

9 general infrastructure

STORMWATER MANAGEMENT

GOAL 1: It is the goal of the University to provide adequate stormwater management facilities and services to meet the present and future needs of the University and to protect the public and property.

The FAU Boca Raton campus is under the regulation of the South Florida Water Management District (SFWMD) for Environmental Resource Permitting (ERP) relating to stormwater management. The Boca Raton campus currently has three Master ERPs for the campus, SFWMD Permit #50-03706-P for the main portion of the FAU controlled campus, SFWMD Permit #50-01718-S for the Palm Beach State College portion of campus, and SFWMD Permit #50-03359-P for the Research & Development Park portion of campus. The last major update of the SFWMD Permit #50-03706-P for FAU was issued approval by SFWMD on May 26, 2015, under Application #141218-12. This update served to correct the permit by more accurately depicting the basin boundaries, storage available, and water quality for each of the basins on campus as well as provide for future development based on the previous master plan.

The Lake Worth Drainage District (LWDD) no longer permits drainage improvements, with the exception of review of any control structure modifications or projects affecting, or immediately adjacent to, their canals, right-of-way, or easements.

Objective 1A: Maintain records and permits

- **Policy 1A-1:** Verify, update, and maintain the FAU Infrastructure Drawings for existing and proposed stormwater management facilities, as projects are constructed or areas are reviewed for accuracy. Reserve stormwater management areas from future development or ensure replacement in kind when redeveloped.
- **Policy 1A-2:** Update the Master Campus Environmental Resource Permit for the proposed master plan, once accepted. Include stormwater management improvements necessary for the proposed development in accordance with the below noted recommendations.









Objective 1B: Meet or exceed level of service requirements

- **Policy 1B-1:** Minimize the development of facilities within the 100-year floodplain. Limit, or mitigate for, impacts to the 100-year floodplain with all developments and redevelopments on campus.
- **Policy 1B-2:** Runoff from the 100-year storm event in excess of facility capacity will be accommodated by overland flow.
- **Policy 1B-3:** Buildings shall be constructed at or above the 100-year / 3-day (no discharge) maximum flood elevation as determined by the South Florida Water Management District Conceptual Permit for each basin.
- **Policy 1B-4:** Maximum discharge rates to the off-site LWDD canals shall be based on the 25-year / 72-hour storm event as determined by the South Florida Water Management District Conceptual Permit for each basin.
- **Policy 1B-5:** Minimum roadway crown elevations will be designed for a 10-year / 24-hour storm event.
- **Policy 1B-6:** Minimum parking lot elevations will be designed for a 5-year / 24-hour storm event.
- **Policy 1B-7:** Continue to meet or exceed water quality criteria as established by SFWMD when developing and redeveloping the campus.

Objective 1C: Utilize sustainable stormwater management methods

- **Policy 1C-1:** Implement underground storage and water quality treatment, when feasible, potentially including exfiltration trenches, underground storage systems (StormTech or similar) in order to maximize development area and usable green space.
- **Policy 1C-2:** Implement sustainable stormwater management practices, potentially including bioswales, dry retention areas/swales, green roofs (when feasible), pervious pavement, and other green/sustainable design methods to treat and store stormwater.
- **Policy 1C-3:** Expand and improve surface water lakes and dry detention areas where possible.

LEGEND

	BASIN 1	28.56 AC
	BASIN 2	40.40 AC
	BASIN 3	18.50 AC
	BASIN 4	103.02 AC
	BASIN 5	171.42 AC
	BASIN 6	36.58 AC
	BASIN 7	32.05 AC
	BASIN CORE	73.50 AC

