Exhibit A
Proposed Preliminary Site Development Plan

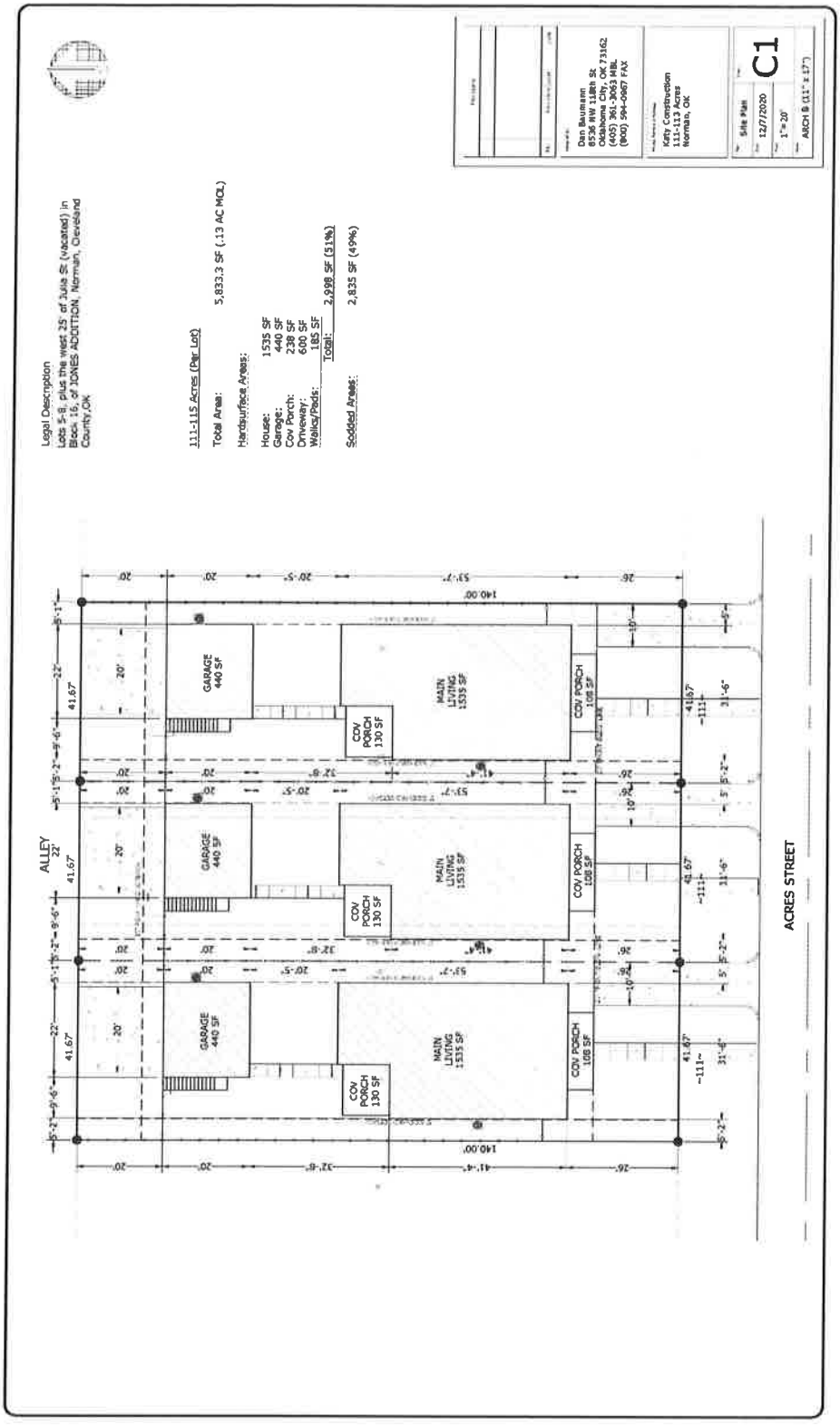


Exhibit B
Proposed Storm Water/ Drainage Report

S·T·P SOLUTIONS, INC.

