10.0 UTILITIES ELEMENT

The purpose of this element is to ensure coordinated provision of utility services required to meet the future needs of the University, consistent with current efforts to address sustainability on campus such as the development of a Climate Action Plan (a responsibility as a signatory of the American College and University Presidents Climate Commitment) and the university-driven direction that all new facilities meet United States Green Building Council (USGBC) standards and be LEED certified. This includes the following:

a) Provision of a chilled water supply
b) Provision of electric power supply and other fuels

CHILLED WATER: The requirements imposed by Florida International University Expansion of Facilities on the chilled water generation and distribution are three-fold. First is the upgrade of the Plant's ability to pump the chilled water to all the growth areas, coupled with the energy efficiency optimization of the generating and pumping equipment. Third is the increment in capacity of the plant to satisfy the higher chilled water demands imposed by new buildings.

ELECTRICAL POWER: Electrical energy is furnished to Florida International University by Florida Power and Light (FP&L). They master plan their facilities to satisfy all campus expansion. Close coordination must be maintained with them so the needs of new buildings are provided for. Additionally, FP&L offers various incentive programs that may be used by the University to improve the energy consumption of their lighting and chiller systems.

TELECOMMUNICATIONS: The existing telecommunications grid has been heavily used in some areas of Modesto A. Maidique Campus. The planning priorities are to expand the grid to serve new buildings and to reinforce the existing grid by adding new ductbanks. Another area of development is the creation of a second feed at Modesto A. Maidique Campus so the grid has the reliability of two sources of off-Campus communication.

For all updated information pertaining to utilities and infrastructure, a copy of the *Utility Infrastructure Survey Update* is on file in the offices of FIU Facilities Planning and Construction.

STORMWATER: FIU addresses stormwater management issues in the design and review process for each building project. Each project shall meet the County's criteria and will be submitted to the County for review.

10.0 UTILITIES ELEMENT

Chilled Water Sub-Element

MODESTO A. MAIDIQUE CAMPUS

GOAL 1: **Upgrade the chilled water generation and distribution system to serve efficiently Modesto A. Maidique Campus's present and future needs.**

Objective 1.1 **Piping Loop Expansion:**
Extend the existing chilled water piping loop to maintain the current level of service standard for existing facilities and to serve the new areas of projected growth. The timing and phasing requirements and priorities for the improvements identified in the following policies are established in the 14.0 Capitol Improvement Element.

Policy 1.1.1 Establish chilled water flow required at each expansion segment so piping sizes may be established. Cumulative flow requirements will be instrumental in determining the parameters for the Chiller Plant capacity upgrade and pumping ability. These issues are discussed under a separate objective.

Policy 1.1.2 Update the University Building Standards to establish clearly piping loop materials and methods of installation. Similarly establish parameters for the piping, controls, and pumping arrangements for the connection of new buildings to the piping loop.

Policy 1.1.3 Engineering Center:
Increase chilled water capacity to coincide with expansion of academic facilities (see Figure 10.4).

Objective 1.2 **Chiller Plant Upgrade:**
Increase chiller capacity of existing plant to serve new building demands. Upgrade and modify pumping system to operate with the existing and expanded piping loop. The timing and phasing requirements and priorities for the improvements identified in the following policies are established in the 14.0 Capital Improvements Element.

Policy 1.2.1 Cooling towers are a significant source of water consumption. Consideration shall be given to installation of water meters for make-up water supply and cooling tower blown down to monitor consumption and avoid sewer fees associated with the water that is

evaporated from the cooling tower.

GOAL 2: **In the process of upgrading the chilled water generation and distribution system, optimize the entire operation to reduce energy costs by increasing operational efficiency.**

Objective 2.1Convert Direct Expansion Systems to Chilled Water:
Convert existing direct expansion systems to chilled water operation. The timing and phasing requirements and priorities for the improvements identified in the following policies are established in the 14.0 Capital Improvements Element.

Policy 2.1.1 Create a satellite chiller plant and chilled water distribution loop to serve Modesto A. Maidique Campus support buildings if the planned growth in this sector of the Campus warrants it. The plant will be an expansion of the Chiller Plant serving the U.S. Century Bank Arena.

Policy 2.1.2 Extend the existing main chilled water loop to serve the existing housing units, Greek Housing, and new resident halls at the northeast corner of the Campus (see Figure 10.2).

BISCAYNE BAY CAMPUS

GOAL 3: **Upgrade the chilled water generation and distribution system to serve efficiently the present and future needs of Biscayne Bay Campus.**

Objective 3.1Piping Loop Expansion:
Extend the existing chilled water piping loop to maintain the current level of service to existing facilities and to serve the new areas of projected growth of the campus core. The timing and phasing requirements and priorities for the improvements identified in the following policies are established in the 14.0 Capital Improvements Element.

Policy 3.1.1 Update the University Building Standards to establish clearly piping loop materials and methods of installation. Similarly establish parameters for the piping, controls, and pumping arrangements for the connection of new buildings to the piping loop. Specific recommendations for underground piping apply to Biscayne Bay Campus due to the aggressive nature of the subsoil materials.

Objective 3.2Chiller Plant Upgrade:
Increase chiller capacity of existing plant to serve new building requirements. Upgrade and modify pumping system to operate with the existing and expanded piping loop. The timing and

phasing requirements and priorities for the improvements identified in the following policies are established in the 14.0 Capital Improvements Element.

Policy 3.2.1 Additional chiller capacity must be added to the system for any expansion beyond the three year capital improvement plan. This may be accomplished either by the substitution of the oldest existing unit, by addition of additional units. All alternatives require an upgrade of the condenser water (cooling towers and pumps) system.

Electrical Power and Other Fuels (Energy) Sub-Element

MODESTO A. MAIDIQUE CAMPUS

GOAL 4: Extend the utility power primary voltage network to efficiently serve the campus in its present and future configurations.