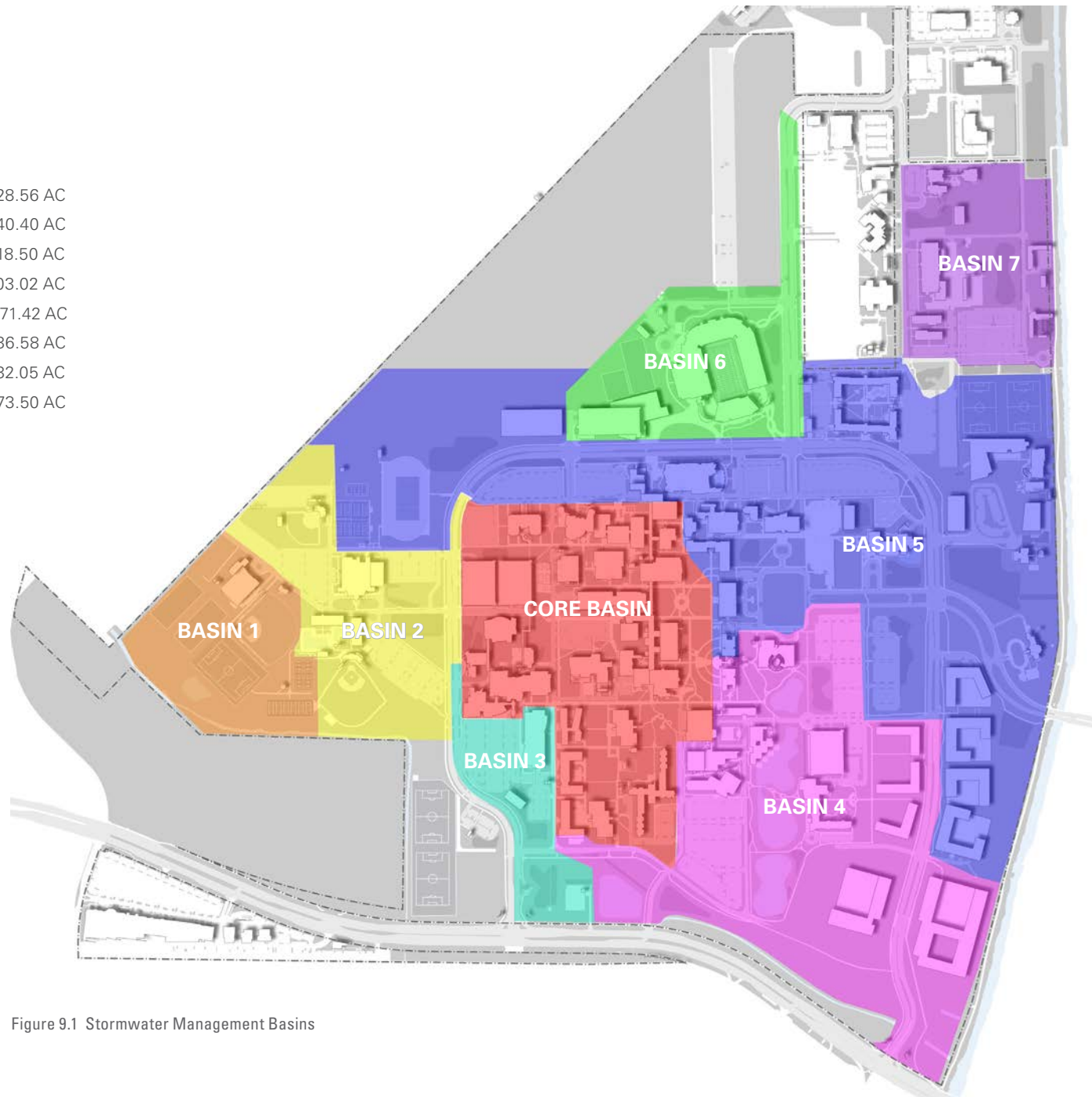


Figure 9.1 Stormwater Management Basins

Objective 1D: Implement an inspection and maintenance program

- **Policy 1D-1:** Inspect campus-wide stormwater management facilities on a routine basis, no more than five (5) years, in accordance with SFWMD requirements.
- **Policy 1D-2:** Identify areas experiencing frequent local ponding and improve stormwater management facilities and conveyance to reduce or eliminate ponding.
- **Policy 1D-3:** Implement a maintenance program to uncover buried stormwater management structures; flush and clean all pipes; vacuum out structures on a routine basis; and ensure proper maintenance of stormwater management detention and retention areas.

