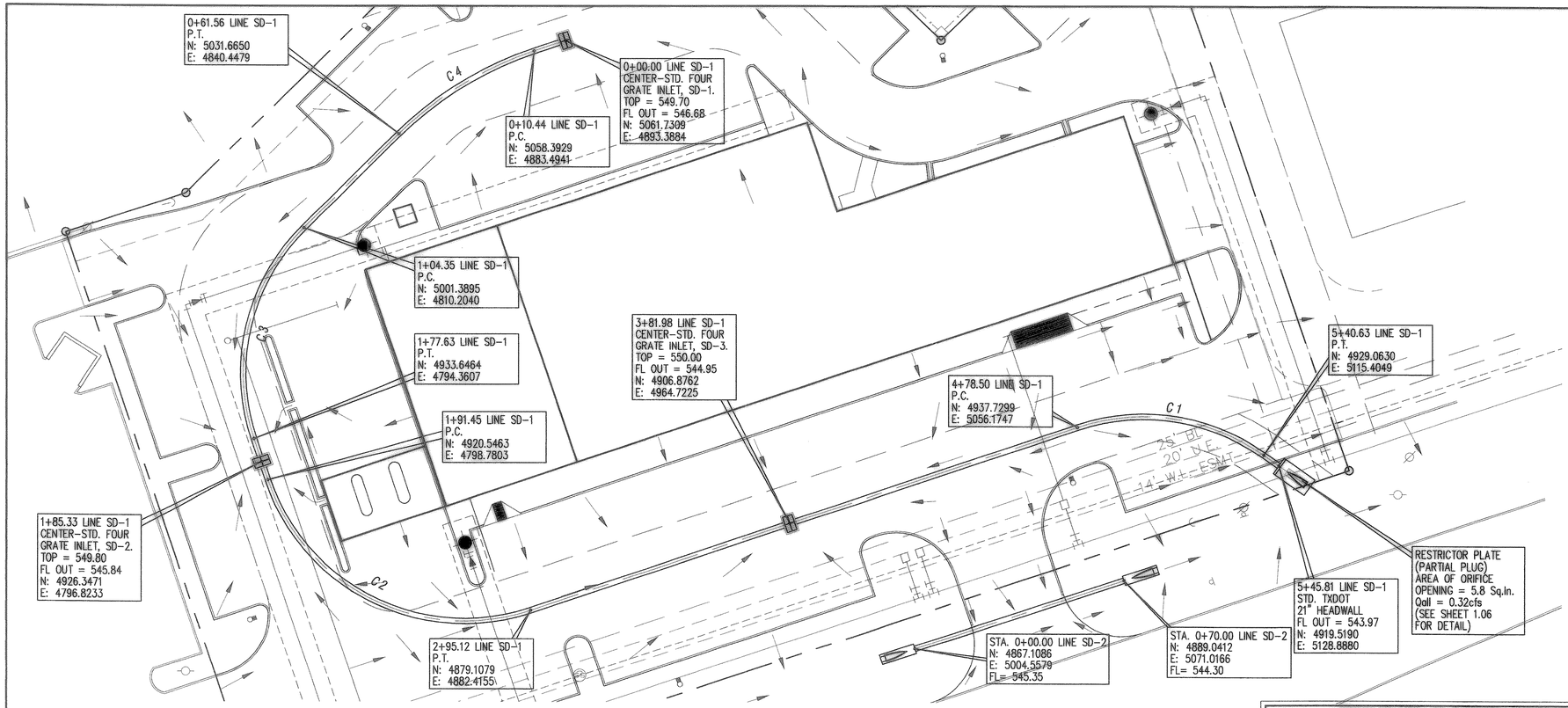


LINE SD-2 CULVERT CALCULATIONS:

