

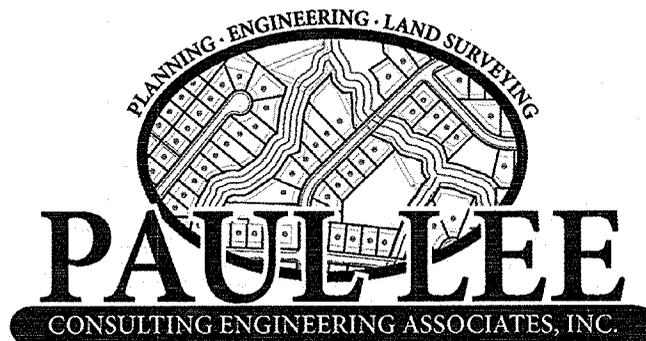
# PRELIMINARY HYDROLOGY STUDY

FOR

## PRITCHARD BUILDERS, INC.

LAND LOT 488 - 17<sup>TH</sup> DISTRICT - 2<sup>ND</sup> SECTION - CITY OF SMYRNA  
COBB, GEORGIA

PREPARED BY



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## SITE ANALYSIS

1. The site to be developed is 1.274 acres located 303.50' east of Guthrie Street on the north side of Bank Street in Land Lot 488 of the 17<sup>th</sup> District, 2<sup>nd</sup> Section, Cobb County, Georgia within the City of Smyrna. The proposed development is a single family residential subdivision.
2. The site currently exists as two residential homes with standard driveways and a good stand of trees. See Pre-Development Map of survey by Frontline Surveying for existing conditions and topographic detail. The site topography is such that the current flows west and northwest leaving the property along three locations which are further identified as study points Basin A, Basin B, and Basin C as shown on the Pre-Development Map. Once the property is redeveloped into the proposed five lot residential subdivision, the proposed development will provide detention at the northwest corner of the property (known as Basin B) and will discharge westerly across 1079 and 1075 Bank Street to an existing creek west of the proposed subdivision.
3. Note: The proposed pond for this study is a 50'x130' gravel pit with three four-foot perforated CMPs to be located at the northwest corner of the proposed tract. All surface flow will be directed underground by swales and yard inlets connected to the four-foot CMPs. The discharge from the pond will be controlled by a 2" circular orifice and a 2" rectangular weir inside a 4' precast weir box with a proposed 18" CMP which outlets through a standard headwall that will eject at grade twenty feet east of the common property line with 1079 Bank Street. To provide velocity distribution, a level spreader will be placed at the 10' point just east of the property line to insure maximum reduction of the velocity of the 1.74 cfs on the 100 year event.

4. All of the designs will be carried through the 100 year event and utilize the NRCS (formally known as the SCS method) Method of Analysis and comply with the latest design standards and specifications of the Georgia Storm Water Management Manual, Volume 2 as well as current City of Smyrna County standards.
  
5. This report is a PRELIMINARY design concept for the proposed five lot subdivision. Detailed plans must be developed for construction prior to the use of this report in order to validate the information contained herein.



## PRE-DEVELOPMENT

(continued)

### STUDY POINT C:

Area: 1.228 Acres (0.718 Ac-onsite, 0.510 Ac-offsite)

Runoff Coefficient: 55

Time of Concentration (Tc): 5 minutes (minimum)

RUNOFFS: (See Hydrograph recap – Hydrograph No. 3)

1 YR (cfs)	2 YR (cfs)	5 YR (cfs)	10 YR (cfs)	25 YR (cfs)	50 YR (cfs)	100 YR (cfs)
0.364	0.960	1.693	2.514	3.718	4.686	5.698

## POST DEVELOPMENT

The proposed development is a proposed five lot subdivision with a maximum of 45% impervious coverage on each lot. Lot 1 will be required to direct all impervious surface into Basin B for detention purposes. All runoff left in existing Basin A will be reduced to 0.011 acres and will be grassed. All runoff left in existing Basin C will be reduced to 0.180 acres and will remain undisturbed and regrassed.