ENGINEERING ♦ LAND SURVEYING ♦ GEOTECHNICAL SERVICES
OK CA 8422

DRAINAGE REPORT

FOR

THE GATEWAY ON ACRES STREET
111-113 Acres Street
Norman, OK 73069

March 1, 2021

LICENSED PROFESSIONAL ENGINEER
Darin
Teeman
25180
OKLAHOMA
03/01/21

CERTIFICATE OF AUTHORIZATION
STP
SOLUTIONS,
INC
8422
OKLAHOMA

Corp. Office: 218 West Side Blvd. ♦ Muskogee, OK 74403 ♦ 918.438.7966
West Oklahoma Office: 7006 NW 63rd Street, Suite 102 ♦ Bethany, OK 73008 ♦ 405.210.3169

City Engineer

PROJECT:

The Gateway on Acres Street
111-113 Acres Street
Norman, OK 73069

Katy Construction proposes to develop this parcel of land into three (3) individual lots with a two story residential unit and an auxiliary dwelling unit on each lot. At the time of this report, the existing two homes, outbuildings and all pavements have been removed.

The property has 125 feet of frontage on the north side of Acres Street and 125 feet frontage at the existing city alley. The property is 17,000 s.f. or 0.40 acres. The alley will be used as access for the auxiliary dwelling units.

HISTORIC DATA

The historical drainage area used for this report is the entire 125'X140' plus the city right-of-way to the back of existing curb on Acres Street. This makes the Historic DA=0.45 acres. of the property is 1.16 acres. The property drains both to the NW and the SW, so two Historic basins were calculated to determine the total Historic release rate. Basin A drains SW to Acres Street and has a DA of 0.32 acres, and a Q100 of 1.79 cfs. Basin B drains NW to the alley and has a DA of 0.13 acres, and a Q100 of 0.81 cfs.

The total Historic release for a 100 year storm event is 2.70 cfs.

DEVELOPED DATA

The developed project has been divided by into two (2) basins. They are as follows:

BASIN A

The developed drainage area for Basin A is 0.30 acres and drains SW to Acres Street. The Developed Q100 = 2.01 cfs.

BASIN B

The developed drainage area for Basin B is 0.15 acres and drains NW to the existing alley. The Developed Q100 = 1.06 cfs.

Total Developed release for a 100 year storm event is 3.07 cfs.

This development will cause an increase of 0.37 cfs. during the 100 year storm. This 0.37 cfs. has been mitigated by the construction of three (3) Porous Paver parking areas in Basin B. The 3 parking areas have a total of 1200 s.f. of surface area and will allow water to be absorbed below grade and when the aggregate section is saturated it will flow in 4" pvc piping to Acres Street and released through the concrete curb. Refer to Exhibit B in this report for details of the Porous Paver Parking details.

SUMMARY

This project has been prepared under my direct supervision; the attached Plans comply with the City of Norman governing ordinances. The discharge from this site will not exceed the historical rates for this property prior to development for the 2 year, 5 year, 10 year, 25 year 50 year and 100 year frequency storm.