Objective 4.1Grid Expansions:
Extend the existing electrical power grid from the updated dual feed source installed by the Utility to maintain the current level of service standard to the existing as well as the new buildings

Policy 4.1.1 Extend electrical feeders to planned building expansion at Modesto A. Maidique Campus with increased service capacity in the area of proposed new housing expansion near the Stadium. (see Figure 10.2)

Policy 4.1.2 Increase primary service capacity at the northeast area of campus to serve future buildings of the Academic Health Science Center. Provide redundant infrastructure necessary for high power reliability required by 24/7 research and healthcare operations. (see Figure 10.2)

Policy 4.1.3 MODESTO A. MAIDIQUE CAMPUS / ENGINEERING CENTER
Maintain close coordination with the local utility, Florida Power & Light (FP&L), so they may tailor their facilities to the projected campus growth. FP&L is responsible for extending their facilities on campus to serve all new buildings. Therefore, Master Plan information must be accessible to FP&L and the University must act as coordinator to guarantee that FP&L planning is in step with Master Plan requirements.

Policy 4.1.4 Establish design guidelines to match FP&L requirements to FIU Building Standards so there is a coordinated design for service entrance to the electrical vaults or pad mounted transformers of new buildings.

GOAL 5: **Improve the efficiency of electrically powered equipment aimed at reducing operating costs.**

Objective 5.1Efficiency optimization:
Install energy efficient equipment in planned buildings and retrofit existing facilities with energy efficient components.

BISCAYNE BAY CAMPUS

GOAL 6: **Extend the utility power primary voltage network to efficiently serve the campus in its present and future configurations.**

Objective 6.1Grid Expansion:
Extend electrical power grid from the service at Bay Vista Boulevard, to maintain the current level of service to the existing as well as the new buildings.

Policy 6.1.1 Extend primary infrastructure in underground ductbanks aligned with new north/south campus axis. (see Figure 10.8)

Policy 6.1.2 Maintain a close coordination with the local utility, Florida Power & Light, so they may tailor their facilities to the projected campus growth.

Policy 6.1.3 Match design guidelines to match FP&L requirements to FIU Building Standards so there is a coordinated design for service entrance to the electrical vaults of new buildings. Provide specific instructions to address underground ductbanks and appurtenances in light of unique subsoil conditions and constraints.

GOAL 7: **Improve the efficiency of electrically powered equipment aimed at reducing operating costs.**

Objective 7.1Efficiency Optimization:
Install energy efficient equipment in planned buildings and retrofit existing facilities with energy efficient components.

Telecommunications Sub-Element

MODESTO A. MAIDIQUE CAMPUS

GOAL 8: **Maintain the level of service for telecommunications and**

upgrade it to include multiple communication modes for new and existing buildings.

Objective 8.1Network Expansion:

Establish new data center in northeast area of campus to serve projected growth of the Academic Health Science Center. See Figure 10.3.

Policy 8.1.1 Provide a new underground ductbank system in the northeast area of campus to service the new buildings in the Academic Health Science Center from a new data center. See Figure 10.3.

Policy 8.1.2 Provide an expansion of ductbanks in the central area of campus, centered along the east side of the new College of Law building and running primarily north and south. See Figure 10.3.

MODESTO A. MAIDIQUE CAMPUS / ENGINEERING CENTER

Policy 8.1.3 Design guidelines for duct bank construction, telephone room conditions, sizes and locations, etc. are established with current release date of August 2007. Provide annual updates to incorporate advancements in technology.

Policy 8.1.4 Coordinate with Bell South the requirements and projections of the master plan so they may tailor their equipment to serve the campus needs.

BISCAYNE BAY CAMPUS

GOAL 9: Maintain the level of service for telecommunications and upgrade it to include multiple communication modes for new and existing buildings.

Objective 9.1Network Expansion:

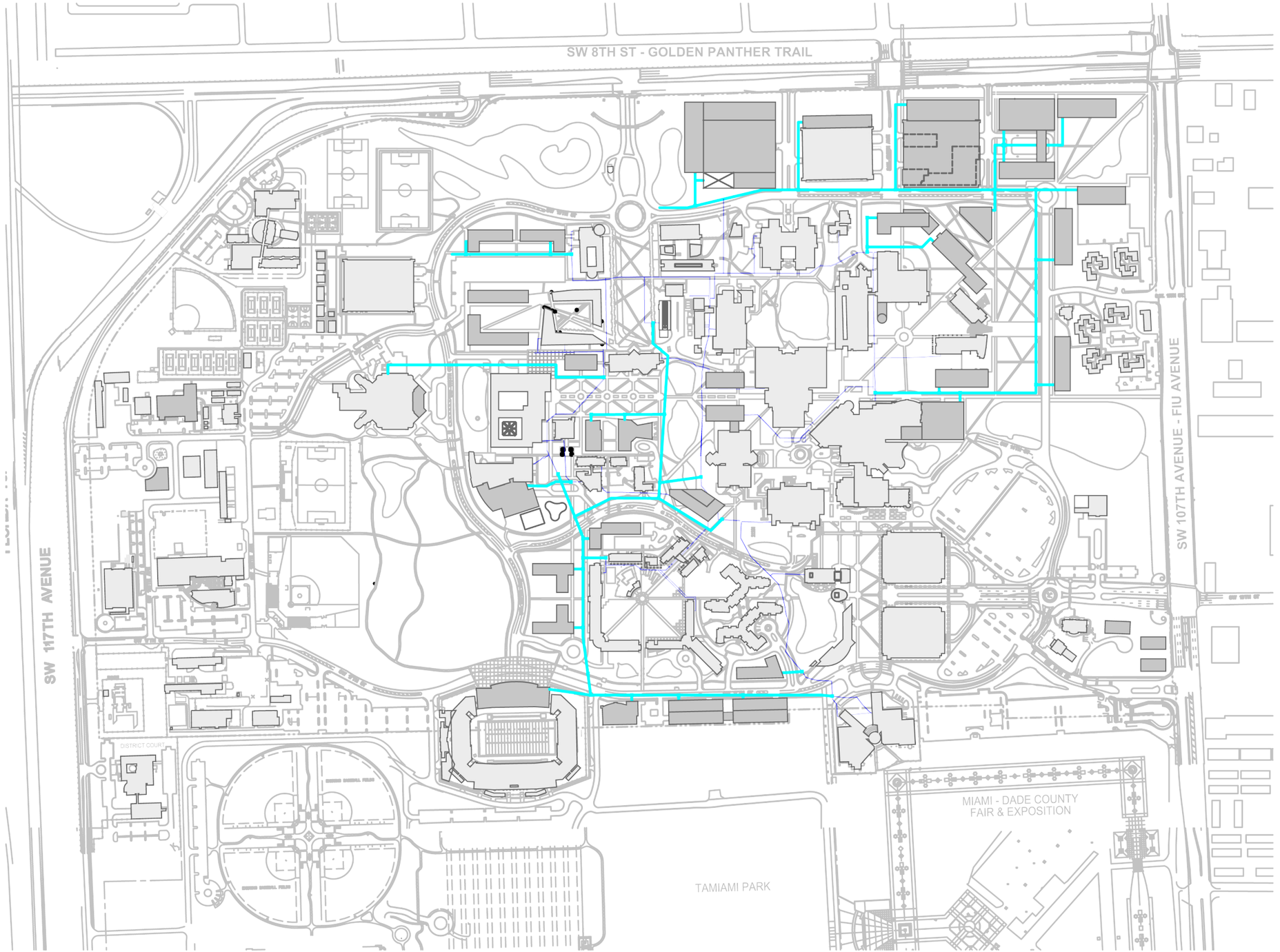
Extend the existing telecommunications infrastructure to service the proposed campus growth.

