



### **Background**

The Raintree Animal Health Center located at 3820 SW Ward Road is planning a physical expansion of their business with a new building addition along with associated sidewalk and patio. The property is 4.76 acres in total. Detention was added to the site several years back when the parking lot was extended to the north. Prior to the parking lot expansion a storm study was conducted to ensure the proposed storm water runoff would meet or exceed the City's storm water regulations. In that study, the property was divided into four (4) drainage sub-basins in relation to their geographic location and topography. Exhibit A at the end of this memo contains the Existing Drainage Area Map from the previous storm study for reference. The impervious area onsite exists completely within two sub-basins Area "A" (0.15 acres) and Area "B" (1.16 acres) both of which are located in the southeast portion of the property. The other two Areas "C" and "D" were unimproved and did not drain to the same point of interest. A detention basin was constructed on the site along Ward Road to attenuate excess runoff from the improved site. The design composite curve number for the 1.31 acre tributary used to design the detention system was 87. The actual existing composite curve number for combined Areas "A" and "B" is 83. The lower curve number results in excess capacity in the existing detention system. The existing detention basin will be field surveyed to ensure required volumes are available. If the existing system does not meet requirements as outlined in this study the Owner will have the existing basin regraded to meet the necessary requirements. If See Exhibit B for a breakdown of existing impervious area on site.

### **Purpose**

The purpose of the memorandum is to determine if any negative impacts due to storm water runoff from the proposed improvements are anticipated.

### **Scope**

- Determine Existing Impervious Area
- Determine Proposed Impervious Area
- Determine Change in Impervious Area

### **Methodology**

The study conforms to the requirements of the City of Lee's Summit, Missouri "Design and Construction Manual" and all applicable codes and criteria referred to therein.

### **Proposed Improvements**

The proposed improvements consisting of a new building addition (2,628.70 sf) along with a new concrete sidewalk and patio (654.74 sf) account for an additional impervious area of 3,283 sf. The new improvements will be constructed adjacent to the existing building located in Area "B". Exhibit C depicts the proposed improvements and details the existing and proposed impervious areas. The proposed improvements are tributary to the existing detention system and any additional runoff generated will be attenuated.

**Analysis** The first step is to determine composite curve numbers and the amount of impervious area for both existing and proposed conditions. Exhibit C both depicts and details the amount of impervious area for both the existing and proposed conditions.



Existing Conditions: Impervious Area (ac.): 0.50 CN = 98  
Pervious Area (ac.): 0.81 CN = 74  
Total Area (ac.): 1.31  
Composite CN: 83

Proposed Conditions: Impervious Area (ac.): 0.58  
Pervious Area (ac.): 0.73  
Total Area (ac.): 1.31  
Composite CN: 85  
Impervious Increase (ac.): 0.08  
Impervious Increase (sf): 3,283

The hard infrastructure improvements making up impervious area are to be constructed in the existing impervious footprint. The increase in impervious area is minor and equates to an increase of (44.27% - 38.17%) 6.10%.

**Findings**

The proposed expansion and renovation improvements on the 1.31 acre tributary increase the impervious area by 3,283 sf or 6.10%. The proposed composite curve number for Areas "A" & "B" is 85 which is below the original design value of 87. The reduced CCN indicates the existing detention system will continue to exceed design performance and meet regulatory requirements. In addition, due to the size of the tributary and the minimal increase in impervious area KC Metro APWA 5600 waives storm water requirements. The waiver may be found in KC Metro APWA 5600 Section 5601.3.A.3. Remodeling, repair, replacement or other improvements to any existing structure or facility and appurtenances on sites smaller than two acres that does not cause an increased area of impervious surface on the site in excess of 10 percent of that previously existing.

**Conclusion**

The proposed improvements do not increase impervious area/runoff above APWA regulatory thresholds therefore no storm water improvements are required nor recommended beyond those that have been previously designed for attenuation of the site. The existing detention basin will be field surveyed to ensure required volumes are available. If the existing system does not meet requirements as outlined in this study the Owner will have the existing basin regraded to meet the necessary requirements. The storm water memorandum is in conformance with applicable codes and design criteria therefore we recommend approval of this storm water memorandum and its findings.

Should you have any questions related to the storm water memorandum, please contact Matt Schlicht with Engineering Solutions.

