STORM SEWER CALCULATIONS

PROJECT NAME: *ROCKWALL RETAIL CENTER* **BY:** *CPH ENGINEERS INC.*

RUNOFF COLLECTION POINT (inlet or Mnahole)			DISTANCE BETWEEN COLLECTION POINTS (ft)	INCREMENTAL DRAINAGE AREA				Accum-ulated "CA"	Time at Upstream Station (minutes)	Design Storm Frequency (yrs.)	Intesity "I" (Inches/Hr.)	Storm Water Runoff "Q" (c.f.s.)	Slope of Hydrolic Gradient "S" (ft/ft)	Selected Storm Sewer Size	Velocity In Sewer Between Collection Points "V" (f.p.s.)	Head Loss Coeff. Kj	Velocity head Loss at Upstream Station Kj = V^2 / 2g (feet)	Flow Time In Sewer Distance V X 60 (minutes)	Time at Downstream Station (minutes)	REMARKS
LINE ID	UPSTREAM STATION	DOWNSTREAM STATION		area No.	Drainage Area "A" (Acres)	Runoff Coeff. "C"	Incremental "CA"													
LINE A	4+50.67	0+00	450.67	-	-	-	0.00	-	12.4	100	9.4	624.79	0.005	9' X 5'	13.41	1.00	2.79	0.56	13.0	
LINE A	6+04.76	4+50.67	154.09	-	-	-	0.00	-	11.1	100	9.4	603.20	0.005	9' X 5'	13.41	1.00	2.79	1.30	12.4	
LINE A	9+88.37	6+04.76	383.61	-	-	-	0.00	-	10.0	100	9.4	603.20	0.0382	9' X 5'	13.41	1.00	2.79	1.10	11.1	
LINE B	0+55.88	0+00	55.88	-	-	-	0.00	5.67	12.4	100	9.4	53.14	0.025	36	7.52	1.00	0.88	0.12	12.5	
LINE B	0+95.89	0+55.88	40.00	10	0.21	0.90	0.19	1.32	11.8	100	9.5	12.54	0.015	24	3.99	0.50	0.25	0.60	12.4	
LINE B	2+50.13	0+95.89	154.24	9	0.93	0.90	0.84	1.13	11.1	100	9.6	10.89	0.025	24	3.47	0.50	0.19	0.74	11.8	
LINE B	3+60.80	2+50.13	110.67	8	0.33	0.90	0.30	0.30	10.0	100	9.8	2.91	0.025	18	1.65	1.00	0.04	1.10	11.1	
LINE C	0+75.93	0+00	75.93	6	0.37	0.90	0.33	3.62	12.3	100	9.4	34.02	0.005	30	6.93	1.50	0.75	0.18	12.5	
LINE C	2+66.83	0+75.93	190.90	-	-	-	0.00	2.48	11.6	100	9.5	23.64	0.005	30	4.82	1.25	0.36	0.66	12.3	
LINE C	3+83.79	2+66.83	116.96	7	0.86	0.90	0.77	0.77	10.0	100	9.8	7.59	0.005	18	4.30	1.00	0.29	0.45	11.6	
LINE D	1+67.24	0+00	167.24	5	0.98	0.90	0.88	1.71	11.1	100	9.6	16.44	0.005	24	5.23	0.70	0.42	0.53	11.6	
LINE D	3+35.06	1+67.24	167.82	4	0.92	0.90	0.83	0.83	10.0	100	9.8	2.59	0.005	24	2.59	1.00	0.10	1.08	11.1	
LINE E	0.47.17	0+00	47.17	11	0.89	0.90	0.80	0.80	10.0	100	9.8	7.85	0.05	18	4.45	1.00	0.31	0.18	10.2	
LINE F	1+02.70	0+00	102.70	12	0.81	0.90	0.73	0.73	10.0	100	9.8	7.14	0.005	24	2.28	1.00	0.08	0.75	10.8	
LINE G	1+33.28	0+00	133.28	OS-2	0.41	0.90	0.37	0.37	10.0	100	9.8	3.62	0.028	24	2.40	1.00	0.09	0.93	10.9	
LINE H	0+49.43	0+00	49.43	2	1.32	0.90	1.19	2.29	10.0	100	9.3	21.59	0.01	24	4.58	0.50	0.33	0.18	10.2	
LINE H	2+93.84	0+49.43	244.41	-	-	0.90	0.00	1.10	12.3	100	9.6	10.54	0.0071	24	2.24	1.00	0.08	1.82	14.1	
LINE H	4+71.97	2+93.84	178.13	3	1.22	0.90	1.10	1.10	11.0	100	9.8	10.76	0.0134	24	3.07	1.00	0.15	1.30	12.3	
LINE K	1+04.70	0+00	104.70	1	2.12	0.90	1.19	1.19	10.0	100	9.8	18.70	0.0381	30	6.10	1.00	0.58	1.00	11.0	
LINE J	1+50.00	0+00	150.00	-	-	-	-	-	10.0	100	0.0	32.70	0.0033	36	4.63	1.00	0.33	0.54	10.5	DETENTION OUTFALL

