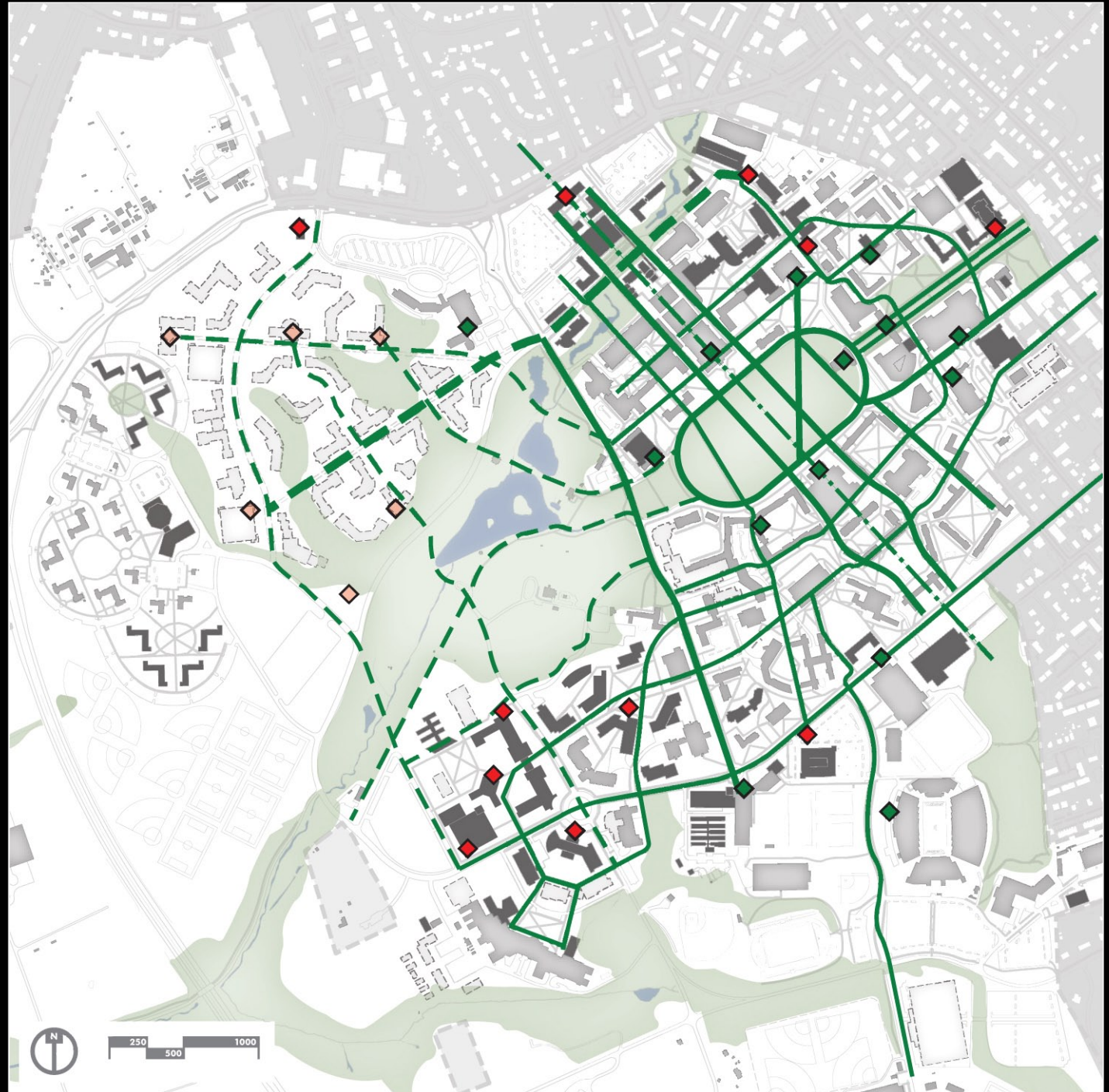
Utilities

- Existing Major Paths
- Existing Minor Paths
- - - Proposed Major Paths
- Proposed Minor Paths
- ◆ Existing Icons
- ◆ Proposed Icons
- ◆ Future Icons

Building upon the walkable village of the Academic Core District, the networks of pedestrian circulation will be integrated with, and extended throughout each of the new districts. Pedestrian circulation can further be enhanced by providing visual landmarks and framed views



that help orient pedestrians to their destinations. The master plan proposes these techniques in developing new campus districts.