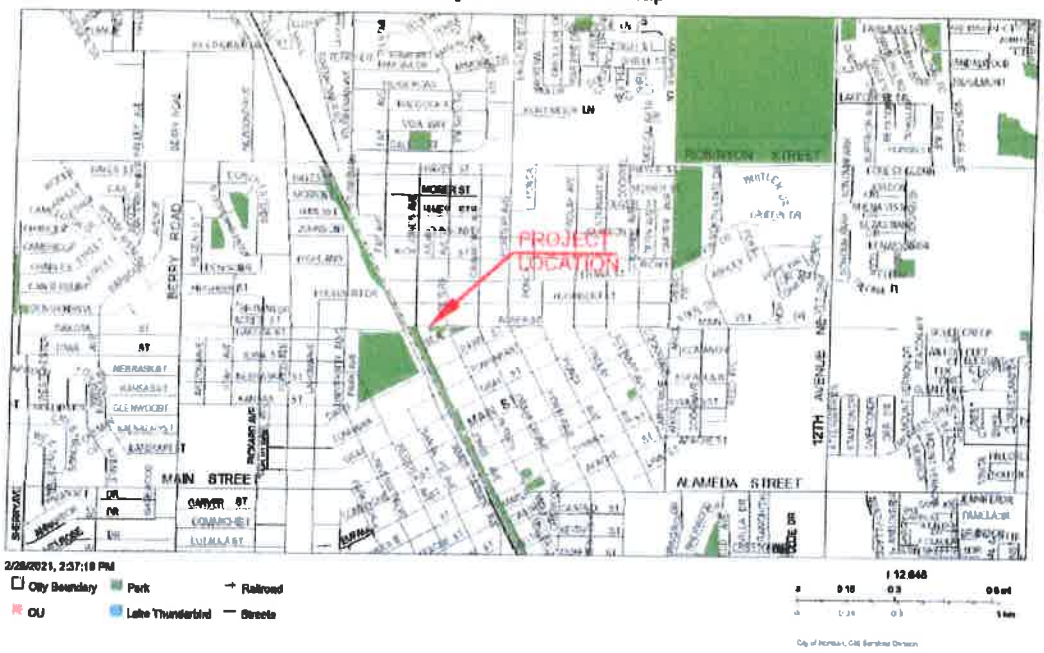
Respectfully submitted,

LICENSED PROFESSIONAL ENGINEER
Darin Teeman
25180
OKLAHOMA

Date: 03/01/21

Darin Teeman, PE 25180

City of Norman WebMap



S·T·P SOLUTIONS, INC.
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◆ LAND SURVEYING
◆ GEOTECHNICAL SERVICES
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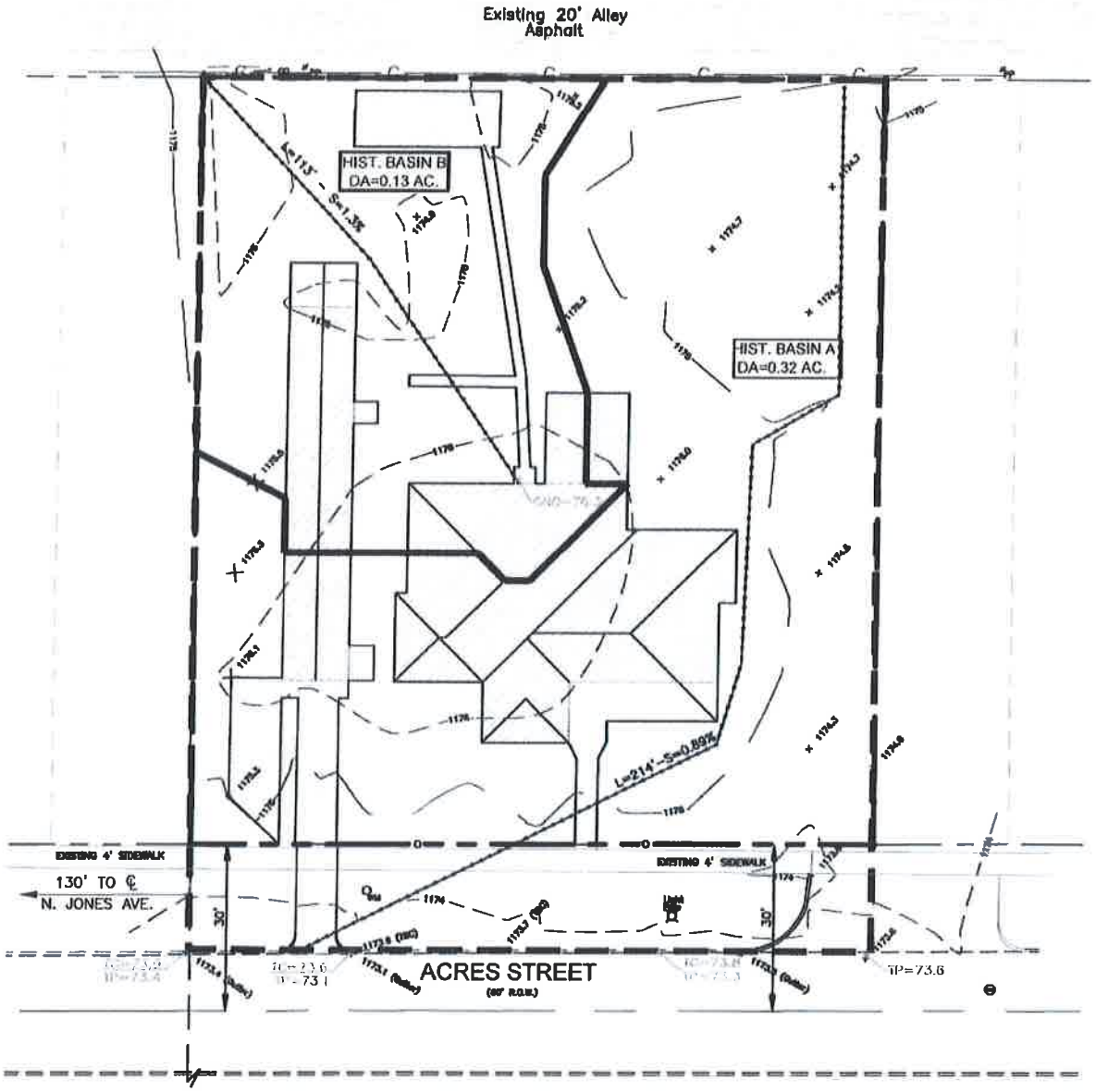
THE GATEWAY ON E. ACRES ST.
KEITH McCABE
111-113 ACRES ST.
NORMAN, OK