TRIAL CULVERT						HEADWATER CALCULATION														INLET CONTROLLING HEADWATER (Feet)	SELECTED CONDUIT SIZE
						INLET CONTROL				OUTLET CONTROL											
										CASE III: HW = H + TW − L x So (Feet)				CASE IV: HW = H + ho − L x So (Feet)							
														ho= dc+D/2 or ho=TW (use larger)							
CULVERT DESIGNATION	AREA OF OPENING (Sq. Ft.)	NUMBER OPENINGS	SIZE RADIUS (FT)	TOTAL CULVERT AREA "Ac" (Sq. Ft.)	"Q" EACH OPENING (CFS)	ENTRANCE TYPE	CASE NUMBER	HW/D	HW (Feet)	ENTRANCE COEFF.	H (Feet)	TW (Feet)	L x So (Feet)	HW (Feet)	H (Feet)	dc (Feet)	D/2 (Feet)	TW (Feet)	ho (Feet)	L x So (Feet)	HW (Feet)		
LINE SD-2	2.405	1	0.875'	2.405	8.44	21" SAFETY HEADWALL	1	0.95	1.66	0.5	0.35	0.86	0.71	0.50	0.35	1.07	1.41	0.86	1.41	0.71	1.05	1.05	1 - 21" RCP

CURVE TABLE					
CURVE	LENGTH	C.L. RADIUS	DELTA	CHORD BRG.	LONG CHORD
C1	62.13	66.00	53°56'09"	S81°40'31"E	59.86
C2	103.67	66.00	90°00'00"	S63°38'35"E	93.34
C3	73.28	66.00	63°36'47"	S13°09'48"W	69.57
C4	51.12	111.00	26°23'13"	S58°09'48"W	50.67

ORIFICE EQUATION (100 YR DESIGN)

$Q_O = C_O A_O \sqrt{2g(H-E_O)}$

Q_O = 0.32 cfs
C_O = 0.65
g = 64.4 ft/sec^2
E_O = 544.0 (CENTER ELEVATION OF ORIFICE)
H = 551.5 (WATER SERVICE STAGE ELEVATION)

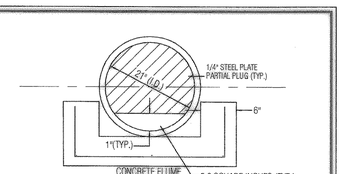
$0.32 = (0.65)\, A_O \sqrt{64.4\,(551.5-544.0)}$

$A = \frac{0.49}{21.98}$

A = 0.224 SQ.FT. = 3.23 SQ.IN.

EXIST. RUNOFF=1.8939*.35*8.30=5.503 CFS
UNDETAINED RUNOFF= A1+A2+A3+A5+B1
= 3.775+.338+.203+.339+.441= 5.185 CFS
ALLOWABLE RUNOFF (Q_O) = 0.32 CFS

UNDETAINED RUNOFF AREAS:
CALCULATED AT FULLY DEVELOPED "C"= 0.90
"I" = 9.80 in/hr



PARTIAL PLUG DETAIL

DETENTION POND OUTFALL
NTS

ORIFICE EQUATION (10 YR DESIGN)

$Q_O = C_O A_O \sqrt{2g(H-E_O)}$

Q_O = 0.0 cfs
C_O = 0.65
g = 64.4 ft/sec^2
E_O = 544.0 (CENTER ELEVATION OF ORIFICE)
H = 551.5 (WATER SERVICE STAGE ELEVATION)

$0 = (0.65)\, A_O \sqrt{64.4\,(551.5-544.0)}$

$A = \frac{0}{21.98}$

A = 0 SQ.FT. = 0 SQ.IN.

