Drainage Report

for

City of Glendale

Improvement District No. 59

Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

Prepared For:

CITY OF GLENDALE
5850 West Glendale
Glendale, Arizona 86301
(602) 435-4152

Property of
Flood Control District of MC Library
Please Return to
2801 W. Durango
Phoenix, AZ 85009

Prepared By:

BURGESS & NIPLE, INC.
5025 East Washington Street, Suite 212
Phoenix, Arizona 85034
(602) 244-8100

Project No. 7840
January, 1993
Revised January, 1994

Drainage Report

for

City of Glendale

Improvement District No. 59

Prepared For:

CITY OF GLENDALE
5850 West Glendale
Glendale, Arizona 86301
(602) 435-4152

Prepared By:

BURGESS & NIPLE, INC.
5025 East Washington Street, Suite 212
Phoenix, Arizona 85034
(602) 244-8100

Project No. 7840
January, 1993
Revised January, 1994

TABLE OF CONTENTS

INTRODUCTION 1

Project Description 1

Existing Drainage Conditions 2

Conceptual Drainage Design 5

OFFSITE HYDROLOGY 9

STREET HYDROLOGY 11

STORM DRAIN DESIGN 12

RETENTION 13

APPENDIX 1 - OFFSITE HYDROLOGY

Runoff Coefficients

Flow Calculations

APPENDIX 2 - STREET HYDROLOGY

Runoff Coefficients

APPENDIX 3 - STORM DRAIN DESIGN

Main Line Hydraulics

Catch Basin Summary

Hydraulic Grade Line Calculations - No Surcharge Condition

Connecting Pipe Summary - No Surcharge Condition

Hydraulic Grade Line Calculations - Surcharge Condition

Connecting Pipe Summary - Surcharge Condition

Hidden Manor Northwest Drainage Channel

APPENDIX 4 - REFERENCE DESIGN INFORMATION

Registered Professional Engineer (Civil)
CERTIFICATE NO. 19250
DEAN J. PEHRSON
Date Signed 1-16-94
ARIZONA, U.S.A.

INTRODUCTION

Project Description

The City of Glendale Improvement District No. 59 encompasses an area bounded by 75th Avenue and 83rd Avenue/Agua Fria Freeway on the east and west respectively and by Union Hills Drive and Bell Road on the north and south respectively. The project will include sewer, water, storm drain, paving, landscaping, street light, and traffic signal improvements on the following roadways:

- 75th Avenue
- 79th Avenue (new construction)
- 83rd Avenue
- Campo Bello Drive (new construction)
- St. John Road (new construction)
- Union Hills Drive

Also included in the project scope is the construction of a neighborhood park and a residential landscape buffer adjacent to the existing Hidden Manor Subdivisions. Except for the Hidden Manor Subdivisions, the property is currently undeveloped with a partially abandoned orange grove over a portion of the property and vacant land over the remainder, where an existing orange grove has been removed within the past year.

Existing Drainage Conditions

There are four major aspects of the existing drainage condition for the project site:

1. 75th Avenue
2. The Hidden Manor Subdivisions (existing)
3. The Secluded Acres Subdivisions (existing)
4. Union Hills Drive

Seventy-fifth Avenue is currently paved with strip pavement, one lane in each direction, from Bell Road north to Union Hills Drive. Where the adjacent property has been subdivided, the lots fronting 75th Avenue drain directly to the 75th Avenue right-of-way. Drainage runoff is conveyed southerly along 75th Avenue via drainage swales along each side of the paved roadway. Adjacent to the east side of the south 1/4 mile of 75th Avenue, the property is un-subdivided. Although there are small retention basins constructed on this property, there will be some direct offsite contribution to the 75th Avenue drainage.

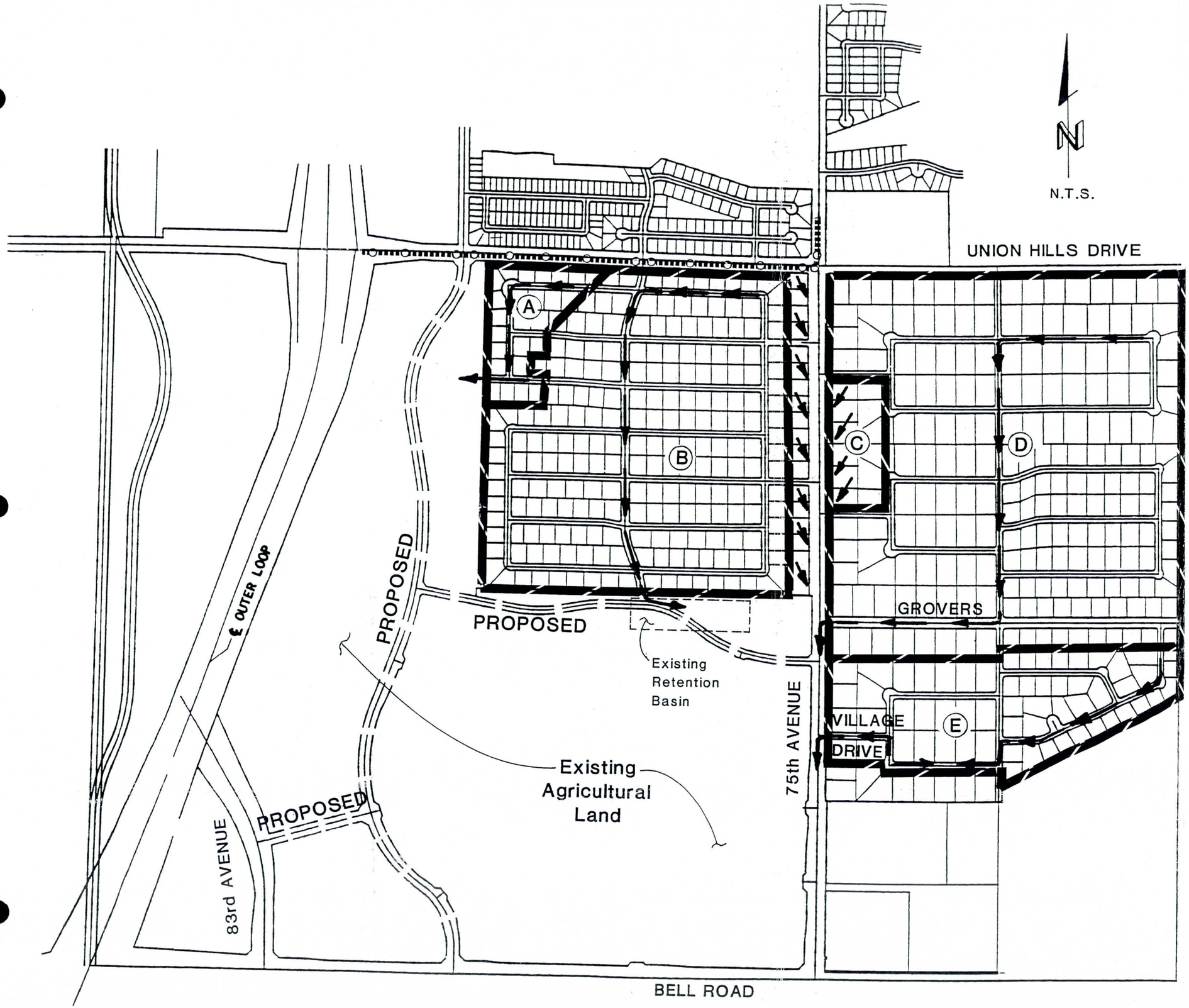
The Hidden Manor subdivisions are a group of medium density residential developments located on the west side of 75th Avenue, starting at Union Hills Drive and extending south 1/2 mile to the Grovers Avenue alignment. The runoff for Hidden Manor is broken into two parts. The northwest corner of the Hidden Manor Subdivisions (22.43 acres) collects at a concentration point on the west boundary line and discharges onto the undeveloped property immediately to the west. The drainage from the remainder of the subdivisions (105.15 acres) collects along 77th Avenue (an interior street) and discharges at a concentration point on the south boundary line of the subdivision. The runoff enters a shallow retention basin located on vacant land to the south of the subdivision.

The Secluded Acres Subdivisions is a group of low to medium density residential developments located on the east side of 75th Avenue, starting at Union Hills Drive and extending south approximately 3/4 of a mile. The original subdivision design made no provisions for retention or detention of the storm water runoff. The drainage pattern follows the interior street pattern then discharges overland into the 75th Avenue right-of-way at two locations; Grovers Avenue and Village Drive.

At the Grovers Avenue location, the grade of 75th Avenue is substantially higher than the grade of Grovers Avenue. A substantial ponding situation is created on Grovers Avenue in close proximity to the intersection. Local flooding of the lots in that area occurs during significant storm events. Lots on the east side of 75th Avenue, south of Grovers Avenue, are also impacted by drainage runoff during significant storms.

At the Village Drive location, the magnitude of the drainage flow is substantially less and the longitudinal grade of the drainage swale running parallel to 75th Avenue is greater allowing the Village Drive runoff to enter the 75th Avenue right-of-way with little impact.

The paving improvements for Union Hills Drive are existing except for curb, gutter, and sidewalk along the south edge of the roadway. There is also an existing storm drain which outfalls to the ADOT channel along the east side of the Agua Fria Freeway. Stubouts have been provided from the existing storm drain for future catch basins to be constructed on the south side of the road.



(A) HIDDEN MANOR NW

(B) HIDDEN MANOR

(C) SECLUDED ACRES-1

(D) SECLUDED ACRES-2

(E) SECLUDED ACRES-3

GLENDALE I.D. 59

MAP NO. 1
EXISTING DRAINAGE CONDITIONS

BURGESS & NIPLE
ENGINEERS
ARCHITECTS

Conceptual Drainage Design

The drainage system for this project was designed to meet the following criteria:

- The storm drain will have sufficient capacity to carry the 10-year storm event.

- The properties within the project area (excluding the existing subdivisions) will be required to detain, on-site, the storm runoff from a 100-year event. The storm drain will have sufficient capacity to bleed off this detained runoff within 36 hours.

- There will be sufficient capacity in the 75th Avenue storm drain to accept the discharges from the Hidden Manor and Secluded Acres Subdivisions for a 10-year event.

- The catch basin spacing will be designed to limit the horizontal spread of the storm water, thus keeping a minimum of one lane of pavement dry in each direction during the 10-year event.

- The neighborhood park site to be developed with this project will be required to detain its own storm runoff from a 100-year event. Bleed off capacity will be provided in the 75th Avenue storm drain to dispose of the detained storm runoff within 36 hours.

- The northwest portion of Hidden Manor will continue to discharge its runoff to the west into the 60' wide landscape buffer to be constructed along the west side of Hidden Manor. This buffer will provide the conveyance of the 10- and 100-year runoff to St. John Road and ultimately to the 79th Avenue right-of-way and storm drain.

- Catch basins will be installed on the south side of Union Hills Drive with the new paving improvements. These new catch basins will use the existing connecting pipes installed with the original storm drain system.

The streets will act as drainage ways, conveying the design storm to catch basin locations along the road alignment. The contributing drainage area for most of the roadways is limited to the road rights-of-way and, in some cases, portions of adjacent landscaping easements where sidewalks are to be constructed.

The exception to this is on 75th Avenue. Proposed and existing frontage roads along with fronting subdivided lots drain directly to 75th Avenue. The Hidden Manor and Secluded Acres Subdivisions will also discharge their runoff to the 75th Avenue right-of-way either into the storm drain or into the street section. The un-subdivided parcels that front 75th Avenue just north of Bell Road (the Mall area) will be required to detain their own runoff when they are developed and will therefore have no direct contribution to 75th Avenue drainage.

In order to alleviate the ponding and flooding problem at the 75th Avenue and Grovers Avenue intersection, we designed the new paving grades for 75th Avenue to be lower than Grovers Avenue at this location. A large catch basin on Grovers Avenue will intercept the 10-year storm runoff and discharge into the 75th Avenue storm drain. The excess runoff in a 100-year event will discharge directly into 75th Avenue right-of-way and proceed south along the 75th Avenue alignment.

Runoff entering 75th Avenue at the Village Drive location will discharge overland into the right-of-way and be intercepted by catch basins along the 75th Avenue alignment.