Objective 1E: Protect and conserve the natural functions of soils

- **Policy 1E-1:** Minimize impacts to downstream waters by utilizing appropriate Best Management Practices for temporary construction and permanent stormwater management systems in accordance with the Florida Department of Environmental Protection (FDEP) standards, such as the LWDD Canals for outfall of stormwater from the FAU campus, to ensure protection of the water quality of those receiving bodies. Development shall not adversely affect adjacent or downstream properties.
- **Policy 1E-2:** Require construction practices that minimize soil erosion in accordance with the National Pollution Discharge Elimination System (NPDES), administered by the Florida Department of Environmental Protection (FDEP). Such practices generally consist of the use of erosion screens; inlet protection; sod, seed, or mulch; phasing and limiting the removal of vegetation; minimizing the amount of land area that is cleared; and wetting soils to prevent wind-borne erosion during construction. Strategies for minimizing soil erosion shall be included in the Soil and Water Resources Protection Guidelines.





POTABLE WATER

GOAL 2: It is the goal of the University to provide adequate water facilities and services, both potable and fire, to support the mission of the University.

The FAU Boca Raton campus currently receives water from the City of Boca Raton via five (5) connections to the off-site municipal water system. The water system is master-metered by the City of Boca Raton at those connection locations. Improvements within the FAU Boca Raton campus to the water distribution system must be permitted through the City of Boca Raton and the Palm Beach County Health Department, meeting both of their standards. No deficiencies to the on-campus water distribution system have been identified by FAU or are known at this time. The system will be adjusted and expanded in order to serve the proposed future development in this master plan, once approved.

Objective 2A: Maintain records and permits

- **Policy 2A-1:** Verify, update, and maintain the FAU Infrastructure Drawings for existing and proposed water distribution and fire protection facilities, as projects are constructed or areas are reviewed for accuracy.

Objective 2B: Meet or exceed level of service requirements

- **Policy 2B-1:** Provide adequate water supply, through coordination with the City of Boca Raton, to provide adequate potable water service and fire protection service for the proposed master plan.
- **Policy 2B-2:** The University shall establish a procedure and assign responsibility for regularly scheduled coordination meetings with appropriate City officials relative to University water needs. FAU shall pursue any interlocal agreements or memoranda of understanding necessary to ensure that potable water will be supplied to the campuses to meet the future needs of the University.
- **Policy 2B-3:** Annually review future construction programs and priorities for deficiency remediation as part of the capital improvements procedures of the BOT to ensure capacity and capital improvements required to meet future University needs are provided when required, based on needs identified in other master plan elements.

- **Policy 2B-4:** Water distribution facilities should be planned and designed at a minimum for the following unit capacities which reflect current actual usages, and should be checked periodically against records to amend as needed if actual usage varies:

- Average daily use: 10 GPD/ Full Time Student plus 15 GPD / Faculty and Staff
- Peak daily rate: Based on a 2.5 peaking factor to the Average Daily Use.

- **Policy 2B-5:** Distribution system shall provide a minimum static pressure in all mains of 65 psi; a minimum residual pressure at building plumbing fixtures of 35 psi; and a minimum fire flow residual pressure of 20 psi.
- **Policy 2B-6:** Expand or relocate the campus water distribution system to accommodate the proposed master plan, serving new buildings.

Objective 2C: Utilize sustainable water management design methods

- **Policy 2C-1:** Implement water-saving measures requirements for new building construction such as use of ultra-low volume fixtures and xeriscape landscaping procedures. See Element 15, Architectural Design Guidelines for further guidance.
- **Policy 2C-2:** Continue to expand the use of the existing reclaimed water (gray water) for irrigation to ensure no use of potable water for irrigation.