Policy 9.1.1 Establish a new telecommunications ductbank running generally north and south aligned with the new campus roadway to interconnect new and existing facilities. (see Figure 10.9)

Policy 9.1.2 Coordinate relocation of existing telecommunications lines with footprints of several proposed new buildings. (see Figure 10.9)

Policy 9.1.3 Design guidelines for duct bank construction, telephone room conditions, sizes and locations, etc. are established with current release date of August 2007. Provide annual updates to incorporate advancements in technology.

Policy 9.1.4 Coordinate with Southern Bell the requirements and projections of the master plan so they may tailor their equipment to serve Biscayne Bay Campus needs.



LEGEND

- Proposed Building
- Existing Building
- Existing Chilled Water
- New Chilled Water
- Proposed New Chiller Plant 3

New Chilled Water infrastructure is served from existing systems unless noted otherwise.

KEY MAP

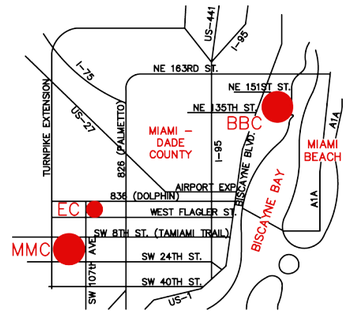


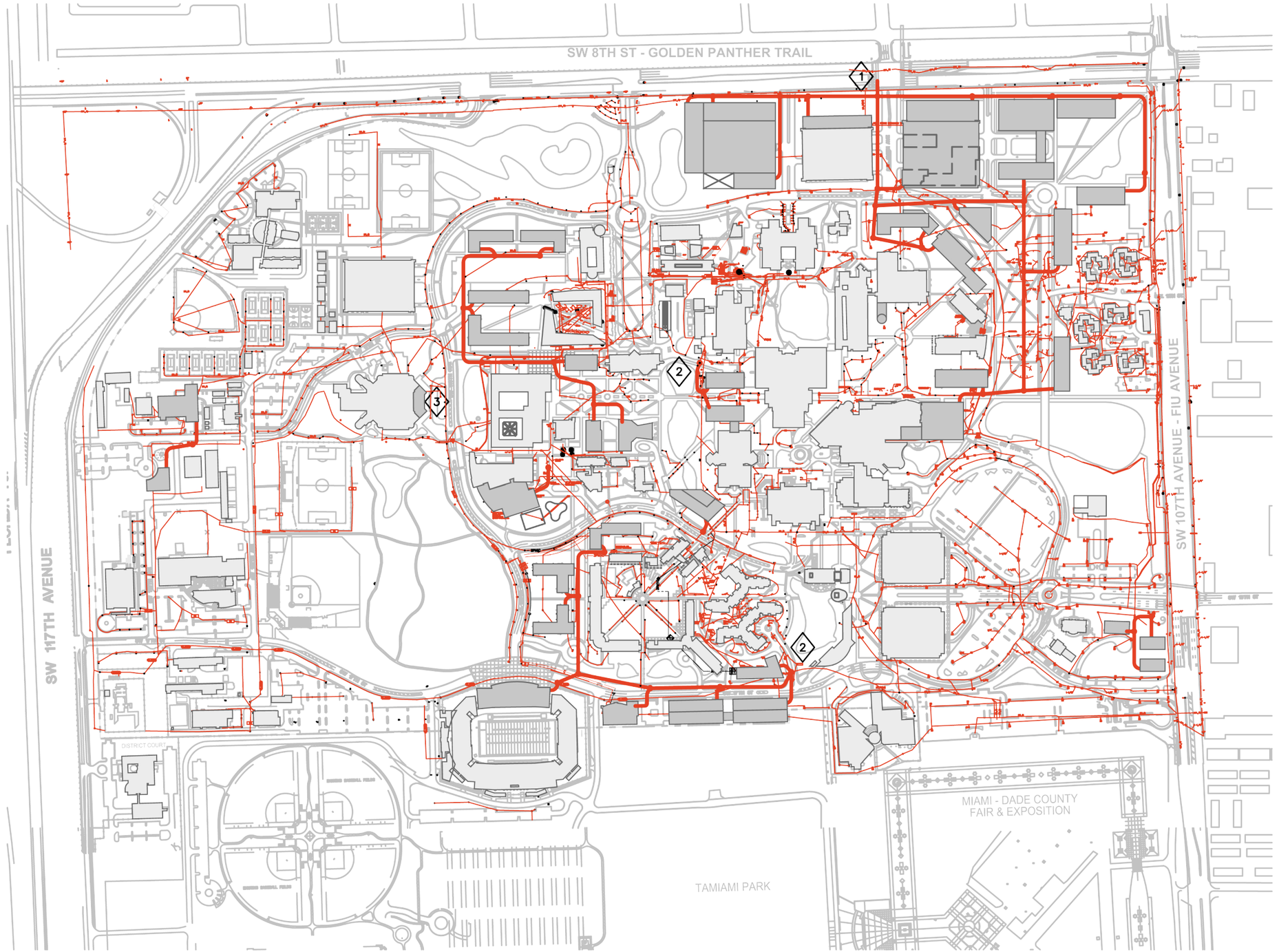
FIGURE: 10.1a
MODESTO A. MAIDIQUE CAMPUS
2015 CHILLED WATER INFRASTRUCTURE PLAN

FIU | FLORIDA INTERNATIONAL UNIVERSITY

Campus Master Plan - June 2010

0 250 500 1000

AEI PERKINS + WILL



LEGEND

- Proposed Building
- Existing Building
- Existing Electrical Infrastructure
- New Electrical Infrastructure

New Electrical Infrastructure is served from existing systems unless noted otherwise.

