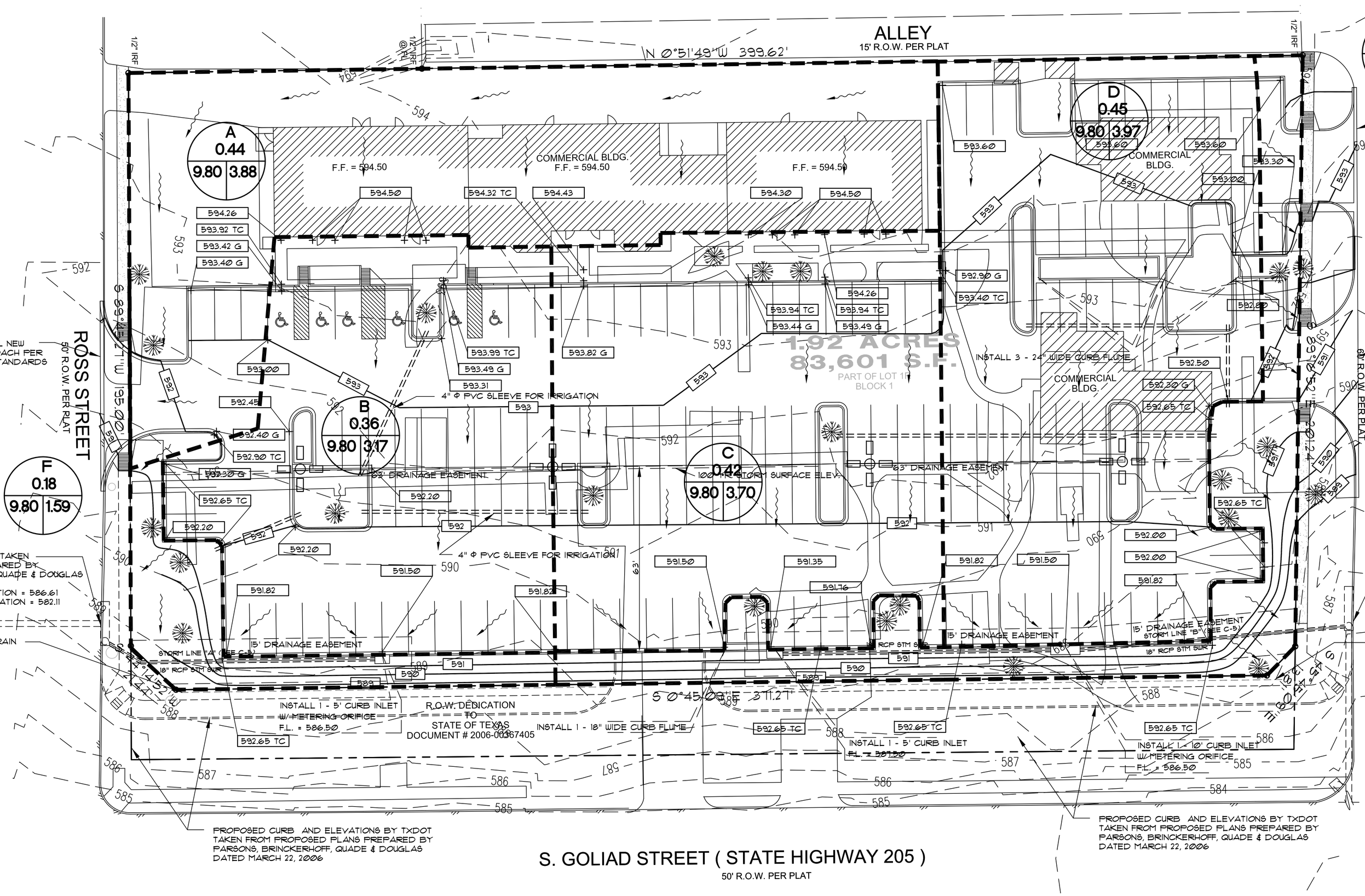
FIRST BAPTIST CHURCH PARKING ADDITION



DRAINAGE DESIGN CRITERIA

BASIS:
RATIONAL METHOD Q = CIA
Q = CUBIC FEET PER SECOND
C = RUNOFF COEFFICIENT
I = DESIGN STORM INTENSITY
A = DRAINAGE AREA (ACRES)

RUNOFF COEFFICIENT:
0.90 SHOPPING CENTERS

INTENSITY:
RAINFALL INTENSITY-DURATION-FREQUENCY CURVES FOR AREA DEVELOPED FROM NATIONAL WEATHER SERVICE RAINFALL FREQUENCY DATA PRESENTED IN TECHNICAL MEMORANDUM NWS HYDRO-35, DATED JUNE 1977 AND TECHNICAL PAPER NO. 40, DATED MAY 1961.