MASTER PLAN GOALS

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Circulation

Roadways

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Transit

Pedestrian Circulation

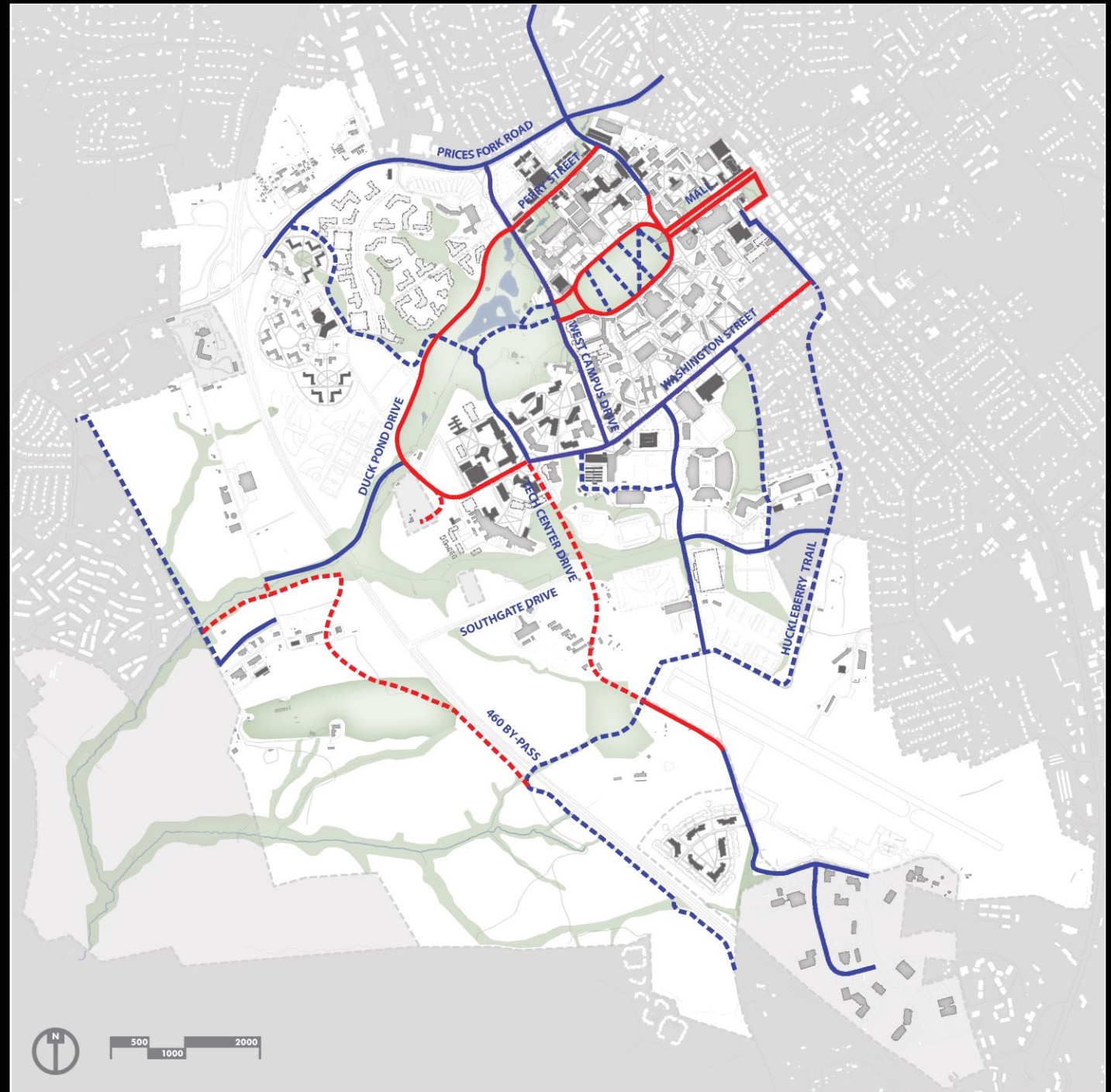
Bike Routes

Infrastructure

Utilities

- Existing Bike Lane
- Existing Bike Paths
- Proposed Bike Lane
- Proposed Bike Paths

Bicycle accommodations will be achieved through the use of parallel bike lanes on streets and roads and off road trails. Bike lanes primarily provide functional movement and while trails provide functional routes, they also are used for exercise and recreation. Establishing an integrated system of bikes lanes and paths will encourage greater use of bicycles as a primary mode of transportation.