Excess runoff from storms greater than a 10-year frequency will discharge into 75th Avenue and proceed south to Bell Road. The paving plans for 75th Avenue in this area do not show a straight grade from Grovers Avenue south to Bell Road. In fact there are two sump conditions which occur at the approximate stations of 23+50 and 34+97. There are also two corresponding crest conditions which occur at the approximate stations of 20+38 and 32+86. The general profile condition is detailed below for both the east and west side of 75th Avenue:

East Side			West Side		
Station	**Gutter Elevation**		**Station**	**Gutter Elevation**	
34+97.00	1210.09	(sump)	34+97.00	1209.87	(sump)
32+86.48	1210.51	(crest)	32+86.48	1211.00	(crest)
23+50.00	1208.01	(sump)	23+50.00	1207.74	(sump)
20+37.62	1208.64	(crest)	20+37.62	1208.66	(crest)
11+00.70	1205.31	(Bell Road)	11+00.70	1205.99	(Bell Road)

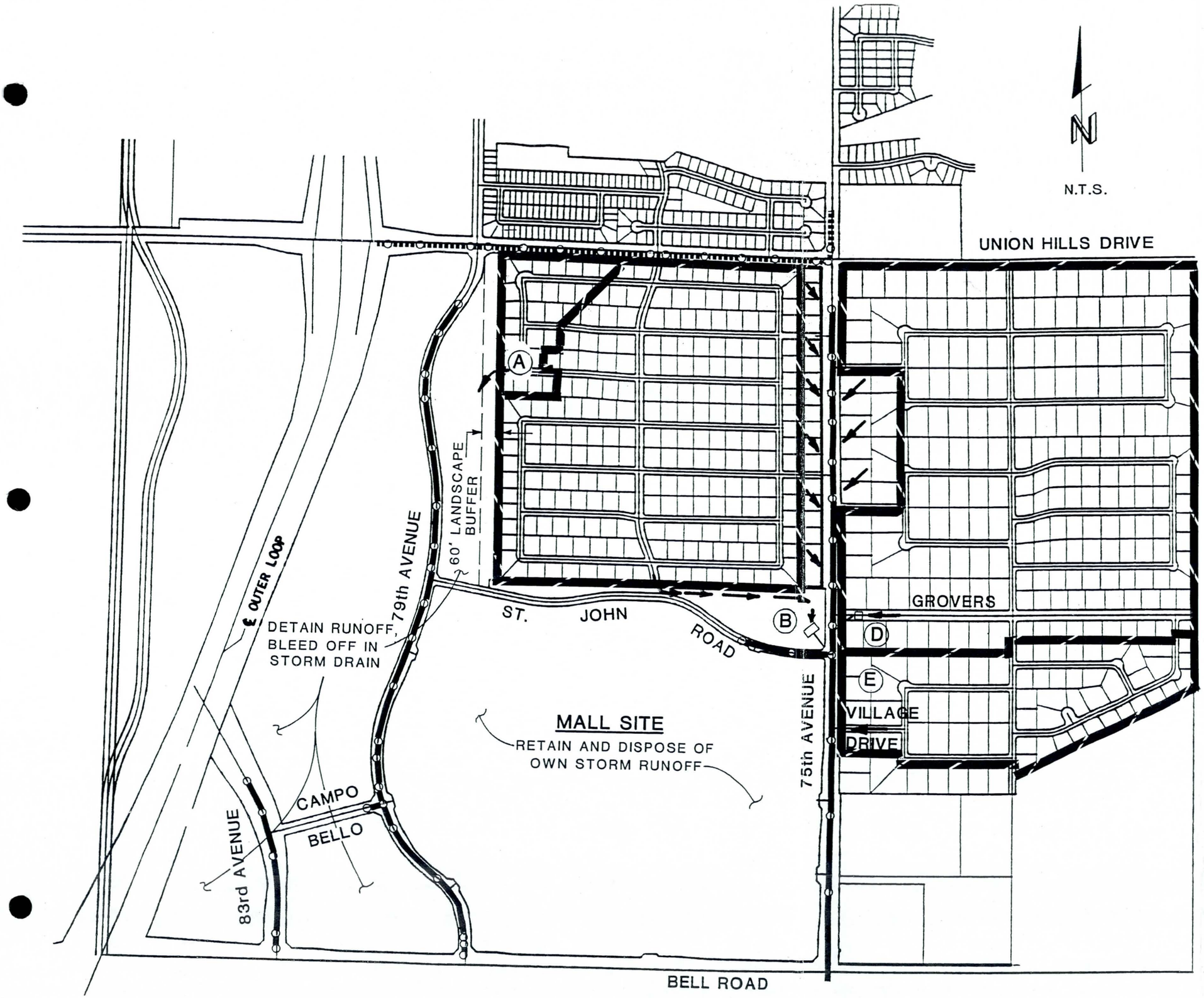
The slopes from crest to crest are as follows:

East Side	West Side
$\frac{1210.51 - 1208.64}{3286.48 - 2037.62} = 0.150\%$	$\frac{1211.00 - 1208.66}{3286.48 - 2037.62} = 0.187\%$

For storms in excess of the 10-year event, water will pond at the sump locations until the water surface exceeds the crest elevation immediately south of the sump condition. Once the water surface exceeds the crest elevation, flow will continue south along the 75th Avenue alignment. the ponding depths which will occur at each sump location when the water surface reaches the controlling crest elevation are detailed below:

East Side		West Side	
Station	**Ponding Depth**	**Station**	**Ponding Depth**
34+97.00	0.42'	34+97.00	1.13'
23+50.00	0.63'	23+50.00	0.92'

Designing a continuous grade through this area would require longitudinal grades of less than 0.10%, which was determined to be unacceptable by the City of Glendale.



DRAINAGE FLOWS

(A) HIDDEN MANOR NW
Q_{10} = 23.2 c.f.s.

(B) HIDDEN MANOR
Q_{10} = 104.1 c.f.s.

(D) SECLUDED ACRES (NORTH)
Q_{10} = 128.8 c.f.s.

(E) SECLUDED ACRES (SOUTH)
Q_{10} = 45.9 c.f.s.

GLENDALE I.D. 59

MAP NO. 2
CONCEPTUAL DRAINAGE DESIGN

BURGESS & NIPLE
ENGINEERS
ARCHITECTS

OFFSITE HYDROLOGY

The offsite areas which impact the storm drain design are Hidden Manor, Secluded Acres, and the property to be developed which is encompassed by Bell Road, 83rd & 75th Avenues, and Union Hills Drive. Hidden Manor and Secluded Acres were analyzed using the Rational Method to determine design flows for the 10-year and 100-year storm events. The property to be developed which is encompassed by Bell Road, 83rd & 75th Avenues, and Union Hills Drive will be required to detain its own storm water for a 100-year event, then bleed it off slowly through the new storm drain system. Therefore, they will have no effect on the peak flow design for the storm drain.

Aerial photographs of Hidden Manor and Secluded Acres were measured to determine the amount of impervious and pervious ground surface. Using accepted factors for concrete, asphalt, landscaping, buildings, and streets, a weighted C-factor of 0.45 was calculated for both of the subdivisions.

Using contour maps supplied by the City of Glendale, the route for drainage flow was identified for each drainage area. Typical cross sections were estimated for each drainage route. Using the Manning's Formula, an estimated time of travel (time of concentration) was determined for each drainage route. Those times of concentration are as follows:

1. Hidden Manor at Grovers Avenue	29.2 minutes
2. Hidden Manor at west subdivision boundary	27.6 minutes
3. Secluded Acres at Grovers Avenue	40.2 minutes
4. Secluded Acres at Village Drive	27.1 minutes

The Rainfall Intensity Curves for the Phoenix area were used along with the appropriate time of concentration to determine proper storm intensity to use in calculating the peak runoff for the 10-year and 100-year events. Runoff quantities for the 10-year and 100-year events for each location are as follows:

Location	10-year Runoff	100-year Runoff
Hidden Manor at Grovers Avenue	104.1 cfs	160.9 cfs
Hidden Manor at west boundary	23.2 cfs	35.3 cfs
Secluded Acres at Grovers Avenue	128.8 cfs	200.3 cfs
Secluded Acres at Village Drive	45.9 cfs	69.9 cfs

STREET HYDROLOGY

The hydrology for the streets themselves was analyzed using the Rational Method. The drainage areas were limited generally to the street right-of-way only. Along 79th Avenue, additional area in a landscape easement was included due to bike path improvements. Drainage areas were defined for each catch basin location. The extent of the drainage area was governed by catch basin spacing and/or grade break locations in the roadway design.

The typical cross-section for each roadway was analyzed using accepted factors for concrete, asphalt, landscaping, etc. Various weighted C-Factors were established based on the relationship of roadway width, right-of-way width, amount of landscaping, and median configuration.

Times of concentration were determined using a rough estimate of gutter flow velocities adjusted for the various longitudinal slopes of the roadway. The time for drainage to flow overland within the right-of-way was considered insignificant. Therefore, no time of concentration was assumed for overland flow.

In every case, the times of concentration for the street drainage areas were less than 10 minutes. Therefore a maximum intensity, $i=3.85$ in/hr, was used to calculate the rate of runoff generated from each area.

STORM DRAIN DESIGN

The storm drain main line was designed using the Rational Method to calculate the magnitude of design flows and the Manning's Equation to verify pipe capacity. The time of concentration for each design flow was based on the drainage area time of concentration plus the accumulative time of travel within the main pipe itself. Cumulative times of concentration were checked against the individual time of concentration for each drainage area. The longest time of concentration for each comparison was used in determining the design flow for that reach of pipe.

The storm drain main line was designed as a gravity flow system. The storm drain for this project outfalls into a proposed storm drain system to be constructed in Bell Road. As a basis for design, the hydraulic grade line for this project's storm sewer was assumed at the top of pipe for the outfall points.

Due to slope and size constraints, the 78" storm drain in 75th Avenue operates in a surcharged condition. The depth of the 78" storm drain pipe is sufficient to handle the surcharge without the water surface encroaching into catch basins or out of manhole covers.

Catch basins were designed for the 10-year storm event using the HEC-12 computer program. City of Phoenix catch basin details were used as the basis for design. Catch basins on grade were designed to be 75% to 95% efficient. Flowby from on grade catch basins was added to the design flow of the next consecutive catch basin down stream. Catch basins in a sag were designed to be 100% efficient. Pavement spread was checked at the catch basin locations and kept to a maximum of one lane (for the 10-year event).

The connecting pipes between the catch basins and the main line were designed to handle the full 10-year runoff at each catch basin location. Fifteen inch diameter pipe was the minimum size used. A minimum grade of 1.0% was used except where conflicts with existing or proposed underground facilities required a gentler slope.

RETENTION

The Neighborhood Park Site, which will be constructed with this project, is to detain its own runoff from a 100-year event. A detention basin will be provided at the east end of the park, adjacent to 75th Avenue. Bleed off capacity will be provided by the storm drain in 75th Avenue in order to drain the detention basin within 36 hours.

The northwest section of Hidden Manor subdivision discharges its storm runoff to the west. Capacity will be constructed in the 60' wide buffer zone on the subdivision west side to detain/retain or convey the storm runoff south to St. John Road, where it will be conveyed to the 79th Avenue right-of-way and storm drain.

The balance of the Hidden Manor project will discharge its runoff into the neighborhood park where it will be conveyed to 75th Avenue. The 10-year runoff will be handled by the storm drain in 75th Avenue. The 100-year runoff will be conveyed to the 75th Avenue right-of-way.

Secluded acres will discharge its runoff to the 75th Avenue right-of-way. Again, the 75th Avenue storm drain has been designed to carry the 10-year flows while the 100-year flows will be handled by the right-of-way.

Secluded Acres has no existing retention facilities. Hidden Manor has a small retention basin located along the south boundary of the subdivision. As discussed at the beginning of this project, providing retention/detention facilities for these previously subdivided areas was not to be part of this project's design. Conveyance of runoff to the public right-of-way was the agreed upon design condition.

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET 1 OF _____ SHEETS

SUBJECT _____ PREPARED BY DJP DATE _____

CHECKED BY _____ DATE _____

Retention Calculations

$Vol = 7200\ C\ i\ A$ $\quad i = 1.25$ (100yr) (Phoenix)

PARK:

Area = 10 acres ±

$Vol = 7200(0.45)(1.25)(10)$

$Vol = 27{,}000$ c.f.

HIDDEN MANOR - NW:

Area = 22.43 acres

$Vol = 7200(0.45)(1.25)(22.43)$

$Vol = 90{,}840$ c.f.

HIDDEN MANOR:

Area = 105.15 acres

$Vol = 7200(0.45)(1.25)(105.15)$

$Vol = 425{,}860$ c.f. *

* This project will not provide retention for Hidden Manor, but will provide capacity for 10-year runoff in 75th Avenue storm Drain.