*HYDRAULIC DATA WAS OBTAINED FROM HYDROFLOW MODEL BY CPH ENGINEERS, INC.

PLUS THE PIPE TRAVEL TIME.

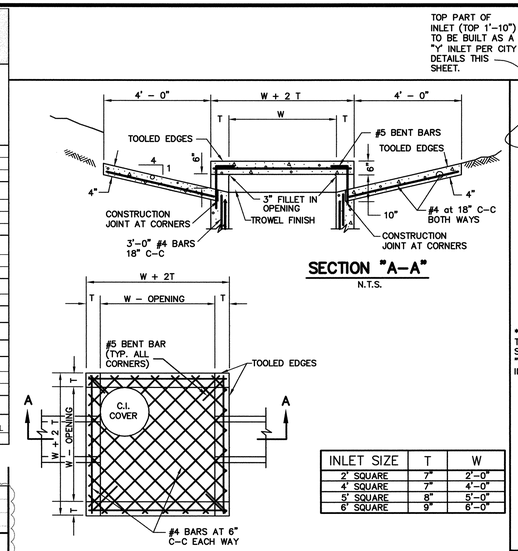
INLET DESIGN CALCULATIONS

PROJECT NAME: *ROCKWALL RETAIL CENTER* BY: *CPH ENGINEERS, INC.*

LINE NAME: *LINES B, C, D, E, F, H, AND J* DATE *MAY 20*

INLET		Design Storm Frequency (yrs)	AREA RUNOFF = Q = CIA					Carry-Over From Upstream Inlet (c.f.s.)	Total Gutter Flow (c.f.s.)	Gutter Capacity (c.f.s.)	Gutter Slope (ft./100 ft.)	Crown Type	SELECTED INLET		Carry-Over To Downstream Inlet (c.f.s.)	
DRA. AREA	Location		Time of Conc. (mins.)	Intensity I (In./hr.)	Runoff Coeff. "C"	Area (ac.)	"Q" (c.f.s.)						Length "LI" Feet	Type		INLET WIDTH "W"
AREA 1	STA. 1+05 L-K	100	10	9.8	0.9	1.5	13.23	-	-	-	-	-	4'X4'	"Y" INLET	-	4'
AREA 2	STA. 0+49 L-H	100	10	9.8	0.9	1.32	11.64	-	-	-	-	-	5'	CURB	-	3'
AREA 3	STA. 4+72 L-H	100	10	9.8	0.9	1.22	10.76	-	-	-	-	-	10'	*	-	3'
AREA 4	STA. 1+67 L-D	100	10	9.8	0.9	0.92	8.11	-	-	-	-	-	5'	*	-	3'
AREA 5	STA. 3+35 L-D	100	10	9.8	0.9	0.98	8.64	-	-	-	-	-	5'	*	-	3'
AREA 6	STA. 0+76 L-C	100	10	9.8	0.9	0.37	3.26	-	-	-	-	-	5'	*	-	4'
AREA 7	STA. 3+84 L-C	100	10	9.8	0.9	0.86	7.59	-	-	-	-	-	5'	*	-	3'
AREA 8	STA. 3+61 L-B	100	10	9.8	0.9	0.33	2.91	-	-	-	-	-	5'	CURB	-	3'
AREA 9	STA. 2+50 L-B	100	10	9.8	0.9	0.93	8.20	-	-	-	-	-	5'	CURB	-	3'
AREA 10	STA. 0+95 L-B	100	10	9.8	0.9	0.21	1.85						5'	CURB		3'
AREA 11	STA. 0+47 L-E	100	10	9.8	0.9	0.89	7.85						5'	*		3'
AREA 12	STA. 1+03 L-F	100	10	9.8	0.9	0.81	7.14						5'	CURB		3'

*TOP OF INLETS SHALL BE CONSTRUCTED AS STANDARD "Y" INLET. UPON ULTIMATE SITE DEVELOPMENT, TOP OF INLET AND APRONS SHALL BE REMOVED AND CAST INTO STANDARD CURB INLETS (SEE INLET DETAILTHIS SHEET).