MASTER PLAN GOALS

DEFINING STRATEGIES

PROGRAM ACCOMMODATION

CAMPUS SYSTEMS

Circulation

Infrastructure

Steam

Chilled Water

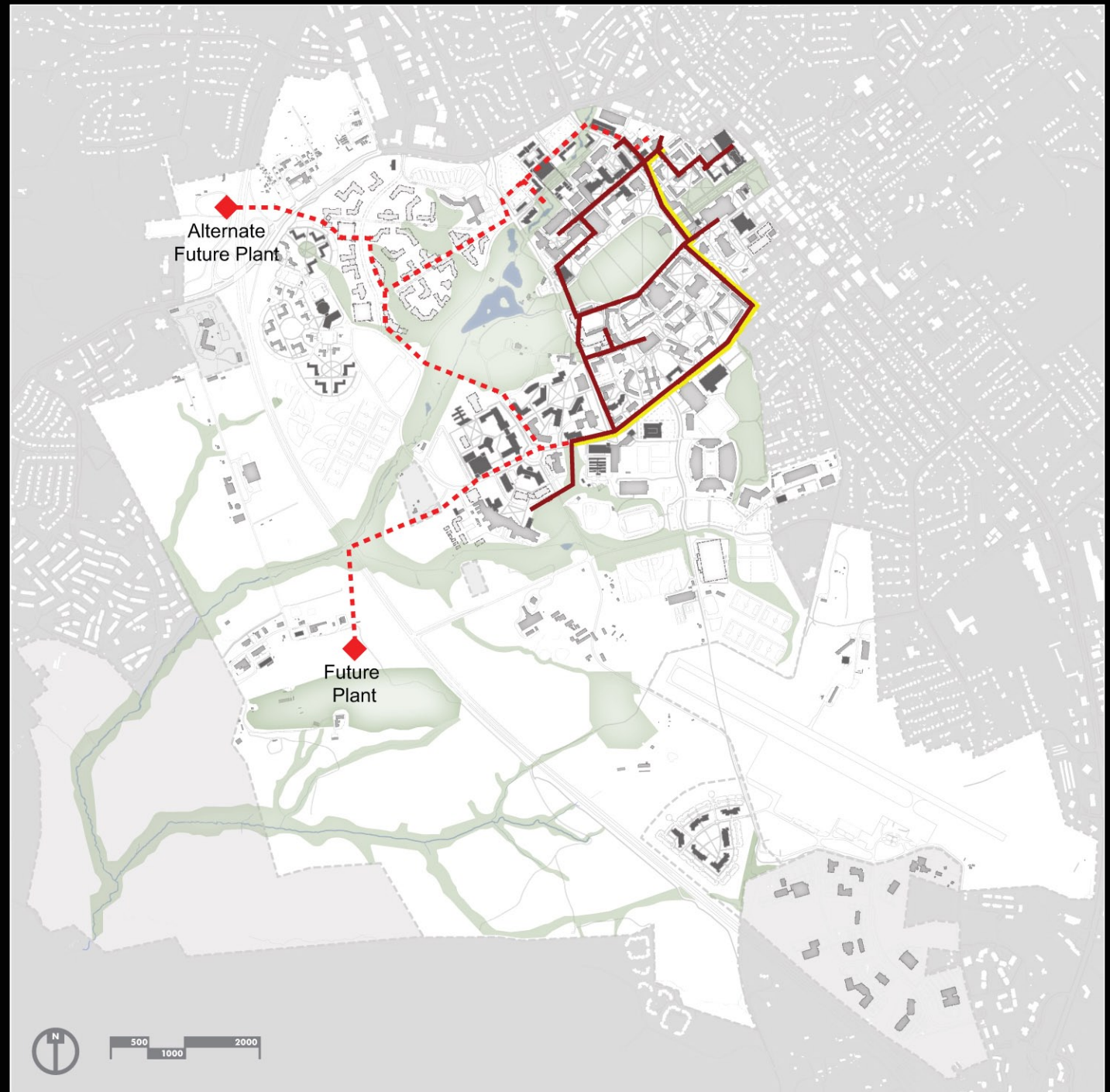
Electrical

CNS

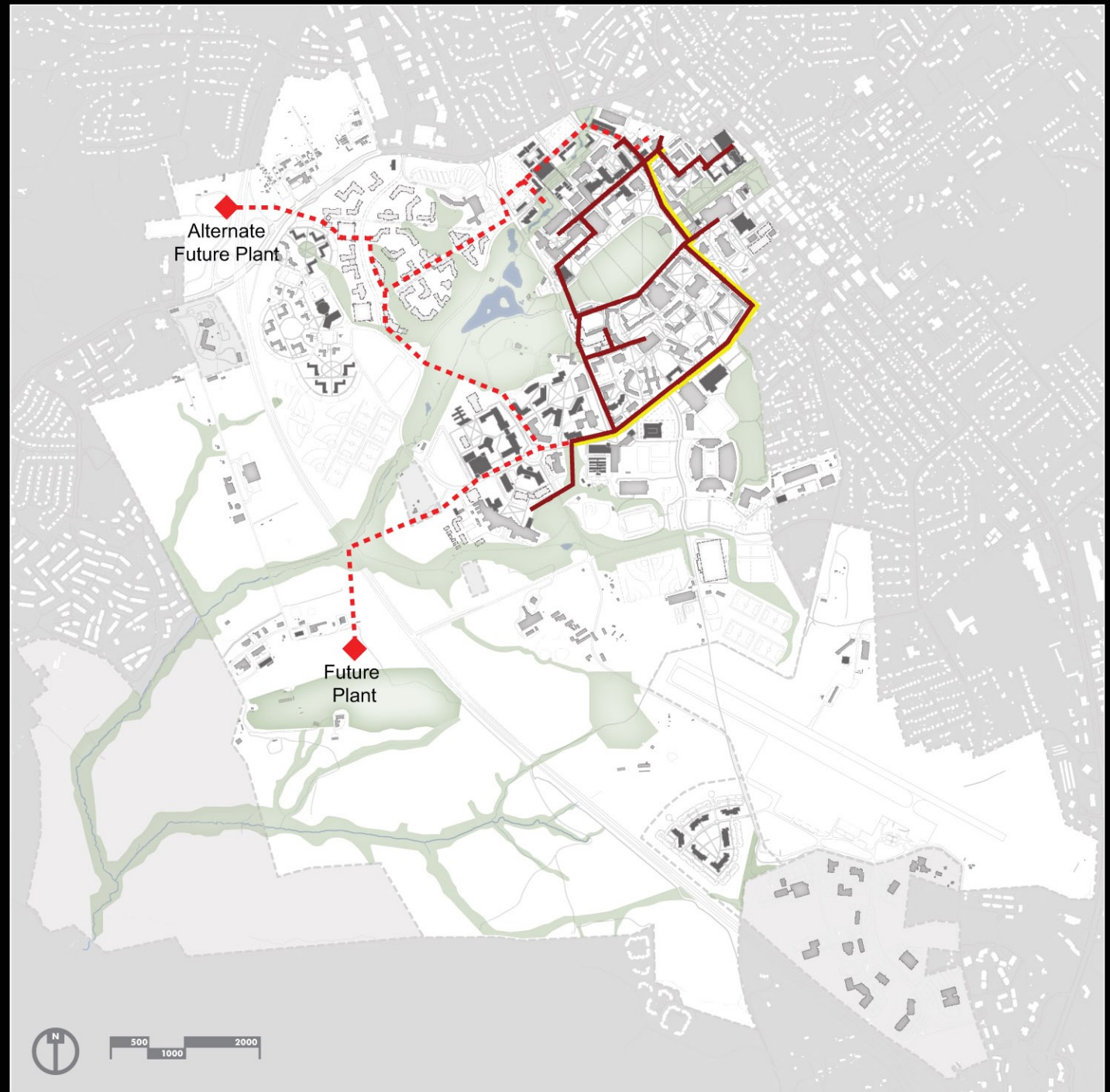
Utilities

- Existing
- Upgraded
- - - Proposed

At an early point in the planning several steam distribution issues were identified which required additional study. A focused sub-study of the master plan was undertaken to analyze and project a course of action relative to the generation and distribution of steam and chilled water. In addition, alternative fuel sources for steam production were studied. The campus central point for steam generation is the co-generation power plant at a far northern point of



campus while the growth of the distribution system is to the south and west creating a polarized system. In addition, the existing distribution systems were not sized to fully accommodate future growth in these directions. The master plan proposes that additional steam capacity be developed in the central power plant, that significant improvements of the steam distribution system within the 10 year period and that a new distribution system across the north campus be added to facilitate 10 year growth. 20-year growth and beyond needs to further extend distribution systems through the Life Sciences District and the future Golf Course District. Eventually new generation capacity will need to be developed in a western campus site. Although alternative fuels did not prove economically viable in the short term, the University should continue to monitor and review its options as it approaches the need to build new steam generation capacity.