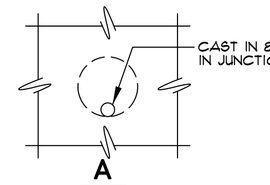
STORM FEQUENCY:
100 YEAR

TIME OF CONCENTRATION:
10 MINUTES

DRAINAGE SYMBOL LEGEND

AC
I_{100} Q_{100}
ACRES
CIA (100 YEAR)
RAINFALL INTENSITY (100 YEAR)

ORIFICE CALCULATION



STORM A
Q_{100} = 1.48 cfs
$1.48 = .7A\sqrt{2gh} = .7A\sqrt{64.4\ (5.79)}$
1.48 = 13.52 A
A = .109 => .373'
USE 4 1/2"Φ

STORM B
Q_{100} = 3.62 cfs
$3.62 = .7A\sqrt{2gh} = .7A\sqrt{64.4\ (5.79)}$
3.62 = 13.52 A
A = .268 => .584'
USE 7"Φ

DRAINAGE LEGEND

DRAINAGE DIRECTION ARROW
DRAINAGE DIVIDE
712 EXISTING CONTOUR
12" PROPOSED STORM SEWER

NOTE: IF IMPROVEMENTS ARE INSTALLED PRIOR TO CONSTRUCTION OF TXDOT SYSTEMS, PLUG THE METERING INSERT AT EACH DISCHARGING INLET AND THE ENDS OF PROPOSED PIPES. INSTALL A "V" NOTCH WEIR ADJACENT TO CURB INLETS (45°) UNTIL TXDOT INLETS ARE INSTALLED . AFTER INSTALLATION OF THE TXDOT INLETS THE PROJECT CONTRACTOR WILL CONNECT TO THE TXDOT INLETS AND REMOVE THE "V" NOTCH WEIR.

DETENTION ANALYSIS
25AUG08

100 YEAR STORM

FIRST BAPTIST CHURCH OF ROCKWALL – PARKING AT GOLIAD
MODIFIED RATIONAL METHOD

PREDEVELOPMENT CONDITIONS
C = 0.90, A = 0.44 (AREA "A")
C = 0.50, A = 1.23 (AREAS "B", "C" AND "D")
Tc = 20 min.
I ∞ = 8.30
Q = 0.50 X 8.30 X 1.23 = 5.10 cfs (AREAS "B","C" AND "D")
TOTAL 5.10 cfs

POSTDEVELOPMENT CONDITIONS
C = 0.90, A = 1.23 (AREAS "B","C" AND "D")
Tc = 10 min.
I ∞ = 9.80
Q = 0.90 X 9.80 X 1.23 = 10.84 cfs (AREAS "B","C" AND "D")
TOTAL 10.84 cfs

15 min.	I = 9.00	Q = .90 X 9.00 X 1.23 =	9.96 cfs
20 min.	I = 8.30	Q = .90 X 8.30 X 1.23 =	9.19 cfs
30 min.	I = 6.90	Q = .90 X 6.90 X 1.23 =	7.64 cfs
40 min.	I = 5.80	Q = .90 X 5.80 X 1.23 =	6.42 cfs
50 min.	I = 5.00	Q = .90 X 5.00 X 1.23 =	5.54 cfs
60 min.	I = 4.50	Q = .90 X 4.50 X 1.23 =	4.98 cfs
70 min.	I = 4.10	Q = .90 X 4.10 X 1.23 =	4.54 cfs
80 min.	I = 3.90	Q = .90 X 3.90 X 1.23 =	4.32 cfs