INLET SIZE	T	W
2' SQUARE	7"	2'-0"
4' SQUARE	7"	4'-0"
5' SQUARE	8"	5'-0"
6' SQUARE	9"	6'-0"

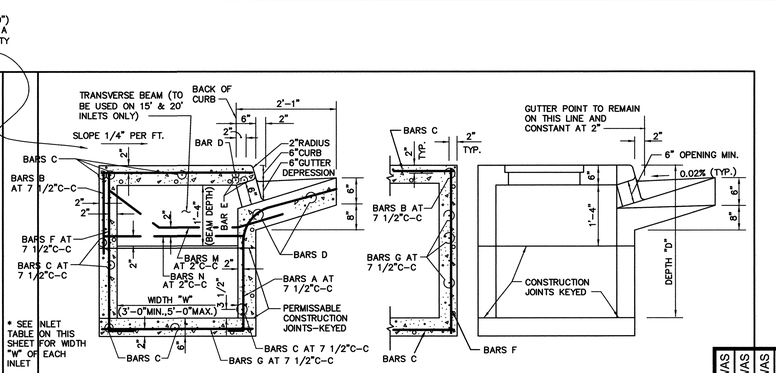
NOTES:

1. MATERIAL AND WORKMANSHIP SHALL CONFORM WITH THE REQUIREMENTS OF NCTCOG STANDARD SPECIFICATIONS FOR STANDARD CONCRETE MANHOLES, MINIMUM CLASS "A" CONCRETE.
2. LAYERS OF REINFORCING STEEL NEAREST THE INTERIOR AND EXTERIOR SURFACES SHALL HAVE A COVER OF 2" TO THE CENTER OF BARS, UNLESS OTHERWISE NOTED.
3. FOR DETAILS OF REINFORCING OF LOWER PORTIONS OF INLET SEE APPROPRIATE SQUARE MANHOLE DETAILS.
4. DEPTH OF DROP INLET FROM FINISHED GRADE TO FLOW LINE OF INLET IS VARIABLE. APPROXIMATE DEPTH WILL BE SHOWN ON PLANS AT LOCATION OF INLET.
5. ALL STANDARD DROP INLETS SHALL HAVE ONE OPENING ON EACH SIDE UNLESS OTHERWISE SHOWN ON PLANS.
6. DECK MAY BE REINFORCED SAME AS 4' SQUARE MANHOLE.

DROP INLET
2', 4', 5' OR 6' SQUARE

North Central Texas Council of Governments

STANDARD SPECIFICATION REFERENCE	
DATE: NOV. '96	STANDARD DRAWING NO. 6040



GENERAL NOTES:

