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Hydrology Narrative

and

Storm Water Management Plan

for

G Enterprises, LLC
1110 Belt Street
Jonesboro, AR 72401

Prepared by:
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August 16, 2016

Civilogic File Number: 115090



HYDROLOGY REPORT AND NARRATIVE

G ENTERPRISES, LLC

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The contents of this report are representative of the site for the development of a new duplex development on the north side of Belt Street, just west of Greensboro Road. The overall site contains 1.05 acres, but the drainage basin contains 1.72 acres.

The overall site is currently unoccupied. The home that was on the lot when purchased has been removed. The site plan includes five new duplex buildings, the associated parking areas, and an additional building for the owner's personal storage. The detention for the development of this site is intended to be accomplished as a single facility. The site currently all drains in a southwest direction. The final development of the site will also convey the water to the same destination, and ultimately into the existing drainage system approximately five hundred feet west of the site.

From the included calculations, it is seen that the storage volume for the development of this duplex complex is 9,748 cubic feet. The necessary storage of 9,748 cubic feet is going to be accomplished by use of an underground detention facility. A diversion ditch is included in the plans along the west side of the property to capture all on-site drainage, and direct it to the detention box.

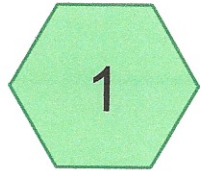
TABLE 1: CALCULATED FLOW RATES

FREQUENCY	PRE DEVELOPED	POST DEVELOPED	ROUTED FLOW	CHANGE
2	2.77	5.69	2.82	+ 0.05
10	5.09	9.20	5.30	+ 0.21
25	6.19	10.80	6.15	- 0.04
50	7.11	12.12	6.80	- 0.31
100	8.14	13.59	7.47	- 0.67

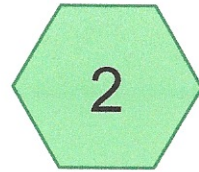
Included in this report are:

- A) Schematic site diagram;
- B) The pre-development flow calculations;
- C) The proposed post-development flow calculations;
- D) Pond routing calculations;
- E) Predeveloped drainage area map; and
- F) Post-developed drainage map.

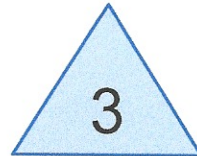
We respectfully present this information for your review and approval.



PRE-DEVELOPED
SITE



POST-DEVELOPED
SITE



PROPOSED
DETENTION BOX



Subcat



Reach



Pond



Link

G Enterprises - Belt Street 115090

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

Printed 8/17/2016

Summary for Subcatchment 1: PRE-DEVELOPED SITE

Runoff = 8.14 cfs @ 12.19 hrs, Volume= 0.714 af, Depth > 4.97"

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
65,108	74	>75% Grass cover, Good, HSG C
9,921	98	Paved roads w/curbs & sewers
75,029	77	Weighted Average
65,108		Pervious Area
9,921		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	65	0.0160	0.11		Sheet Flow, FROM HIGH POINT Grass: Dense n= 0.240 P2= 3.88"
10.0	150	0.0335	0.25		Sheet Flow, OVERLAND FLOW Grass: Short n= 0.150 P2= 3.88"
2.1	45	0.1530	0.36		Sheet Flow, OVERLAND FLOW Grass: Short n= 0.150 P2= 3.88"
3.4	45	0.0440	0.22		Sheet Flow, OVERLAND FLOW Grass: Short n= 0.150 P2= 3.88"
25.5	305	Total			

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Events for Subcatchment 1: PRE-DEVELOPED SITE

Event	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	2.77	0.245	1.71
10-year	5.09	0.444	3.10
25-year	6.19	0.540	3.77
50-year	7.11	0.622	4.33
100-year	8.14	0.714	4.97

Summary for Subcatchment 2: POST-DEVELOPED SITE

[49] Hint: Tc<2dt may require smaller dt

Runoff = 13.59 cfs @ 12.02 hrs, Volume= 0.866 af, Depth> 6.03"

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
36,544	74	>75% Grass cover, Good, HSG C
38,485	98	Paved roads w/curbs & sewers
75,029	86	Weighted Average
36,544		Pervious Area
38,485		Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0	65	0.0160	0.11		Sheet Flow, FROM HIGH POINT Grass: Dense n= 0.240 P2= 3.88"
0.7	60	0.0100	1.50		Shallow Concentrated Flow, OVERLAND FLOW Grassed Waterway Kv= 15.0 fps
0.8	190	0.0350	3.80		Shallow Concentrated Flow, FLOW THROUGH PARKING LOT Paved Kv= 20.3 fps
11.5	315	Total			

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Events for Subcatchment 2: POST-DEVELOPED SITE

Event	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-year	5.69	0.349	2.43
10-year	9.20	0.575	4.00
25-year	10.80	0.680	4.73
50-year	12.12	0.767	5.35
100-year	13.59	0.866	6.03

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Summary for Pond 3: PROPOSED DETENTION BOX