BURGESS & NIPLE

APPENDIX 1

Offsite Hydrology

Time of Concentration Calculations

CITY OF GLENDALE
IMPROVEMENT DISTRICT NO. 59

OFFSITE DRAINAGE
TIME OF CONCENTRATION CALCULATIONS

Hidden Manor

Northwest Area (at point of exit from subdivision)

	Across Lot		5.0 mins
Streets			
785	lf @ 0.9 ft/sec	=	14.5 mins
340	lf @ 2.3 ft/sec	=	2.5 mins
500	lf @ 1.5 ft/sec	=	5.6 mins
	TOTAL Tc =		27.6 mins

Northwest Area (at point of entry to 79th Avenue right-of-way)

	Across Lot		5.0 mins
Streets			
785	lf @ 0.9 ft/sec	=	14.5 mins
340	lf @ 2.3 ft/sec	=	2.5 mins
500	lf @ 1.5 ft/sec	=	5.6 mins
Drainage Channel			
390	lf @ 1.7 ft/sec	=	3.8 mins
700	lf @ 2.2 ft/sec	=	5.4 mins
450	lf @ 2.4 ft/sec	=	3.2 mins
460	lf @ 1.7 ft/sec	=	4.6 mins
	TOTAL Tc =		44.6 mins

Southeast Area

	Across Lot		5.0 mins
740	lf @ 1.4 ft/sec	=	8.8 mins
1455	lf @ 2.5 ft/sec	=	9.7 mins
850	lf @ 2.5 ft/sec	=	5.7 mins
	TOTAL Tc =		29.2 mins

CITY OF GLENDALE
IMPROVEMENT DISTRICT NO. 59

OFFSITE DRAINAGE
TIME OF CONCENTRATION CALCULATIONS

Secluded Acres

North Area (Grovers Avenue)

	Across Lot		5.0 mins
Streets			
1090	lf @ 1.3 ft/sec	=	14.0 mins
1540	lf @ 2.5 ft/sec	=	10.3 mins
1120	lf @ 2.5 ft/sec	=	7.5 mins
560	lf @ 2.5 ft/sec	=	3.7 mins
	TOTAL Tc	=	40.2 mins

South Area (Village Drive)

	Across Lot		5.0 mins
Streets			
1550	lf @ 2.5 ft/sec	=	10.3 mins
1060	lf @ 2.5 ft/sec	=	7.1 mins
710	lf @ 2.5 ft/sec	=	4.7 mins
	TOTAL Tc	=	27.1 mins

Flow Calculations

CITY OF GLENDALE
IMPROVEMENT DISTRICT NO. 59

OFFSITE DRAINAGE
FLOW CALCULATIONS

Hidden Manor

Northwest Area (at point of exit from subdivision)

A = 22.43 acres
Tc = 27.6 mins
C = 0.45
i-10 = 2.3 in/hr
i-100 = 3.5 in/hr

Q-10 = 23.2 cfs
Q-100 = 35.3 cfs

Northwest Area (at point of entry to 79th Avenue right-of-way)

Sum CA = 10.73 acres
Tc = 44.6 mins
i-10 = 1.6 in/hr
i-100 = 2.6 in/hr

Q-10 = 17.9 cfs
Q-100 = 27.9 cfs

Southeast Area (at point of exit from subdivision)

A = 105.15 acres
Tc = 29.2 mins
C = 0.45
i-10 = 2.2 in/hr
i-100 = 3.4 in/hr

Q-10 = 104.1 cfs
Q-100 = 160.9 cfs

CITY OF GLENDALE
IMPROVEMENT DISTRICT NO. 59

OFFSITE DRAINAGE
FLOW CALCULATIONS

Secluded Acres

North Area (Grovers Avenue) (at point of exit from subdivision)

A = 158.96 acres
Tc = 40.2 mins
C = 0.45
i-10 = 1.8 in/hr
i-100 = 2.8 in/hr

Q-10 = 128.8 cfs
Q-100 = 200.3 cfs

South Area (Village Drive) (at point of exit from subdivision)

A = 44.37 acres
Tc = 27.1 mins
C = 0.45
i-10 = 2.3 in/hr
i-100 = 3.5 in/hr

Q-10 = 45.9 cfs
Q-100 = 69.9 cfs

BURGESS & NIPLE

APPENDIX 2

Street Hydrology

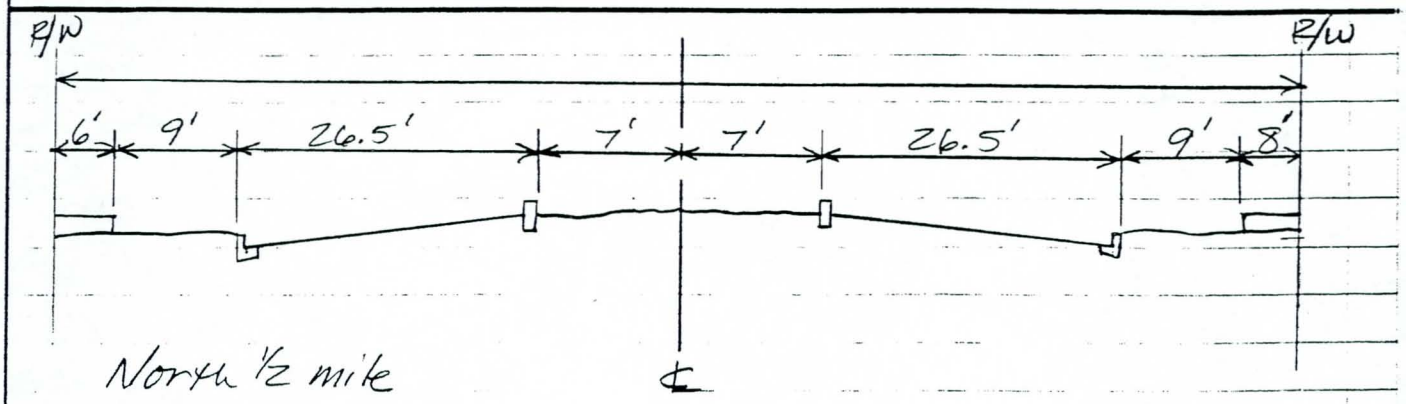
Runoff Coefficients

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET ___ OF ___ SHEETS

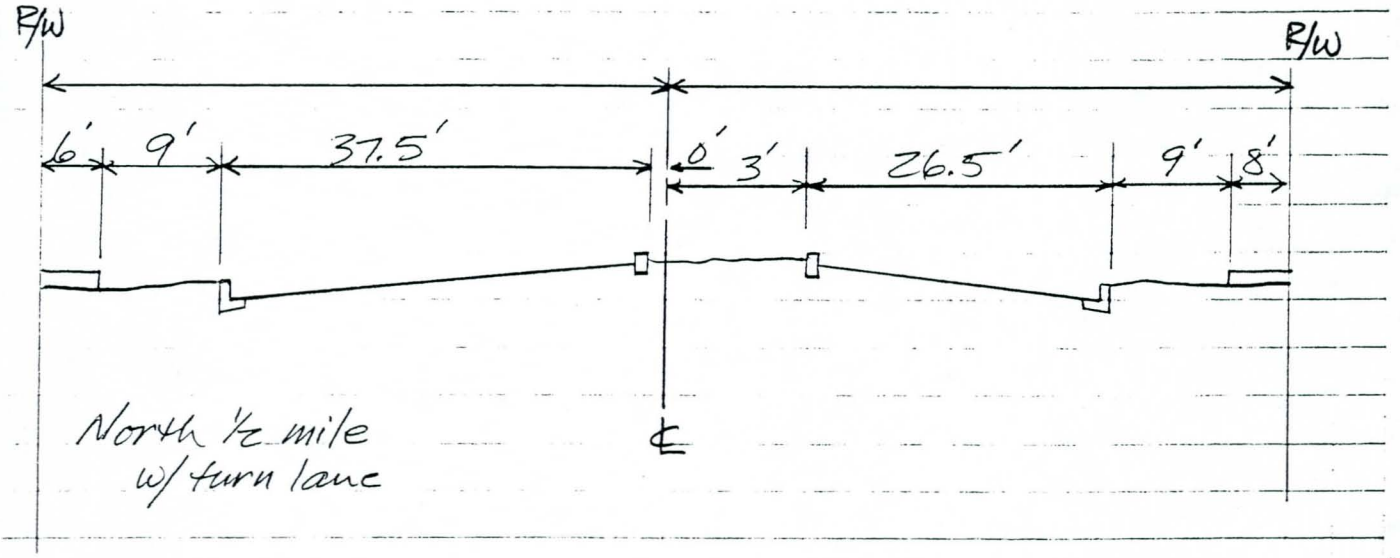
SUBJECT 79th Avenue PREPARED BY ___ DATE ___

C_w Calculations CHECKED BY ___ DATE ___



North ½ mile

$$C_w = \frac{30(0.45) + 67(0.95)}{97} = 0.80$$



North ½ mile
w/ turn lane

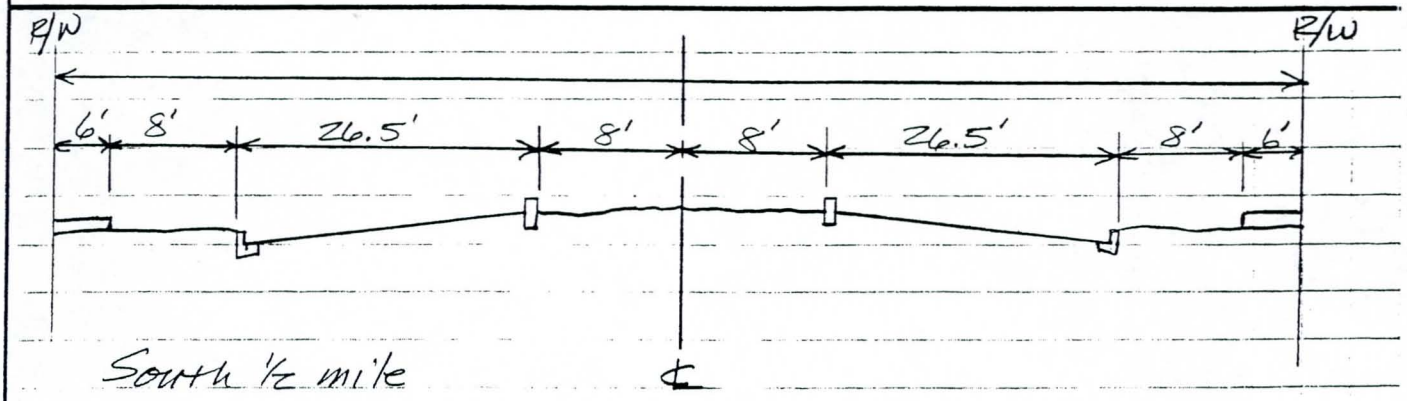
$$C_w = \frac{19(0.45) + 78(0.95)}{97} = 0.85$$

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET ___ OF ___ SHEETS

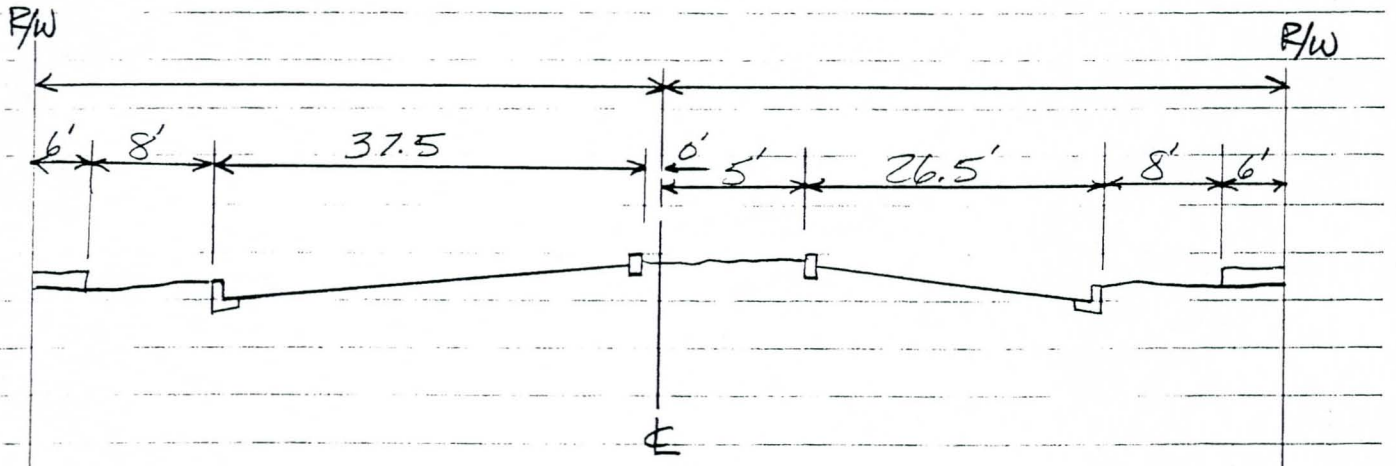
SUBJECT 79th Avenue PREPARED BY ___ DATE ___

Cw Calculations CHECKED BY ___ DATE ___



South ½ mile

$$C_w = \frac{32(0.45) + 65(0.95)}{97} = 0.79$$



South ½ mile w/ Turn lane

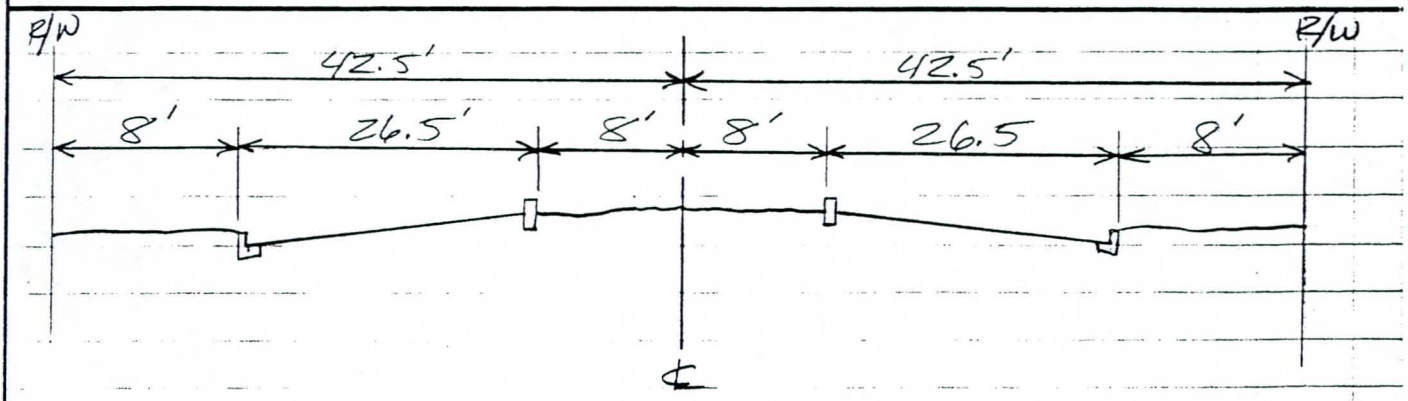
$$C_w = \frac{21(0.45) + 76(0.95)}{97} = 0.84$$