NORTH

LOCATION MAPS

Drawn By: TLP	Scale: NONE
Checked By: DT	Date: 03/01/21
Project No.: E21–100.1	EXHIBIT A

G:\Shared drives\Engineering Department\05-ENGINEERING CONTRACTS\E20-116.1-KEITH McCABE-111-113 E. ACRES\03-DWG\01- MacABE BASE_21-02-25.dwg 2/27/2021 1:55:53 PM 11



HISTORIC RUNOFF CALCULATIONS

BASIN A		BASIN B	
DA=	.32 AC.	DA=	.13 AC.
L=	214'	L=	113'
S=	0.89%	S=	1.33%
Tc=	12.40 MIN.	Tc=	9.60 MIN.
Q100=	1.79 CFS	Q100=	0.81 CFS

TOTAL HIST. Q100 = 2.70 CFS

LICENSED PROFESSIONAL ENGINEER
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03/01/21

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THE GATEWAY ON E. ACRES ST.
KEITH McCABE
111-113 ACRES ST.
NORMAN, OK

NORTH

HISTORIC DRAINAGE MAP

Drawn By: TLP	Scale: 1"=30'
Checked By: DT	Date: 03/01/21
Project No.: E21-100.1	HIST. 1.0

RUNOFF CALCULATION BY

OKC RATIONAL METHOD

CITY OF NORMAN

FILE McCABE - ACRES STREET
PROJECT NO E21-100.1
BY DT/TLP
DATE 21/02/24
SHEET NO 1 **OF** 1
SUBJECT 02-HIST. BASIN A

Project Location: 111 to 113 ACRES STREET
Drainage Area: 02-HISTORIC CONDITIONS - BASIN A
Structure Number: N/A
Area: 0.32 Acres (0.00 Sq. Mi.) **Avg. Slope:** % (ft/mi.)

WEIGHTED RUNOFF COEFFICIENT:

Land Use:	Area (Ac)	% Total Area	C	Lo	K Factor
Landscaped	0.234	73.13%	0.55	154.0	0.775
Undeveloped	0.000	0.00%	0.30	0.0	0.775
Cultivated	0.000	0.00%	0.50	0.0	0.775
Commercial	0.000	0.00%	0.95	0.0	0.445
Residential	0.000	0.00%	0.70	0.0	0.511
Paved	0.086	26.88%	0.95	60.0	0.372

Weighted C: 0.66

Weighted K Factor: 0.662

TIME OF CONCENTRATION:

Time Overland:

Length of Overland Flow, L:	214.00	ft
Drop in Ft.	1.90	ft
Overland Average Slope, S:	0.0089	ft/ft
Overland K Factor (K):	0.6620	

Overland Time of Concentration, $T_C = K^*(L^{0.33}) / S^{0.20}$

Time In System:

Total Time Overland: 12.40 min. **Total Time In System:** min.
Total TC: 12.40 min.

RAINFALL INTENSITY:

$I = A / (B + Tc)^E$

I_{50} = 7.64 I_{25} = 6.72
I_{10} = 5.80 I_5 = 5.09
I_2 = 4.32

Where: I_{10c} = 8.49 Intensity of rainfall (inches / hour)
A, B, and E = ... Intensity, Frequency and Duration (I-F-D) Equation Parameters; shown below in Table 1-1.
Tc = ... Time of Concentration unique to the sub-basin

Table 1-1

Frequency	Parameters					
(Year)	2 year	5 year	10 year	25 year	50 year	100 year
D	56.43	72	82	95	108	120
E	11.5	15	15	15	15	15
F	0.81	0.80	0.80	0.80	0.80	0.80

HISTORIC PEAK DISCHARGE:

