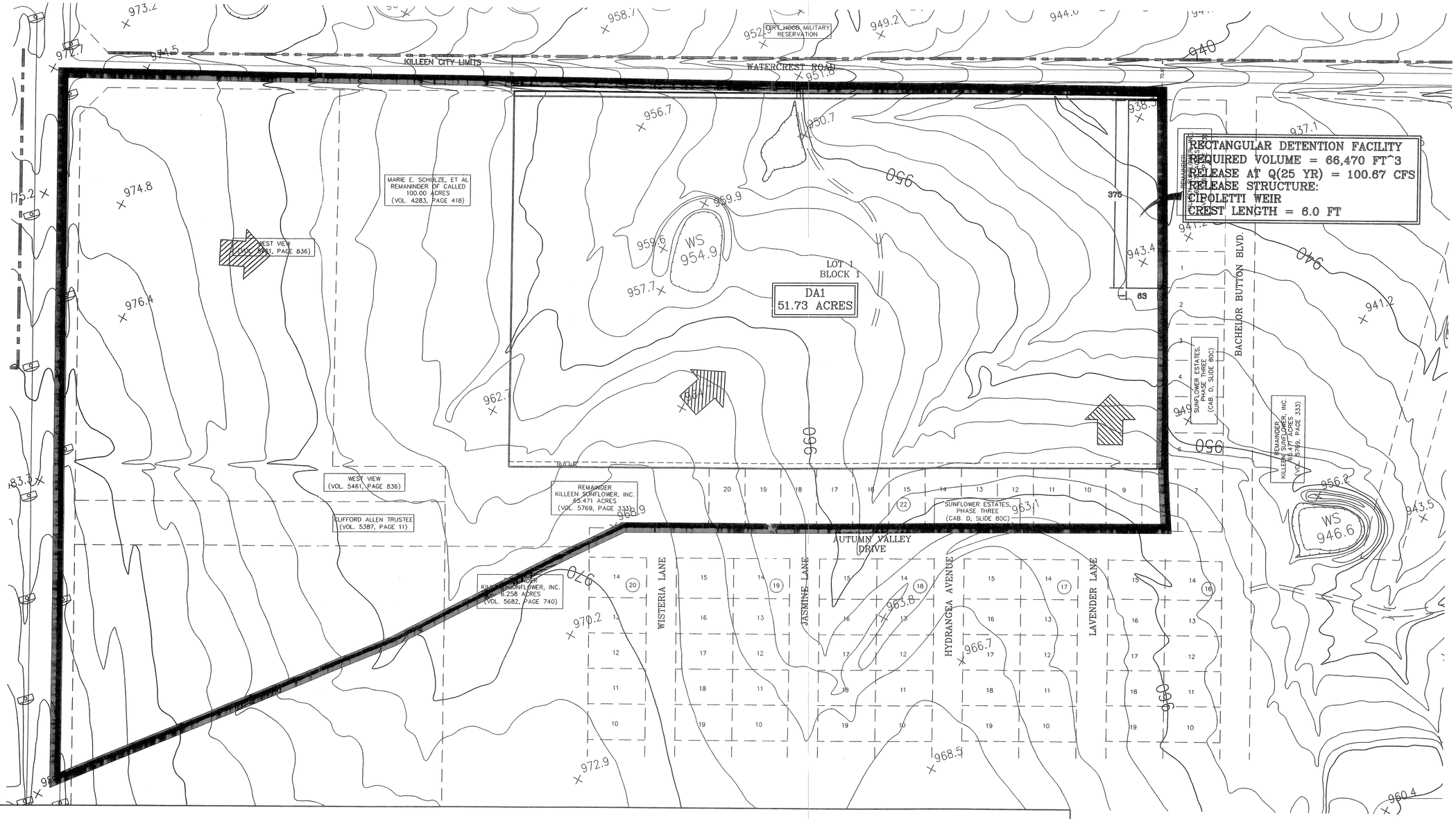

EXISTING CONDITIONS

Existing DA1 — 51.73 Ac.

TIME OF CONCENTRATION

SHEET FLOW

$T_c = Ln/(42*S^{0.5})$

300	L =	Length of reach in feet
0.10	n =	Manning's n
0.0233	S =	Slope of Ground in ft/ft
4.7	T_t =	Travel time in minutes

SHALLOW CONCENTRATED FLOW

$T_c = Ln/(60*S^{0.5})$

2278	L =	Length of reach in feet
0.10	n =	Manning's n
0.0178	S =	Slope of Ground in ft/ft
28.6	T_t =	Travel time in minutes

33.2 T_c = TOTAL TIME OF CONCENTRATION

Use city maximum time of concentration. Tc=30 minutes

EXISTING	COMPOSITE C FACTOR	
	AREA(Ac.)	C
Undeveloped	48.00	0.35
Residential	3.73	0.50
Commercial	0.00	0.90
	COMPOSITE C=	0.36

Existing DA1	51.73 AC			Rainfall Intensity (in/hr)
	Q (cfs)	C	Area (ac)	
5 year	74.7	0.36	51.73	4.00
10 year	86.8	0.36	51.73	4.58
25 year	100.7	0.36	51.73	5.39
100 year	123.9	0.36	51.73	6.64

PROPOSED CONDITIONS

Proposed DA1 — 51.73 Ac.