**STUDY POINT A:**

Area: 0.011 Acres (All onsite flows)

Runoff Coefficient: 61 (All grass)

Time of Concentration (Tc): 5 minutes (minimum)

**RUNOFFS:** (See Hydrograph recap – Hydrograph No. 4)

1 YR (cfs)	2 YR (cfs)	5 YR (cfs)	10 YR (cfs)	25 YR (cfs)	50 YR (cfs)	100 YR (cfs)
0.008	0.015	0.023	0.031	0.044	0.053	0.063

**STUDY POINT C:**

Area: 0.180 Acres (0.148 Ac-onsite; 0.032 Ac-offsite)

Runoff Coefficient:  $60 = 0.148(61) + 0.032(55)/0.18$

Time of Concentration (Tc): 5 minutes (minimum)

**RUNOFFS:** (See Hydrograph recap – Hydrograph No. 5)

1 YR (cfs)	2 YR (cfs)	5 YR (cfs)	10 YR (cfs)	25 YR (cfs)	50 YR (cfs)	100 YR (cfs)
0.12	0.229	0.354	0.491	0.686	0.841	1.00

## POST DEVELOPMENT (continued)

**STUDY POINT B – INTO POND:**

Total Area: 1.593 Acres  
(0.045 Acres from Basin A)  
(0.500 Acres from Basin B)  
(1.048 Acres from Basin C)

Runoff Coefficient:  $78 = 0.394(55) + 0.54(98) + 0.0654(61)/1.593$

Time of Concentration (Tc): 5 minutes (minimum)

**RUNOFFS:** (See Hydrograph recap – Hydrograph No. 6)

1 YR (cfs)	2 YR (cfs)	5 YR (cfs)	10 YR (cfs)	25 YR (cfs)	50 YR (cfs)	100 YR (cfs)
2.773	4.101	5.514	6.982	9.070	10.67	12.29

**DETENTION REQUIRED.**

## ALLOWABLE FLOWS – BASIN A

Study Point “A”:  
 Runoffs (cfs)

	1 YR (cfs)	2 YR (cfs)	5 YR (cfs)	10 YR (cfs)	25 YR (cfs)	50 YR (cfs)	100 YR (cfs)
<b>Q<sub>PRE</sub></b>	0.017	0.044	0.077	0.115	0.170	0.214	0.260
<b>Q<sub>ALL</sub> – 10% reduction minimum</b>	0.015	0.039	0.069	0.104	0.153	0.192	0.234
<b>Q<sub>POST</sub></b>	<u>0.008</u>	<u>0.015</u>	<u>0.023</u>	<u>0.031</u>	<u>0.044</u>	<u>0.053</u>	<u>0.063</u>

Q<sub>PRE</sub> = Q<sub>predevelopment</sub> (See Hydrograph recap – Hydrograph No. 1)

Q<sub>ALL</sub> = Q<sub>allowable</sub>

Q<sub>POST</sub> = Q<sub>postdevelopment</sub> (See Hydrograph recap – Hydrograph No. 4)

$$Q_{POST} < Q_{ALLOWABLE}$$

**NO DETENTION REQUIRED**

## ALLOWABLE FLOWS – BASIN B

Study Point “B”:  
 Runoffs (cfs)

	1 YR (cfs)	2 YR (cfs)	5 YR (cfs)	10 YR (cfs)	25 YR (cfs)	50 YR (cfs)	100 YR (cfs)
<b>Q<sub>PRE</sub></b>	0.148	0.391	0.689	1.024	1.514	1.908	2.32
<b>Q<sub>ALL</sub> – 10% reduction minimum</b>	0.133	0.352	0.620	0.922	1.363	1.717	2.088
<b>Q<sub>POST</sub></b>	<b>2.773</b>	<b>4.101</b>	<b>5.514</b>	<b>6.982</b>	<b>9.070</b>	<b>10.670</b>	<b>12.290</b>

Q<sub>PRE</sub> = Q<sub>predevelopment</sub> (See Hydrograph recap – Hydrograph No. 2)

Q<sub>ALL</sub> = Q<sub>allowable</sub>

Q<sub>POST</sub> = Q<sub>postdevelopment</sub> (See Hydrograph recap – Hydrograph No. 6)

**Q<sub>POST</sub> > Q<sub>ALLOWABLE</sub>**

**DETENTION REQUIRED**

## FLOW SUMMARY FROM POND

Study Point “B”:  
 Runoffs (cfs)

	1 YR (cfs)	2 YR (cfs)	5 YR (cfs)	10 YR (cfs)	25 YR (cfs)	50 YR (cfs)	100 YR (cfs)
<b>Q<sub>ROUTED</sub></b>	0.099	0.125	0.172	0.350	0.736	1.152	1.740
<b>Q<sub>ALL</sub> – 10% reduction minimum</b>	0.133	0.352	0.620	0.922	1.363	1.717	2.088

$Q_{ROUTED} = Q_{routed}$  from pond (See Hydrograph recap – Hydrograph No. 7)

$Q_{ALL} = Q_{allowable}$

$Q_{ROUTED} < Q_{ALLOWABLE}$

**DETENTION SATISFIED**

## ALLOWABLE FLOWS – BASIN C

Study Point “C”:  
 Runoffs (cfs)

