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Hydrology Narrative

and

Storm Water Management Plan

for

HOWARD HILL SUBDIVISION
(Originally 716 Patrick Street)
Jonesboro, AR 72401

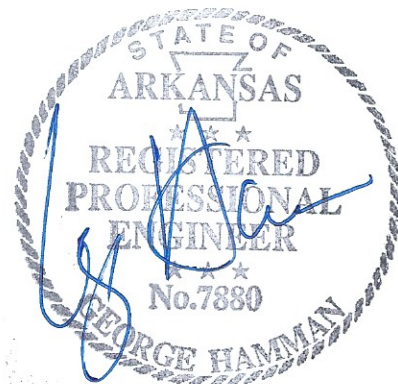
Prepared by:

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May 19, 2019

Civilogic File Number: 118154



HYDROLOGY REPORT AND NARRATIVE

HOWARD HILL SUBDIVISION

PAGE 1 OF 1

CIVILOGIC FILE NUMBER: 118154

The contents of this report are representative of the site for the development of three new homes to be located on Patrick Street, just north of the intersection of Patrick Street and Belt Street. The original parcel number was 01-144083-03000. There is a small amount of off-site drainage to consider for the detention for this site, emanating from the east.

There is a proposed detention pond to be located east of the proposed new houses, and the discharge will be directed to the existing road-side ditch on the east side of Patrick Street. There is an area that will bypass the pond. That includes the new homes, the front yards, and a portion of the rear yards. That bypass area is accounted for in the calculations, and the pond is designed to overcompensate.

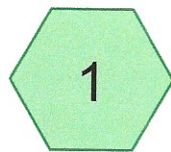
TABLE 1: CALCULATED FLOW RATES

FREQUENCY	PRE DEVELOPED	POND BYPASS	ALLOWED OUTFLOW	ROUTED FLOW	NET DIFFERENCE
2	5.16	4.23	0.93	1.66	+ 0.73
10	9.65	7.27	2.38	2.14	+ 0.24
25	11.79	8.68	3.11	2.29	- 0.82
50	13.59	9.85	3.74	2.41	- 1.33
100	15.61	11.15	4.46	2.53	- 1.93

Included in this report are:

- A) Schematic pre-developed site diagram;
- B) The pre-development flow calculations;
- C) The bypass flow calculations;
- C) The post-development flow calculations; and
- D) Pond calculations with the appropriate routing.

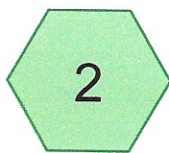
We respectfully present this information for your review and approval.



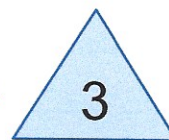
Pre-Developed Site



Post-Developed Bypass



Post-Developed Site To
Pond



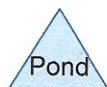
Detention Pond



Subcat



Reach



Pond



Link

Drainage Diagram for 118154 HOWARD HILL SUBDIVISION PUGH

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118154 HOWARD HILL SUBDIVISION PUGH

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Type II 24-hr 100-year Rainfall=7.70"

Printed 5/20/2019

Summary for Subcatchment 1: Pre-Developed Site

Runoff = 15.61 cfs @ 12.22 hrs, Volume= 1.441 af, Depth> 4.86"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type II 24-hr 100-year Rainfall=7.70"

Area (sf)	CN	Description
140,415	74	>75% Grass cover, Good, HSG C
12,446	98	Paved parking & roofs
2,200	89	Gravel roads, HSG C
155,061	76	Weighted Average
142,615		Pervious Area
12,446		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0500	0.19		Sheet Flow, Pre-Developed Site
					Grass: Dense n= 0.240 P2= 3.88"
5.4	100	0.0700	0.31		Sheet Flow, OVERLAND FLOW
					Grass: Short n= 0.150 P2= 3.88"
3.3	50	0.0600	0.25		Sheet Flow, OVERLAND FLOW
					Grass: Short n= 0.150 P2= 3.88"
5.7	100	0.0600	0.29		Sheet Flow, OVERLAND FLOW
					Grass: Short n= 0.150 P2= 3.88"
4.0	65	0.0615	0.27		Sheet Flow, OVERLAND FLOW
					Grass: Short n= 0.150 P2= 3.88"
0.6	15	0.3300	0.39		Sheet Flow, OVERLAND FLOW INTO DITCH
					Grass: Short n= 0.150 P2= 3.88"
28.0	430	Total			

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Type II 24-hr 100-year Rainfall=7.70"

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Events for Subcatchment 1: Pre-Developed Site