Sincerely,

Anthony Philipscheck

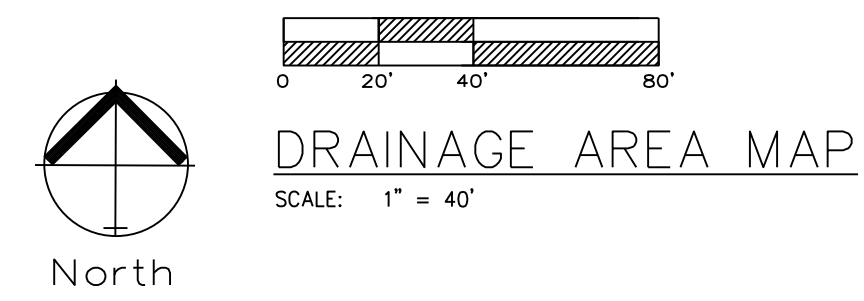




Storm Water Memorandum  
September 16, 2021  
Raintree Animal Health Center  
Lee's Summit, MO

# Exhibit A

## Existing Drainage Area Map



AREA LABEL	AREA (ac)
A -	0.15
B -	1.16
C -	0.26
D -	3.20

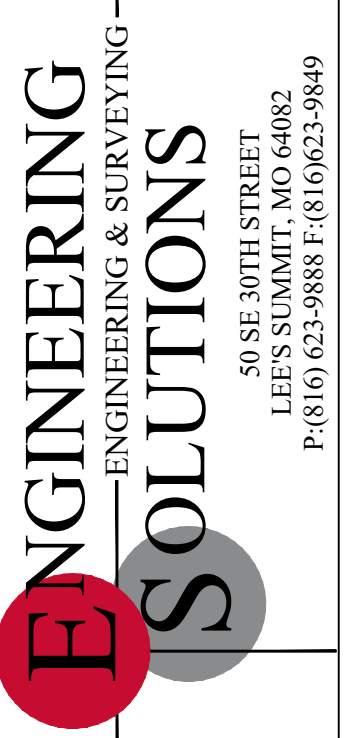
Total Basin Area  
4.77 Acres



APWA STORM DRAINAGE "TC" COMPUTATIONS FOR : Raintree Animal Health

AREA ID	TOTAL ACRES	WTRSHD LENGTH	UP ELEV	DN ELEV	SURFACE CODE	SURFACE CODES				SURFACE CODES				TC COMPUTATION				AREA ID								
						A	B	D	G	L	M	S	U	Z	Cal Overland Flow	Used Min 15	Cal Channel One		Cal Channel Two	Cal Channel Total						
A	0.15	110.0	979.0	972.0	Z	0.50	100.0	979.0	973.0	6.0	U	10.0	973.0	972.0	10.00	5.1	5.9	5.9	0.0	0.0	6.0	7.1	9.9	0.53	0.74	A
B	1.16	285.0	987.5	976.5	Z	0.87	100.0	987.5	984.0	3.5	U	185.0	984.0	976.5	4.05	3.2	2.7	5.0	0.9	0.0	5.9	7.1	9.9	7.14	10.03	B
C	0.26	350.0	985.0	972.0	Z	0.30	100.0	985.0	981.0	4.0	U	250.0	981.0	972.0	3.60	3.1	9.1	9.1	1.4	0.0	10.4	6.0	8.5	0.47	0.66	C
D	3.20	670.0	1004.7	985.0	Z	0.30	100.0	1004.7	1002.0	2.7	U	570.0	1002.0	985.0	2.98	2.8	10.3	10.3	3.4	0.0	13.7	5.4	7.6	5.17	7.34	D

ID #	Impervious CN		Pervious CM		Composite CN
	% Impervious Area	% Pervious Area	% Impervious Area	% Pervious Area	
A	7.7	92.3	98	80	81
B	43.9	56.1			88
C	0	100			80
D	0	100			80
Developed Site	11.2	88.8			82



Professional Registration  
Missouri  
Engineering 200502188-D  
Surveying 200508318-D  
Kansas  
Engineering E-1695  
Surveying LS-218  
Oklahoma  
Engineering 6254  
Nebraska  
Engineering CA2821

Raintree Animal Health Center  
Lee's Summit, Jackson County, Missouri

PAINTREE ANIMAL HEALTH CENTER  
Issue Date: December 2015

Drainage Area Map  
Final Development Plans for:  
Raintree Animal Health Center  
Lee's Summit, Jackson County, Missouri