SHEET KEYNOTES

1. Upgrade 8th Street FP&L service to accommodate Health Center growth.
2. Relocate existing infrastructure in area of proposed building(s).
3. Expand from existing service.

KEY MAP

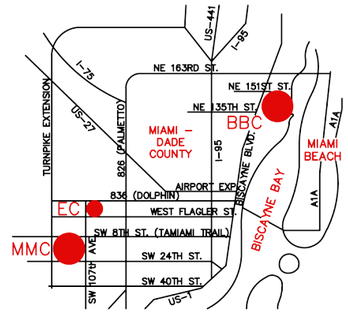


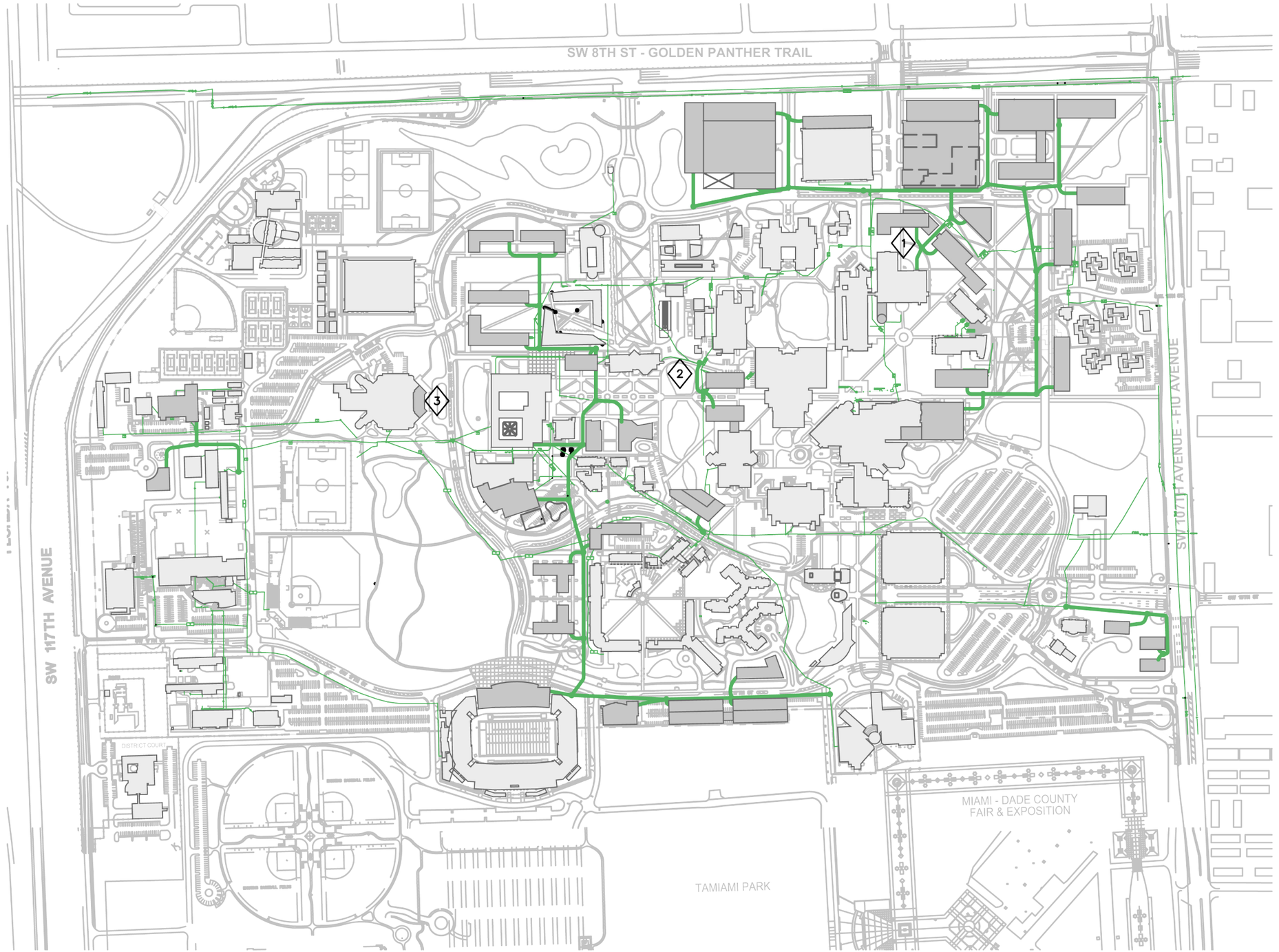
FIGURE: 10.1b
MODESTO A. MAIDIQUE CAMPUS
2015 ELECTRICAL INFRASTRUCTURE PLAN

FIU FLORIDA INTERNATIONAL UNIVERSITY

Campus Master Plan - June 2010

0 250 500 1000

AEI PERKINS + WILL



LEGEND

- Proposed Building
- Existing Building
- Existing Telecommunications Infrastructure
- New Telecommunications Infrastructure

New Telecommunications Infrastructure is served from existing systems unless noted otherwise.

SHEET KEYNOTES

1. Health Center growth served from Data Center in new Science Building.
2. Relocate existing infrastructure in area of proposed building(s).
3. Expand from existing service.