Event	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	5.16	0.485	1.63
10-year	9.65	0.890	3.00
25-year	11.79	1.086	3.66
50-year	13.59	1.252	4.22
100-year	15.61	1.441	4.86

118154 HOWARD HILL SUBDIVISION PUGH*Type II 24-hr 100-year Rainfall=7.70"*

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Summary for Subcatchment 4: Post-Developed Bypass

Runoff = 11.15 cfs @ 12.05 hrs, Volume= 0.748 af, Depth> 5.45"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs

Type II 24-hr 100-year Rainfall=7.70"

Area (sf)	CN	Description
50,514	74	>75% Grass cover, Good, HSG C
19,046	98	Paved parking & roofs
2,200	89	Gravel roads, HSG C
71,760	81	Weighted Average
52,714		Pervious Area
19,046		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	50	0.0600	0.25		Sheet Flow, OVERLAND FLOW
					Grass: Short n= 0.150 P2= 3.88"
5.7	100	0.0600	0.29		Sheet Flow, OVERLAND FLOW
					Grass: Short n= 0.150 P2= 3.88"
4.0	65	0.0615	0.27		Sheet Flow, OVERLAND FLOW
					Grass: Short n= 0.150 P2= 3.88"
0.6	15	0.3300	0.39		Sheet Flow, OVERLAND FLOW INTO DITCH
					Grass: Short n= 0.150 P2= 3.88"
13.6	230	Total			

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Events for Subcatchment 4: Post-Developed Bypass

Event	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	4.23	0.277	2.02
10-year	7.27	0.480	3.49
25-year	8.68	0.576	4.19
50-year	9.85	0.657	4.78
100-year	11.15	0.748	5.45

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Type II 24-hr 100-year Rainfall=7.70"

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Summary for Subcatchment 2: Post-Developed Site To Pond

Runoff = 11.60 cfs @ 12.07 hrs, Volume= 0.774 af, Depth> 4.76"

Runoff by SCS TR-20 method, UH=SCS, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
Type II 24-hr 100-year Rainfall=7.70"

Area (sf)	CN	Description
83,056	74	>75% Grass cover, Good, HSG C
2,000	98	Paved parking & roofs
85,056	75	Weighted Average
83,056		Pervious Area
2,000		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	100	0.0500	0.19		Sheet Flow, Pre-Developed Site
					Grass: Dense n= 0.240 P2= 3.88"
5.4	100	0.0700	0.31		Sheet Flow, OVERLAND FLOW
					Grass: Short n= 0.150 P2= 3.88"
14.4	200	Total			

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Events for Subcatchment 2: Post-Developed Site To Pond

Event	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	3.83	0.256	1.57
10-year	7.17	0.475	2.92
25-year	8.76	0.581	3.57
50-year	10.10	0.672	4.13
100-year	11.60	0.774	4.76

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Type II 24-hr 100-year Rainfall=7.70"

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Summary for Pond 3: Detention Pond

Inflow Area = 1.953 ac, 2.35% Impervious, Inflow Depth > 4.76" for 100-year event
 Inflow = 11.60 cfs @ 12.07 hrs, Volume= 0.774 af
 Outflow = 2.53 cfs @ 12.42 hrs, Volume= 0.774 af, Atten= 78%, Lag= 21.4 min
 Primary = 2.53 cfs @ 12.42 hrs, Volume= 0.774 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
 Peak Elev= 327.96' @ 12.42 hrs Surf.Area= 6,242 sf Storage= 11,129 cf

Plug-Flow detention time= 33.3 min calculated for 0.774 af (100% of inflow)
 Center-of-Mass det. time= 32.7 min (851.4 - 818.7)

Volume	Invert	Avail.Storage	Storage Description
#1	324.00'	11,403 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
324.00	0	0	0
325.00	1,125	563	563
326.00	2,695	1,910	2,473
327.00	4,420	3,558	6,030
328.00	6,325	5,373	11,403

Device	Routing	Invert	Outlet Devices
#1	Primary	324.00'	8.0" x 205.0' long Culvert CMP, projecting, no headwall, Ke= 0.900 Outlet Invert= 311.50' S= 0.0610 '/' Cc= 0.900 n= 0.013

Primary OutFlow Max=2.52 cfs @ 12.42 hrs HW=327.95' (Free Discharge)
1=Culvert (Inlet Controls 2.52 cfs @ 7.23 fps)

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Events for Pond 3: Detention Pond

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
2-year	3.83	1.66	325.90	2,224
10-year	7.17	2.14	326.93	5,725
25-year	8.76	2.29	327.32	7,555
50-year	10.10	2.41	327.63	9,208
100-year	11.60	2.53	327.96	11,129