	C		I (in/hr)		A (Ac)		
Q_{100}=	0.66	*	8.49	*	0.32	=	1.79 cfs
Q_{50}=	0.66	*	7.64	*	0.32	=	1.61 cfs
Q_{25}=	0.66	*	6.72	*	0.32	=	1.41 cfs
Q_{10}=	0.66	*	5.80	*	0.32	=	1.22 cfs
Q_5=	0.66	*	5.09	*	0.32	=	1.07 cfs
Q_2=	0.66	*	4.32	*	0.32	=	0.91 cfs

HIST A

RUNOFF CALCULATION BY

OKC RATIONAL METHOD

CITY OF NORMAN

FILE McCABE - ACRES STREET
PROJECT NO E21-100.1
BY DT/TLP
DATE 21/02/24
SHEET NO 1 **OF** 1
SUBJECT 02-HIST. BASIN B

Project Location: 111 to 113 ACRES STREET
Drainage Area: 02-HISTORIC CONDITIONS - BASIN B
Structure Number: N/A
Area: 0.13 Acres (0.00 Sq. Mi.) **Avg. Slope:** % (ft/mi.)

WEIGHTED RUNOFF COEFFICIENT:

Land Use:	Area (Ac)	% Total Area	C	Lo	K Factor
Landscaped	0.09	69.23%	0.55	93.0	0.775
Undeveloped	0.00	0.00%	0.30	0.0	0.775
Cultivated	0.00	0.00%	0.50	0.0	0.775
Commercial	0.00	0.00%	0.95	0.0	0.445
Residential	0.00	0.00%	0.70	0.0	0.511
Paved	0.04	30.77%	0.95	20.0	0.372

Weighted C: 0.67

Weighted K Factor: 0.704

TIME OF CONCENTRATION:

Time Overland:

Length of Overland Flow, L: 113.00 ft
6 1.50 ft
Overland Average Slope, S: 0.0133 ft/ft
Overland K Factor (K): 0.7037
Overland Time of Concentration, $T_C = K*(L^{0.33}) / S^{0.20}$

Time In System:

Total Time Overland: 9.60 min. **Total Time in System:** min.
Total TC: 9.60 min.

RAINFALL INTENSITY:

$I = A / (B + Tc)^{\wedge E}$

I_{50} = 8.33 I_{25} = 7.33
I_{10} = 6.32 I_5 = 5.55
I_2 = 4.77

Where: I_{10c} = 9.26 Intensity of rainfall (inches / hour)
A, B, and E = ... Intensity, Frequency and Duration (I-F-D) Equation Parameters; shown below in Table 1-1.
Tc = ... Time of Concentration unique to the sub-basin

