

QUESTION 19 - STORMWATER MANAGEMENT**A. Describe the existing drainage patterns on-site as shown on Map I, including any potential flooding and erosion problems.**

The subject property is a relatively undeveloped and wooded tract of land with unpaved trail roads accessing the interior of the site. There are areas of disturbed lands that contain ongoing agricultural and farming operations located on the western portion of the site at the corner of State Road 207 and County Road 305.

The site is favorable for the project and for the treatment of stormwater based on the topography provided. The existing site topography indicates that the north and western portions of the site currently overland flow into existing irrigation ditches that were cut for the agricultural operations currently occurring on this portion of the site. The eastern and southern portions drain via overland flow into existing onsite wetlands. These existing onsite ditches and wetlands eventually outfall into Moccasin Branch and ultimately to the St. John's River. The existing topography provides some assistance in creating an effective stormwater system as the central portion of the site acts a high point between the predevelopment basins and the site elevation falls a minimum of 5 feet to both the east and west. This provides positive gravity discharge across the proposed parcels, which should negate the needs for stormwater pumping.

The open waters of the existing systems will not be used as the primary outfall for stormwater. Instead, a greenway and preserve system will link the drainage subbasins and serve as the drainage outfall. Utilizing these existing waterways for drainage points of treated stormwater will minimize the potential for flooding or erosion problems. The use of multiple discharge points throughout the project at various locations minimizes the intensity and volume of any single discharge point thereby reducing the potential for flooding and erosion. All drainage improvements will be designed so that the rate of stormwater that flows into the creeks and tributary wetland systems is equal to, or reduced from, the pre-development condition.

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 portion of the system.

The proposed drainage systems will consist of sodded swales, curb and gutter streets, storm inlets and sewers and retention/detention lakes. Wet detention

ponds/lakes will be the primary stormwater management design element employed for this project, although other systems may be utilized where soil and groundwater conditions are favorable. Wet detention is routinely used in areas with a high water table, as is the typical condition in St. Johns County. The normal water elevations (NWL) will be designed so that groundwater elevations of adjacent wetlands are not adversely affected. The ponds will be designed to reduce flooding, provide treatment of stormwater runoff and prevent any increase in the post-development peak discharge rates from the pre-development rates. The stormwater management systems will be designed in compliance with the rules and criteria required by the St. Johns River Water Management District (SJRWMD) as indicated per the SJRWMD Manual for Chapter 40C-42, Section 14, as stated below:

“To meet the objectives of the Stormwater Rule, the traditional flood attenuation pond was modified to maximize water quality treatment processes. These modified detention ponds are identified by the name “wet detention systems”. These systems are permanently wet ponds, which are designed to slowly release collected stormwater runoff through an outlet structure...

Wet detention systems are the recommended BMP for sites with moderate to high water table conditions. The District strongly encourages the use of wet detention treatment systems for the following two reasons. First, wet detention systems provide significant removal of both dissolved and suspended pollutants by taking advantage of physical, chemical, and biological processes within the pond (CDM 1985). Second, the complexity of BMP’s such as underdrains are not encountered in a wet detention pond control structure. Wet detention systems offer an effective alternative for the long term control of water levels in the pond, provide a predictable recovery of storage volumes within the pond, and are easily maintained by the maintenance entity.

In addition to provide good removal of pollutants from runoff, wet detention systems also provide other benefits such as flood detention, passive recreation activities related adjacent to ponds, storage of runoff for irrigation, and pleasing aesthetics.”

It is the intent of the Elkton project to employ these principles in order to protect and enhance water quality by utilizing wet detention systems.

The volume and quality of runoff from the site will be handled to meet SJRWMD criteria. The objectives will be to treat post-development runoff per accepted methods. SJRWMD requires that for wet detention systems, runoff shall be treated as follows:

“For wet detention systems, the design treatment volume is the greater of the following:

- (a) one inch of runoff over the drainage area
- (b) 2.5 inches times the impervious area (excluding water bodies)

Additional treatment volume may be required for systems which discharge directly to Class I, Class II, Outstanding Florida Waters, or Class III waters which are approved, conditionally approved, restricted, or conditionally restricted for shellfish harvesting.”

In accordance with SJRWMD regulations, this treatment storage will be discharged from the stormwater lakes at a rate so that no more than one half of the stored treatment volume is discharged in the first 30 hours following a storm event. Detention structures for the stormwater lakes will be designed to control the post-development discharge at rates equal to or less than the pre-development discharge rates. The design will be based on the S.C.S. 25-year frequency 24-hour duration rainfall event, which meets the criteria of both SJRWMD and St. Johns County. At locations where the lakes discharge into a FDOT facility, the detention requirements will be satisfied for the 1, 2, 4, 8 and 24 hour durations of the 2, 5, 10, 25, 50 and 100 year storm frequencies.