MASTER PLAN GOALS

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Circulation

Infrastructure

Steam

Chilled Water

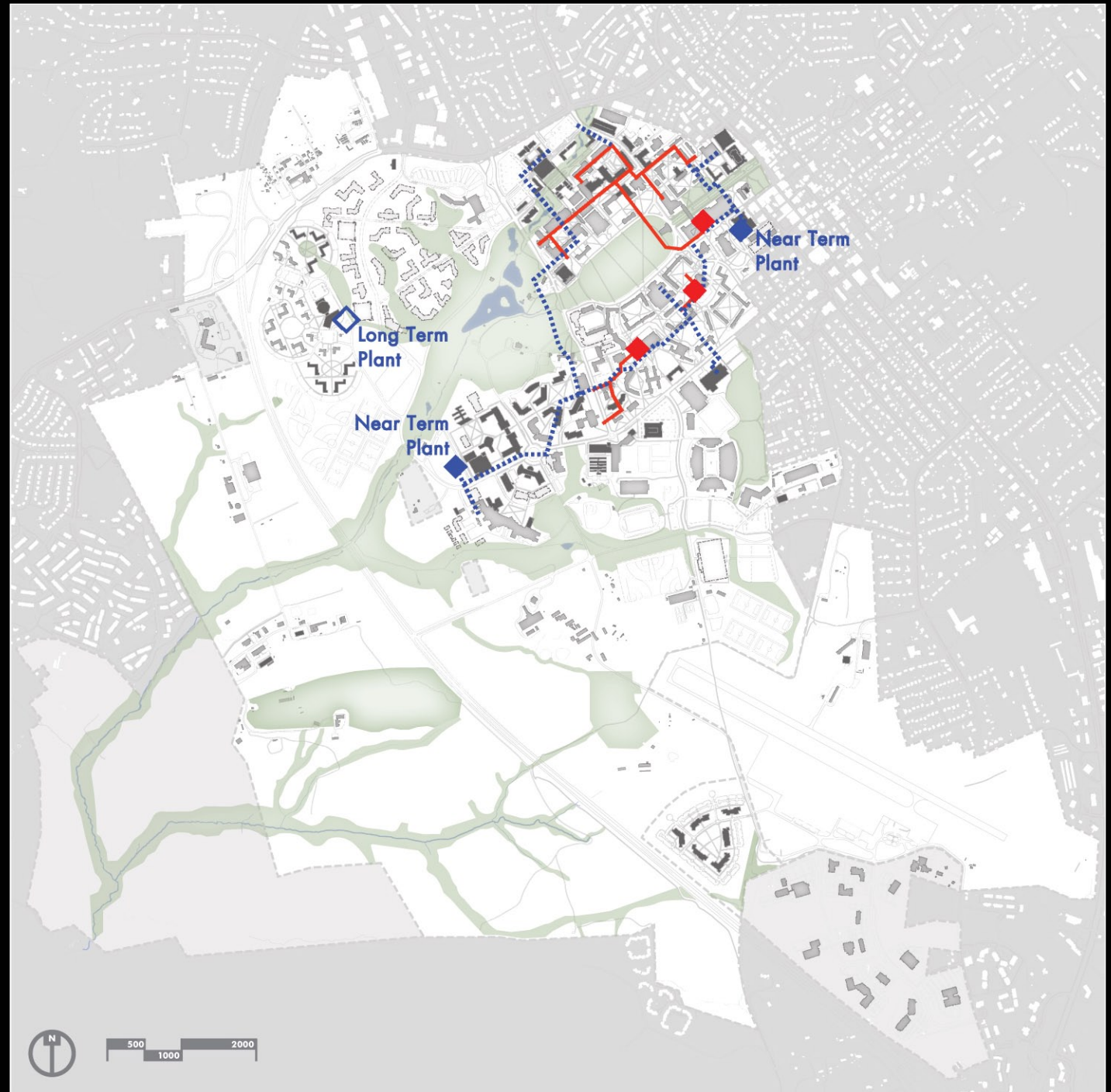
Electrical

CNS

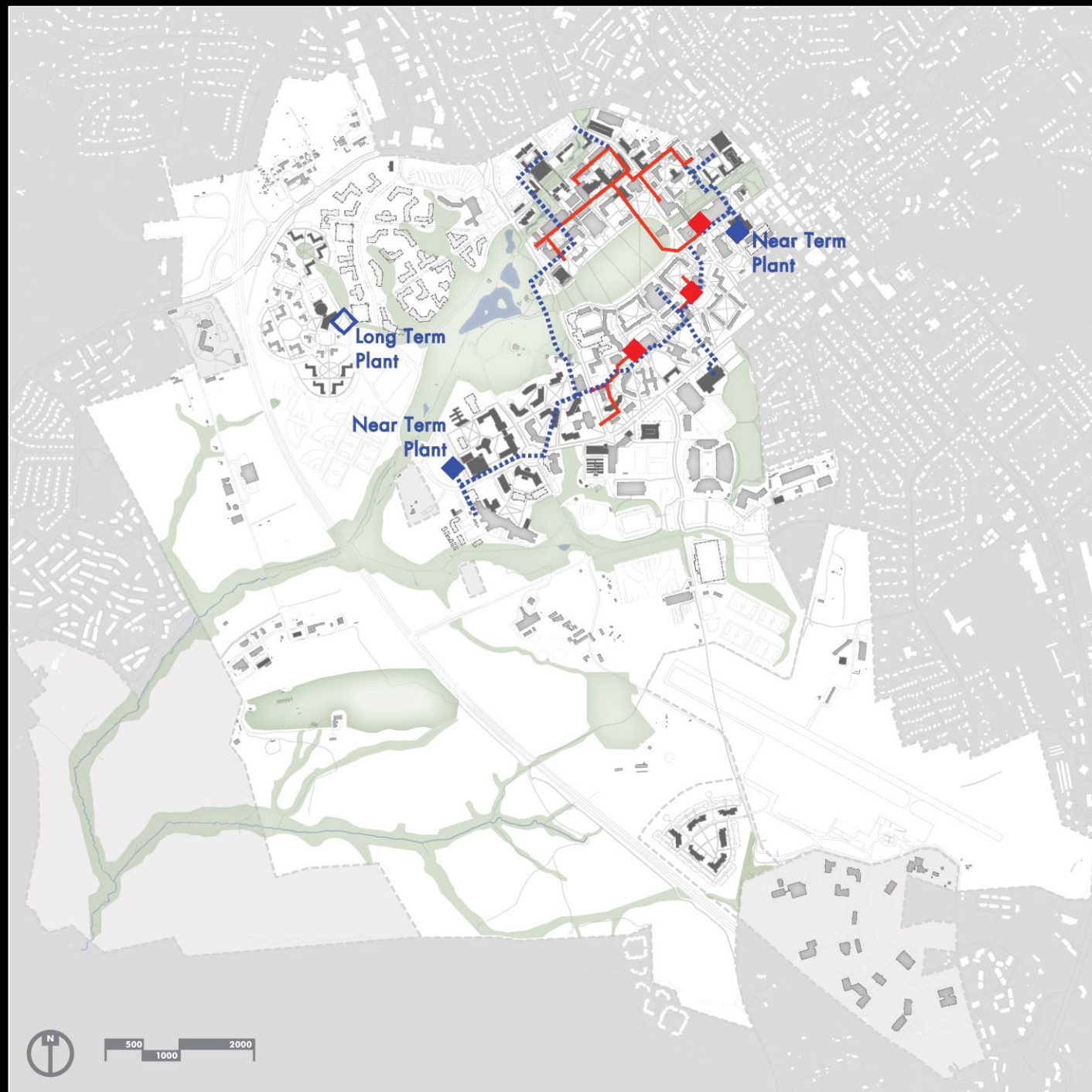
Utilities

- Existing
- Proposed
- ◆ Decommissioned Plant

Chilled Water capacity is generated in the academic core through a series of regional plants through distribution loops which provide redundancy and capacity for academic buildings. Additionally, micro-plants have been developed for buildings within the residential areas of campus. However, most of the residence life complex is not air-conditioned. Building-specific chilled water capacity has been employed in the Life Sciences District to date. It is critical for the



university to add regional plant generation capacity in the eastern and southern parts of the Academic Core District, and add regional plant capacity in the very near term in the Life Sciences District and, eventually, in the Golf Course District. It is also important to develop a distribution system with loops to provide redundancy throughout the system.