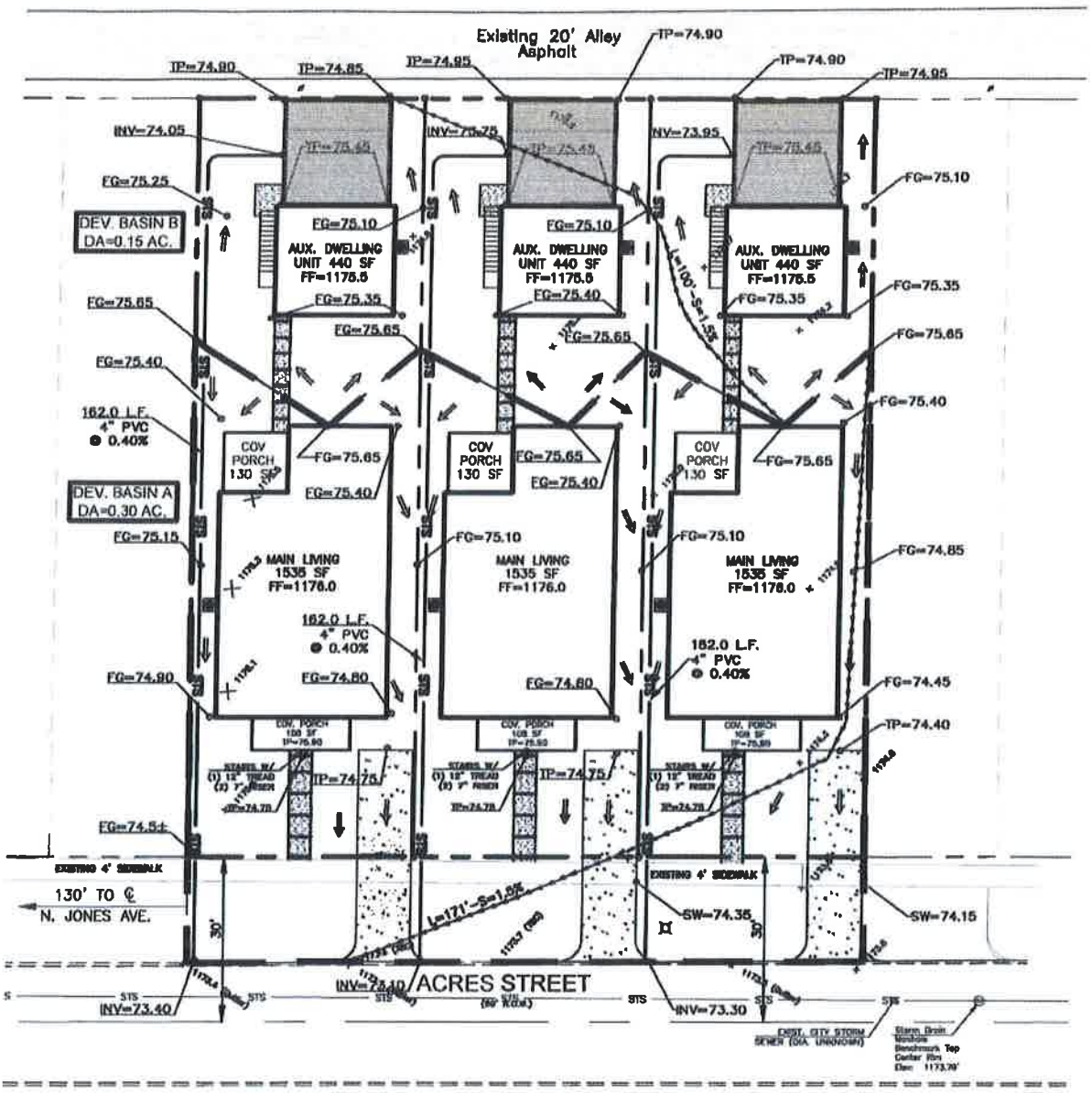
Table 1-1

Frequency (Year)	Parameters					
	2 year	5 year	10 year	25 year	50 year	100 year
D	56.43	72	82	95	108	120
E	11.5	15	15	15	15	15
F	0.81	0.80	0.80	0.80	0.80	0.80

HISTORIC PEAK DISCHARGE:

	C		I (in/hr)		A (Ac)		
Q_{100}=	0.67	*	9.26	*	0.13	=	0.81 cfs
Q_{50}=	0.67	*	8.33	*	0.13	=	0.73 cfs
Q_{25}=	0.67	*	7.33	*	0.13	=	0.64 cfs
Q_{10}=	0.67	*	6.32	*	0.13	=	0.55 cfs
Q_5=	0.67	*	5.55	*	0.13	=	0.49 cfs
Q_2=	0.67	*	4.77	*	0.13	=	0.42 cfs

HIST B



DEVELOPED RUNOFF CALCULATIONS

BASIN A		BASIN B	
DA=	.30 AC.	DA=	.15 AC.
L=	171'	L=	100'
S=	1.5%	S=	0.80%
Tc=	10.29 MIN.	Tc=	9.73 MIN.
Q100=	2.01 CFS	Q100=	1.06 CFS

TOTAL DEV. Q100 = 3.07 CFS

LICENSED PROFESSIONAL ENGINEER
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03/01/21

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THE GATEWAY ON E. ACRES ST.
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NORMAN, OK

NORTH

DEVELOPED DRAINAGE MAP

Drawn By: TLP	Scale: 1"=30'
Checked By: DT	Date: 03/01/21
Project No.:E21-100.1	DEV. 1.0

RUNOFF CALCULATION BY

OKC RATIONAL METHOD

CITY OF NORMAN

FILE McCABE - ACRES STREET
PROJECT NO E21-100.1
BY DT/TLP
DATE 21/02/24
SHEET NO 1 **OF** 1
SUBJECT 02-DEV. BASIN A

Project Location: 111 to 113 ACRES STREET
Drainage Area: 02-DEV. CONDITIONS - BASIN A
Structure Number: N/A
Area: 0.30 Acres (0.00 Sq. Mi.) **Avg. Slope:** % (ft/mi.)