EXIST. RUNOFF=1.8939*.35*4.90=3.248 CFS
UNDETAINED RUNOFF= A1+A2+A3+A5+B1
= 2.407+.153+.139+.340+.284= 3.334 CFS
ALLOWABLE RUNOFF (Q_O) = 0 CFS

UNDETAINED RUNOFF AREAS:
CALCULATED AT FULLY DEVELOPED "C"= 0.90
"I" = 6.30 in/hr

ORIFICE EQUATION (25 YR DESIGN)

$Q_O = C_O A_O \sqrt{2g(H-E_O)}$

Q_O = 0.32 cfs
C_O = 0.65
g = 64.4 ft/sec^2
E_O = 544.0 (CENTER ELEVATION OF ORIFICE)
H = 551.5 (WATER SERVICE STAGE ELEVATION)

$0.00 = (0.65)\, A_O \sqrt{64.4\,(551.5-544.0)}$

$A = \frac{0}{21.98}$

A = 0.224 SQ.FT. = 0 SQ.IN.

EXIST. RUNOFF=1.8939*.35*5.60=3.712 CFS
UNDETAINED RUNOFF= A1+A2+A3+A5+B1
= 2.719+.179+.149+.389+.324= 3.810 CFS
ALLOWABLE RUNOFF (Q_O) = 0 CFS

UNDETAINED RUNOFF AREAS:
CALCULATED AT FULLY DEVELOPED "C"= 0.90
"I" = 7.20 in/hr

ORIFICE EQUATION (50 YR DESIGN)

$Q_O = C_O A_O \sqrt{2g(H-E_O)}$

Q_O = 0.32 cfs
C_O = 0.65
g = 64.4 ft/sec^2
E_O = 544.0 (CENTER ELEVATION OF ORIFICE)
H = 551.5 (WATER SERVICE STAGE ELEVATION)

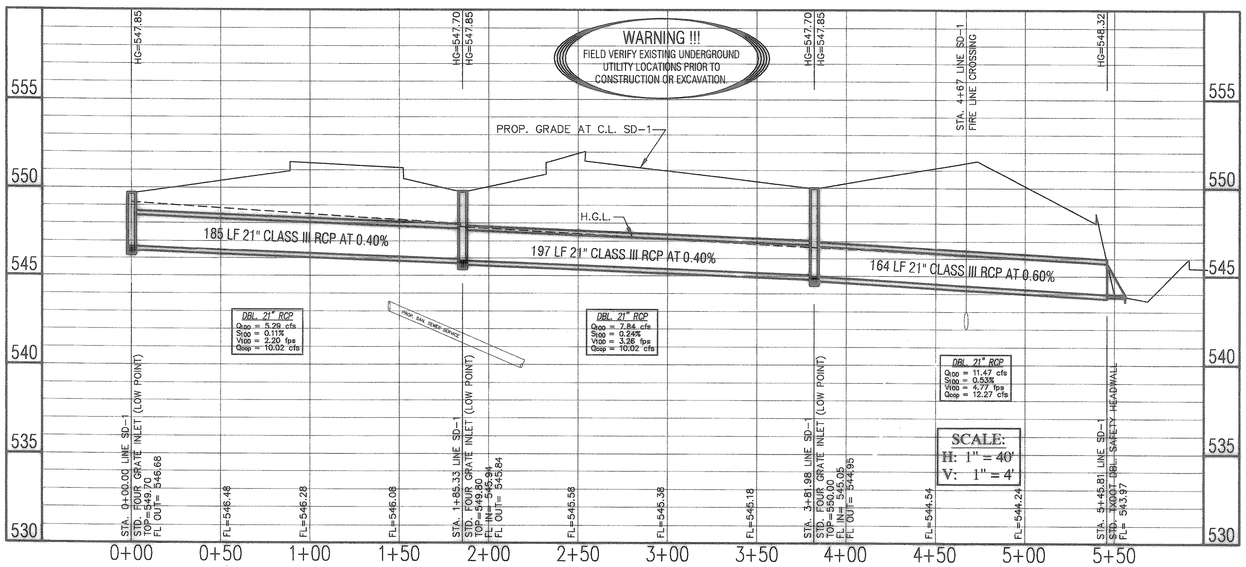
$0.00 = (0.65)\, A_O \sqrt{64.4\,(551.5-544.0)}$