KEY MAP

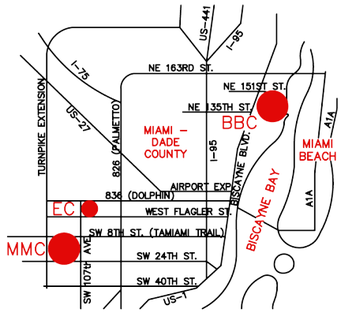


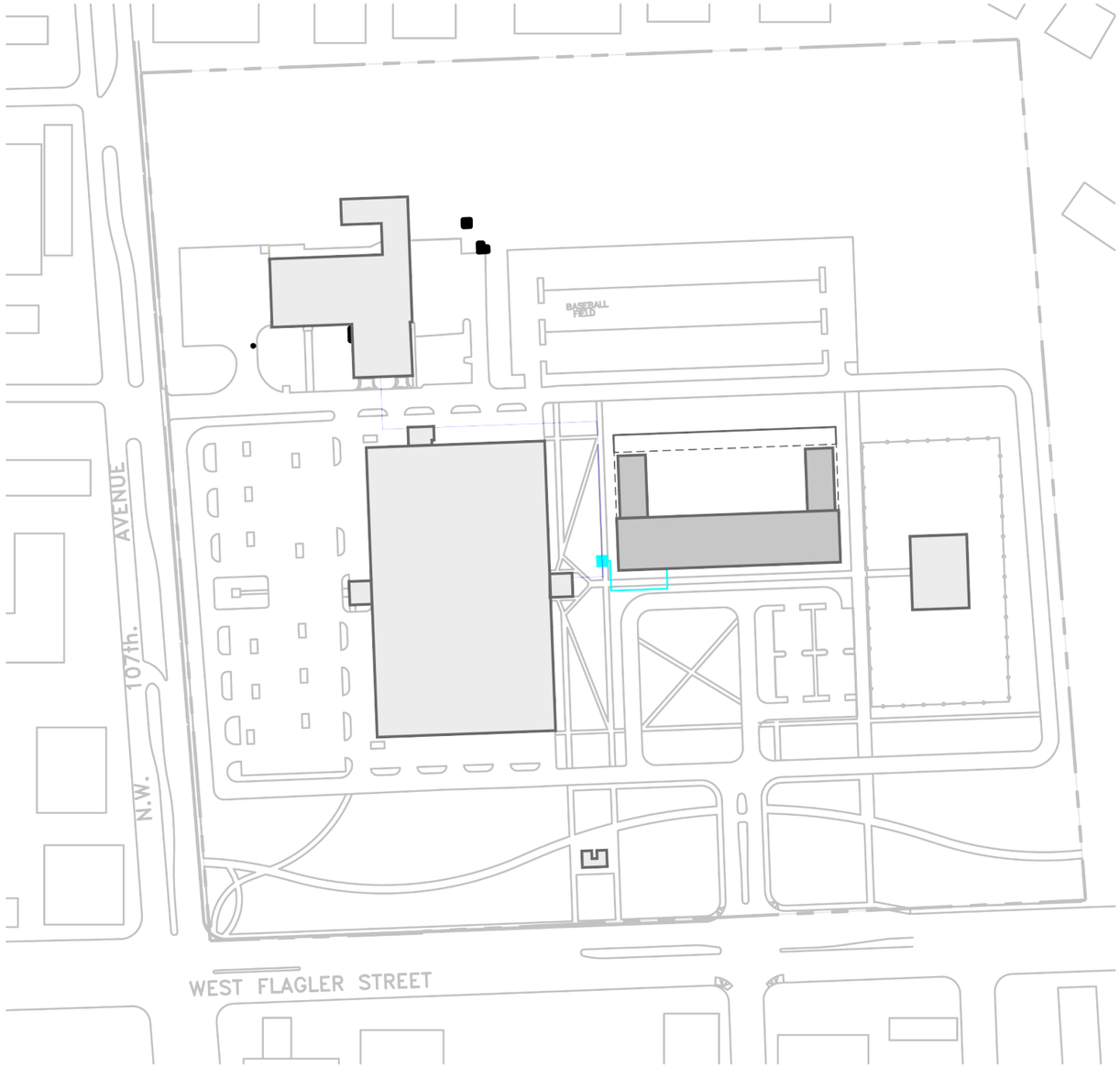
FIGURE: 10.1c
MODESTO A. MAIDIQUE CAMPUS 2015 TELECOMMUNICATIONS INFRASTRUCTURE PLAN

FLORIDA INTERNATIONAL UNIVERSITY

Campus Master Plan - June 2010

0 250 500 1000

AEI PERKINS + WILL



LEGEND

- Proposed Building
- Existing Building
- Existing Chilled Water
- New Chilled Water

New Chilled Water infrastructure is served from existing systems unless noted otherwise.