MASTER PLAN GOALS

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Circulation

Infrastructure

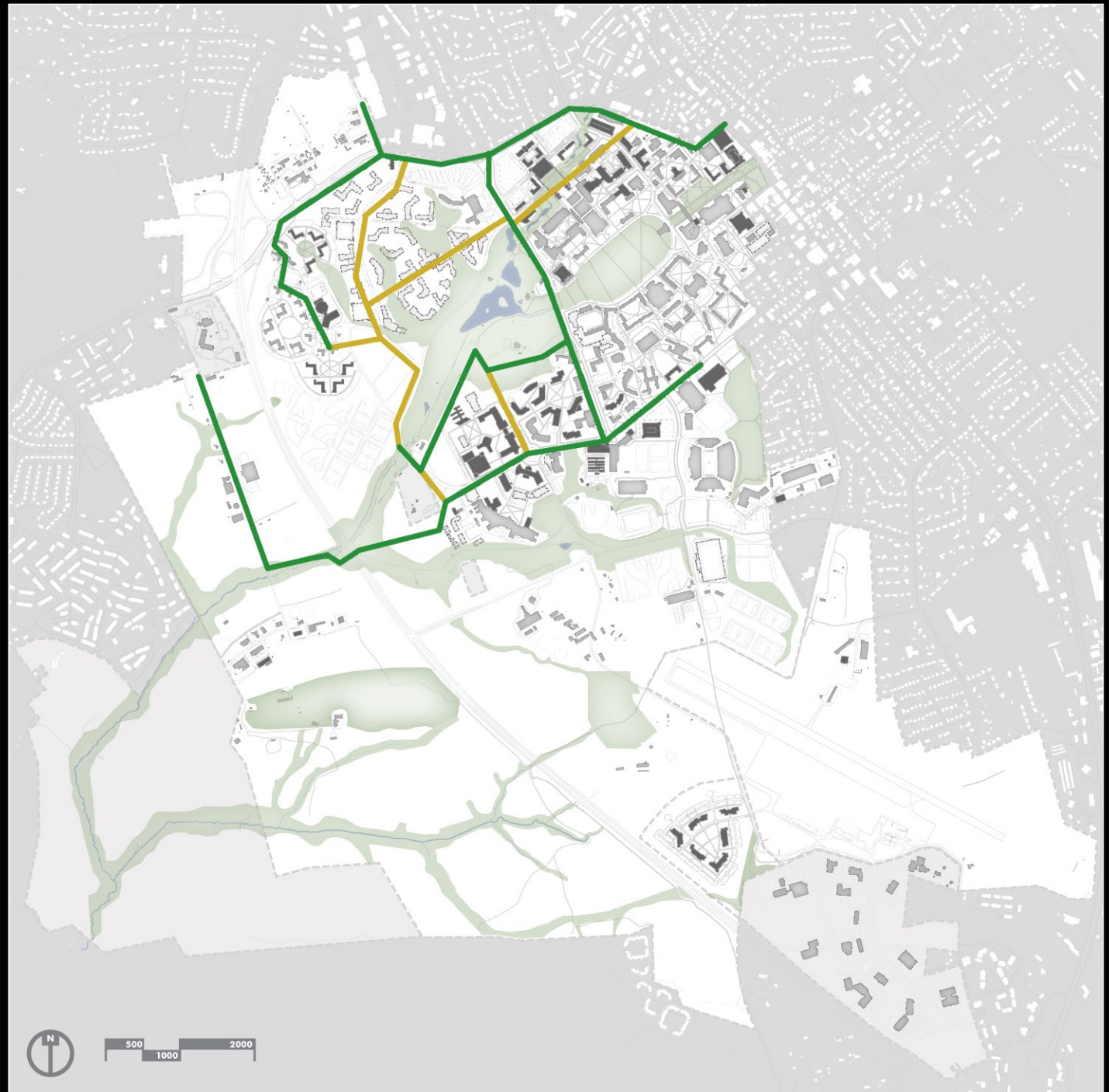
Utilities

Water

Sanitary Sewer

Stormwater

Existing Water Main
Future Water Main



MASTER PLAN GOALS

DEFINING STRATEGIES

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Circulation

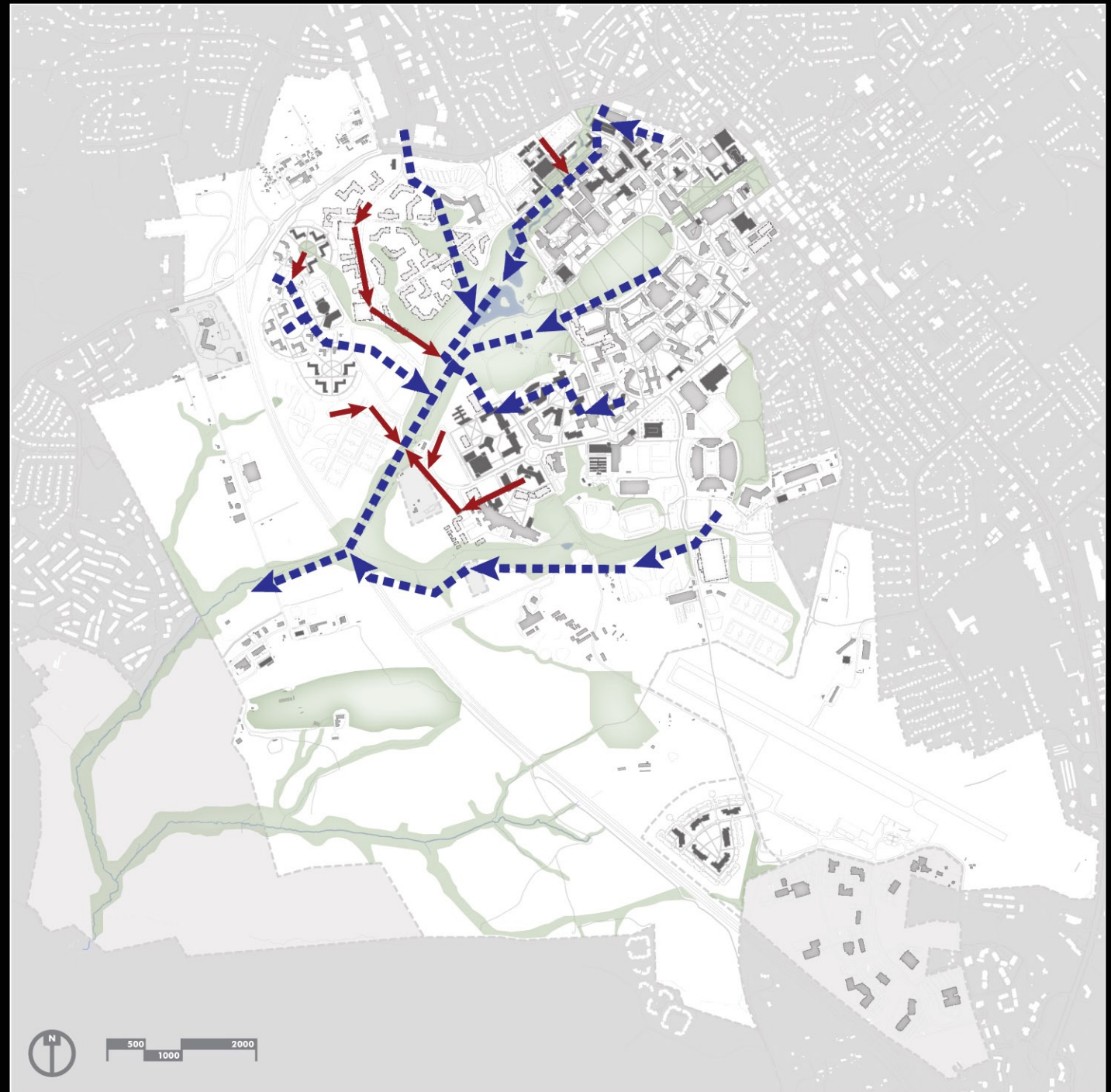
Infrastructure

Utilities

Water

Sanitary Sewer

Stormwater



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Circulation

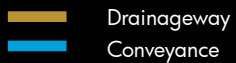
Infrastructure

Utilities

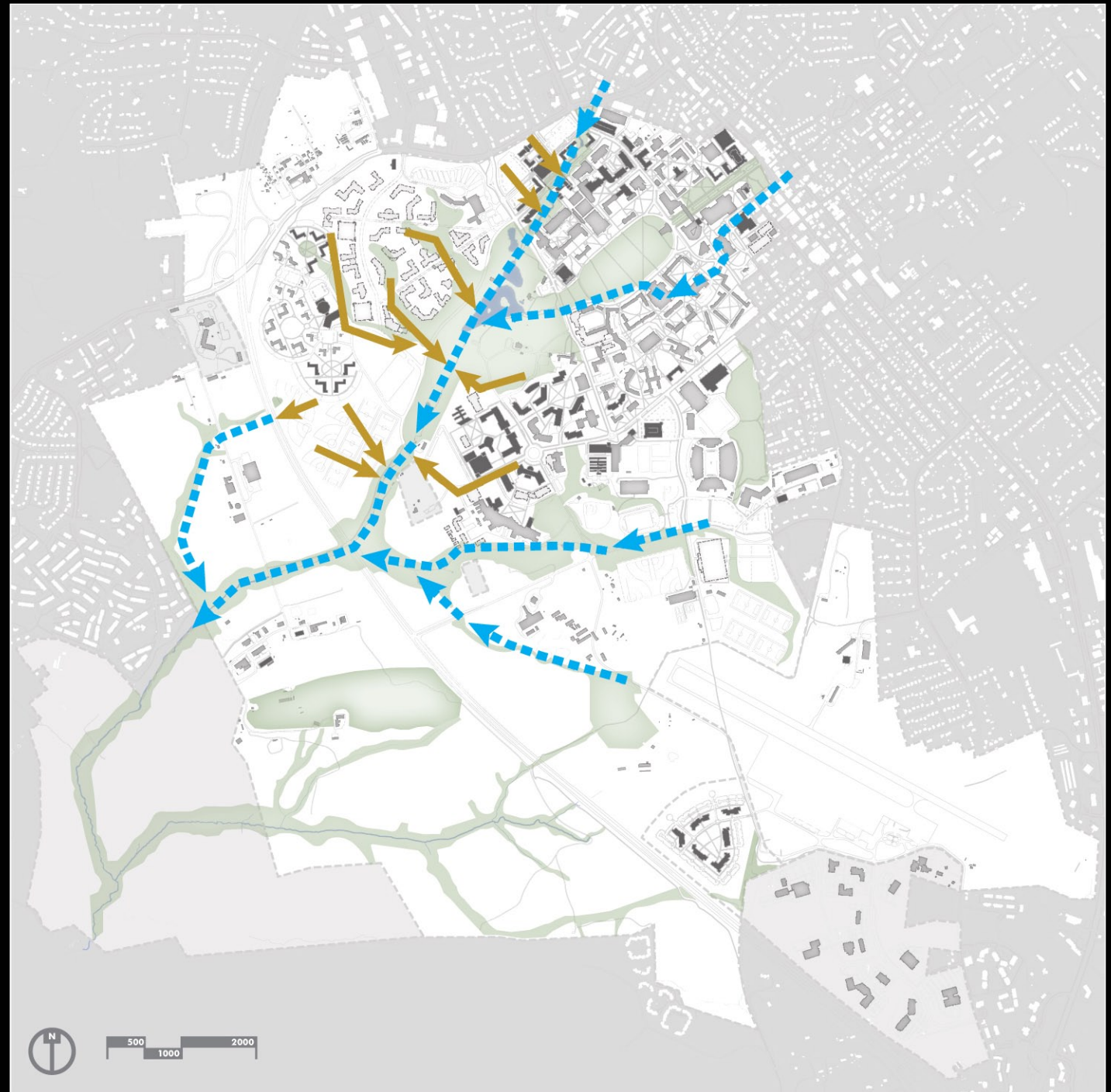
Water

Sanitary Sewer

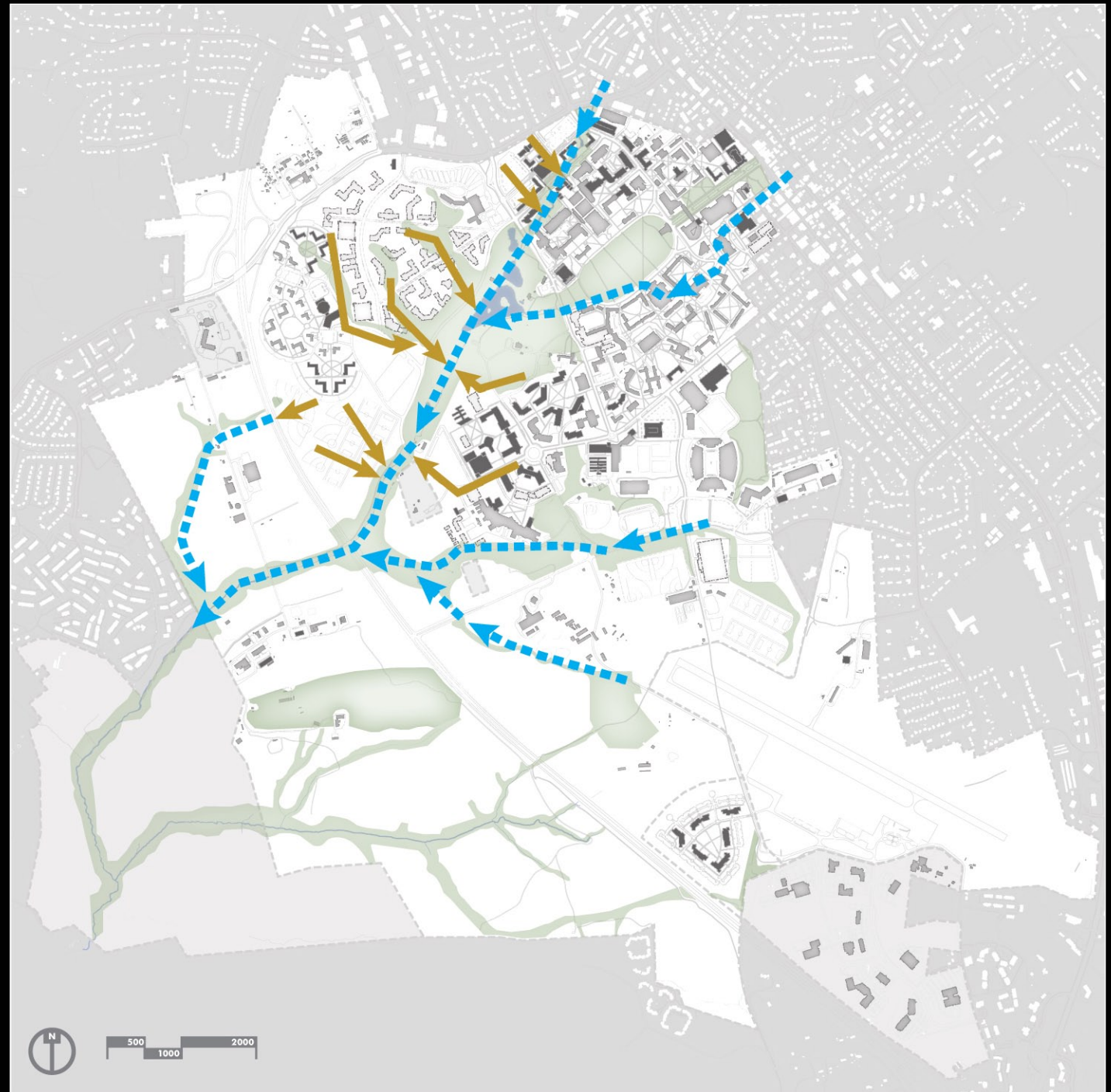
Stormwater



The campus lies in the drainage basin below the Town of Blacksburg and is drained by the various branches of Stroubles Creek. Stroubles Creek has been declared an impaired body of water by the State. Several branches of Stroubles Creek have been buried in pipes. Early in the planning it was recognized that a focused sub-study was needed to understand the issues of stormwater quality and quantity and



the potential impact of flood plains on the further development of the Virginia Tech campus. This study recommends as its major strategy the creation of a greenway that preserves and restores the drainage ways and connects the major natural assets of the campus in an integrated system. The master plan further defines this system and its integration with historic and cultural assets to create an "Environmental and Cultural Greenway."