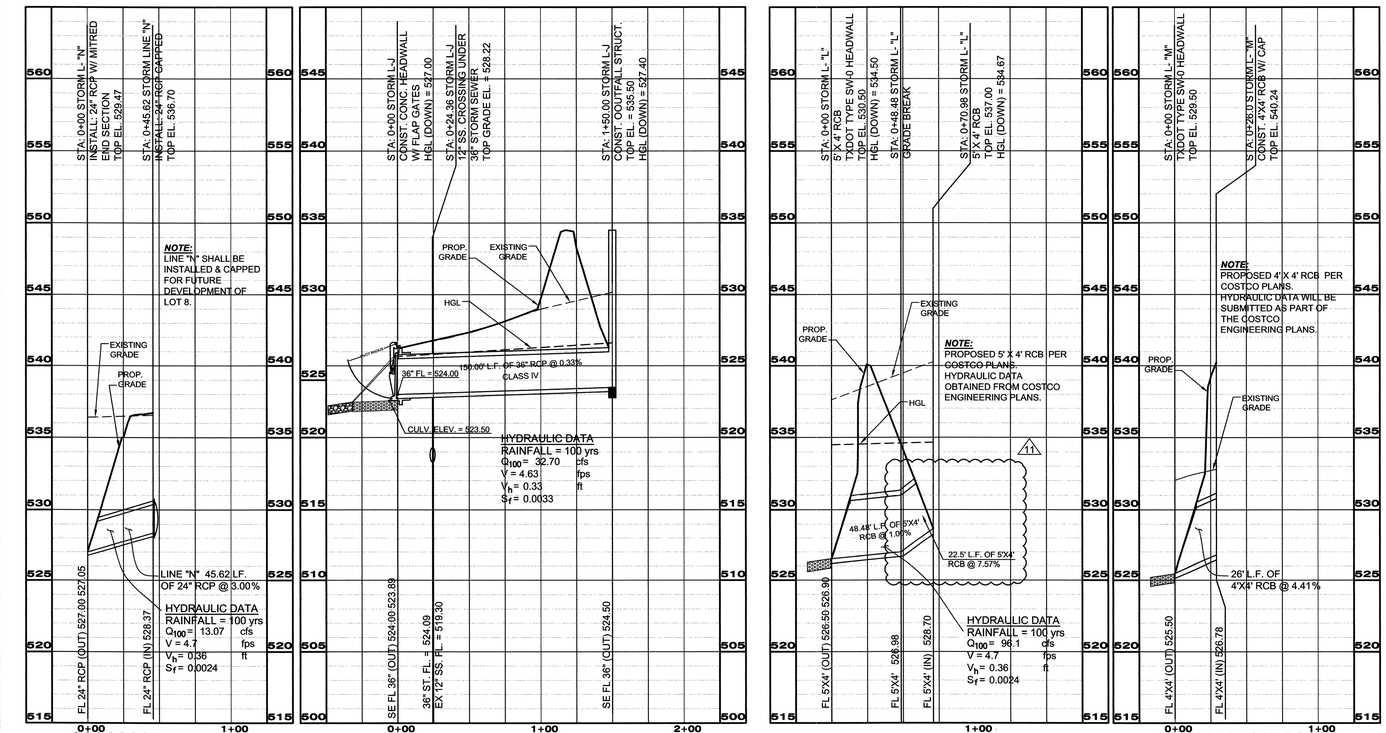
1. ALL CONCRETE SHALL BE CLASS "A" CONCRETE.
2. REINFORCING BARS SHALL BE STANDARD GRADE STEEL, DEFORMED REINFORCING BARS OF A DIAMETER AND LENGTH AS SHOWN.
3. CHAMFER ALL EXPOSED CORNERS 3/4" EXCEPT WHERE OTHERWISE NOTED.
4. DIMENSIONS RELATING TO REINFORCING STEEL ARE TO CENTERS OF BARS.
5. FIELD CUT AND BEND BARS AS NECESSARY TO ACCOMODATE STORM SEWER PIPE.
6. RING AND COVER SHALL BE APPROVED BY THE OWNER AND INSTALLED BY THE CONTRACTOR.

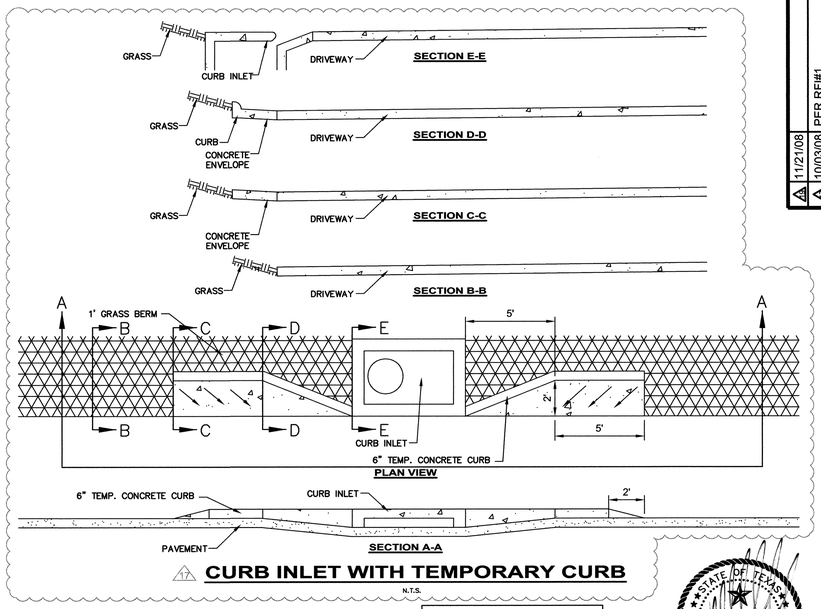
80209 TEXAS REGISTERED ENGINEERING PRACTICE

CURB INLET
CROSS SECTION & INLET THROAT

North Central Texas Council of Governments

STANDARD SPECIFICATION REFERENCE	
	7.6.
DATE: NOV. '96	STANDARD DRAWING NO. 60209





CURB INLET WITH TEMPORARY CURB
N.T.S.