$A = \frac{0}{21.98}$

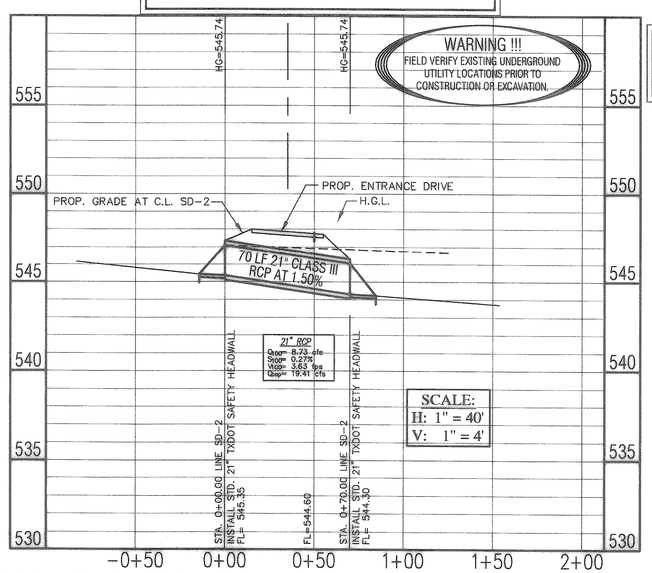
A = 0.224 SQ.FT. = 0 SQ.IN.

EXIST. RUNOFF=1.8939*.35*6.30=4.176 CFS
UNDETAINED RUNOFF= A1+A2+A3+A5+B1
= 3.080+.194+.165+.432+.360= 4.234 CFS
ALLOWABLE RUNOFF (Q_O) = 0 CFS

UNDETAINED RUNOFF AREAS:
CALCULATED AT FULLY DEVELOPED "C"= 0.90
"I" = 8.00 in/hr



SD-1 STA 0+00.00 to 5+54.06



SD-2 STA 0+00.00 to 0+70.00

BENCHMARK:
SQUARE CUT ON NORTH CORNER OF INLET ON EAST SIDE OF TACO BUENO.
ELEVATION = 541.75

LEGEND

+ETP600.0	EX. TOP OF PVMT.
+ETG600.0	EX. TOP OF GRND.
+ETC600.0	EX. TOP OF CURB
+600.0	FIN.FLR. SPOT ELEV.
TP600.0	TOP OF PAVEMENT
TC600.0	TOP OF CONCRETE
TG600.0	TOP OF GROUND
600.0	TOP OF CURB
650	PROP. GRADE LINE
—650—	EX. GRADE LINE
FF	FINISHED FLOOR
	GUY WIRE ANCHOR
	POWER POLE
	STREET/CABLE SIGN
	WATER VALVE
	UTILITY BOX
	WOOD BOLLARD
	GAS METER
	CURB INLET
	GRATE INLET
	FIRE HYDRANT
	WATER METER
	STORM/SS MANHOLE
	TREE
	LIGHT POLE
	SIGNAL POLE
	SIGNAL PULL BOX

dietz engineering
CIVIL ENGINEERING • SURVEYING
972 889 • 9977
FAX 972• 889 9993
1761 INTERNATIONAL PARKWAY SUITE 115
RICHARDSON TX 75081

STATE OF TEXAS
JAY M. CHILDS
76753
REGISTERED PROFESSIONAL ENGINEER

DATE SIGNED: 3/30/04

A New Site Design for
ROCKWALL TOWNE CENTRE, REPLAT
SHAFER PROPERTIES
ROCKWALL, TEXAS

STORM SEWER PLAN / PROFILE

SCALE:
Horizontal: 1" = 20'
Vertical: NA

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

Project No.: ESPC002
Date: 03/29/04
Issue: AS BUILT
Drawn By: TDK
Checked By: JMC
Revisions:

SHEET
C1.06