MASTER PLAN GOALS

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Circulation

Infrastructure

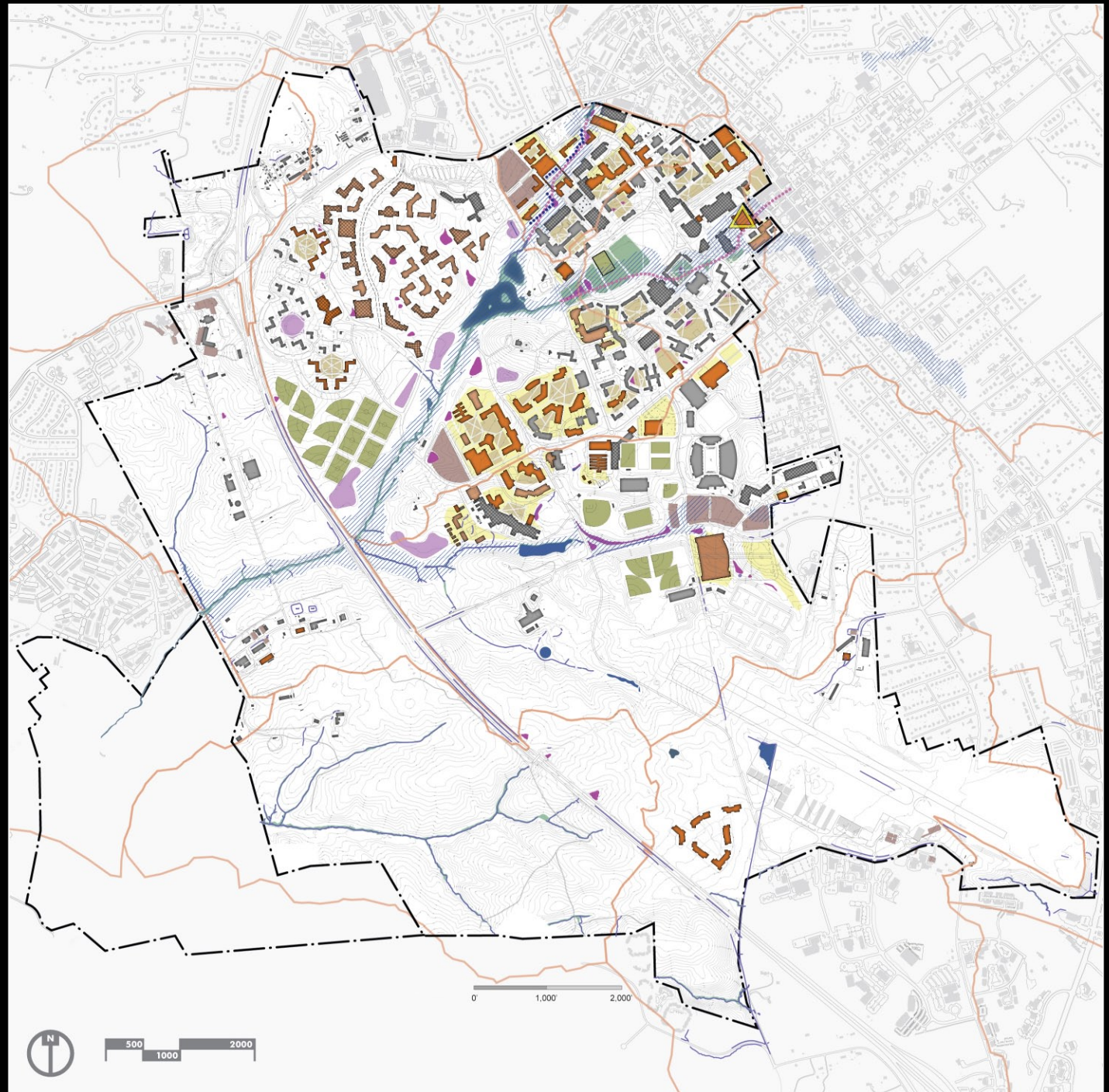
Utilities

Water

Sanitary Sewer

Stormwater

The Stroubles Creek Study and the master plan further propose that the university fully consider and employ a range of structural “Best Management Practices” (BMPs). BMPs include such things as pervious parking lots over storage beds, green roofs, and vegetated swales with the design intent of managing the runoff from impervious surfaces locally.