WEIGHTED RUNOFF COEFFICIENT:

Land Use:	Area (Ac)	% Total Area	C	Lo	K Factor
Landscaped	0.140	46.67%	0.50	123.0	0.775
Undeveloped	0.000	0.00%	0.30	0.0	0.775
Cultivated	0.000	0.00%	0.50	0.0	0.775
Commercial	0.000	0.00%	0.95	0.0	0.445
Residential	0.000	0.00%	0.70	0.0	0.511
Paved	0.160	53.33%	0.95	48.0	0.372

Weighted C: 0.74

Weighted K Factor: 0.662

TIME OF CONCENTRATION:

Time Overland:

Length of Overland Flow, L:	171.00	ft
Drop in Ft.	2.55	ft
Overland Average Slope, S:	0.0149	ft/ft
Overland K Factor (K):	0.6619	

Overland Time of Concentration, $T_C = K*(L^{0.33}) / S^{0.20}$

Time in System:

Total Time Overland: 10.29 min. **Total Time in System:** min.
Total TC: 10.29 min.

RAINFALL INTENSITY:

$I = A / (B + Tc)^{E}$

Where: I_{10C} = 9.05 Intensity of rainfall (inches / hour)
A, B, and E = ... Intensity, Frequency and Duration (I-F-D) Equation Parameters; shown below in Table 1-1.
Tc = ... Time of Concentration unique to the sub-basin

I_{50} = 8.15 I_{25} = 7.17
I_{10} = 6.19 I_5 = 5.43
I_2 = 4.65

Table 1-1

Frequency	*Parameters*					
(Year)	*2 year*	*5 year*	*10 year*	*25 year*	*50 year*	*100 year*
D	56.43	72	82	95	108	120
E	11.5	15	15	15	15	15
F	0.81	0.80	0.80	0.80	0.80	0.80

HISTORIC PEAK DISCHARGE:

	C		I (in/hr)		A (Ac)		
Q_{100}=	0.74	*	9.05	*	0.30	=	2.01 cfs
Q_{50}=	0.74	*	8.15	*	0.30	=	1.81 cfs
Q_{25}=	0.74	*	7.17	*	0.30	=	1.59 cfs
Q_{10}=	0.74	*	6.19	*	0.30	=	1.37 cfs
Q_5=	0.74	*	5.43	*	0.30	=	1.21 cfs
Q_2=	0.74	*	4.65	*	0.30	=	1.03 cfs

RUNOFF CALCULATION BY

OKC RATIONAL METHOD

FILE McCABE - ACRES STREET
PROJECT NO E21-100.1
BY DT/TLP
DATE 21/02/24
SHEET NO 1 **OF** 1
SUBJECT 02-DEV BASIN B

CITY OF NORMAN

Project Location: 111 to 113 ACRES STREET
Drainage Area: 02-DEV. CONDITIONS - BASIN B
Structure Number: N/A
Area: 0.15 Acres (0.00 Sq. Mi.) **Avg. Slope:** % (ft/mi.)

WEIGHTED RUNOFF COEFFICIENT:

Land Use:	Area (Ac)	% Total Area	C	Lo	K Factor
Landscaped	0.060	40.00%	0.50	75.0	0.775
Undeveloped	0.000	0.00%	0.30	0.0	0.775
Cultivated	0.000	0.00%	0.50	0.0	0.775
Commercial	0.000	0.00%	0.95	0.0	0.445
Residential	0.000	0.00%	0.70	0.0	0.511
Paved	0.090	60.00%	0.95	25.0	0.372

Weighted C: 0.77

Weighted K Factor: 0.674

TIME OF CONCENTRATION:

Time Overland:

Length of Overland Flow, L:	100.00	ft
Drop in Ft.	0.80	ft
Overland Average Slope, S:	0.0080	ft/ft
Overland K Factor (K):	0.6743	

Overland Time of Concentration, $T_C = K^*(L^{0.5})\ /\ S^{0.20}$

Time In System:

Total Time Overland: 9.73 min. **Total Time in System:** min.
Total TC: 9.73 min.