Inflow Area = 1.722 ac, 51.29% Impervious, Inflow Depth > 6.03" for 100-year event
 Inflow = 13.59 cfs @ 12.02 hrs, Volume= 0.866 af
 Outflow = 7.47 cfs @ 12.17 hrs, Volume= 0.853 af, Atten= 45%, Lag= 9.3 min
 Primary = 7.47 cfs @ 12.17 hrs, Volume= 0.853 af

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.10 hrs
 Peak Elev= 332.57' @ 12.17 hrs Surf.Area= 2,400 sf Storage= 9,748 cf

Plug-Flow detention time= 37.5 min calculated for 0.853 af (99% of inflow)
 Center-of-Mass det. time= 28.5 min (818.3 - 789.7)

Volume	Invert	Avail.Storage	Storage Description
#1	328.50'	10,788 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
328.50	0	0	0
328.51	2,400	12	12
329.00	2,400	1,176	1,188
330.00	2,400	2,400	3,588
331.00	2,400	2,400	5,988
332.00	2,400	2,400	8,388
333.00	2,400	2,400	10,788

Device	Routing	Invert	Outlet Devices
#1	Primary	328.50'	6.0" Vert. Orifice/Grate C= 0.600
#2	Primary	329.86'	12.0" Vert. Orifice/Grate C= 0.600

Primary OutFlow Max=7.38 cfs @ 12.17 hrs HW=332.51' (Free Discharge)

└1=Orifice/Grate (Orifice Controls 1.83 cfs @ 9.34 fps)

└2=Orifice/Grate (Orifice Controls 5.54 cfs @ 7.06 fps)

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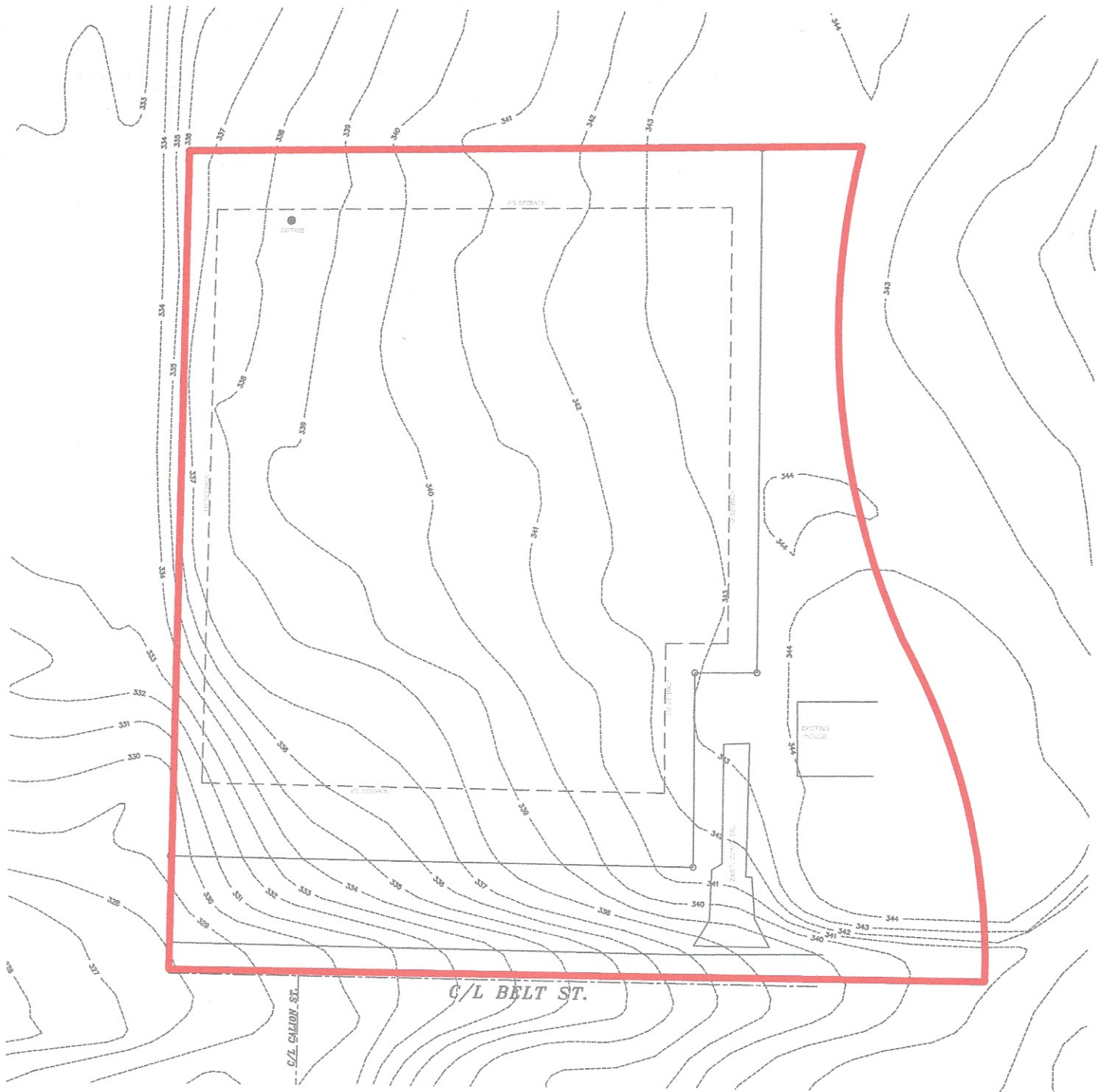
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Type II 24-hr 100-year Rainfall=7.70"