	1 YR (cfs)	2 YR (cfs)	5 YR (cfs)	10 YR (cfs)	25 YR (cfs)	50 YR (cfs)	100 YR (cfs)
<b>Q<sub>PRE</sub></b>	0.364	0.960	1.693	2.514	3.718	4.686	5.698
<b>Q<sub>ALL</sub> – 10% reduction minimum</b>	0.328	0.864	1.524	2.263	3.346	4.217	5.128
<b>Q<sub>POST</sub></b>	<u>0.120</u>	<u>0.229</u>	<u>0.354</u>	<u>0.491</u>	<u>0.686</u>	<u>0.841</u>	<u>1.00</u>

Q<sub>PRE</sub> = Q<sub>predevelopment</sub> (See Hydrograph recap – Hydrograph No. 3)

Q<sub>ALL</sub> = Q<sub>allowable</sub>

Q<sub>POST</sub> = Q<sub>postdevelopment</sub> (See Hydrograph recap – Hydrograph No. 5)

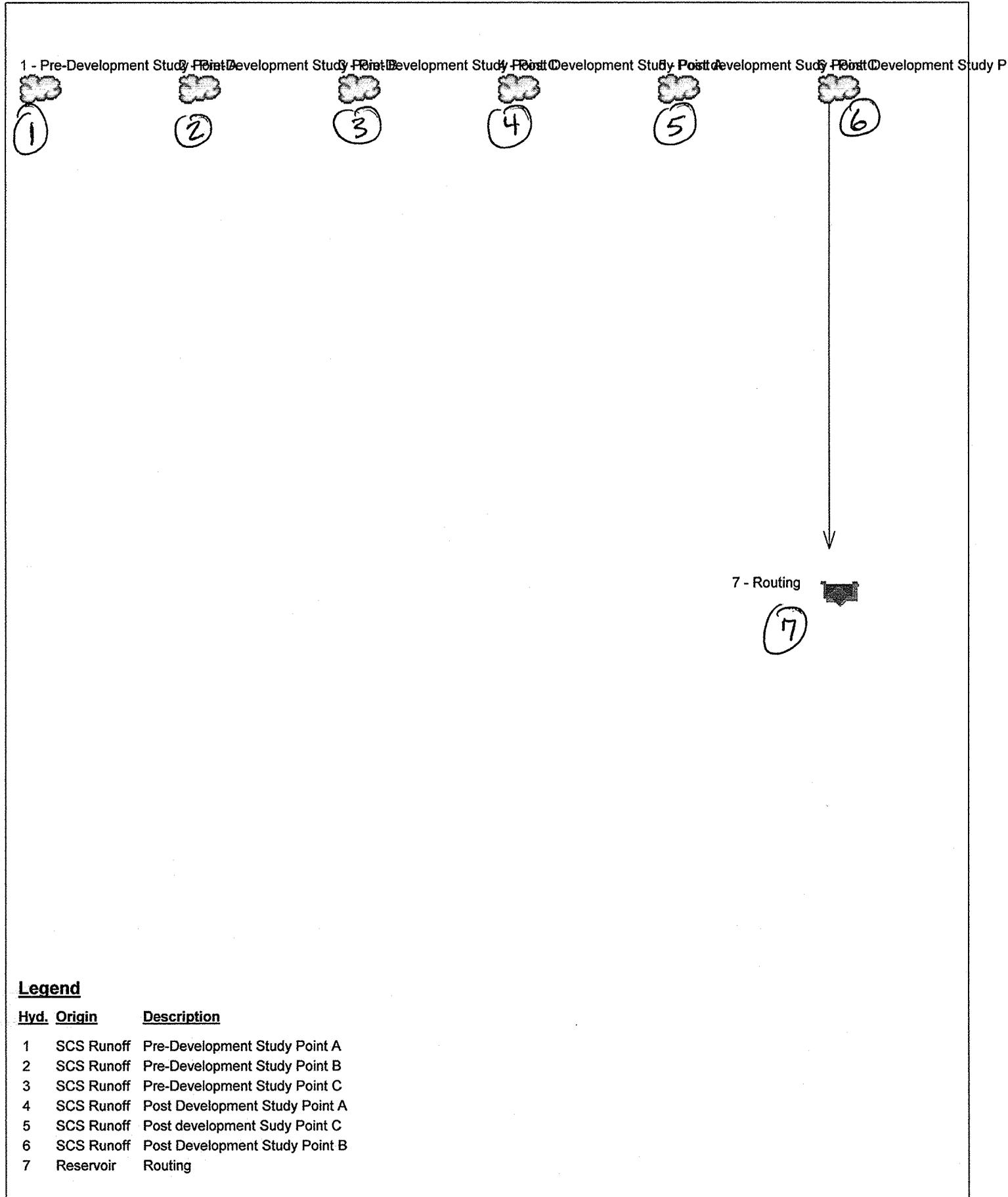
$$Q_{POST} < Q_{ALLOWABLE}$$

**NO DETENTION REQUIRED**

## **APPENDIX**

# Watershed Model Schematic

Hydraflow Hydrographs by Intelisolve v9.25



### Legend

Hyd. Origin	Description
1	SCS Runoff Pre-Development Study Point A
2	SCS Runoff Pre-Development Study Point B
3	SCS Runoff Pre-Development Study Point C
4	SCS Runoff Post Development Study Point A
5	SCS Runoff Post development Sudy Point C
6	SCS Runoff Post Development Study Point B
7	Reservoir Routing

# Hydrograph Return Period Recap

Hydraflow Hydrographs by Intelisolve v9.25

Hyd. No.	Hydrograph type (origin)	Inflow Hyd(s)	Peak Outflow (cfs)								Hydrograph description
			1-Yr	2-Yr	3-Yr	5-Yr	10-Yr	25-Yr	50-Yr	100-Yr	
1	SCS Runoff	—	0.017	0.044	—	0.077	0.115	0.170	0.214	0.260	Pre-Development Study Point A
2	SCS Runoff	—	0.148	0.391	—	0.689	1.024	1.514	1.908	2.320	Pre-Development Study Point B
3	SCS Runoff	—	0.364	0.960	—	1.693	2.514	3.718	4.686	5.698	Pre-Development Study Point C
4	SCS Runoff	—	0.008	0.015	—	0.023	0.031	0.044	0.053	0.063	Post Development Study Point A
5	SCS Runoff	—	0.120	0.229	—	0.354	0.491	0.686	0.841	1.000	Post development Study Point C
6	SCS Runoff	—	2.773	4.101	—	5.514	6.982	9.070	10.67	12.29	Post Development Study Point B
7	Reservoir	6	0.099	0.125	—	0.172	0.350	0.736	1.152	1.740	Routing





# Pond Report

Hydraflow Hydrographs by Intelisolve v9.25

Thursday, Jul 30, 2015