BURGESS & NIPLE, INC. - COMPUTATION SHEET

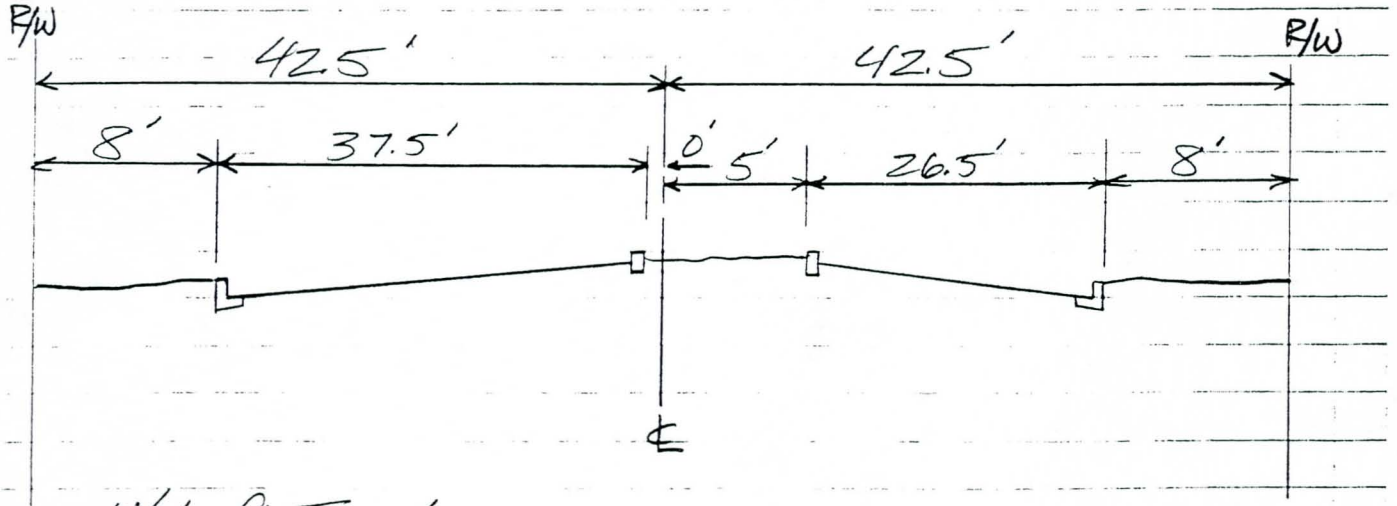
JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET ___ OF ___ SHEETS

SUBJECT 83rd Avenue C_w Calculations PREPARED BY ___ DATE ___

CHECKED BY ___ DATE ___



$$C_w = \frac{24(0.45) + 53(0.95)}{85} = 0.72$$



w/ Left Turn Lane

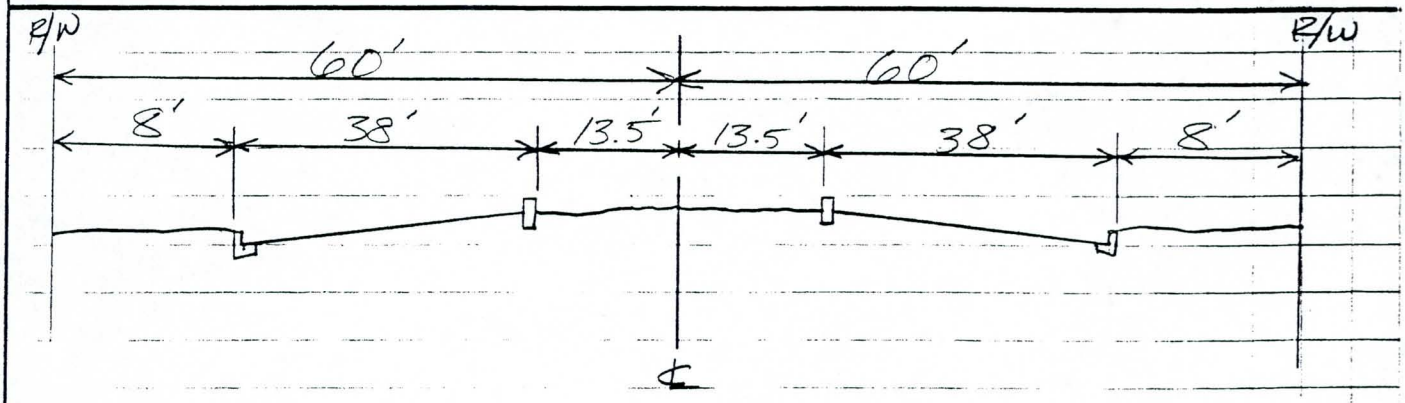
$$C_w = \frac{16(0.45) + 69(0.95)}{85} = 0.86$$

BURGESS & NIPLE, INC. - COMPUTATION SHEET

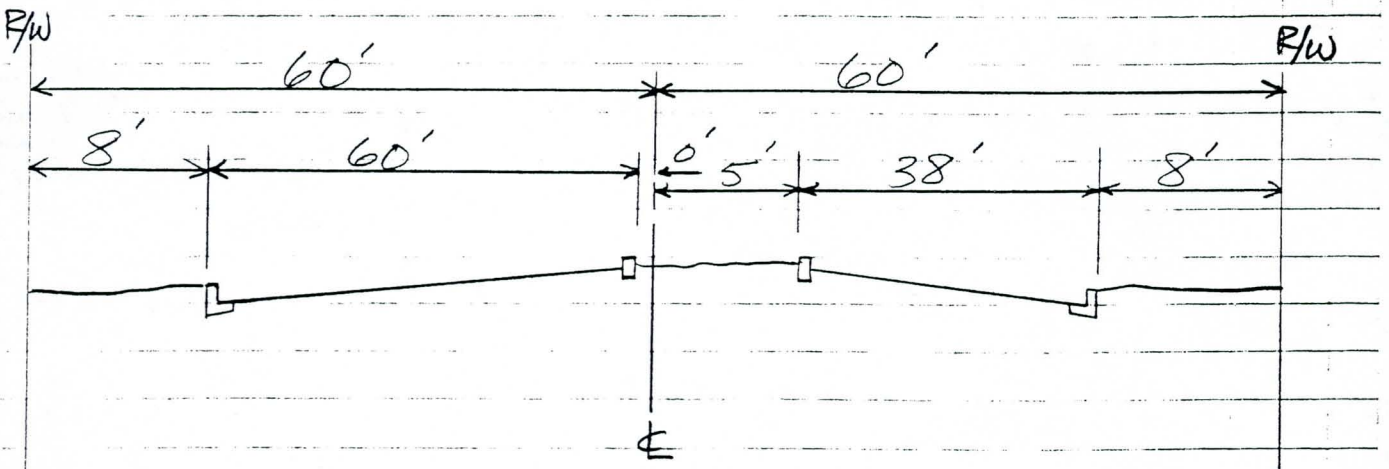
JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET ___ OF ___ SHEETS

SUBJECT 83rd Avenue PREPARED BY ___ DATE ___

C_w Calculations CHECKED BY ___ DATE ___



$$C_w = \frac{43(0.45) + 76(0.95)}{120} = 0.76$$



w/ Left Turn Lane

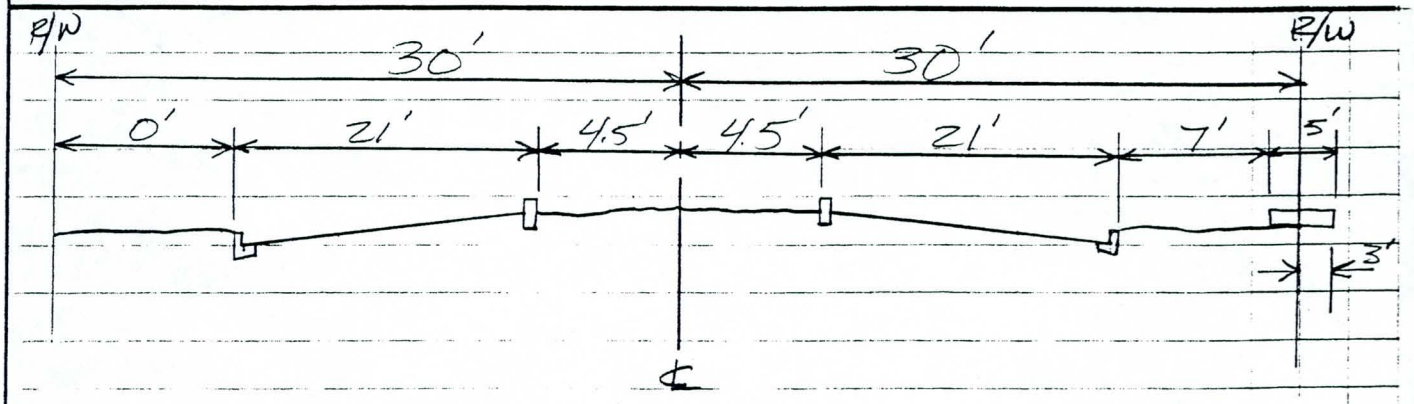
$$C_w = \frac{16(0.45) + 103(0.95)}{120} = 0.88$$

BURGESS & NIPLE, INC. - COMPUTATION SHEET

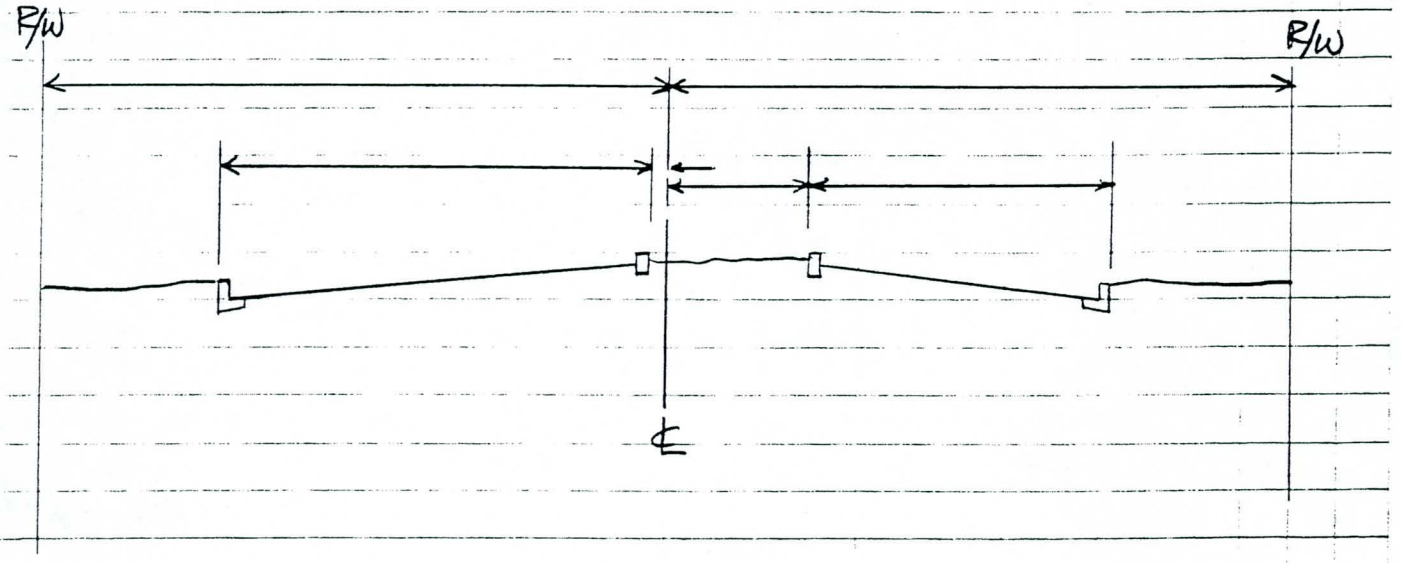
JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET ___ OF ___ SHEETS