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Events for Pond 3: PROPOSED DETENTION BOX

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
2-year	5.69	2.82	330.53	4,862
10-year	9.20	5.30	331.35	6,832
25-year	10.80	6.15	331.78	7,854
50-year	12.12	6.80	332.15	8,740
100-year	13.59	7.47	332.57	9,748

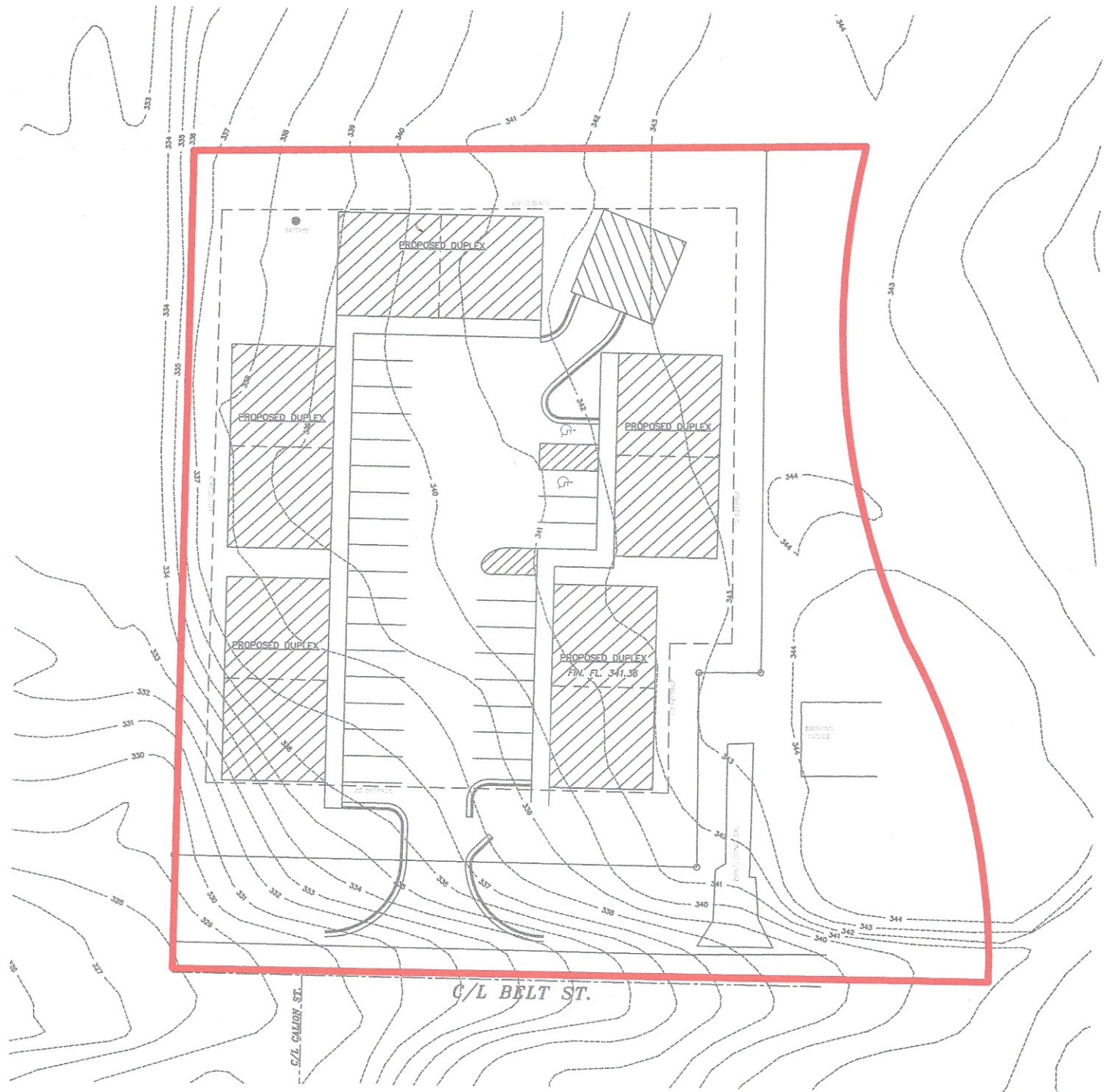


PRE-DEVELOPED DRAINAGE MAP

ENGINEERS PLANNERS SURVEYORS

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Scale: 1"=50 ft.

POST-DEVELOPED DRAINAGE MAP

ENGINEERS

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