## Pond No. 3 - Combined

### Pond Data

Pond storage is based on user-defined values.

### Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	990.00	n/a	0	0
0.40	990.40	n/a	1,007	1,007
0.80	990.80	n/a	1,167	2,174
1.20	991.20	n/a	1,249	3,423
1.60	991.60	n/a	1,295	4,718
2.00	992.00	n/a	1,318	6,036
2.40	992.40	n/a	1,318	7,354
2.80	992.80	n/a	1,295	8,649
3.20	993.20	n/a	1,249	9,898
3.60	993.60	n/a	1,167	11,065
4.00	994.00	n/a	1,007	12,072

### Culvert / Orifice Structures

	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 18.00	2.00	0.00	0.00
Span (in)	= 18.00	2.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 990.00	990.05	0.00	0.00
Length (ft)	= 5.00	0.00	0.00	0.00
Slope (%)	= 1.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	Yes	No	No

### Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 12.00	0.17	0.00	0.00
Crest El. (ft)	= 994.10	992.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Riser	Rect	---	---
Multi-Stage	= Yes	Yes	No	No
Exfil.(in/hr)	= 0.000 (by Wet area)			
TW Elev. (ft)	= 0.00			

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).

### Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	PrfRsr cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	User cfs	Total cfs
0.00	0	990.00	0.00	0.00	---	---	0.00	0.00	---	---	---	---	0.000
0.40	1,007	990.40	0.06 ic	0.05 ic	---	---	0.00	0.00	---	---	---	---	0.054
0.80	2,174	990.80	0.09 ic	0.09 ic	---	---	0.00	0.00	---	---	---	---	0.086
1.20	3,423	991.20	0.12 oc	0.11 ic	---	---	0.00	0.00	---	---	---	---	0.108
1.60	4,718	991.60	0.13 oc	0.13 ic	---	---	0.00	0.00	---	---	---	---	0.126
2.00	6,036	992.00	0.14 oc	0.14 ic	---	---	0.00	0.00	---	---	---	---	0.142
2.40	7,354	992.40	0.31 oc	0.15 ic	---	---	0.00	0.14	---	---	---	---	0.296
2.80	8,649	992.80	0.58 oc	0.16 ic	---	---	0.00	0.41	---	---	---	---	0.567
3.20	9,898	993.20	0.93 oc	0.17 ic	---	---	0.00	0.74	---	---	---	---	0.914
3.60	11,065	993.60	1.33 oc	0.18 ic	---	---	0.00	1.15	---	---	---	---	1.322
4.00	12,072	994.00	1.80 oc	0.18 ic	---	---	0.00	1.60	---	---	---	---	1.783