AS-BUILT LEGEND	
DESIGN	STA. 0.95.89 STORM L-B CONST. 5' CURB INLET TOP = ~~545.56~~ 546.19 AS-BUILT HGL = 543.61 NE. FL 24" (IN) 540.68 SE. FL 24" (OUT) ~~540.48~~ 540.34
NORTHING	N:7019919.500
EASTING	E:2598286.590

NOTE:
1. REFER TO CITY OF ROCKWALL STANDARD DETAILS AND NCTCOG 3RD EDITION FOR ALL UTILITY AND STORM DRAINAGE DETAILS AND SPECIFICATIONS

RECORD DRAWING

THIS RECORD DRAWING IS BASED ON INFORMATION RECEIVED BY THE CONTRACTOR AS TO LOCATION AND DETAILS OF THE FACILITIES ACTUALLY CONSTRUCTED. THE ENGINEER HAS PROVIDED LIMITED INSPECTION OF ONSITE CONSTRUCTION AND HAS OBSERVED THAT THE READILY VISIBLE FEATURES ARE INSTALLED IN GENERAL ACCORDANCE WITH THIS DRAWING.

NOTICE
THE SIZE OF THIS PLAN MAY HAVE BEEN SLIGHTLY ALTERED BY REPRODUCTION PROCESSES, THIS MUST BE CONSIDERED WHEN SCALING ANY REPRODUCED PLAN FOR THE PURPOSE OF COLLECTING DATA.

STATE OF TEXAS
WILLIAM A. STUEBER
90436
LICENSED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY WILLIAM A. STUEBER, P.E. 90436 ON 01/09/2009 . ALTERATION OF A SEALED DOCUMENT TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

STORM DRAINAGE PROFILES & CALCULATIONS

ROCKWALL CENTRE CORNERS
INTERSTATE HIGHWAY 30 AND S.H. 205
CITY OF ROCKWALL, ROCKWALL COUNTY, TEXAS

Designed by:	HMH
Drawn by:	A.C.
Checked by:	WAS
Approved by:	WAS
Scale:	AS SHOWN
Date:	10/19/2007
Job No.:	S13217
File:	STORM PROF

Sheet No.
C-15A

No.	Date	Revision	By
1	11/21/08		WAS
2	10/03/08	PER RFI#1	WAS
3	09/08/08	NO CHANGES TO THIS SHEET	WAS
4	06/30/08	NO CHANGES TO THIS SHEET	WAS
5	06/10/08	PER COSTCO ENGINEERING PLANS	WAS
6	05/23/08	PER CITY COMMENTS 5/21/08	WAS
7	05/06/08	PER COSTCO PLANS	WAS
8	01/29/08	PER CITY COMMENTS 12/06/07	WAS
9	11/15/07	PER CITY COMMENTS 11/05/07	WAS
10	10/19/07	PER CLIENTS NEW SITE LAYOUT	WAS
11	01/09/09	PER CO#1 AND RFI #3	WAS
12	11/06/08		WAS
13	09/23/08	NO CHANGES TO THIS SHEET	WAS
14	08/04/08	NO CHANGES TO THIS SHEET	WAS
15	06/26/08	NO CHANGES TO THIS SHEET	WAS
16	06/03/08	PER CITY COMMENTS 5/29/08	WAS
17	05/19/08	NO CHANGES TO THIS SHEET	WAS
18	03/07/08	NO CHANGES TO THIS SHEET	WAS
19	12/05/07	PER CITY COMMENTS 11/26/07	WAS
20	10/22/07	PER CITY COMMENTS 10/22/07	WAS
No.	Date	Revision	By

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Design / Build

HMACOMBER - 05/04/2009 - 10:38AM - DRAWING SCALE:50
J:\S13217 ST.IVES ROCKWALL\DWG\DESIGN\RECORD DRAWINGS\S13217 - STORM PROF.DWG