Objective 2D: Implement an inspection and maintenance program

- **Policy 2D-1:** Implement a program to operate every valve and flush every fire hydrant within the FAU campus on an annual basis with a written log of the operations.
- **Policy 2D-2:** Maintain leak detection and repair program for existing lines. Monitor meter readings for abnormal data.
- **Policy 2D-3:** Ensure backflow prevention devices are installed on all service lines. Eliminate any cross-connection violations of State requirements.

LEGEND

- EXISTING POTABLE WATER LINE
- ▲ CONNECTION TO CITY LINE

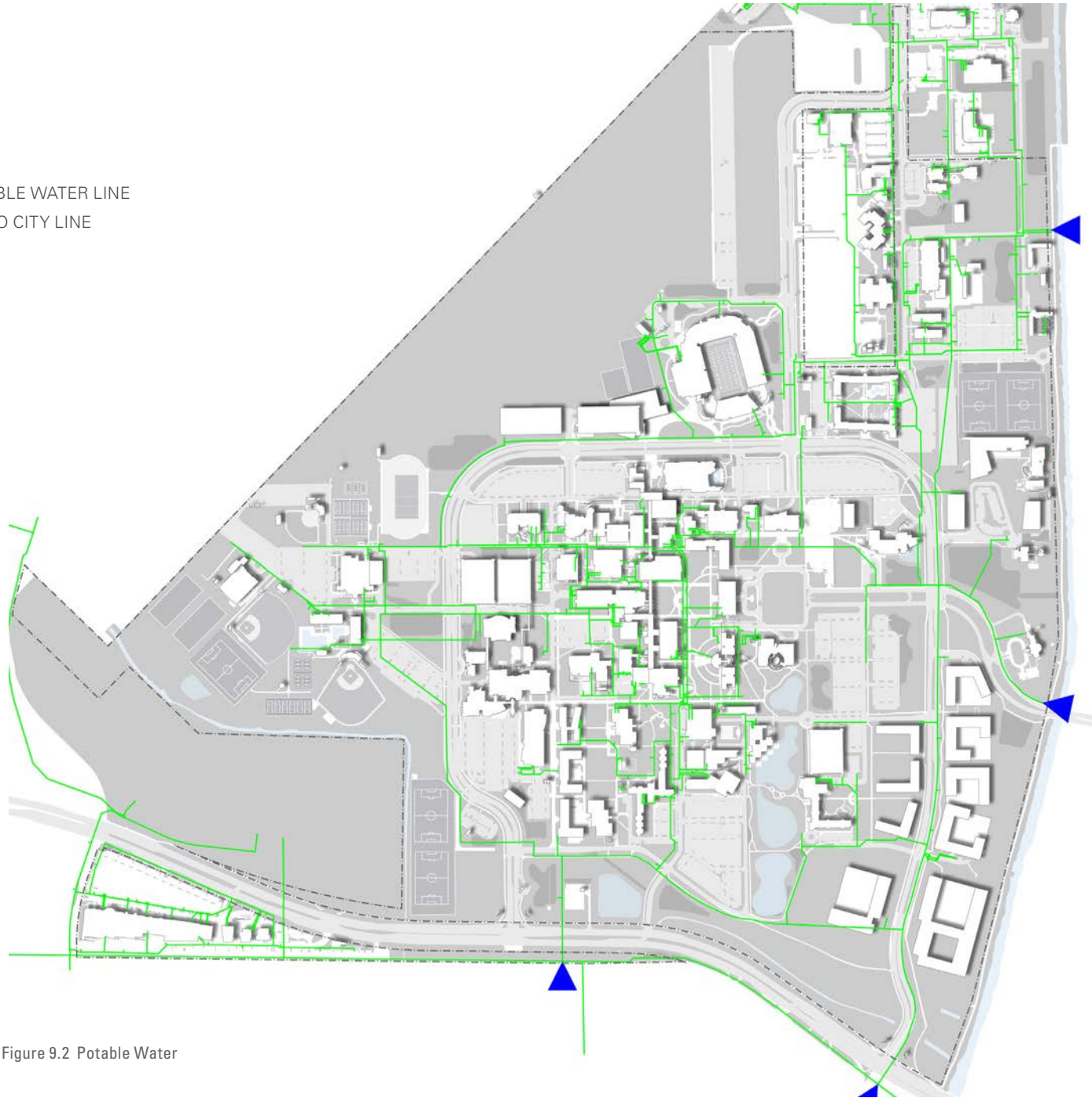


Figure 9.2 Potable Water

SANITARY SEWER

GOAL 3: It is the goal of the University to provide adequate sanitary sewage facilities and services to support the mission of the University.

