

QUESTION 19 - STORMWATER MANAGEMENT

See State Comprehensive Plan (Chapter 187, F.S.)

GOAL (8); POLICY (12)

GOAL (16); POLICY (1)

GOAL (18); POLICIES (1),(2),(3),(4),(6)

EXISTING LEVEL OF SERVICE:

ADOPTED LEVEL OF SERVICE STANDARD:

LEVEL OF SERVICE AFTER PROJECT BUILDOUT:

A. Describe the existing drainage patterns on-site as shown on Map I, including any potential flooding and erosion problems.

The project is located within the western basin of the Central Broward Water Control District (District) in the N-31 and N-32 Basins. The N-31 Canal runs along the western boundary of the site while the N-32 Canal is parallel to the eastern boundary adjacent to Shotgun Road. These canals continue south to junction with the South Florida Water Management C-11 Canal.

The entire site is within FEMA Flood Zone AH, with base flood elevation of 6.0' NGVD. Based on the topographic map, there are many areas within this site at or below this elevation. Erosion is not a problem as the site is extremely flat and has depression pockets. The canals are also slow moving, thus not susceptible to erosive velocities.

B. Describe the various elements of the proposed drainage system shown on Map I, including any wetlands to be used as part of the system, and discuss the design criteria (including stage-storage/stage discharge assumption) to be used for the various elements. Provide typical cross-sections (showing dimensions, slopes and control elevations) for any proposed lakes or swales. Identify the control elevation for all drainage structures. Include information as to what design storm will be used for what portions of the system.

Several underground pipe systems will convey runoff from the building and paved areas to a series of interconnected lakes along the north and east boundaries of the site. In order to improve drainage in the basins, the N-31 and N-32 canals will be interconnected as part of the design of this project. Also, the regulations of the District require that this project contributes 25% of the total site area or the actual flood plain calculation,

whichever is less, in water surface within the western C-11 Basin. As a way of meeting this requirement it is proposed to widen both the N-31 and N-32 canals within the site boundaries, as well as construct the on-site lakes.

The western basin of the Central Broward Water Control District is controlled by the South Florida Water Management District Pump Station S-9, located at U.S. 27 and Griffin Road. The drainage system serving the area is composed of a system of interconnected lakes and canals that discharge through the S-9 Pump Station.

The control elevation for this area is elevation 4.00' NGVD. Minimum road elevations will be at 7.0' NGVD with finished floor elevations at 8.0' NGVD in accordance with existing District criteria. Discharge shall be limited based on South Florida Water Management District requirements of 3/4"/acre/day.

C. From Map I, indicate the total number of acres in each drainage area and specify the acreage of any portions of drainage areas outside the site boundaries. Complete the following table for on-site drainage areas.

The proposed development includes approximately 152 acres. The proposed drainage system will manage runoff from only on-site drainage areas. The on-site drainage area will be divided into several sub-basins with the required stormwater management taking place in the interconnected lake system.

Table 19.1 Drainage Areas				
Existing Use				
Area	Impervious Surfaces (Ac)	Surface Retention (Ac)	Open Space (Ac)	Total (Ac)
Site	0	0	148.47	148.47
On-Site Canals	0	3.24	0	3.24
TOTALS	0	3.24	148.47	151.71
Proposed Use				
Area	Impervious Surfaces (Ac)	Surface Retention (Ac)	Open Space (Ac)	Total (Ac)
Retail	81.69	0	32.94	114.63
Office				
Hotel				
Lake	0	30.69	0	30.69
Canals	0	6.39	0	6.39
TOTALS	81.69	37.08	32.94	151.71

- D. Specify and compare the volume and quality of run-off from the site in its existing condition to the anticipated run-off at the end of each phase of development. (The parameters to be used to define "quality" and methodology should be agreed to by the regional planning council and other reviewing agencies at the pre-application conference stage.) Identify any changes in timing or pattern of water flows between pre- and post-development conditions. Indicate major points of discharge and ultimate receiving water body(ies). Indicate what provisions will be incorporated in the design of the drainage system, including a summary description of any Best Management Practices to be utilized, to minimize any increase in run-off from the site and to minimize any degradation of water quality in the ultimate receiving body over that occurring in its pre-development state.**

The proposed development is scheduled to occur in one phase. The existing site presents pockets of ponding with infiltration and/or evaporation of runoff and eventual discharge via the existing canals. The proposed development will contain impervious areas which will convey larger volumes of runoff to the proposed lakes and canals.

The surface water management system will be evaluated and designed to take into account the entire 152 acre development. Currently runoff from the site discharges uncontrolled to both Central Broward Water Control District's Canals N-31 and N-32 with an estimated peak discharge of 331.57 cfs for the 25 yr – 3 day storm. Discharge from the proposed development will be limited to the current allowable discharge rate of ¾" acre/day for as estimated 25 yr – 3 day peak discharge of 4.41 cfs. This limited discharge rate will be achieved by utilizing on-site lakes (30.70 ± acres) grass swales and underground dry retention areas. Discharge will be to only the N-32 canal through a small triangular bleeder located in the control structure. Water quality will be provided through the use of grass swales, underground dry retention areas (½" dry pre-treatment) and retention in on-site lakes. Water quality for the proposed development is estimated to be 20.1 ± acres-ft (2.5" times % impervious). The equivalent of ½" of the water quality (6.32 Ac. Ft.) will be provided in grass swales, exfiltration systems and dry retention areas. The balance of 13.78 Ac. Ft. feet will be retained in the on-site lakes. The retention provided in the on-site lakes with a proposed top of bank elevation of 6.00 NGVD would be 61.40 acre feet which is 4 + times that which would be required.

The project facilities shall be built according to the following levels of service adopted by the Central Broward Water Control District:

Facility	Duration	Design Storm
Roadways and Parking Lots	10-year Frequency	1-day
Discharge	25-year Frequency	3-days
Finish Floors	100-year Frequency	3-days – 0 Discharge

Table 19.2		
25-yr/72 Hr. Storm - Pre - Post - Development Comparison		
	Runoff Volume (Ac-ft)	Routed Peak Flow (cfs)
Existing Vacant Site	131.3	331.57
Proposed Developed Site **	146.1	4.41 *

* Allowable discharge is regulated to 20 cubic feet /sec. / sq. mi. For this site the allowable discharge = $(20 \text{ csm})(151.71 \text{ Ac}/640 \text{ Ac/sq. mi.}) = 4.74 \text{ cfs}$

E. Who will operate and maintain the drainage system after completion of the development?

The Applicant or other appropriate entity will operate and maintain the drainage system.