Matthew J. Schlicht  
MO PE 2006019708  
KS PE 19071  
OK PE 21526

REVISIONS

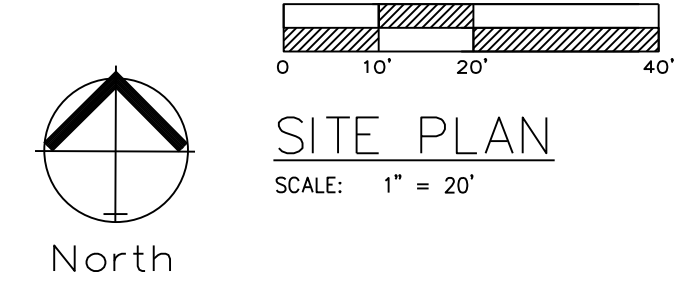
REV.	DATE	DESCRIPTION
REV.	04/04/16	



Storm Water Memorandum  
September 16, 2021  
Raintree Animal Health Center  
Lee's Summit, MO

## Exhibit B

# Existing Impervious Area



**Site Data Table**

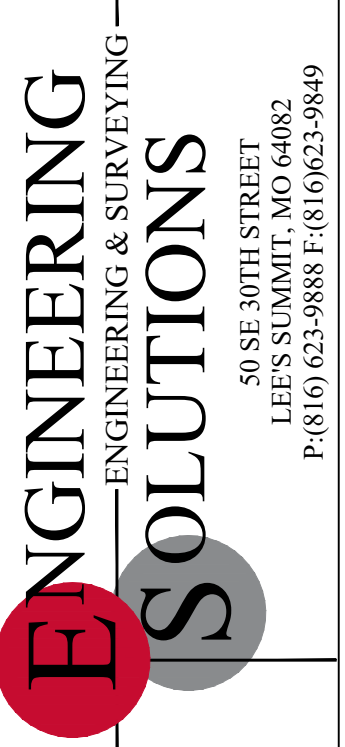
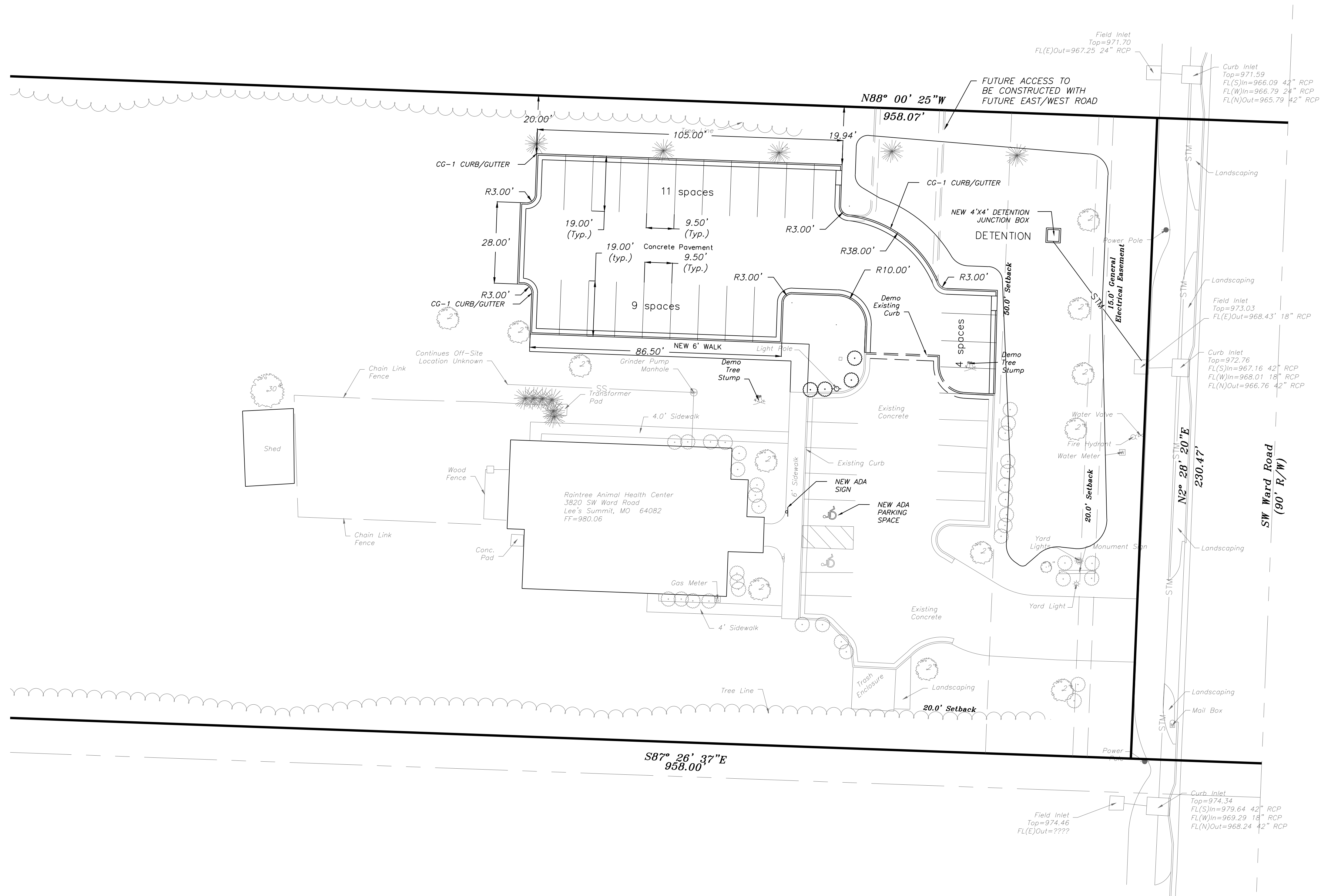
Total Area 207,501.86 Sq. Ft. (4.76 Ac.)