SUBJECT ST. JOHN ROAD PREPARED BY ___ DATE ___

Cw Calculations CHECKED BY ___ DATE ___



$$C_w = \frac{47(0.9) + 16(0.45)}{63} = 0.79$$



BURGESS & NIPLE

APPENDIX 3

Storm Drain Design

Main Line Hydraulics

75TH AVENUE STORM DRAIN - 10 YEAR EVENT

Sta	LOCAL CA 75A [ac]	75B [ac]	75C [ac]	75D [ac]	HID. MANOR [ac]	SEC. ACRES [ac]	Total CA [ac]	CA Sum CA [ac]	LOCAL Tc (str) Tc [min]	(lot) Tc [min]	(offsite) Tc [min]	Local Tc [min]	Tc (in) Sum Tc [min]	(control) Tc [min]	Q-10yr (used) Tc [min]	Sum CA [ac]	i [in/hr]	Q [cfs]	Pipe Slope [%]	Pipe Dia. [inch]	Pipe Vel [fps]	Pipe Length [ft]	Pipe Delta T [min]	Sum Tc [min]	Comments
58+00			0.48				0.48	0.48	2.80			2.80	0.00	2.80	10.00	0.48	3.85	1.85	0.60	18.00	3.30	20.00	0.10	2.90	
57+80	0.83						0.83	1.31	3.47	5.00		8.47	2.90	8.47	10.00	1.31	3.85	5.04	0.60	18.00	4.30	35.00	0.14	8.61	
57+45		0.33					0.33	1.64	3.70			3.70	8.61	8.61	10.00	1.64	3.85	6.31	0.60	18.00	4.50	205.00	0.76	9.36	
55+40			0.21	1.14			1.35	2.99	5.10	5.00		10.10	9.36	10.10	10.10	2.99	3.85	11.51	0.60	24.00	5.20	220.00	0.54	10.64	
53+20	In-line Manhole						0.00	2.99	1.93			1.93	10.64	10.64	10.64	2.99	3.85	11.51	0.60	24.00	5.20	170.00	0.15	10.80	
51+50	0.29	0.39					0.68	3.67	4.00			4.00	10.80	10.80	10.80	3.67	3.70	13.58	0.60	24.00	5.50	50.00	0.29	11.08	
51+00	1.06						1.06	4.73	N/A			0.00	11.08	11.08	11.08	4.73	3.65	17.26	0.60	30.00	5.80	100.00	0.42	11.50	
50+00			0.33	0.39			0.72	5.45	N/A			0.00	11.50	11.50	11.50	5.45	3.60	19.62	0.60	30.00	6.00	150.00	0.26	11.76	
48+50				2.68			2.68	8.13	N/A			0.00	11.76	11.76	11.76	8.13	3.55	28.86	0.60	30.00	6.30	100.00	0.09	11.85	
47+50	0.69						0.69	8.82	N/A			0.00	11.85	11.85	11.85	8.82	3.50	30.87	0.40	36.00	5.80	30.00	0.63	12.48	
47+20		0.25					0.25	9.07	N/A			0.00	12.48	12.48	12.48	9.07	3.50	31.75	0.40	36.00	5.80	220.00	0.10	12.58	
45+00		0.34					0.34	9.41	N/A			0.00	12.58	12.58	12.58	9.41	3.45	32.46	0.40	36.00	5.90	35.00	0.10	12.68	
44+65				1.86			1.86	11.27	N/A			0.00	12.68	12.68	12.68	11.27	3.45	38.88	0.52	36.00	6.50	265.00	0.68	13.36	
42+00	0.28	0.35					0.63	11.90	N/A			0.00	13.36	13.36	13.36	11.90	3.40	40.46	0.52	36.00	6.50	75.00	0.19	13.55	
41+25	0.96						0.96	12.86	N/A			0.00	13.55	13.55	13.55	12.86	3.40	43.72	1.04	36.00	9.00	165.00	0.31	13.86	
39+60				1.07			1.07	13.93	N/A			0.00	13.86	13.86	13.86	13.93	3.35	46.67	1.04	36.00	9.00	60.00	0.11	13.97	
39+00			0.39	0.35			0.74	14.67	N/A			0.00	13.97	13.97	13.97	14.67	3.35	49.14	1.04	36.00	9.10	64.00	0.12	14.09	
38+36	0.59						0.59	15.26	N/A			0.00	14.09	14.09	14.09	15.26	3.35	51.12	1.04	36.00	9.40	36.00	0.06	14.15	
38+00	In-line Manhole						0.00	15.26	N/A			0.00	14.15	14.15	14.15	15.26	3.35	51.12	1.04	36.00	9.40	100.00	0.18	14.33	
37+00				0.66			0.66	15.92	N/A			0.00	14.33	14.33	14.33	15.92	3.30	52.54	0.40	36.00	7.43	130.00	0.29	14.62	* Pressure Flow
35+70					47.32	71.53	118.85	134.77	N/A		40.20	40.20	14.62	40.20	40.20	134.77	1.84	247.98	0.22	78.00	7.47	73.00	0.16	40.36	* Pressure Flow
34+97		0.84	0.40	1.06			2.30	137.07	N/A			0.00	40.36	40.36	40.36	137.07	1.83	250.84	0.22	78.00	7.56	153.00	0.34	40.70	* Pressure Flow
33+48	2.24 (ST. JOHN - EAST)						2.24	139.31	N/A		13.01	13.01	40.70	40.70	40.70	139.31	1.82	253.54	0.22	78.00	7.64	464.00	1.01	41.71	* Pressure Flow
28+80		0.33					0.33	139.64	N/A			0.00	41.71	41.71	41.71	139.64	1.82	254.14	0.22	78.00	7.66	13.00	0.03	41.74	* Pressure Flow
28+67			0.25	1.09			1.34	140.98	N/A			0.00	41.74	41.74	41.74	140.98	1.81	255.17	0.22	78.00	7.69	137.00	0.30	42.04	* Pressure Flow
27+30	In-line Manhole						0.00	140.98	N/A			0.00	42.04	42.04	42.04	140.98	1.81	255.17	0.22	78.00	7.69	380.00	0.82	42.86	* Pressure Flow
23+50		0.89	0.67	1.39		19.97	22.92	163.90	N/A			0.00	42.86	42.86	42.86	163.90	1.72	281.91	0.22	78.00	8.50	177.00	0.35	43.21	* Pressure Flow
21+73	In-line Manhole						0.00	163.90	N/A			0.00	43.21	43.21	43.21	163.90	1.72	281.91	0.22	78.00	8.50	373.00	0.73	43.94	* Pressure Flow
18+00			0.28				0.28	164.18	N/A			0.00	43.94	43.94	43.94	164.18	1.72	282.39	0.22	78.00	8.51	180.00	0.35	44.29	* Pressure Flow
[illegible]20	In-line Manhole						0.00	164.18	N/A			0.00	44.29	44.29	44.29	164.18	1.72	282.39	0.22	78.00	8.51	220.00	0.43	44.72	* Pressure Flow
[illegible]+00			0.55				0.55	164.73	N/A			0.00	44.72	44.72	44.72	164.73	1.72	283.34	0.22	78.00	8.54	298.00	0.58	45.30	* Pressure Flow
11+02		1.29					1.29	166.02	N/A			0.00	45.30	45.30	45.30	166.02	1.71	283.89	0.22	78.00	8.54	8.00	0.02	45.32	* Pressure Flow
10+94			0.54				0.54	166.56	N/A			0.00	45.32	45.32	45.32	166.56	1.71	284.82	0.22	78.00	8.58	45.00	0.09	45.41	* Pressure Flow

79TH AVENUE STORM DRAIN - 10 YEAR EVENT

Sta	LOCAL CA Total CA [ac]	CA Sum CA [ac]	LOCAL Tc (str) Tc [min]	(lot) Tc [min]	(offsite) Tc [min]	Local Tc [min]	Tc (in) Sum Tc [min]	(control) Tc [min]	Q-10yr (used) Tc [min]	Sum CA [ac]	i [in/hr]	Q [cfs]	OUTFLOW PARAMETERS Pipe Slope [%]	Pipe Dia. [inch]	Q-cap [cfs]	Pipe Vel [fps]	Pipe Length [ft]	Pipe Delta T [min]	Sum Tc [min]	Comments
61+00	1.16	1.16	6.54			6.54	0.00	6.54	10.00	1.16	3.85	4.47	0.48	18.00		3.80	460.00	2.02	8.56	
56+40	0.86	2.02	6.30			6.30	8.56	8.56	10.00	2.02	3.85	7.78	0.48	24.00		4.70	480.00	1.70	10.26	
51+60	0.90	2.92	6.30			6.30	10.26	10.26	10.26	2.92	3.80	11.10	0.32	30.00		4.10	460.00	1.87	12.13	
47+00	0.85	3.77	N/A			0.00	12.13	12.13	12.13	3.77	3.60	13.57	0.32	30.00		4.40	500.00	1.89	14.02	
42+00	0.93	4.70	N/A			0.00	14.02	14.02	14.02	4.70	3.40	15.98	0.40	30.00		4.80	150.00	0.52	14.54	
40+50	0.79	5.49	N/A			0.00	14.54	14.54	14.54	5.49	3.30	18.12	0.40	30.00		5.60	50.00	0.15	14.69	St. John Rd. (future)
40+00	11.30	16.79	N/A		44.60	44.60	14.69	44.60	44.60	16.79	1.67	28.04	0.40	30.00		5.70	340.00	0.99	45.59	Hidden Manor
36+60	0.82	17.61	N/A			0.00	45.59	45.59	45.59	17.61	1.67	29.41	0.40	30.00		6.00	345.00	0.96	46.55	
33+15	0.73	18.34	N/A			0.00	46.55	46.55	46.55	18.34	1.64	30.08	0.40	30.00		6.10	355.00	0.97	47.52	
29+60	0.68	19.02	N/A			0.00	47.52	47.52	47.52	19.02	1.63	31.00	0.40	30.00		6.30	500.00	1.32	48.85	
24+60	0.93	19.95	N/A			0.00	48.85	48.85	48.85	19.95	1.58	31.52	0.24	36.00		4.50	70.00	0.26	49.10	
23+90	1.05	21.00	N/A			0.00	49.10	49.10	49.10	21.00	1.57	32.97	0.24	36.00		4.70	260.00	0.92	50.03	
21+30	0.33	21.33	N/A			0.00	50.03	50.03	50.03	21.33	1.56	33.27	0.24	36.00		4.70	370.00	1.31	51.34	
17+60	0.99	22.32	N/A			0.00	51.34	51.34	51.34	22.32	1.54	34.37	0.32	36.00		5.10	385.00	1.26	52.60	
13+75	0.43	22.75	N/A			0.00	52.60	52.60	52.60	22.75	1.52	34.58	0.32	36.00		5.10	65.00	0.21	52.81	
13+10	0.44	23.19	N/A			0.00	52.81	52.81	52.81	23.19	1.50	34.79	0.32	36.00		5.10	210.00	0.69	53.50	
11+00	0.79	23.98	N/A			0.00	53.50	53.50	53.50	23.98	1.49	35.73	2.06	36.00		5.10	0.00	0.00	53.50	

REVISED 10/93

83RD AVENUE STORM DRAIN - 10 YEAR EVENT

Sta	LOCAL CA Total CA [ac]	CA Sum CA [ac]	LOCAL Tc (str) Tc [min]	(lot) Tc [min]	(offsite) Tc [min]	Local Tc [min]	Tc (in) Sum Tc [min]	(control) Tc [min]	Q-10yr (used) Tc [min]	Sum CA [ac]	i [in/hr]	Q [cfs]	OUTFLOW PARAMETERS Pipe Slope [%]	Pipe Dia. [inch]	Q-cap [cfs]	Pipe Vel [fps]	Pipe Length [ft]	Pipe Delta T [min]	Sum Tc [min]	Comments
63+13	1.01	1.01	5.00			5.00	0.00	5.00	10.00	1.01	3.85	3.89	3.60	18.00		7.80	313.00	0.67	5.67	
60+00	0.59	1.60	2.00			2.00	5.67	5.67	10.00	1.60	3.85	6.16	1.20	18.00		5.70	350.00	1.02	6.69	
56+50	0.79	2.39	3.00			3.00	6.69	6.69	10.00	2.39	3.85	9.20	0.24	24.00		3.30	250.00	1.26	7.95	
54+00	0.57	2.96	5.00			5.00	7.95	7.95	10.00	2.96	3.85	11.40	0.40	24.00		4.40	315.00	1.19	9.15	
50+85	1.18	4.14	5.00			5.00	9.15	9.15	10.00	4.14	3.85	15.94	1.10	24.00		7.30	75.00	0.17	9.32	

ST JOHN (EAST) STORM DRAIN - 10 YEAR EVENT

Sta	LOCAL CA Total CA [ac]	CA Sum CA [ac]	LOCAL Tc (str) Tc [min]	(lot) Tc [min]	(offsite) Tc [min]	Local Tc [min]	Tc (in) Sum Tc [min]	(control) Tc [min]	Q-10yr (used) Tc [min]	Sum CA [ac]	i [in/hr]	Q [cfs]	OUTFLOW PARAMETERS Pipe Slope [%]	Pipe Dia. [inch]	Q-cap [cfs]	Pipe Vel [fps]	Pipe Length [ft]	Pipe Delta T [min]	Sum Tc [min]	Comments
16+00	0.69	0.69	4.00			4.00	0.00	4.00	10.00	0.69	3.85	2.66	0.24	18.00		2.50	600.00	4.00	8.00	
22+00	0.69	1.38	4.00			4.00	8.00	8.00	10.00	1.38	3.85	5.31	0.20	24.00		2.60	530.00	3.40	11.40	
27+60	0.79	2.17	3.80			3.80	11.40	11.40	11.40	2.17	3.70	8.03	0.20	24.00		2.60	251.00	1.61	13.01	
30+11	0.07	2.24	N/A			0.00	13.01	13.01	13.01	2.24	3.60	8.06	0.20	24.00		2.60	75.00	0.48	13.49	