RAINFALL INTENSITY:

I= A / (B + Tc)^E

I_{50} = 8.29 I_{25} = 7.30
I_{10} = 6.30 I_5 = 5.53
I_2 = 4.75

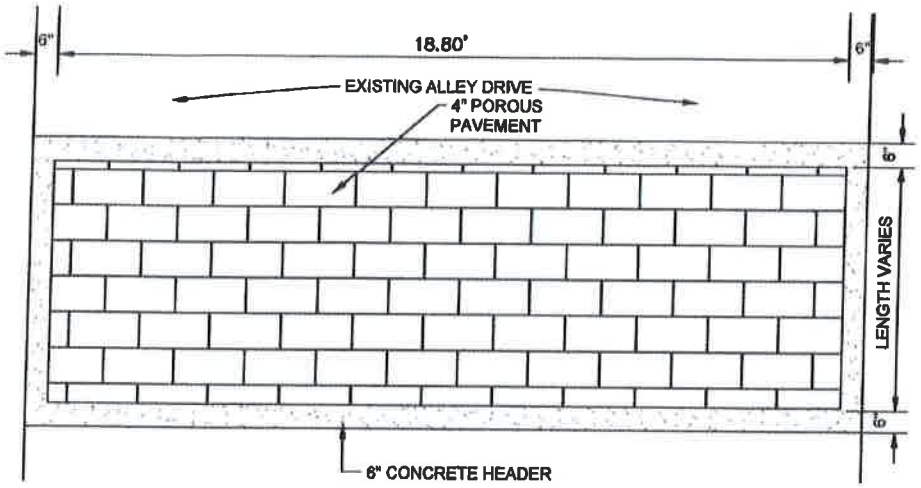
Where: I_{10C} = 9.22 Intensity of rainfall (inches / hour)
A, B, and E = ... Intensity, Frequency and Duration (I-F-D) Equation Parameters; shown below in Table 1-1.
Tc = ... Time of Concentration unique to the sub-basin

Table 1-1

Frequency	*Parameters*					
(Year)	*2 year*	*5 year*	*10 year*	*25 year*	*50 year*	*100 year*
D	56.43	72	82	95	108	120
E	11.5	15	15	15	15	15
F	0.81	0.80	0.80	0.80	0.80	0.80

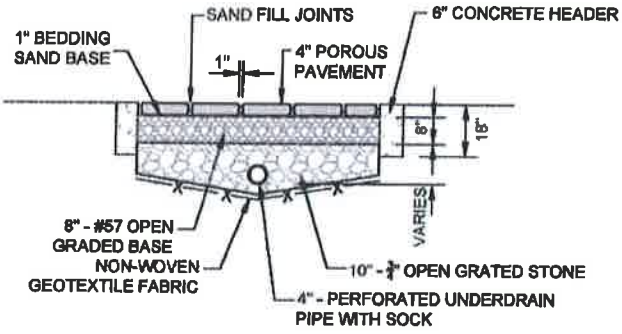
HISTORIC PEAK DISCHARGE:

	C		I (in/hr)		A (Ac)		
Q_{100}=	0.77	*	9.22	*	0.15	=	1.06 cfs
Q_{50}=	0.77	*	8.29	*	0.15	=	0.96 cfs
Q_{25}=	0.77	*	7.30	*	0.15	=	0.84 cfs
Q_{10}=	0.77	*	6.30	*	0.15	=	0.73 cfs
Q_5=	0.77	*	5.53	*	0.15	=	0.64 cfs
Q_2=	0.77	*	4.75	*	0.15	=	0.55 cfs



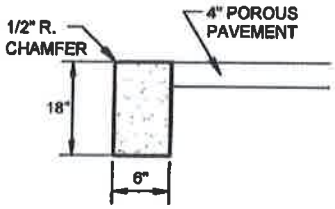
PAVESTONE PARKING AREA

SCALE: NTS



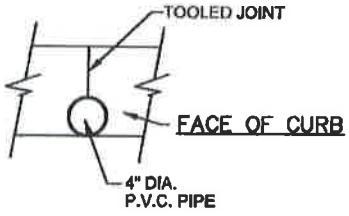
POROUS PAVER SECTION

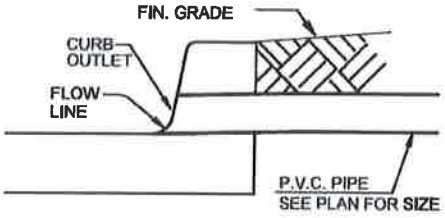
SCALE: NTS



CONCRETE HEADER

NO SCALE





DRAIN LINE @ CURB OUTLET DETAIL

SCALE: NTS

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NORMAN, OK

NORTH

PAVESTONE PARKING AREA	
Drawn By: TLP	Scale: NONE
Checked By: DT	Date: 03/01/21
Project No.: E21-100.1	EXHIBIT B