The FAU Boca Raton campus currently discharges sanitary sewer to the City of Boca Raton via four (4) connections to the off-site municipal sewer force main system. Improvements within the FAU Boca Raton campus to the sewer collection system must be permitted through the City of Boca Raton and the Palm Beach County Health Department, meeting both of their standards. No deficiencies to the on-campus sewer collection system have been identified by FAU or are known at this time. The system will be adjusted and expanded in order to serve the proposed future development in this master plan, once approved.

Objective 3A: Maintain records and permits

- **Policy 3A-1:** Verify, update, and maintain the FAU Infrastructure Drawings for existing and proposed sewer collection facilities, as projects are constructed or areas are reviewed for accuracy.

Objective 3B: Meet or exceed level of service requirements

- **Policy 3B-1:** The University shall establish a procedure and assign responsibility for regularly scheduled coordination meetings with appropriate City officials relative to University sanitary sewer needs. FAU shall pursue any interlocal agreements or memoranda of understanding necessary to ensure that sanitary sewer will be supplied to the campuses to meet the future needs of the University.
- **Policy 3B-2:** Annually review future construction programs and priorities for deficiency remediation as part of the capital improvements procedures of the BOT to ensure capacity and capital improvements required to meet future University needs are provided when required, based on needs identified in other master plan elements.

- **Policy 3B-3:** Sewer collection facilities should be planned and designed at a minimum for the following unit capacities which reflect current actual usages, and should be checked periodically against records to amend as needed if actual usage varies:
 - o Average daily use: 10 GPD/ Full Time Student plus 15 GPD / Faculty and Staff
 - o Peak daily rate: Based on a 2.5 peaking factor to the Average Daily Use.
- **Policy 3B-4:** The sewer collection system, including gravity sewer mains and laterals, lift stations, force mains, grease traps, and other sewer collection facilities shall be designed in accordance with the City of Boca Raton, Florida Department of Environmental Protection (FDEP), Palm Beach County Health Department (PBCHD), Florida Administrative Code Section 64E-6, and 10 States Standards requirements, as applicable.
- **Policy 3B-5:** Expand or relocate the campus sewer collection system to accommodate the proposed master plan, serving new buildings.

Objective 3C: Implement an inspection and maintenance program

- **Policy 3C-1:** Television (TV) inspect all sewer mains on campus over a five-year span. TV inspection should be performed in order to review the existing sewer main conditions for the following:
 - o Sewer lines must be watertight to prevent ground water inflow and infiltration resulting in capacity reduction and increased pumping costs and to prevent possible contamination of ground water.
 - o Identify and correct leaks, damaged or broken pipe, and other deficiencies in the gravity collection system.
 - o Identify sewer mains with insufficient slopes, mains that are overloaded, clogged, or otherwise not functioning to their full capacity.
- **Policy 3C-2:** Identify and eliminate non-sewer connections to the collection system, such as roof drains, yard drains, etc.
- **Policy 3C-3:** Replace older clay pipes with new PVC pipe
- **Policy 3C-4:** Maintain leak detection and repair program for existing lines. Monitor meter readings for abnormal data.

LEGEND









-  LIFT STATION
-  FUTURE LIFT STATION
-  UPGRADE LIFT STATION
-  SEWAGE GRAVITY LINE
-  FUTURE SEWAGE GRAVITY LINE
-  SEWAGE PRESSURE LINE
-  FUTURE SEWAGE PRESSURE LINE
-  CONNECTION TO CITY COLLECTION SYSTEM



Figure 9.3 Sanitary Sewer