Catch Basin Summary

CATCH BASIN
DESIGN SUMMARY TABLE
75th Avenue

Station	CB No.	Condition	Q (cfs)	Overflow Q (cfs)	Q total (cfs)	Selection	Q int (cfs)	Q flowby (cfs)
EAST SIDE								
58+00	75C-1	Grade	1.85	0.00	1.85	Type M-1; Std Det P-1569; Single 10' wing	1.60	0.25
55+40	75C-2	Grade	0.81	0.25	1.06	Type M-1; Std Det P-1569; Single 6' wing	0.95	0.11
50+00	75C-3	Grade	3.17	0.11	3.28	Type M-1; Std Det P-1569; Single 17' wing	3.07	0.21
45+00	75C-4	Grade	1.31	0.21	1.52	Type M-1; Std Det P-1569; Single 6' wing	1.25	0.27
39+00	75C-5	Grade	4.67	0.27	4.94	Type M-2; Std Det P-1569; Double 10' wing	4.05	0.89
34+97	75C-6	Sump	2.93	0.89	3.82	Type M-1; Std Det P-1569; Single 3' wing	3.82	0.00
28+67	75C-8	Grade	0.96	0.00	0.96	Type M-1; Std Det P-1569; Single 3' wing	0.80	0.16
23+50	75C-9	Sump	4.26	0.16	4.42	Type M-1; Std Det P-1569; Single 3' wing	4.42	0.00
18+00	75C-11	Grade	1.08	0.00	1.08	Type M-1; Std Det P-1569; Single 6' wing	1.08	0.00
14+00	75C-12	Grade	2.12	0.00	2.12	Type M-1; Std Det P-1569; Single 6' wing	1.78	0.34
10+93.79	75C-13	Sump	2.08	0.34	2.42	Type M; Std Det P-1569; No wing	2.42	0.00
WEST SIDE								
57+45	75B-1	Grade	1.27	0.00	1.27	Type M-1; Std Det P-1569; Single 6' wing	0.98	0.29
51+50	75B-2	Grade	2.97	0.29	3.26	Type M-1; Std Det P-1569; Single 17' wing	3.06	0.20
47+20	75B-3	Grade	0.96	0.20	1.16	Type M-1; Std Det P-1569; Single 6' wing	0.98	0.18
42+00	75B-4	Grade	2.60	0.18	2.78	Type M-1; Std Det P-1569; Single 10' wing	2.27	0.51
34+97	75B-5	Sump	3.24	0.51	3.75	Type M-1; Std Det P-1569; Single 3' wing	3.75	0.00
28+80	75B-7	Grade	1.27	0.00	1.27	Type M-1; Std Det P-1569; Single 6' wing	1.18	0.09
23+50	75B-8	Sump	3.42	0.09	3.51	Type M-1; Std Det P-1569; Single 3' wing	3.51	0.00
18+00	75B-10	Grade	1.12	0.00	1.12	Type M-1; Std Det P-1569; Single 3' wing	0.90	0.22
11+02.20	75B-11	Sump	4.97	0.22	5.19	Type M-1; Std Det P-1569; Single 3' wing	5.19	0.00

CATCH BASIN
DESIGN SUMMARY TABLE
75th Avenue Frontage Roads

Station	CB No.	Condition	Q (cfs)	Overflow Q (cfs)	Q total (cfs)	Selection	Q int (cfs)	Q flowby (cfs)
EAST SIDE								
55+40	75D-1	Grade	4.39	0.00	4.39	Type M-1; Std Det P-1569; Single 17' wing	3.99	0.40
48+50	75D-3A	Grade	10.32	0.00	10.32	Type M-2; Std Det P-1569; Double 10' wings	8.03	2.29
44+64.75	75D-3B	Grade	7.16	2.29	9.45	Type M-2; Std Det P-1569; Double 10' wing	7.63	1.82
39+60	75D-5	Grade	4.12	0.00	4.12	Type M-1; Std Det P-1569; Single 17' wing	3.40	0.72
37+00	75D-6	Grade	2.54	0.72	3.26	Type M-1; Std Det P-1569; Single 10' wing	2.99	0.27
34+97	75D-8	Sump	2.96	0.00	2.96	Type M-1; Std Det P-1569; Single 3' wing	2.96	0.00
28+67	75D-10	Grade	4.20	0.00	4.20	Type M-1; Std Det P-1569; Single 10' wing	3.60	0.60
23+50	75D-12	Sump	4.27	0.00	4.27	Type M-1; Std Det P-1569; Single 3' wing	4.27	0.00
WEST SIDE								
57+80	75A-1	Grade	3.19	0.00	3.19	Type M-1; Std Det P-1569; Single 17' wing	2.84	0.35
51+00	75A-3	Grade	4.07	0.00	4.07	Type M-1; Std Det P-1569; Single 17' wing	3.40	0.67
47+50	75A-4	Grade	0.69	0.67	1.36	Type M-1; Std Det P-1569; Single 10' wing	1.19	0.17
41+25	75A-6	Grade	3.69	0.00	3.69	Type M-1; Std Det P-1569; Single 10' wing	3.08	0.61
38+36	75A-7	Sump	2.29	0.61	2.90	Type M-1; Std Det P-1569; No wing	2.90	0.00

CATCH BASIN
DESIGN SUMMARY TABLE
79th Avenue

Station	CB No.	Condition	Q (cfs)	Overflow Q (cfs)	Q total (cfs)	Selection	Q int (cfs)	Q flowby (cfs)
61+00	79E-1	Grade	2.24	0.00	2.24	Type M-1; Std Det P-1569; Single 10' wing	2.01	0.23
56+40	79E-2	Grade	1.66	0.23	1.89	Type M-1; Std Det P-1569; Single 10' wing	1.75	0.14
51+60	79E-3	Grade	1.73	0.14	1.87	Type M-1; Std Det P-1569; Single 10' wing	1.75	0.12
47+00	79E-4	Grade	1.66	0.12	1.78	Type M-1; Std Det P-1569; Single 6' wing	1.45	0.33
42+00	79E-5	Grade	1.79	0.33	2.12	Type M-1; Std Det P-1569; Single 10' wing	1.93	0.19
40+00	79E-6	Grade	0.80	0.19	0.99	Type M-1; Std Det P-1569; Single 6' wing	0.86	0.13
36+60	79E-7	Grade	1.21	0.13	1.34	Type M-1; Std Det P-1569; Single 6' wing	1.20	0.14
33+15	79E-8	Grade	1.57	0.14	1.71	Type M-1; Std Det P-1569; Single 10' wing	1.51	0.20
29+60	79E-9	Grade	1.34	0.20	1.54	Type M-1; Std Det P-1569; Single 6' wing	1.27	0.27
24+67.23	79E-10	Sump	2.11	0.27	2.38	Type M; Std Det P-1569; No wing	2.38	0.00
21+30	79E-11	Grade	1.28	0.00	1.28	Type M-1; Std Det P-1569; Single 6' wing	1.12	0.16
17+60	79E-12	Grade	1.41	0.16	1.57	Type M-1; Std Det P-1569; Single 6' wing	1.31	0.26
13+75	79E-13	Grade	1.66	0.26	1.92	Type M-1; Std Det P-1569; Single 10' wing	1.70	0.22
11+05.56	79E-14	Sump	1.53	0.22	1.75	Type M; Std Det P-1569; No wing	1.75	0.00
61+00	79W-1	Grade	2.24	0.00	2.24	Type M-1; Std Det P-1569; Single 10' wing	1.81	0.43
56+40	79W-2	Grade	1.66	0.43	2.09	Type M-1; Std Det P-1569; Single 10' wing	1.73	0.36
51+60	79W-3	Grade	1.73	0.36	2.09	Type M-1; Std Det P-1569; Single 10' wing	1.79	0.30
47+00	79W-4	Grade	1.66	0.30	1.96	Type M-1; Std Det P-1569; Single 10' wing	1.79	0.17
42+00	79W-5	Grade	1.79	0.17	1.96	Type M-1; Std Det P-1569; Single 10' wing	1.74	0.22
36+60	79W-6	Grade	1.98	0.22	2.20	Type M-1; Std Det P-1569; Single 10' wing	1.92	0.28
33+15	79W-7	Grade	1.25	0.28	1.53	Type M-1; Std Det P-1569; Single 6' wing	1.26	0.27
29+60	79W-8	Grade	1.28	0.27	1.55	Type M-1; Std Det P-1569; Single 6' wing	1.28	0.27
24+60.46	79W-9	Sump	2.11	0.27	2.38	Type M; Std Det P-1569; No wing	2.38	0.00
17+60	79W-10	Grade	2.43	0.00	2.43	Type M-1; Std Det P-1569; Single 10' wing	2.12	0.31
13+10	79W-11	Grade	1.69	0.31	2.00	Type M-1; Std Det P-1569; Single 10' wing	1.55	0.45
11+02.56	79W-12	Sump	1.82	0.45	2.27	Type M; Std Det P-1569; No wing	2.27	0.00

CATCH BASIN
DESIGN SUMMARY TABLE
83rd Avenue

Station	CB No.	Condition	Q (cfs)	Overflow Q (cfs)	Q total (cfs)	Selection	Q int (cfs)	Q flowby (cfs)
63+12.5	83E-1	Grade	1.95	0.00	1.95	Type M-1; Std Det P-1569; Single 10' wing	1.39	0.56
60+00	83E-2	Grade	1.04	0.56	1.60	Type M-1; Std Det P-1569; Single 10' wing	1.20	0.40
56+50	83E-3	Grade	1.52	0.40	1.92	Type M-1; Std Det P-1569; Single 10' wing	1.67	0.25
54+00	83E-4	Grade	1.10	0.25	1.35	Type M-1; Std Det P-1569; Single 6' wing	1.13	0.22
50+86	83E-5	Sump	1.93	0.22	2.15	Type M; Std Det P-1569; No wing	2.15	0.00
63+12.5	83W-1	Grade	1.95	0.00	1.95	Type M-1; Std Det P-1569; Single 10' wing	1.39	0.56
60+00	83W-2	Grade	1.23	0.56	1.79	Type M-1; Std Det P-1569; Single 10' wing	1.22	0.57
56+50	83W-3	Grade	1.52	0.57	2.09	Type M-1; Std Det P-1569; Single 10' wing	1.76	0.33
54+00	83W-4	Grade	1.10	0.33	1.43	Type M-1; Std Det P-1569; Single 6' wing	1.07	0.36
50+97.84	83W-5	Sump	2.61	0.36	2.97	Type M; Std Det P-1569; No wing	2.97	0.00

CATCH BASIN
DESIGN SUMMARY TABLE
St. John Road

Station	CB No.	Condition	Q (cfs)	Overflow Q (cfs)	Q total (cfs)	Selection	Q int (cfs)	Q flowby (cfs)
16+00	SJN-1	Grade	1.09	0.00	1.09	Type M-1; Std Det P-1569; Single 3' wing (fut	0.75	0.34
22+00	SJN-2	Grade	1.09	0.34	1.43	Type M-1; Std Det P-1569; Single 6' wing (fut	1.22	0.21
27+60.25	SJN-3	Sump	1.25	0.21	1.46	Type M; Std Det P-1569; No wing	1.46	0.00
30+03	SJN-4	Grade	0.21	0.00	0.21	Type M; Std Det P-1569; No wing	0.17	0.04
16+00	SJS-1	Grade	1.55	0.00	1.55	Type M-1; Std Det P-1569; Single 6' wing (fut	1.25	0.30
22+00	SJS-2	Grade	1.55	0.30	1.85	Type M-1; Std Det P-1569; Single 6' wing (fut	1.46	0.39
27+60.25	SJS-3	Sump	1.79	0.39	2.18	Type M; Std Det P-1569; No wing	2.18	0.00
30+11	SJS-4	Grade	0.33	0.00	0.33	Type M; Std Det P-1569; No wing	0.23	0.10

CATCH BASIN
DESIGN SUMMARY TABLE
Union Hills Drive (south side only)

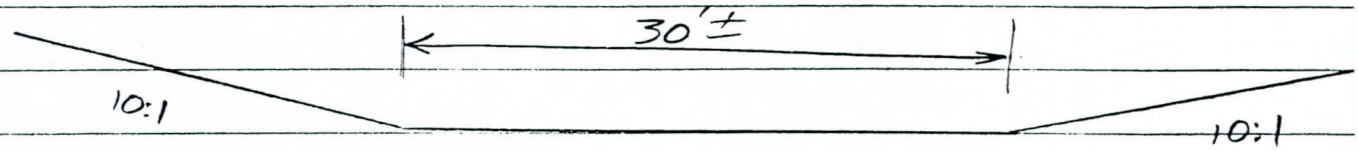
Station	CB No.	Condition	Q (cfs)	Overflow Q (cfs)	Q total (cfs)	Selection	Q int (cfs)	Q flowby (cfs)
32+05	UH1-1	Grade	1.21	0.00	1.21	Type M-1; Std Det P-1569; Single 10' wing	1.02	0.19
35+54	UH1-2	Grade	1.78	0.19	1.97	Type M-1; Std Det P-1569; Single 17' wing	1.97	0.00
55+65	UHS-7	Grade	2.34	0.00	2.34	Type M-1; Std Det P-1569; Single 6' wing	1.98	0.36
49+91	UHS-6	Grade	2.34	0.36	2.70	Type M-1; Std Det P-1569; Single 6' wing	2.19	0.51
42+65	UHS-4	Grade	2.71	0.51	3.22	Type M-1; Std Det P-1569; Single 17' wing	3.22	0.00

CATCH BASIN DESIGN
GROVERS AVENUE

5791 7842
03
GID 59
Storm Drain
Catch Basin @
Grovers

Q_{10} = 132 cfs. (Secluded Acres)

STREET HYDRAULIC CROSS-SECTION



Long. Slope of existing Grover's Avenue.
$S_{ex} = 0.006$

$n = 0.018$
$S = 0.006$
$m = 10$
$b = 30'$

for d = 0.4'

V = 3.22 fps ; Q = 43.81 cfs.

for d = 0.8'

V = 4.85 fps ; Q = 147.32 cfs.

for d = 0.75'

V = 4.67 fps ; Q = 131.3 cfs.