KEY MAP

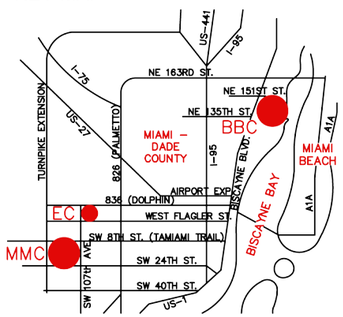


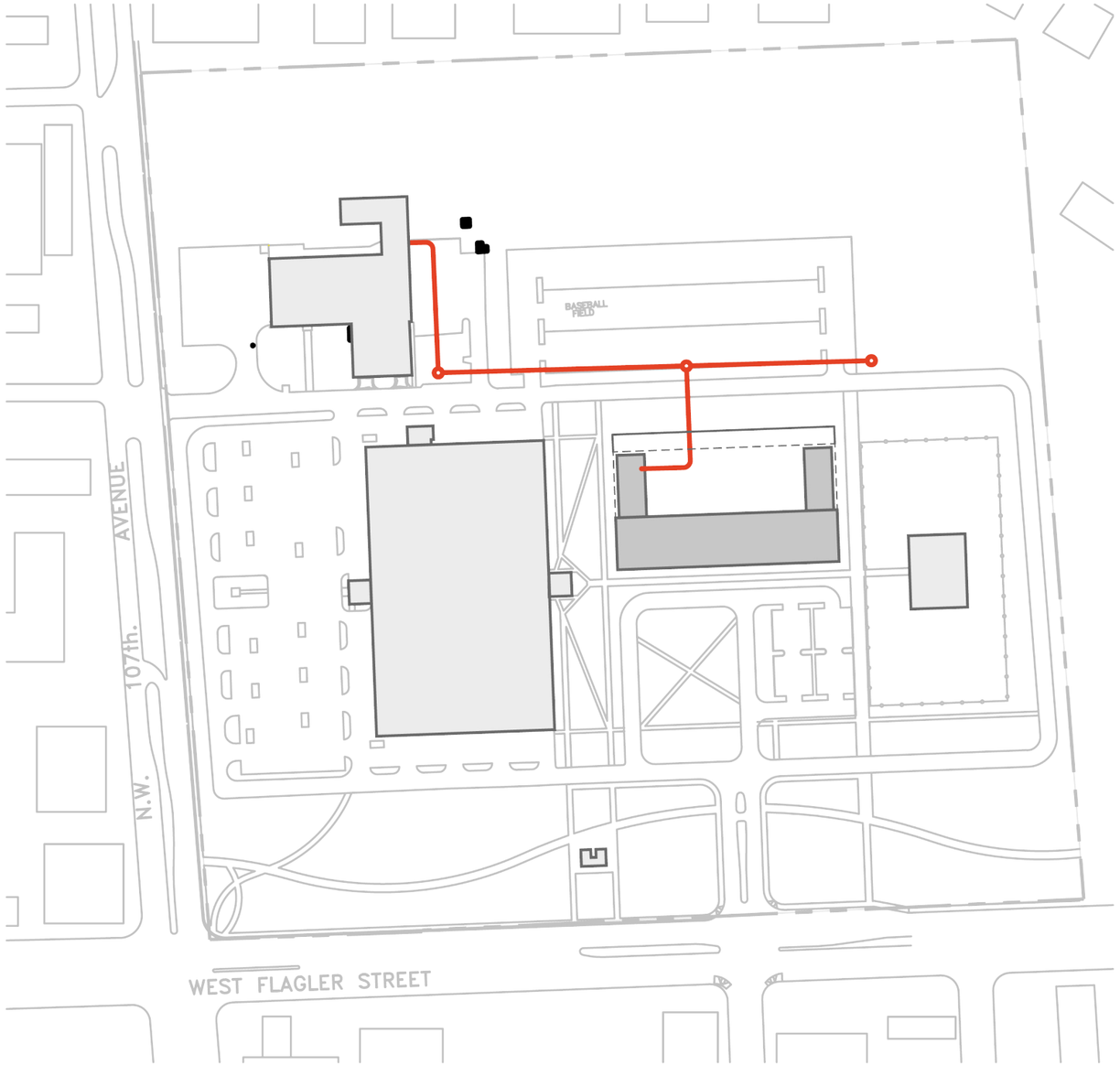
FIGURE: 10.2a
ENGINEERING CAMPUS
2015 CHILLED WATER
INFRASTRUCTURE PLAN

FLORIDA INTERNATIONAL UNIVERSITY

Campus Master Plan - June 2010

0 100 200 400

AEI PERKINS + WILL



LEGEND

- Proposed Building
- Existing Building
- New Electrical Infrastructure

New Electrical Infrastructure is served from existing systems unless noted otherwise.

