CULVERT "1" DESIGN CALCULATIONS

CULVERT LOCATION: CARUTH LAKE PHASE 6, ROCKWALL, TEXAS
LENGTH, L 112.18 FT DESIGN STORM FREQ. 100-YR
ROUGHNESS COEFF., n 0.012 MAX. VEL. 12.0 ft/sec
TAILWATER 1.38' D.S. CHANNEL WIDTH 6'
ENTRANCE DESCRIPTION 3A DESIGN DISCHARGE 100.84 cfs

RDWY. ELEV. 502.00	U.S. CULV. F.L. 497.02
U.S. CULV. F.L. 497.02	D.S. CULV. F.L. 495.00
DIFFERENCE 4.98'	DIFFERENCE 2.07'
REQ'D. FREEBOARD 1.0 FT.	CULV. SLOPE, S_o = DIFF. FT. / LENGTH FT.
ALLOW. HEADWATER 3.98' FT.	S_o = 2.02 FT. / 112.0 = 1.80%

DOWNSTREAM CHANNEL CALCULATIONS

Q_{100} = 100.84 cfs
n = 0.035
SIDE SLOPE (LT. & RT.) = 3:1
LONGITUDINAL SLOPE = 3.10%
DEPTH OF FLOW = 1.36 ft
AVERAGE VELOCITY = 7.23 fps

CULVERT "2" DESIGN CALCULATIONS

CULVERT LOCATION: CARUTH LAKE PH 6, ROCKWALL, TEXAS
LENGTH, L 123.42 FT DESIGN STORM FREQ. 100-YR
ROUGHNESS COEFF., n 0.012 MAX. VEL. 12.0 ft/sec
TAILWATER 1.85' D.S. CHANNEL WIDTH 6'
ENTRANCE DESCRIPTION 3A DESIGN DISCHARGE 72.81 cfs

RDWY. ELEV. 530.00	U.S. CULV. F.L. 526.19
U.S. CULV. F.L. 526.19	D.S. CULV. F.L. 525.50
DIFFERENCE 3.81'	DIFFERENCE 0.69
REQ'D. FREEBOARD 1.0 FT.	CULV. SLOPE, S_o = DIFF. FT. / LENGTH FT.
ALLOW. HEADWATER 2.81 FT.	S_o = 0.69 FT. / 138.60 = 0.50%

DOWNSTREAM CHANNEL CALCULATIONS

Q_{100} = 72.81 cfs
n = 0.035
SIDE SLOPE (LT. & RT.) = 3:1
LONGITUDINAL SLOPE = 0.50%
DEPTH OF FLOW = 1.85 ft
AVERAGE VELOCITY = 3.41 fps

LEGEND

PP	Power Pole
WV	Water Valve
SN	Sign
TSN	Traffic Signs
LP	Light Pole
W	Water Line
OH	Overhead Power Lines
742	Proposed Contour Line
742	Existing Contour Line

CULVERT "1"

TRIAL CULVERT									HEADWATER CALCULATION																		
		DEPTH RANGE D.R.			POSSIBLE CULVERT SIZES				INLET CONTROL (Using Figure 11)					OUTLET CONTROL (Using Figure 14 & 30)												The Greater Controlling Head Water (Inlet or Outlet) (feet)	SELECTED CONDUIT SIZE
															CASE III HW = H + TW − L X S_o (feet)				CASE IV HW = H + h_o − L X S_o (feet)								
Trial Area of Opening $T.A_c = \frac{Q}{V_{max}}$ (sq. ft.)	Channel Width "W" (feet)	$\frac{T.A_c}{W}$ (feet)	AHW (feet)	Try Depth "D" (feet)	No. Openings	Width of Box "D" (ft.)	Total Culvert Area "A_c" (sf)	"Q" Each Opening (c.f.s.)	Entrance Type	Case No.	Q/B (c.f.s.)	$\frac{HW}{D}$ (figure 25)	HW (feet)	Entrance Coeff. K_e	"H" (figure 27) (feet)	"TW" (feet)	L X S_o (feet)	"HW" (feet)	"H" (figure 27) (feet)	$h_o = \frac{d_c + D}{2}$ or h_o = TW (use larger) d_c (figure 30) (feet)	$\frac{d_c + D}{2}$ (feet)	"TW" (feet)	h_o (feet)	L X S_o (feet)	"HW" (feet)		
1	2	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
8.42	6'	1.40	3.98	3	1	6	18	101.11	3A	I	16.85	1.30	3.75	0.70	1.30	1.38	2.02	0.66	1.30	2.0	2.50	1.38	2.50	2.02	1.78	3.90' (INLET)	6'x3' RCB