5-7-91, 7840
GID 59 03
Storm Drain
Catch Basin @
Grovers

Pavement width = 32'
Depth = 0.75'

<u>Check Grate Capacity</u>

Use R-3079 (3076, Type "L"), $S_T = 0$, $S_L = 0.60\%$

from Neenah Catalog, pg. 7.;
estimate "k" = 22

$\therefore Q = K D^{5/3} = 22(0.75)^{5/3} = 13.62$ cfs/grate

No. of Grates = 132/13.62 = 9.69 ⇒ say 10

No. of Grates per row = 32/1.5 = 21 grates

21 > 10 OK

TRY D = 0.50'

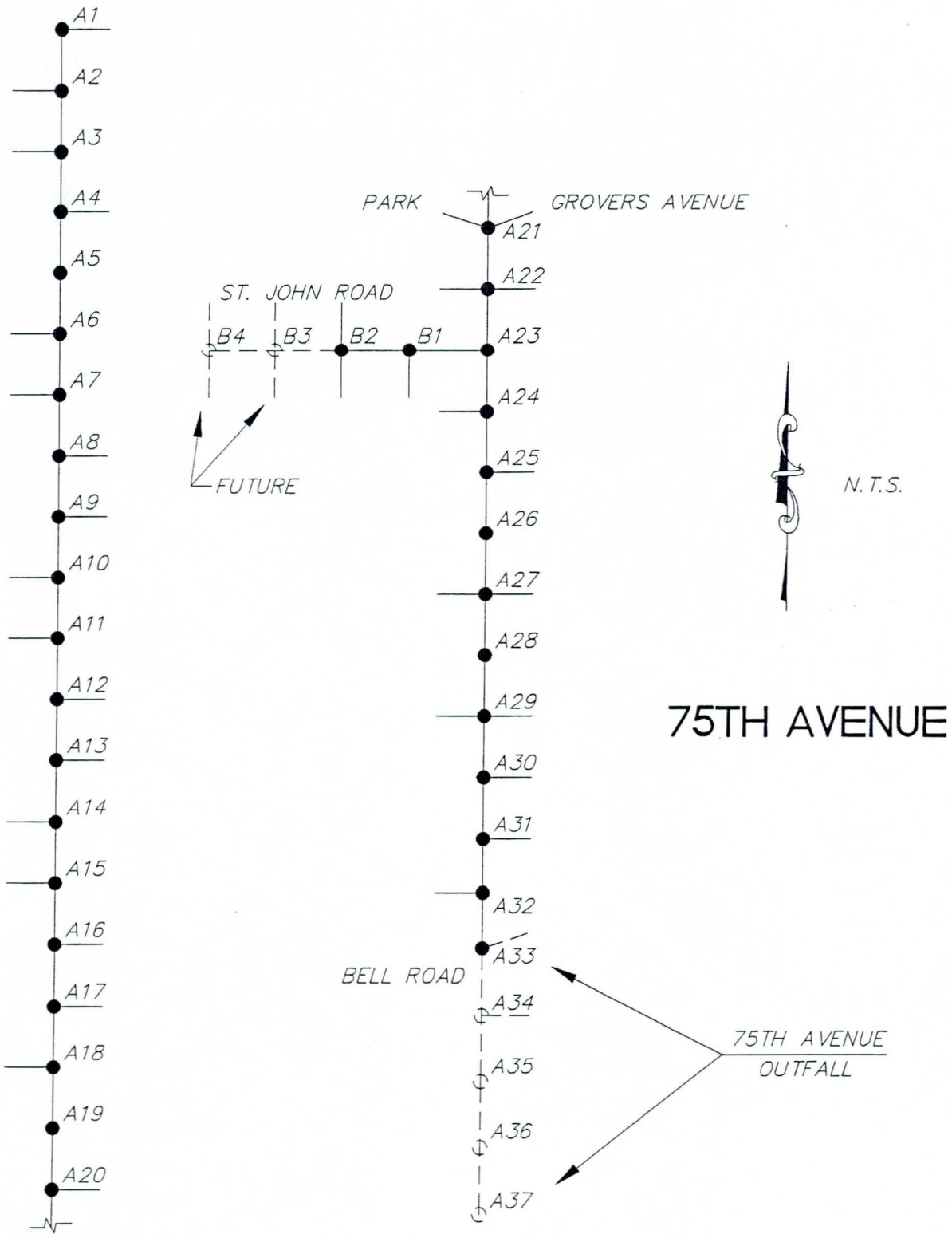
$Q = kD^{5/3} = 22(0.50)^{5/3} = 6.93$ cfs/grate

No of Grates = 132/6.93 = 19.05 ⇒ say 20 grates

20 < 21 OK

Hydraulic Grade Line Calculations
No Surcharge Condition

STORM DRAIN SCHEMATIC



DATA FILE: A:75AVE_I.DAT

```
*******************************
*                             *
*           THYSYS            *
*                             *
*   TEXAS HYDRAULICS SYSTEM   *
*                             *
*******************************
```

```
$ GLENDALE ID 59
$ STORM SEWER ANALYSIS

  75TH AVENUE MAINLINE
$ * ANALYSIS STOPS AT BELL ROAD WHERE 75TH AVENUE STORM DRAIN ENTERS THE 75TH
$   AVENUE OUTFALL (DONOHUE'S DESIGN).
$ * ZERO SURCHARGE IS ASSUMED AT THE TIE IN POINT (ORIGINAL DESIGN PARAMETER).
$
$
$
$
$
SEWER              ANALYSIS                    SEWER     FREQUENCY=10YR
DA A 01                                        t10.0                1.9
DA A 02                                        t10.0                3.2
DA A 03                                        t10.0                1.3
DA A 04                                        t10.0                5.2
DA A 06                                        t10.0                2.1
DA A 07                                        t10.0                3.7
DA A 08                                        t10.0                2.4
DA A 09                                        t10.0                9.2
DA A 10                                        t10.0                2.0
DA A 11                                        t10.0                0.9
DA A 12                                        t10.0                0.7
DA A 13                                        t10.0                6.4
DA A 14                                        t10.0                1.6
DA A 15                                        t10.0                3.3
DA A 16                                        t10.0                3.0
DA A 17                                        t10.0                2.5
DA A 18                                        t10.0                2.0
    20                                         t10.0                1.4
 . A 21                                        t10.0              195.4
DA A 22                                        t10.0                2.9
DA A 24                                        t10.0                0.6
DA A 25                                        t10.0                1.0
DA A 27                                        t10.0               26.7
DA A 29                                        t10.0                4.3
DA A 31                                        t10.0                1.0
DA A 32                                        t10.0                0.6
DA A 33                                        t10.0                8.0
DA B 01                                        t10.0                2.7
DA B 02                                        t10.0                2.7
DA B 03                                        t10.0                2.7
DA B 04                                        t10.0                0.1
$
JUNC A 05 TYPE=JUNCT
JUNC A 19 TYPE=JUNCT
JUNC A 26 TYPE=JUNCT
JUNC A 28 TYPE=JUNCT
JUNC A 30 TYPE=JUNCT
JUNC B 01 TYPE=JUNCT
JUNC B 02 TYPE=JUNCT
JUNC B 03 TYPE=JUNCT
JUNC B 04 TYPE=JUNCT
$
OUTLET    STATIONING     0948 T.W. ELEV  1200.48   A 33
DSGN 001  A 01 A 02 US1222.60 DS1222.46   20          .014        18 CIRC
DSGN 002  A 02 A 03 US1222.46 DS1222.23   35          .014        18 CIRC
     003  A 03 A 04 US1222.23 DS1220.83  205          .014        18 CIRC
 ɜN 004  A 04 A 05 US1220.83 DS1219.34  220          .014        24 CIRC
DSGN 005  A 05 A 06 US1219.34 DS1218.18  170          .014        24 CIRC
DSGN 006  A 06 A 07 US1218.18 DS1217.84   50          .014        24 CIRC
DSGN 007  A 07 A 08 US1216.80 DS1216.00  100          .014        30 CIRC
DSGN 008  A 08 A 09 US1216.00 DS1214.80  150          .014        30 CIRC
```

```
DSGN 010  A 10 A 11 US1214.00 DS1213.88   30          .014        36 CIRC
DSGN 011  A 11 A 12 US1213.88 DS1213.00  220          .014        36 CIRC
DSGN 012  A 12 A 13 US1213.00 DS1212.86   35          .014        36 CIRC
DSGN 013  A 13 A 14 US1212.86 DS1211.48  265          .014        36 CIRC
DSGN 014  A 14 A 15 US1211.48 DS1211.09   75          .014        36 CIRC
DSGN 015  A 15 A 16 US1211.09 DS1209.38  165          .014        36 CIRC
     016  A 16 A 17 US1209.38 DS1208.75   60          .014        36 CIRC
     017  A 17 A 18 US1208.75 DS1208.09   64          .014        36 CIRC
DSGN 018  A 18 A 19 US1208.09 DS1207.71   36          .014        36 CIRC
DSGN 019  A 19 A 20 US1207.71 DS1207.31  100          .014        36 CIRC
DSGN 020  A 20 A 21 US1207.31 DS1206.79  130          .014        36 CIRC
DSGN 021  A 21 A 22 US1206.79 DS1206.49   73          .014        78 CIRC
DSGN 022  A 22 A 23 US1206.49 DS1205.84  153          .014        78 CIRC
DSGN 023  A 23 A 24 US1205.84 DS1204.82  464       -5.5 .014        78 CIRC
DSGN 024  A 24 A 25 US1204.82 DS1204.79   13          .014        78 CIRC
DSGN 025  A 25 A 26 US1204.79 DS1204.49  137          .014        78 CIRC
DSGN 026  A 26 A 27 US1204.49 DS1203.66  380          .014        78 CIRC
DSGN 027  A 27 A 28 US1203.66 DS1203.27  177          .014        78 CIRC
DSGN 028  A 28 A 29 US1203.27 DS1202.45  373          .014        78 CIRC
DSGN 029  A 29 A 30 US1202.45 DS1202.05  180          .014        78 CIRC
DSGN 030  A 30 A 31 US1202.05 DS1201.57  220          .014        78 CIRC
DSGN 031  A 31 A 32 US1201.57 DS1200.91  298          .014        78 CIRC
DSGN 032  A 32 A 33 US1200.91 DS1200.48  154          .014        78 CIRC
DSGN 101  B 01 B 02 US1209.26 DS1207.82  600          .014        18 CIRC
DSGN 102  B 02 B 03 US1207.82 DS1206.48  560          .014        18 CIRC
DSGN 103  B 03 B 04 US1206.48 DS1205.99  248          .014        24 CIRC
DSGN 104  B 04 A 23 US1205.99 DS1205.84   75          .014        24 CIRC
$
ANAL 001  A 01 A 02        18
ANAL 002  A 02 A 03        18
ANAL 003  A 03 A 04        18
ANAL 004  A 04 A 05        24
ANAL 005  A 05 A 06        24
ANAL 006  A 06 A 07        24
     007  A 07 A 08        30
     008  A 08 A 09        30
ANAL 009  A 09 A 10        30
ANAL 010  A 10 A 11        36
ANAL 011  A 11 A 12        36
ANAL 012  A 12 A 13        36
ANAL 013  A 13 A 14        36
ANAL 014  A 14 A 15        36
ANAL 015  A 15 A 16        36
ANAL 016  A 16 A 17        36
ANAL 017  A 17 A 18        36
ANAL 018  A 18 A 19        36
ANAL 019  A 19 A 20        36
ANAL 020  A 20 A 21        36
ANAL 021  A 21 A 22        78
ANAL 022  A 22 A 23        78
ANAL 023  A 23 A 24        78
ANAL 024  A 24 A 25        78
ANAL 025  A 25 A 26        78
ANAL 026  A 26 A 27        78
ANAL 027  A 27 A 28        78
ANAL 028  A 28 A 29        78
ANAL 029  A 29 A 30        78
ANAL 030  A 30 A 31        78
ANAL 031  A 31 A 32        78
ANAL 032  A 32 A 33        78
ANAL 101  B 01 B 02        18
ANAL 102  B 02 B 03        18
     103  B 03 B 04        24
     104  B 04 A 23        24
$
ENDATA
```