KEY MAP

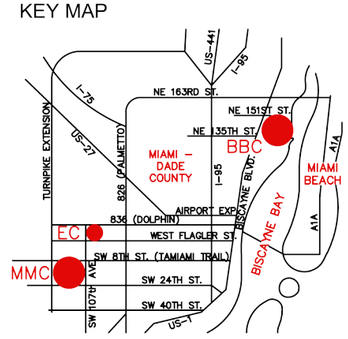


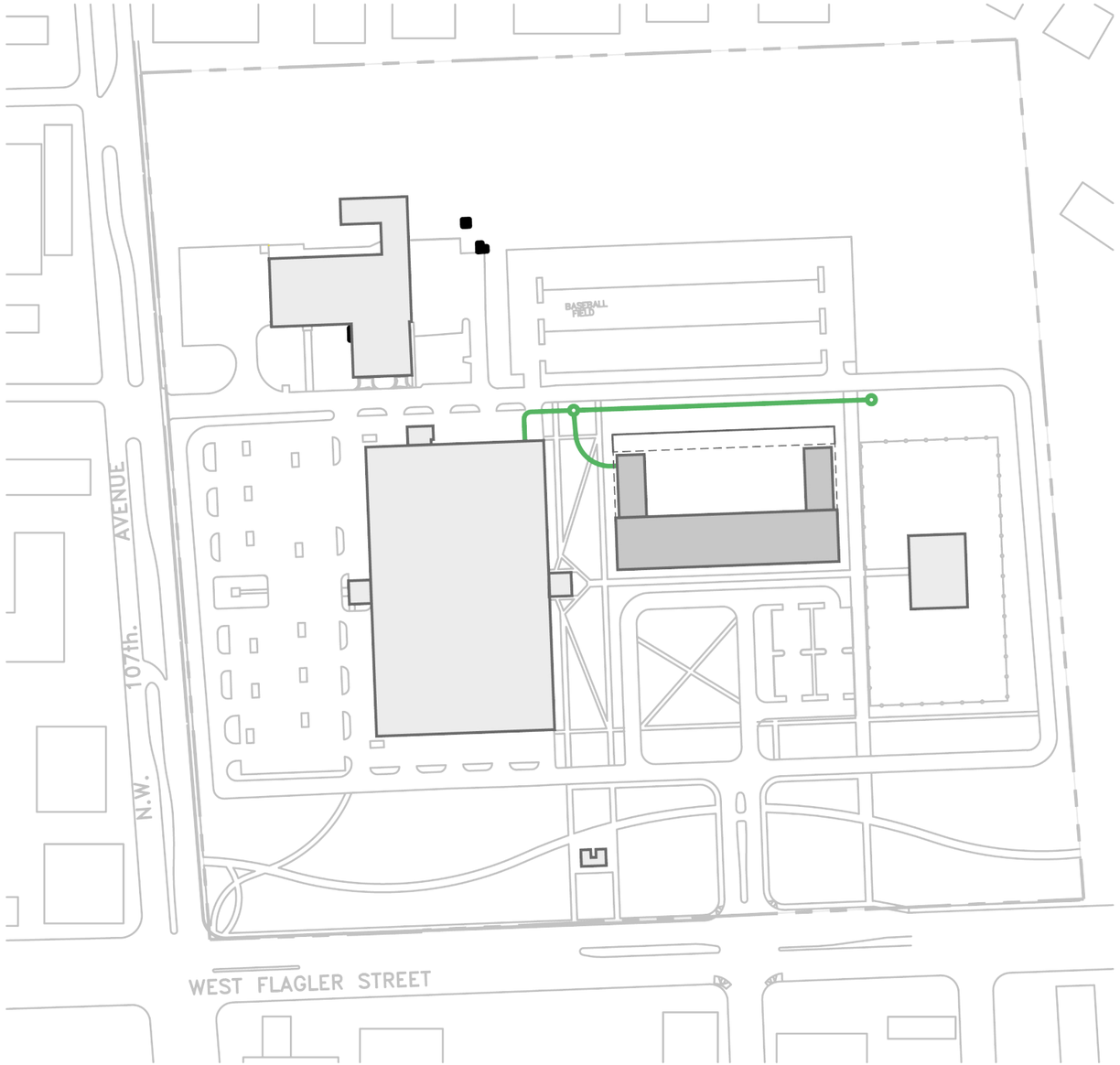
FIGURE: 10.2b
ENGINEERING CAMPUS
2015 ELECTRICAL
INFRASTRUCTURE PLAN

FIU | FLORIDA INTERNATIONAL UNIVERSITY

Campus Master Plan - June 2010

0 100 200 400

AEI PERKINS + WILL



LEGEND

- Proposed Building
- Existing Building
- New Telecommunications Infrastructure

New Telecommunications Infrastructure is served from existing systems unless noted otherwise.

KEY MAP

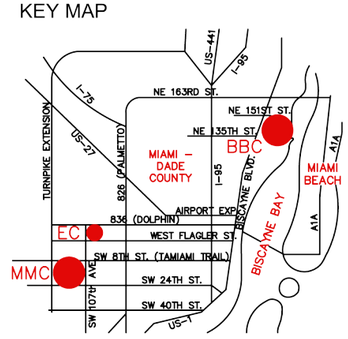


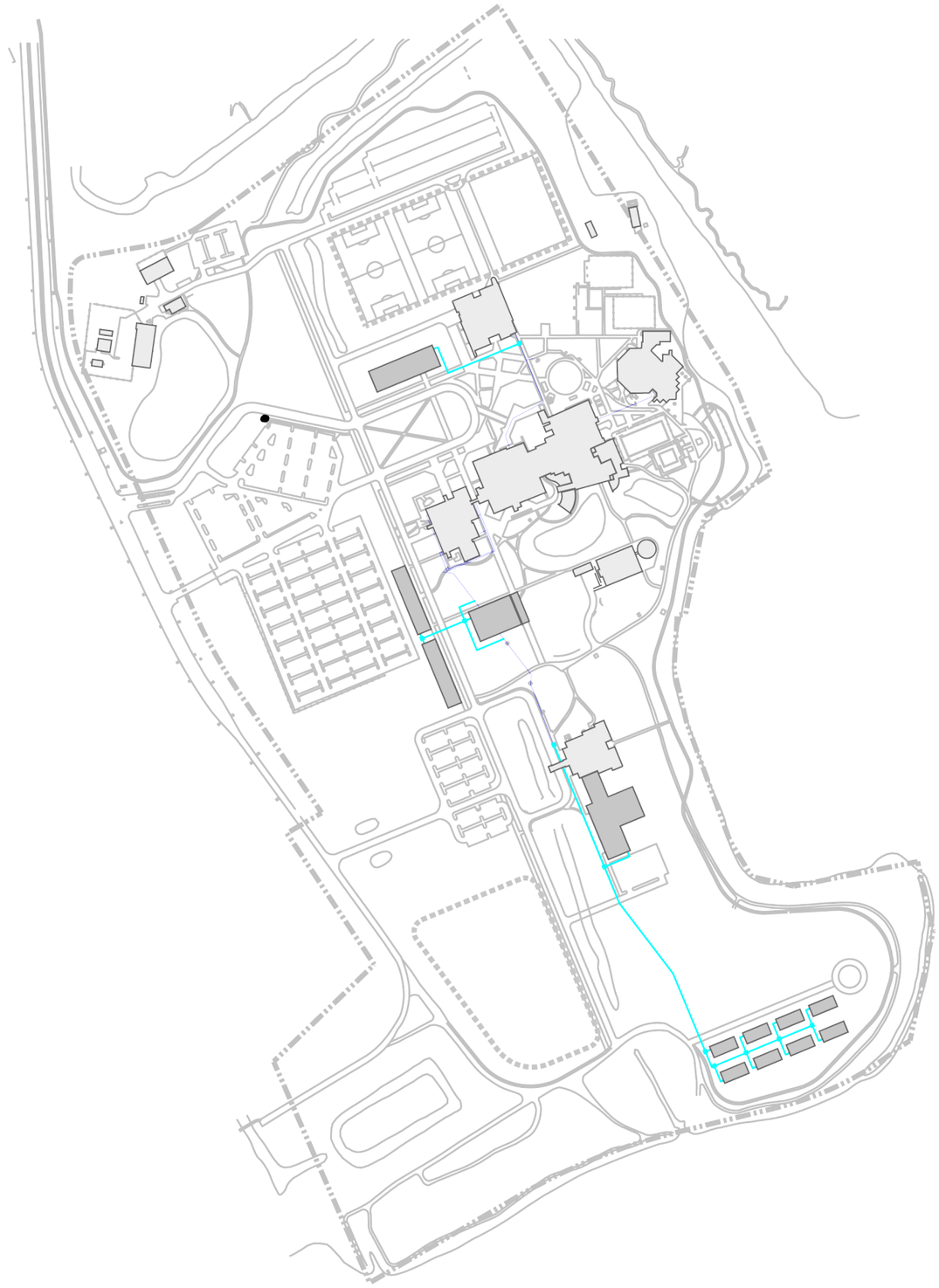
FIGURE: 10.2c
ENGINEERING CAMPUS
2015
TELECOMMUNICATIONS
INFRASTRUCTURE PLAN

FIU | FLORIDA INTERNATIONAL UNIVERSITY

Campus Master Plan - June 2010

0 100 200 400

AEI PERKINS + WILL



LEGEND

- Proposed Building
- Existing Building
- Existing Chilled Water
- New Chilled Water

New Chilled Water infrastructure is served from existing systems unless noted otherwise.