Storage Volume

15 min. Storm Inflow 15 X 9.96 X 60 sec./min.	=	8,964 cf
Outflow 0.5 X 25 X 5.10 X 60 sec./min.	=	3,825 cf
		5,139 cf
20 min. Storm Inflow 20 X 9.19 X 60 sec./min.	=	11,028 cf
Outflow 0.5 X 30 X 5.10 X 60 sec./min.	=	4,590 cf
		6,438 cf
30 min. Storm Inflow 30 X 7.64 X 60 sec./min.	=	13,752 cf
Outflow 0.5 X 40 X 5.10 X 60 sec./min.	=	6,120 cf
		7,632 cf
40 min. Storm Inflow 40 X 6.42 X 60 sec./min.	=	15,408 cf
Outflow 0.5 X 50 X 5.10 X 60 sec./min.	=	7,650 cf
		7,758 cf
50 min. Storm Inflow 50 X 5.54 X 60 sec./min.	=	16,620 cf
Outflow 0.5 X 60 X 5.10 X 60 sec./min.	=	9,180 cf
		7,440 cf
60 min. Storm Inflow 60 X 4.98 X 60 sec./min.	=	17,928 cf
Outflow 0.5 X 70 X 5.10 X 60 sec./min.	=	10,710 cf
		7,218 cf
70 min. Storm Inflow 70 X 4.54 X 60 sec./min.	=	19,068 cf
Outflow 0.5 X 80 X 5.10 X 60 sec./min.	=	12,240 cf
		6,828 cf
80 min. Storm Inflow 80 X 4.32 X 60 sec./min.	=	20,736 cf
Outflow 0.5 X 90 X 5.10 X 60 sec./min.	=	13,770 cf
		6,966 cf

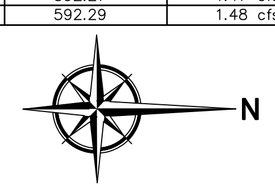
PEAK VOLUME = 7,758 ft^3 at 40 min. Storm

DRAINAGE CRITERIA Q = CIA

AREA NO.	AREA AC	Tc	c	I IN	Q_{100}	REMARKS
A	0.44	10	0.90	9.80	3.88	15' CURB INLET
B	0.36	10	0.90	9.80	3.17	5' CURB INLET
C	0.42	10	0.90	9.80	3.70	5' CURB INLET
D	0.45	10	0.90	9.80	3.97	10' CURB INLET
E	0.07	10	0.90	9.80	0.62	OFF SITE
F	0.18	10	0.90	9.80	1.59	OFF SITE

DETENTION DISCHARGE

YEAR	DETAINED VOLUME	WATER SURFACE ELEV.	STORM A "Q" ACTUAL	STORM A "Q" ALLOWED	STORM B "Q" ACTUAL	STORM B "Q" ALLOWED
2 YEAR	3,222 ft^3	592.08	1.45 cfs	0.71 cfs	3.55 cfs	1.75 cfs
5 YEAR	4,546 ft^3	592.19	1.46 cfs	0.87 cfs	3.58 cfs	2.14 cfs
10 YEAR	5,274 ft^3	592.21	1.46 cfs	1.04 cfs	3.59 cfs	2.54 cfs
25 YEAR	6,036 ft^3	592.24	1.47 cfs	1.20 cfs	3.60 cfs	2.93 cfs
50 YEAR	6,840 ft^3	592.27	1.47 cfs	1.30 cfs	3.61 cfs	3.18 cfs
100 YEAR	7,758 ft^3	592.29	1.48 cfs	1.48 cfs	3.62 cfs	3.62 cfs



SCALE 1"= 20'

RECORD DRAWINGS
FEBRUARY 10, 2010

BENCHMARK:
ON SITE BENCHMARK, FINISH FLOOR OF EXISTING BUILDING, RELATIVE ELEVATION – 100.00 = 595.28 CITY DATUM.

REV. NO.	TYPE OF WORK	ENG.	DATE	CITY OF ROCKWALL	DATE

DRAINAGE AREA MAP

2008 PARKING ADDITION

FIRST BAPTIST CHURCH – ROCKWALL, TX

PUBLIC WORKS DEPARTMENT

CITY OF ROCKWALL, TEXAS

TMBP
CONSULTING ENGINEERS INC.
2301 NORTH AKARD ST. SUITE 405
DALLAS, TEXAS 75201
(214) 871-2302 (214) 871-8716 FAX

DESIGN	DRAWN	DATE	SCALE	NOTES	FILE	NO.
J. PITT	R.MITCH	AUG 28 2008				C-3

FIRST BAPTIST CHURCH PARKING ADDITION