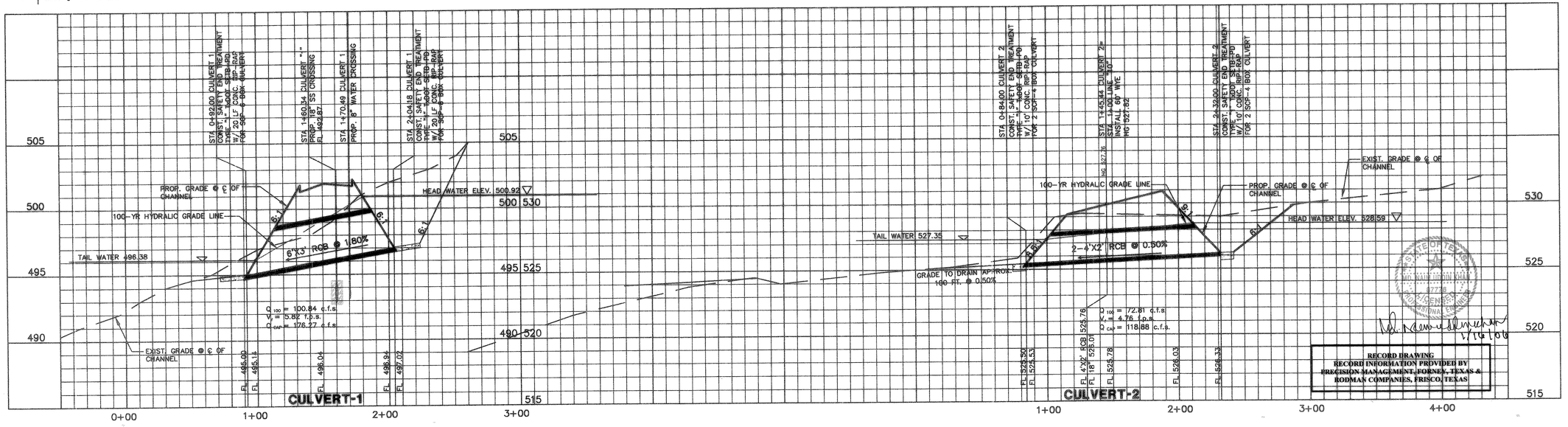
CULVERT "2"

TRIAL CULVERT									HEADWATER CALCULATION																		
		DEPTH RANGE D.R.			POSSIBLE CULVERT SIZES				INLET CONTROL (Using Figure 11)					OUTLET CONTROL (Using Figure 14 & 30)												The Greater Controlling Head Water (Inlet or Outlet) (feet)	SELECTED CONDUIT SIZE
															CASE III HW = H + TW − L X S_o (feet)				CASE IV HW = H + h_o − L X S_o (feet)								
Trial Area of Opening $T.A_c = \frac{Q}{V_{max}}$ (sq. ft.)	Channel Width "W" (feet)	$\frac{T.A_c}{W}$ (feet)	AHW (feet)	Try Depth "D" (ft)	No. Openings	Width of Box "D" (ft.)	Total Culvert Area "A_c" (sf)	"Q" Each Opening (c.f.s.)	Entrance Type	Case No.	Q/B (c.f.s.)	$\frac{HW}{D}$ (figure 25)	HW (feet)	Entrance Coeff. K_e	"H" (figure 27) (feet)	"TW" (feet)	L X S_o (feet)	"HW" (feet)	"H" (figure 27) (feet)	$h_o = \frac{d_c + D}{2}$ or h_o = TW (use larger) d_c (figure 30) (feet)	$\frac{d_c + D}{2}$ (feet)	"TW" (feet)	h_o (feet)	L X S_o (feet)	"HW" (feet)		
1	2	3	4	5	6	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
6.06	6	0.61	2.81	2	2	4	16	36.40	3A	I	9.10	1.20	2.40	0.70	0.90	1.85	0.62	2.13	0.90	1.40	1.70	1.85	1.85	0.62	2.13	2.40' (INLET)	2-4'x2' RCB

NOTE:
FIG. 25, 27 & 29 ARE THE NOMOGRAPHS OF BREAU OF PUBLIC ROADS, JAN. 1963, PAGE NO. G-25, G-27, G-29

BENCHMARK 1
TOP OF GRATE INLET IN ALLEY NORTH OF LOT 10, BLOCK A OF SILVER CREEK CROSSING, PH III, SECT. 4 – ELEV.= 709.17

BENCHMARK 2
SQUARE CUT FOUND IN THE CORNER OF CONCRETE ALLEY AT THE NORTHERLY MOST CORNER OF SILVER CREEK CROSSING PH. III, SECT.4 – ELEV.= 723.0



THESE CONSTRUCTION PLANS WERE PREPARED UNDER THE RESPONSIBLE SUPERVISION OF MD. NAIM UDDIN KHAN, REGISTERED PROFESSIONAL ENGINEER NO. 87776.
Md. Naim Uddin Khan 4/12/04

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHOURIZED BY MD. NAIM UDDIN KHAN, P.E. #87776

NO.	DATE	REVISION	APPROV.

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MICHAEL JAMES SURVEY, ABSTRACT NO. 710
CITY OF DESOTO
DALLAS COUNTY, TEXAS

LUMBERMEN'S INVESTMENT CORPORATION
5495 BELTLINE ROAD #225
DALLAS, TEXAS 75240

CULVERT PROFILES & CALCULATIONS
[PHASE 6 & PHASE 6A]

Scale : H. 1"=40' Date : 12/2/03
Designed By : NK
Drawn By : MS
Checked By : NK
File :\14654ANCPR.dwg\new :
Project No. : 14654.01

SHEET 33 OF 57

RECORD DRAWING
RECORD INFORMATION PROVIDED BY PRECISION MANAGEMENT, FORNEY, TEXAS & RODMAN COMPANIES, FRISCO, TEXAS

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