**Existing Impervious Area**

Building 3,980.95 Sq. Ft. (0.09 Ac.)  
 Asphalt/Sidewalk 8,717.30 Sq. Ft. (0.20 Ac.)  
 Impervious Area 12,698.25 Sq. Ft. (0.29 Ac. = 6.12% of Site)  
 Parking Spaces 12 Standard / 1 Handicap

**Future Impervious Area (Includes Existing)**

Building 3,980.95 Sq. Ft. (0.09 Ac.)  
 Asphalt/Sidewalk 17,610.68 Sq. Ft. (0.40 Ac.)  
 Impervious Area 21,591.63 Sq. Ft. (0.50 Ac. = 10.41% of Site)  
 Parking Spaces 36 Standard / 2 Handicap



Professional Registration  
 Missouri Engineering 200502188-D  
 Surveying 200508318-D  
 Kansas Engineering E-1695  
 Surveying LS-218  
 Oklahoma Engineering 6254  
 Nebraska Engineering CA2821

Site Plan  
 Final Development Plans for:  
 Raintree Animal Health Center  
 Lee's Summit, Jackson County, Missouri

DATE PREPARED: December 2015  
 DRAWN BY: ANIMAL HEALTH CENTER

Site Plan  
 Final Development Plans for:  
 Raintree Animal Health Center  
 Lee's Summit, Jackson County, Missouri