MASTER PLAN GOALS

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Infrastructure

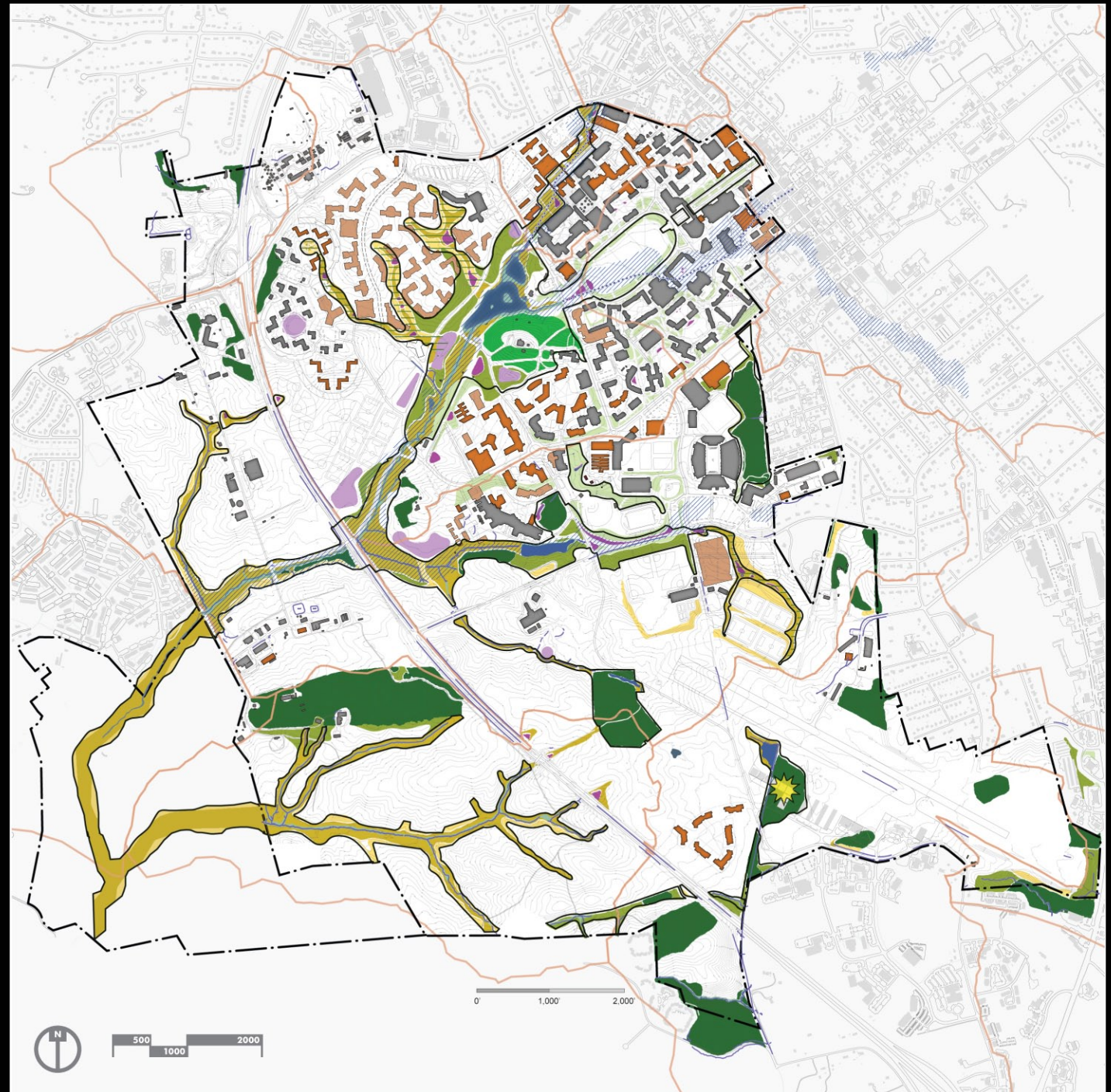
Utilities

Water

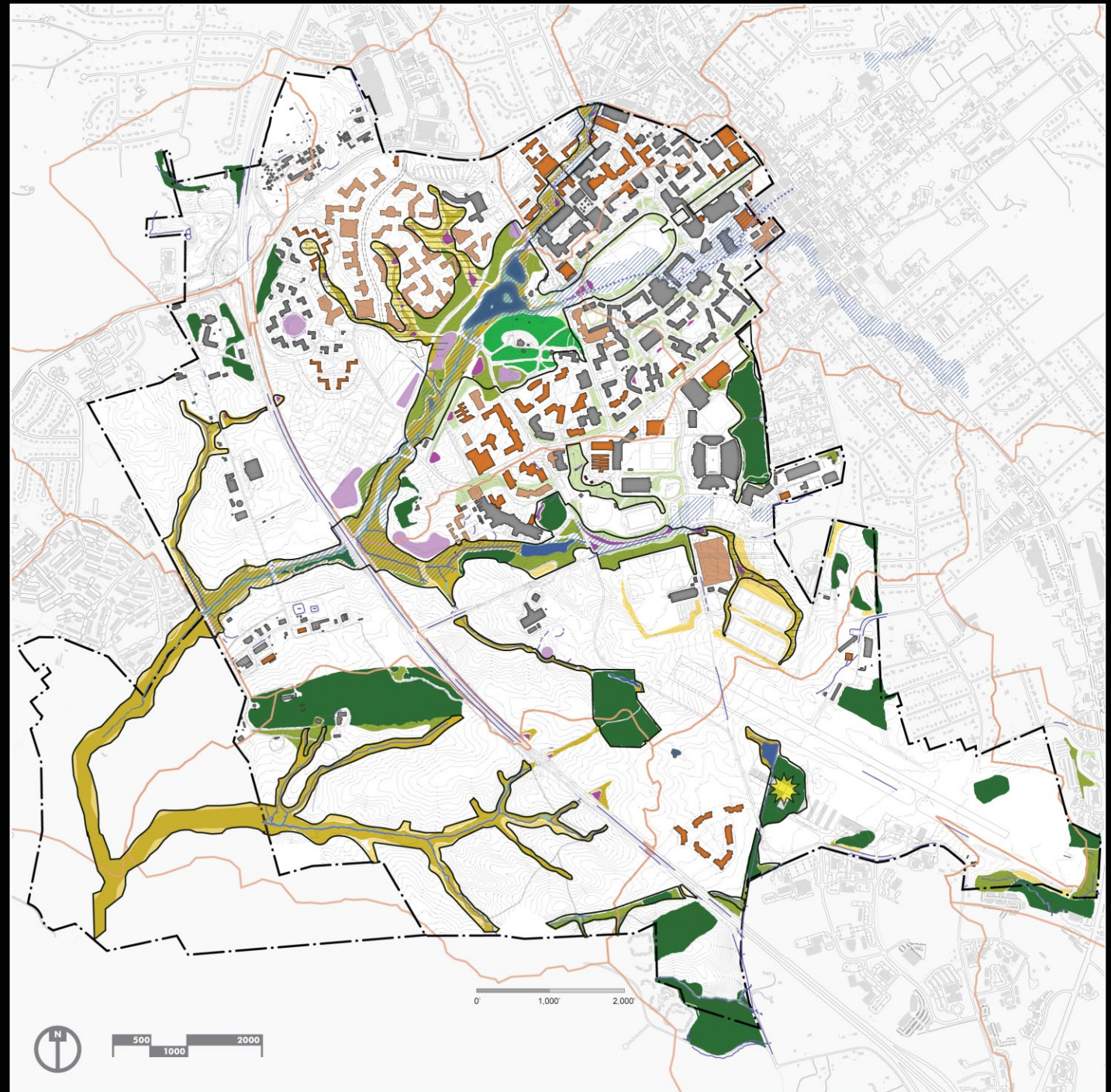
Sanitary Sewer

Stormwater

The Stroubles Creek Study also recommends the protection of the Stroubles Creek drainage ways and their reintegration with the forested areas of campus. The study proposes the reforestation of the significant slopes surrounding the drainage ways and the daylighting of Stroubles Creek through the parking lots north of the academic core. The study further recommends that all new development respond to the physical characteristics of the drainage ways in configuring the future campus, without compromising the typology of the campus open spaces, i.e., quadrangles.



These structural and non-structural best management practices when taken together and when implemented over a period of time will begin to significantly improve downstream impacts on Stroubles Creek from the university development. Best management practices must also be carefully employed with respect to Virginia Tech's farming operations. The Town of Blacksburg needs to develop and define a comprehensive response to the impact of its existing and further urban development. These strategies when implemented holistically can significantly improve the water quality issues surrounding Stroubles Creek.



MASTER PLAN GOALS

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Infrastructure

Utilities

Water

Sanitary Sewer

Stormwater

On the northern branch of Stroubles Creek, the master plan proposes a demonstration project that, when implemented, will provide multiple benefits to the quality of campus development. The sub-area of the Stroubles Creek drainage basin that surrounds the north branch has the highest percentage of impervious area of any of the branches of Stroubles Creek, and runs through two large parking lots north of the academic core. Several previous master plans have proposed development crossing this branch of Stroubles Creek and its related floodplain but, to date, no development has taken

