

Jalarmy Road & Lake Minneola Shores Roundabout

Lake County

Stormwater Calculation Package



*Engineers
Planners
Landscape Architects
Surveyors
Construction Management
Design/Build*

Certificate of Authorization No. 00003215

500 W Fulton Street
Sanford, FL 32772
CPH Job # L3609
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Jason R. Kellogg, P.E.

56952

P.E. Number

Date

Exemption Statement for the Jalarmy Rd and Lake Minneola Shores Roundabout Project

Lake County is proposing to convert the existing tee intersection of Jalarmy Road and Lake Minneola Shores, located in the City of Clermont, into a roundabout due to safety related concerns with the intersection.

Jalarmy Road and Lake Minneola Shores are both rural road sections. Existing swales along the west side of Jalarmy and north side of Lake Minneola Shores are currently being used to capture and convey storm water runoff.

The proposed roundabout is being designed in the northwest corner of the intersection resulting in portions of the existing swales being filled in. To mitigate this impact, new swales are being designed to accommodate runoff from a 100-year storm event as a worst-case scenario, while closely matching the conveyance capacity of the existing swales. Although the improvements will result in some reduction to the steep grades, swale checks are proposed to be reestablished along Jalarmy Road with rip-rap being placed at the termination of the swale to reduce water velocity and potential erosion. The new swales storm water piping have been graded to ensure the existing flow patterns will be maintained. The proposed swale along Lake Minneola Shores west of the roundabout will match into the existing swale and flow west along Lake Minneola Shores. The runoff from Jalarmy Road and the roundabout will be collected and conveyed to the east into the existing swales.

The peak flow was calculated for both pre and post-development conditions of the site area using the Rational Equation from the *FDOT Drainage Design Guide*. The hydraulic capacity of the existing and proposed swales was calculated using Manning's Equation to evaluate the swales ability to convey the calculated peak flows. **Table 2** and **Table 3** shows the peak flows and hydraulic capacities. Under existing conditions, the swales have sufficient capacity to convey the peak flow from a 100yr storm event. Similarly, the proposed swale design provides approximately twice the capacity needed for the 100yr peak flow, demonstrating a conservative and effective drainage solution.

Based on the above analysis and comparison of the existing and proposed conditions, the proposed improvements will not change the existing flow patterns or cause adverse impacts to the capacity of the swales. Since the improvements do not cause any adverse impacts, are not creating additional travel lanes, and are solely for the purpose of safety related improvements we are requesting that this project be considered to be exempt.

The following variables were used in the calculation in **Table 2** for existing conditions on each road.

- Jalarmy Road Swale [V-Bottom]
 - Average slope of 8.23%
 - Flow depth of 1ft (full depth of 1.5ft, 0.5ft for free board)
 - Side slopes of 1:6
- Lake Minneola Shores Swale [V-Bottom]
 - Average slope of 2.23%
 - Flow depth of 1.5ft (full depth of 2ft, 0.5ft for free board)
 - Side slopes of 1:6

The following variables were used in the calculation in **Table 3** for proposed conditions on each road.

- Jalarmy Road Swale
 - Average slope of 9.78%
 - Flow depth of 1ft (full depth of 1.5ft, 0.5ft for free board)
 - Side slopes of 1:6 and 1:4
 - 2ft wide base
- Lake Minneola Shores Swale
 - Average slope of 0.6%
 - Flow depth of 1.5ft (full depth of 2ft, 0.5ft for free board)
 - Side slopes of 1:6 and 1:4
 - 2ft wide base

Table 1

Site Conditions			
Rainfall Intensity (in/hr)		Total Basin Area (Acres)	
10yr	6.68	5.72	
100yr	9.06		

Table 2

Pre-Development	
Areas	
Impervious Area	0.90 AC
Pervious Area	4.82 AC
Peak Flow	
Q=CiA	
C=	0.44
i=	9.06 (in/hr)
A=	5.72 (AC)
Q=	22.80 (cfs)
Hydraulic Capacity	
$Q = \frac{1.49}{n} * A * R^{\frac{2}{3}} * S^{\frac{1}{2}}$	
Jalarmy Rd	
n=	0.035
A=	6 (sqft)
(R ^{2/3})=	0.62 (ft)
(S ^{1/2})=	0.29
Q=	45.93 (cfs)
Lake Minneola Shores	
n=	0.035
A=	13.50 (sqft)
(R ^{2/3})=	0.82 (ft)
(S ^{1/2})=	0.15
Q=	70.69 (cfs)

Table 3

Post-Development	
Areas	
Impervious Area	1.68 AC
Pervious Area	4.04 AC
Peak Flow	
Q=CiA	
C=	0.53
i=	9.06 (in/hr)
A=	5.72 (AC)
Q=	27.47 (cfs)
Hydraulic Capacity	
$Q = \frac{1.49}{n} * A * R^{\frac{2}{3}} * S^{\frac{1}{2}}$	
Jalarmy Rd	
n=	0.035
A=	7 (sqft)
(R ^{2/3})=	0.69 (ft)
(S ^{1/2})=	0.31
Q=	63.74 (cfs)
Lake Minneola Shores	
n=	0.035
A=	14.25 (sqft)
(R ^{2/3})=	0.88 (ft)
(S ^{1/2})=	0.08
Q=	42.71 (cfs)





Post-Development	
Areas	
Impervious Area	1.68 AC
Pervious Area	4.04 AC

	BASIN (5.72 AC)
	POST PERVIOUS AREA
	JALARMY RD SWALE
	LAKE MINNEOLA SHORES SWALE