Roadway stormwater systems shall be designed to convey stormwater runoff from a five (5) year frequency storm event using the FDOT Zone 5 intensity-duration-frequency curves.

Initially, a permit application will be filed with SJRWMD for a conceptual permit for the site that will be followed with an individual construction permit for the improvements actually proposed.

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.

Table 19-1 provides the total developable acres in each drainage area. Due to the fact that the project site is bounded to the north by State Road 207, the east and south by wetlands, and elevations fall off to the west there will be little drainage contribution from off-site. Nevertheless, any off-site drainage will be taken into consideration in sizing of the drainage systems. Coordination with the roadway culvert sizing at the wetland crossings at State Road 207 will be well coordinated between the project engineer and the County’s engineer.

Table 19-1 provides the breakdown of the developable area within each drainage basin by land use as well as the estimated impervious surface, stormwater management area and open space. This exhibit does not include the Greenway or

wetland preserves, which will remain in their natural state within each drainage area.

Table 19-1

Drainage Area

Land Use	Impervious Surfaces (acres) ^a	Surface Retention (acres)	Open Space (acres)	Total (acres)
Basin 1				
Single-Family	38.7	8.3	8.3	55.3
Multi-Family	31.3	8.8	8.8	48.9
Retail	14.7	3.2	3.2	21
Flex Industrial	7.7	1.7	1.7	11
Office	6.2	1.3	1.3	8.8
Subtotal	98.6	23.2	23.2	145.0
Basin 2				
Single-Family	63.2	13.5	13.5	90.3
Multi-Family	11.1	3.1	3.1	17.4
School	22.8	4.9	4.9	32.6
Park	7.7	1.7	1.7	11
Subtotal	104.9	23.2	23.2	151.3
Basin 3				
Single-Family	90.2	19.3	19.3	128.8
Subtotal	90.2	19.3	19.3	128.8
Basin 4				
Single-Family	173.4	37.2	37.2	247.7
Multi-Family	13.2	3.7	3.7	20.6
School	6.0	1.3	1.3	8.6
Subtotal	192.6	42.2	42.2	276.9
Basin 5				
Single-Family	41.7	8.9	8.9	59.6
Park	35.8	7.7	7.7	51.2
Subtotal	77.6	16.6	16.6	110.8
Basin 6				
Single-Family	29.8	6.4	6.4	42.5
Multi-Family	3.6	1.0	1.0	5.7
School	29.8	6.4	6.4	42.6
Park	24.3	5.2	5.2	34.7
Subtotal	87.5	19.0	19.0	125.5
Basin 7				
Single-Family	62.0	13.3	13.3	88.6
Subtotal	62.0	13.3	13.3	88.6
Total	713.3	156.8	156.8	1026.9

(a) Impervious surface represents the total estimated impervious area for each land use.

Note: This exhibit was developed without benefit of design. Therefore, these figures are only estimates. The actual figures will be refined upon design and permitting.

D. Specify and compare the volume and quality of runoff from the site in its existing condition to the anticipated runoff 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 preapplication conference stage.) Identify any changes in timing or pattern of waterflows 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 runoff 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 Elkton project will add impervious area and therefore the post-development runoff volume will exceed the pre-development runoff volume. However the drainage areas within the project site are not volume-sensitive and attenuation of the peak rate of discharge will be provided. The post development peak rate of discharge will not exceed the pre-development rate of discharge for a 25-year, 24-hour storm event. According to the St. Johns River Water Management District, Applicant’s Handbook, a system that meets the criteria for peak rate of discharge is presumed to not cause adverse flooding to on-site or off-site property.

The stormwater management systems will be designed and permitted to meet the SJRWMD Chapter 40C-42, FAC. Each construction project within the Elkton development will obtain a site-specific permit from the St. Johns River Water Management District. The extensive wetland preserve system that links the sub basins will serve as the initial drainage outfall for the project. This will minimize changes in hydrology in the existing system and maximize times of concentration.

The normal water elevation (NWL) of all ponds will be established during final design in order to prevent groundwater drawdown of the adjacent wetlands.

During construction, erosion and sediment control will be provided through the use of silt fences, hay bales or other appropriate best management practice measures. Development of the site will incorporate vegetative natural buffers for stormwater treatment and grading design to protect existing trees and prevent filling additional wetlands. Treatment within isolated wetlands will also be considered during final design.

A Homeowners Association or Community Development District will be established to maintain the stormwater management facilities upon completion of the project. The Developer shall be the responsible maintenance and operation entity until such time that the Homeowners Association or CDD is formed and takes over

responsibility of the stormwater system. Portions of the drainage collection system may be dedicated to and maintained by St. Johns County.