Matthew J. Schlicht  
 MO PE 2006019708  
 KS PE 19071  
 OK PE 25226

REVISIONS

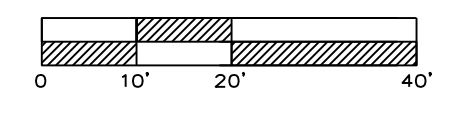
REV. 04/04/16	



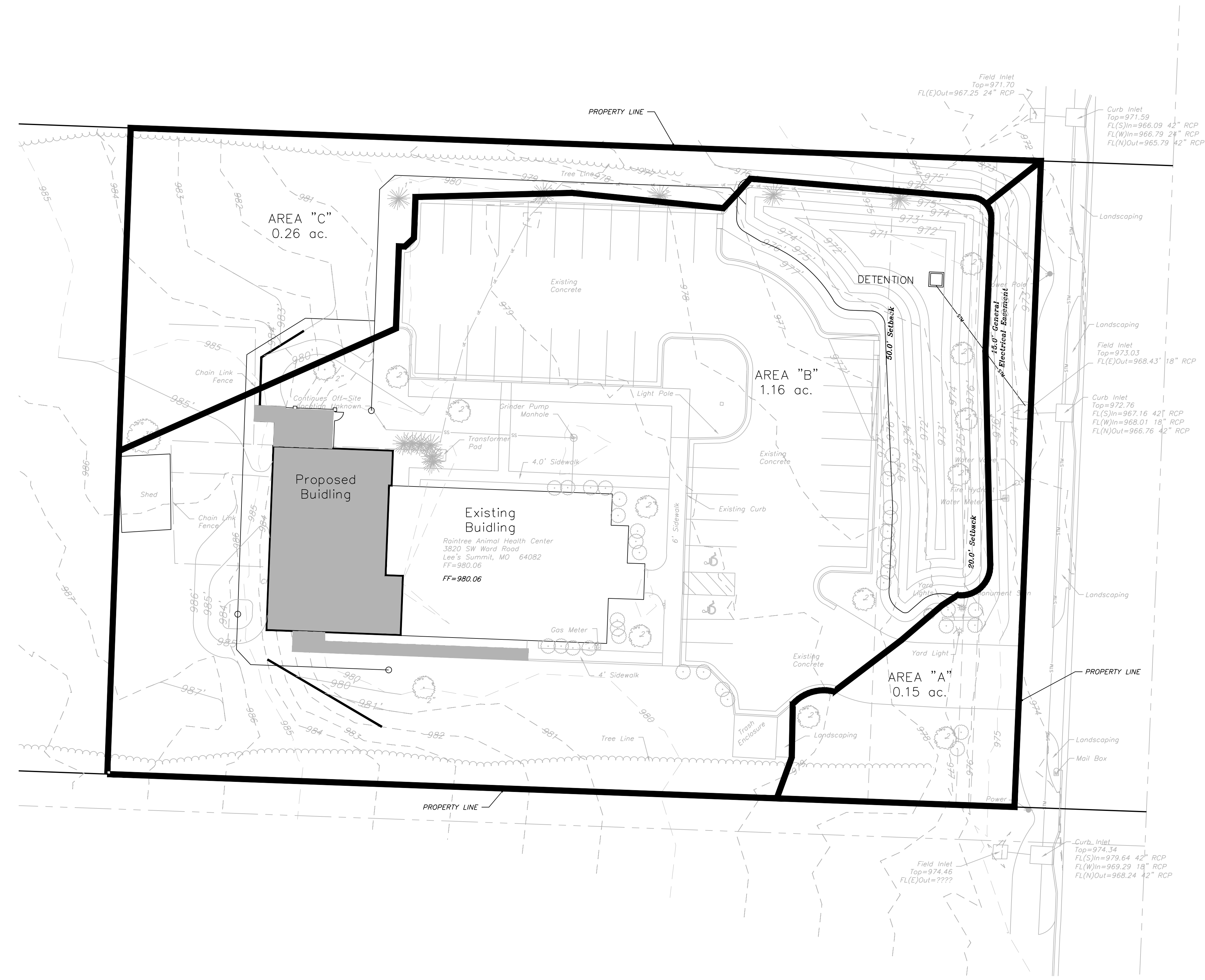
Storm Water Memorandum  
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## Exhibit C

# Proposed Impervious Area



PROPOSED IMPERVIOUS AREA  
SCALE: 1" = 20'



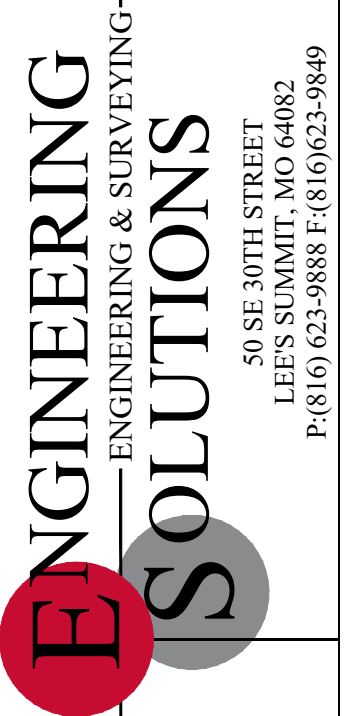
PROPOSED IMPERVIOUS AREA =  
0.06 ACRES

IMPERVIOUS AREA CALCULATIONS

EXISTING	Area (ac.)	CN	Area x CN
Impervious Area	0.50	98	49
Pervious Area	0.81	74	59.94
Total Area	1.31		108.94
Composite CN		83	

PROPOSED	Area (ac.)	CN	Area x CN
Impervious Area	0.58	98	56.84
Pervious Area	0.73	74	54.02
Total Area	1.31		110.86
Composite CN		85	

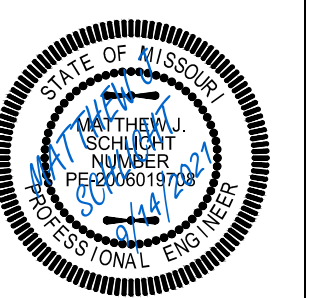


Professional Registration  
Missouri  
Engineering 2005002186-D  
Surveying 2005008319-D  
Kansas  
Engineering E-1685  
Surveying LS-218  
Oklahoma  
Engineering 6254  
Nebraska  
Engineering CA2821

Raintree Animal Health Center  
Lee's Summit, Jackson County, Missouri

Project: RAIN TREE ANIMAL HEALTH CENTER  
Issue Date: September 14, 2021

Proposed Impervious Area  
Final Development Plans for:  
Raintree Animal Health Center  
Lee's Summit, Jackson County, Missouri



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NE PE E-14335

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