KEY MAP

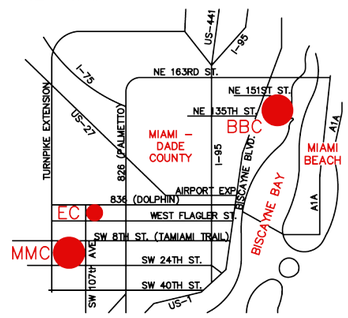


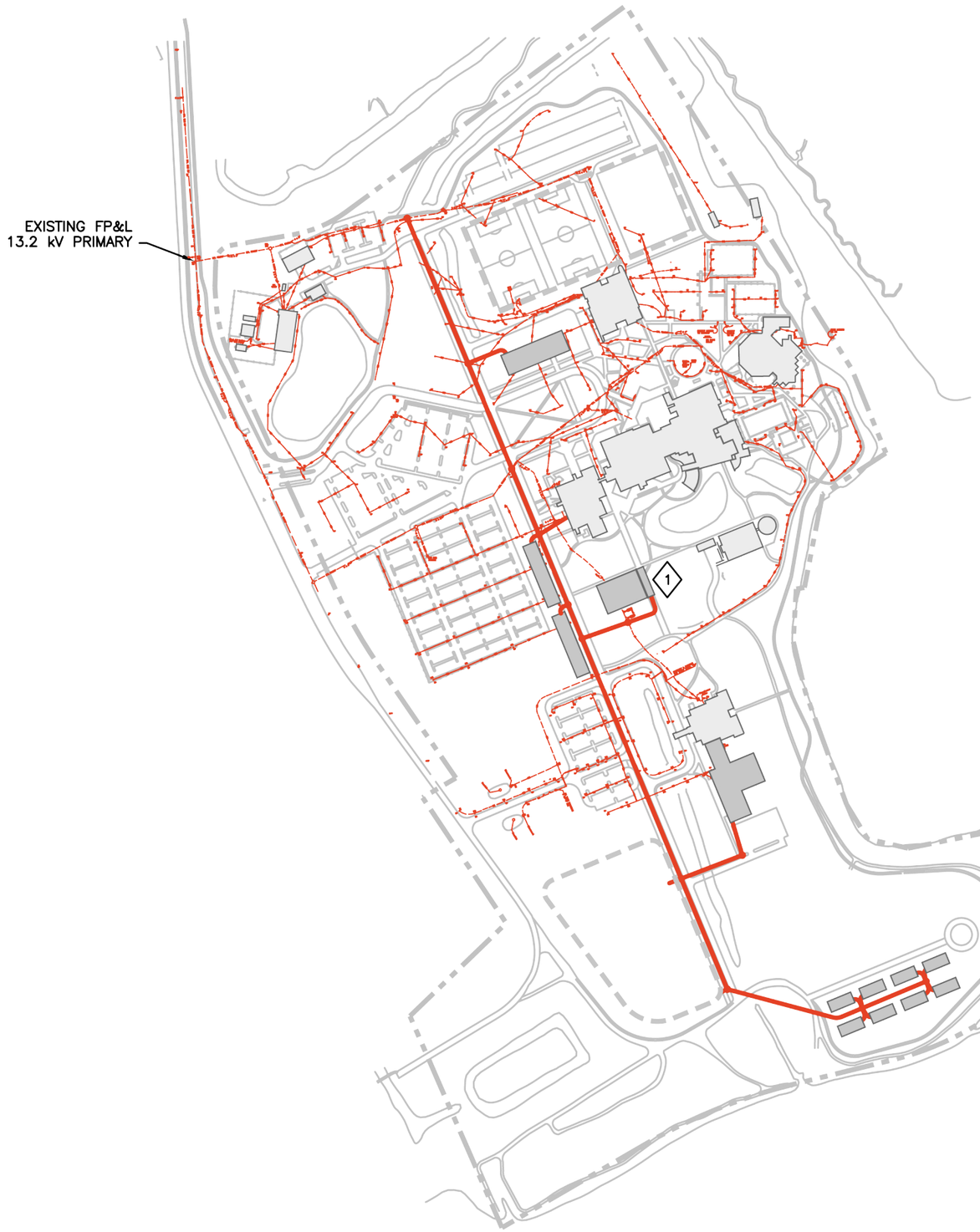
FIGURE: 10.3a
BISCAYNE BAY
2015 CHILLED WATER
INFRASTRUCTURE PLAN

FIU FLORIDA INTERNATIONAL UNIVERSITY

Campus Master Plan - June 2010

0 250 500 1000

AEI PERKINS + WILL



LEGEND

- Proposed Building
- Existing Building
- Existing Electrical Infrastructure
- New Electrical Infrastructure

New Electrical Infrastructure is served from existing systems unless noted otherwise.

SHEET KEYNOTES

1. Relocate existing infrastructure in area of proposed building(s).

KEY MAP

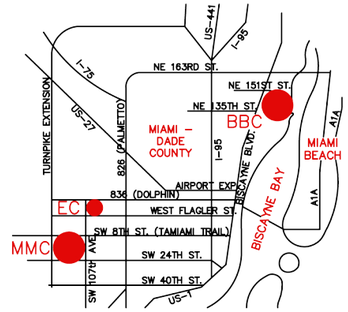


FIGURE: 10.3b
BISCAYNE BAY
2015 ELECTRICAL
INFRASTRUCTURE PLAN

FIU | FLORIDA INTERNATIONAL UNIVERSITY

Campus Master Plan - June 2010

0 250 500 1000

AEI PERKINS + WILL

SHEET KEYNOTES

1. New ductbank aligned with new primary roadway; interconnect to existing ductbank system.
2. Resupply Building 07 from new ductbank in advance of constructing new Research Labs (new footprint overlaps existing service to Building 07).

LEGEND

- Proposed Building
- Existing Building
- Existing Telecommunications Infrastructure
- New Telecommunications Infrastructure

New Telecommunications Infrastructure is served from existing systems unless noted otherwise.

KEY MAP

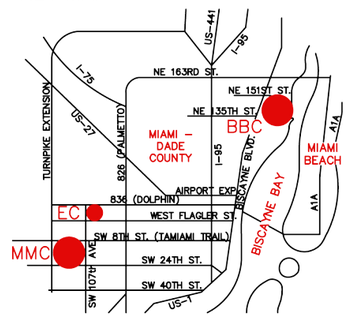


FIGURE: 10.3c
BISCAYNE BAY
2015
TELECOMMUNICATIONS
INFRASTRUCTURE PLAN

FIU | FLORIDA INTERNATIONAL UNIVERSITY

Campus Master Plan - June 2010

0 250 500 1000

AEI PERKINS + WILL