"C"

0.18 AC

(0.143 AC on site, 0.032 AC off site)

"B"

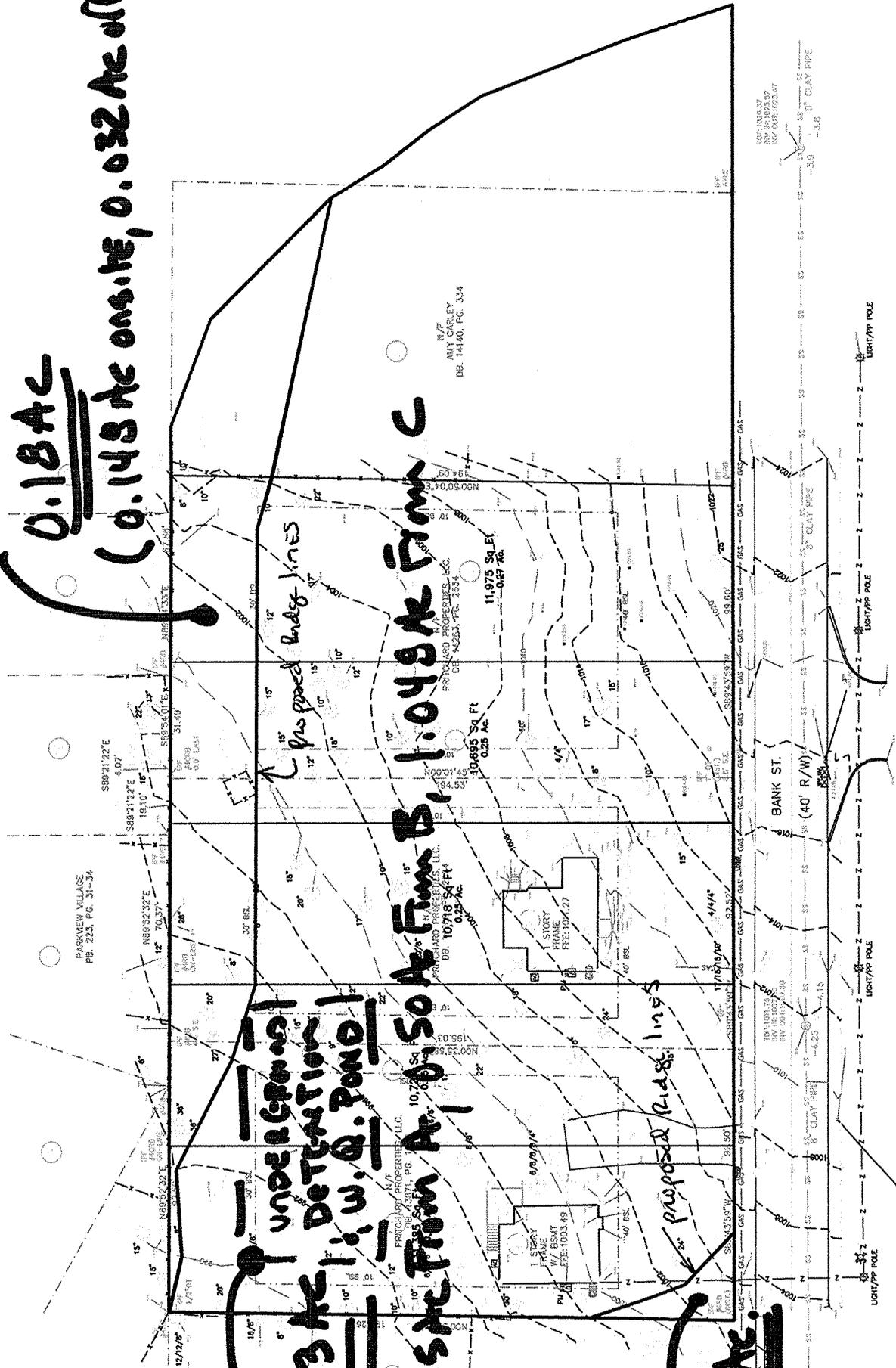
1.593 AC  
UNDERGRND  
RETENTION  
TANK W/ Q. POND

0.045 AC  
FROM A1

1.049 AC  
FROM C

"A"

0.011 AC



Post Development Map 1"=50'