TIME OF CONCENTRATION

SHEET FLOW

$T_c = Ln/(42*S^{0.5})$

300	L =	Length of reach in feet
0.10	n =	Manning's n
0.0233	S =	Slope of Ground in ft/ft
4.7	T_t =	Travel time in minutes

SHALLOW CONCENTRATED FLOW

$T_c = Ln/(60*S^{0.5})$

2278	L =	Length of reach in feet
0.10	n =	Manning's n
0.0178	S =	Slope of Ground in ft/ft
28.6	T_t =	Travel time in minutes

33.2 T_c = TOTAL TIME OF CONCENTRATION

Use city maximum time of concentration. Tc=30 minutes

PROPOSED	COMPOSITE C FACTOR	
	AREA(Ac.)	C
Undeveloped	25.78	0.35
Residential	25.95	0.50
Commercial	0.00	0.90
	COMPOSITE C=	0.43

Proposed DA1	51.73 AC			Rainfall Intensity (in/hr)
	Q (cfs)	C	Area (ac)	
5 year	86.0	0.43	51.73	4.00
10 year	100.8	0.43	51.73	4.58
25 year	118.6	0.43	51.73	5.39
100 year	146.1	0.43	51.73	6.64

25-Year Storm Preliminary Design for Detention Facility

Rainfall Duration (min)	Rainfall Intensity (in/hr)	Peak Runoff Rate = Qp (cfs)	Qin 25-year Developed
10.0	9.49	208.8	
13	8.45	185.9	
15	7.89	173.6	
20	6.80	149.6	
25	6.00	132.0	
30	5.39	118.6	
35	4.91	108.0	
40	4.51	99.2	

Note:
Qp=c*I*A
c= 0.43
A= 51.73

Storm Duration (min)	Storm Runoff Vol. (cubic feet)	Required Storage Vol. (cubic feet)	
10	125257	64857.4	
13	144889	66469.8	<---- max. volume
15	156208	65608.9	
20	179504	58705.2	
25	197982	46983.9	
30	213425	32226.9	
35	226821	15424.0	
40	238106	-3460.6	

NOTE:
Storm Runoff Volume = Vr (cu.ft.)
Vr= 60(sec/min) * Duration(min) * Peak Runoff Rate(cfs)
Required Storage Volume = Vs (cu.ft.)
Vs= 60(sec/min) * Duration(min) * [Qp - Qo](cfs)
where: Qo = undeveloped flow rate (25-year storm event)
Qo(cfs)= 100.67

66,470 cu.ft. is the required storage volume for the proposed Detention Facility

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)
1 inch = 100 ft.

NOTES:
1: THE DEVELOPER, THROUGH HIS ENGINEER OR AUTHORIZED REPRESENTATIVE, SHALL ACQUIRE ALL REQUIRED NATIONWIDE PERMITS, SUCH AS 401, 402, AND/OR 404, AS APPROPRIATE FROM ENVIRONMENTAL PROTECTION AGENCY, THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY AND/OR THE CORP OF ENGINEERS.

2: TOPOGRAPHICAL INFORMATION IS FOR DRAINAGE PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION. TOPOGRAPHICAL INFORMATION SHOWN IS DERIVED FROM AERIAL PHOTOGRAPHIC METHODS FOR THE CITY OF KILLEEN.

No.	DATE	REMARKS	BY
1	05/30/06	CITY COMMENTS	GEJ

REVISIONS

WATERCREST PLACE

KILLEEN, BELL COUNTY, TEXAS

DRAINAGE & TOPOGRAPHY LAYOUT

SHEET TITLE:

STATE OF TEXAS
ROBERT E. MITCHELL
87826
LICENSED PROFESSIONAL ENGINEER

6-2-06

MITCHELL & ASSOCIATES, INC.
ENGINEERING & SURVEYING
102 N. COLLEGE STREET
KILLEEN, TEXAS 76541
PHONE: (254) 634-5541
FAX: (254) 634-2141

DWG No.	DRAWN BY:	DATE:	SCALE:	FB/LB:	1 LOT	AREA:
06-208-D	DD/FRB	MAY 2006	1"= 100'	GPS	1 BLOCK	22.221 Ac.

S:\Subdivisions\Watercrest Place\dwg\Watercrest Place.dwg, TOPO, 6/1/2006 3:00:36 PM, cad2, 1:1

SHEET D1 OF D1