SEWER

SEWER ANALYSIS

CONFIGURATION DATA

RUN	U.S. ID	D.S. ID	U.S. F.L. ELEV	D.S. F.L. ELEV	LENGTH FEET	SLOPE	BBLS	RISE	SPAN	SHAPE
001	A 1	A 2	1221.10	1220.96	20	0.00700	1	18	18	CIRC
002	A 2	A 3	1220.96	1220.73	35	0.00657	1	18	18	CIRC
003	A 3	A 4	1220.73	1219.33	205	0.00683	1	18	18	CIRC
004	A 4	A 5	1218.83	1217.34	220	0.00677	1	24	24	CIRC
005	A 5	A 6	1217.34	1216.18	170	0.00682	1	24	24	CIRC
006	A 6	A 7	1216.18	1215.84	50	0.00680	1	24	24	CIRC
007	A 7	A 8	1214.30	1213.50	100	0.00800	1	30	30	CIRC
008	A 8	A 9	1213.50	1212.30	150	0.00800	1	30	30	CIRC
009	A 9	A10	1212.30	1211.50	100	0.00800	1	30	30	CIRC
010	A10	A11	1211.00	1210.88	30	0.00400	1	36	36	CIRC
011	A11	A12	1210.88	1210.00	220	0.00400	1	36	36	CIRC
012	A12	A13	1210.00	1209.86	35	0.00400	1	36	36	CIRC
013	A13	A14	1209.86	1208.48	265	0.00521	1	36	36	CIRC
014	A14	A15	1208.48	1208.09	75	0.00520	1	36	36	CIRC
015	A15	A16	1208.09	1206.38	165	0.01036	1	36	36	CIRC
016	A16	A17	1206.38	1205.75	60	0.01050	1	36	36	CIRC
017	A17	A18	1205.75	1205.09	64	0.01031	1	36	36	CIRC
018	A18	A19	1205.09	1204.71	36	0.01056	1	36	36	CIRC
019	A19	A20	1204.71	1204.31	100	0.00400	1	36	36	CIRC
020	A20	A21	1204.31	1203.79	130	0.00400	1	36	36	CIRC
021	A21	A22	1200.29	1199.99	73	0.00411	1	78	78	CIRC
022	A22	A23	1199.99	1199.34	153	0.00425	1	78	78	CIRC
023	A23	A24	1199.34	1198.32	464	0.00220	1	78	78	CIRC
024	A24	A25	1198.32	1198.29	13	0.00230	1	78	78	CIRC
025	A25	A26	1198.29	1197.99	137	0.00219	1	78	78	CIRC
026	A26	A27	1197.99	1197.16	380	0.00218	1	78	78	CIRC
027	A27	A28	1197.16	1196.77	177	0.00220	1	78	78	CIRC
028	A28	A29	1196.77	1195.95	373	0.00220	1	78	78	CIRC
029	A29	A30	1195.95	1195.55	180	0.00222	1	78	78	CIRC
030	A30	A31	1195.55	1195.07	220	0.00218	1	78	78	CIRC
031	A31	A32	1195.07	1194.41	298	0.00221	1	78	78	CIRC
032	A32	A33	1194.41	1193.98	154	0.00279	1	78	78	CIRC
101	B 1	B 2	1207.76	1206.32	600	0.00240	1	18	18	CIRC
102	B 2	B 3	1206.32	1204.98	560	0.00239	1	18	18	CIRC
103	B 3	B 4	1204.48	1203.99	248	0.00198	1	24	24	CIRC
104	B 4	A23	1203.99	1203.84	75	0.00200	1	24	24	CIRC

HYDRAULIC DATA

RUN	U.S. ID	D.S. ID	'N'	JUNC LOSS	FLOW	U.S. HEAD	D.S. HEAD	HYDR. GRAD	DEPTH	VELOC.	PIPE CAPAC.	
001	A 1	A 2	0.014	0.00	1.90	1221.85	1221.85	0.00038	0.33	3.7	8.2	
002	A 2	A 3	0.014	0.00	5.10	1221.85	1221.75	0.00273	0.59	4.7	7.9	
003	A 3	A 4	0.014	0.00	6.40	1221.75	1220.35	0.00431	0.68	5.0	8.1	
004	A 4	A 5	0.014	0.00	11.60	1220.03	1218.54	0.00305	0.60	5.9	17.3	
005	A 5	A 6	0.014	0.00	11.60	1218.54	1217.54	0.00305	0.60	5.9	17.4	
006	A 6	A 7	0.014	0.00	13.70	1217.54	1217.20	0.00425	0.68	6.0	17.3	
007	A 7	A 8	0.014	0.00	17.40	1215.58	1215.18	0.00209	0.51	6.9	34.1	
008	A 8	A 9	0.014	0.00	19.80	1215.18	1214.78	0.00270	0.55	7.2	34.1	
009	A 9	A10	0.014	0.00	29.00	1214.78	1214.20	0.00580	0.72	7.7	34.1	
010	A10	A11	0.014	0.00	31.00	1214.20	1214.12	0.00251	0.68	6.1	39.2	
011	A11	A12	0.014	0.00	31.90	1214.12	1213.54	0.00265	0.69	6.1	39.2	
012	A12	A13	0.014	0.00	32.60	1213.54	1213.44	0.00277	0.70	6.2	39.2	
013	A13	A14	0.014	0.00	39.00	1213.44	1212.39	0.00397	0.73	7.1	44.7	
014	A14	A15	0.014	0.00	40.60	1212.39	1212.07	0.00430	0.76	7.0	44.7	
015	A15	A16	0.014	0.00	43.90	1212.07	1211.24	0.00502	0.62	9.5	63.0	
016	A16	A17	0.014	0.00	46.90	1211.24	1210.89	0.00573	0.64	9.8	63.5	
017	A17	A18	0.014	0.00	49.40	1210.89	1210.49	0.00636	0.67	9.8	62.9	
018	A18	A19	0.014	0.00	51.40	1210.49	1210.24	0.00689	0.69	9.9	63.6	
019	A19	A20	0.014	0.00	51.40	1210.24	1209.55	0.00689	1.00	7.3	39.2	**
020	A20	A21	0.014	0.00	52.80	1209.55	1208.61	0.00727	1.00	7.5	39.2	**
021	A21	A22	0.014	0.00	248.20	1208.61	1208.42	0.00260	0.68	10.3	312.1	
022	A22	A23	0.014	0.00	251.10	1208.42	1208.01	0.00266	0.68	10.4	317.3	
023	A23	A24	0.014	0.00	253.80	1208.01	1206.75	0.00272	1.00	7.6	228.3	**
024	A24	A25	0.014	0.00	254.40	1206.75	1206.71	0.00273	1.00	7.7	233.5	**
025	A25	A26	0.014	0.00	255.40	1206.71	1206.33	0.00275	1.00	7.7	227.8	**
026	A26	A27	0.014	0.00	255.40	1206.33	1205.29	0.00275	1.00	7.7	227.5	**
027	A27	A28	0.014	0.00	282.10	1205.29	1204.69	0.00336	1.00	8.5	228.5	**
028	A28	A29	0.014	0.00	282.10	1204.69	1203.44	0.00336	1.00	8.5	228.3	**
029	A29	A30	0.014	0.00	286.40	1203.44	1202.82	0.00346	1.00	8.6	229.5	**
030	A30	A31	0.014	0.00	286.40	1202.82	1202.06	0.00346	1.00	8.6	227.4	**
031	A31	A32	0.014	0.00	287.40	1202.06	1201.02	0.00349	1.00	8.7	229.1	**
032	A32	A33	0.014	0.00	288.00	1201.02	1200.48	0.00350	1.00	8.7	257.3	**
101	B 1	B 2	0.014	0.00	2.70	1210.67	1210.21	0.00077	0.54	2.8	4.8	
102	B 2	B 3	0.014	0.00	5.40	1210.21	1208.49	0.00307	1.00	3.1	4.8	**
103	B 3	B 4	0.014	0.00	8.10	1208.49	1208.12	0.00149	0.73	3.3	9.3	

RUN	U.S. ID	D.S. ID	'N'	JUNC LOSS	FLOW	U.S. HEAD	D.S. HEAD	HYDR. GRAD	DEPTH	VELOC.	PIPE CAPAC.
104	B 4	A23	0.014	0.00	8.20	1208.12	1208.01	0.00152	0.73	3.3	9.4

```
SEW0008--CAPACITY OF RUN 019 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 020 IS EXCEEDED.
    008--CAPACITY OF RUN 023 IS EXCEEDED.
 /0008--CAPACITY OF RUN 024 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 025 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 026 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 027 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 028 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 029 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 030 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 031 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 032 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 102 IS EXCEEDED.
```

STATIONING

RUN	UPSTREAM JUNCTION ID	STATIONING
001	A 1	5800
002	A 2	5780
003	A 3	5745
004	A 4	5540
005	A 5	5320
006	A 6	5150
007	A 7	5100
008	A 8	5000
009	A 9	4850
010	A10	4750
011	A11	4720
012	A12	4500
013	A13	4465
014	A14	4200
015	A15	4125
016	A16	3960
017	A17	3900
018	A18	3836
019	A19	3800
020	A20	3700
021	A21	3570
022	A22	3497
023	A23	3344
024	A24	2880
025	A25	2867
026	A26	2730
027	A27	2350
028	A28	2173
029	A29	1800
030	A30	1620
031	A31	1400
032	A32	1102
101	B 1	4827
102	B 2	4227
103	B 3	3667
104	B 4	3419

GLENDALE ID 59 STORM DRAIN
SURCHARGE ANALYSIS
FILE NAME: SUR75_I Computer File: SRCHRG2.WQ2

75TH AVENUE MAINLINE TO BELL ROAD
(ZERO SURCHARGE ON OUTFALL)

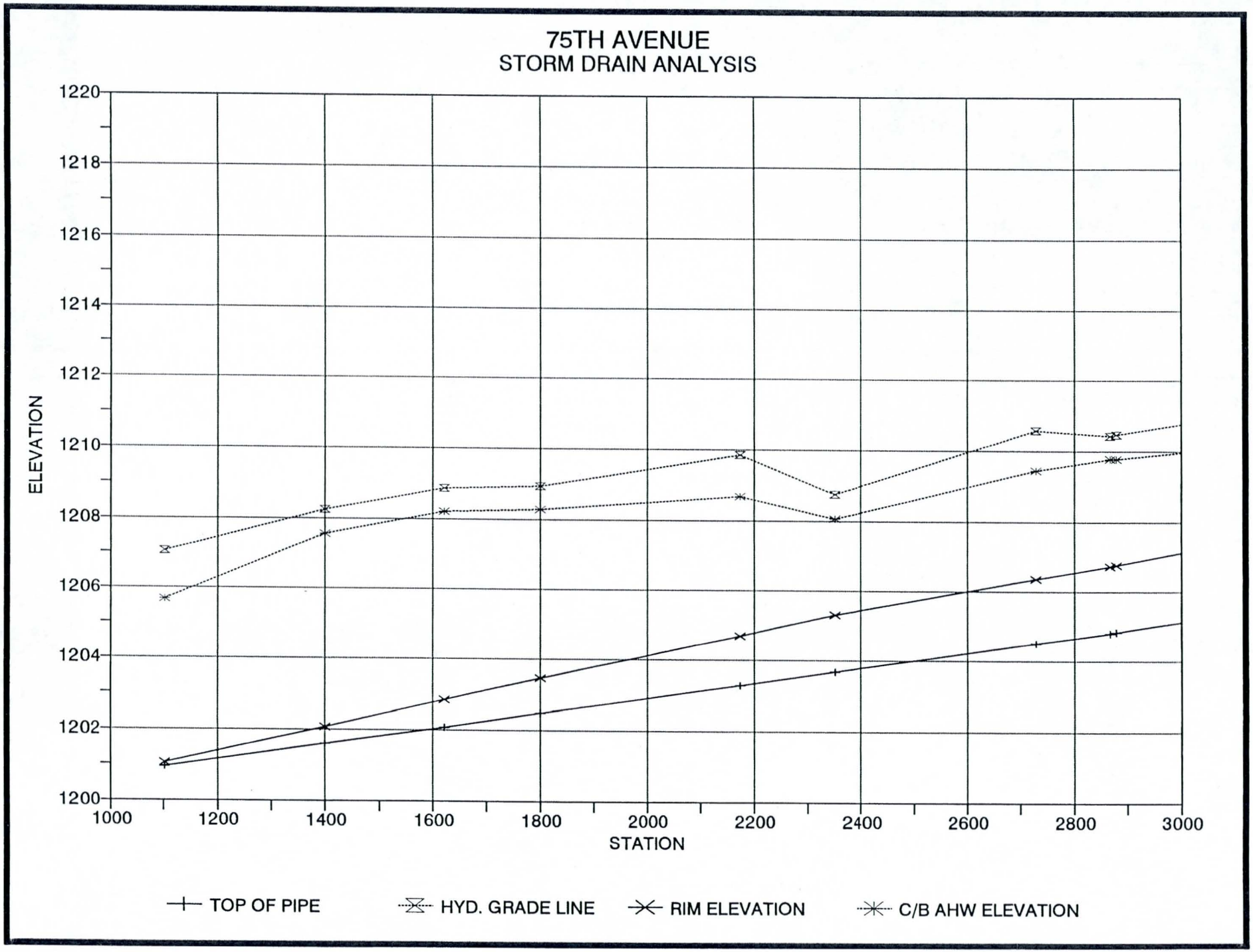
NODE	STATION	SOFFIT ELEV	HGL ELEV	SURCHARGE	RIM ELEV	DIST TO RIM	ELEV AHW-CB	DIST TO AHW-CB
A01	5800.00	1222.60	1221.85	-0.75	1227.10	-5.25	1226.30	-4.45
A02	5780.00	1222.46	1221.85	-0.61	1226.79	-4.94	1226.13	-4.28
A03	5745.00	1222.23	1221.75	-0.48	1226.40	-4.65	1225.74	-3.99
A04	5540.00	1220.83	1220.03	-0.80	1224.80	-4.77	1223.62	-3.59
A05	5320.00	1219.34	1218.54	-0.80	1223.95	-5.41	1222.79	-4.25
A06	5150.00	1218.18	1217.54	-0.64	1221.23	-3.69	1220.57	-3.03
A07	5100.00	1216.80	1215.58	-1.22	1221.80	-6.22	1220.99	-5.41
A08	5000.00	1216.00	1215.18	-0.82	1220.63	-5.45	1219.97	-4.79
A09	4850.00	1214.80	1214.78	-0.02	1219.75	-4.97	1219.09	-4.31
A10	4750.00	1214.00	1214.20	0.20	1219.60	-5.40	1218.51	-4.31
A11	4720.00	1213.88	1214.12	0.24	1219.00	-4.88	1218.34	-4.22
A12	4500.00	1213.00	1213.54	0.54	1217.60	-4.06	1216.94	-3.40
A13	4465.00	1212.86	1213.44	0.58	1217.30	-3.86	1216.64	-3.20
A14	4200.00	1211.48	1212.39	0.91	1215.78	-3.39	1215.12	-2.73
A15	4125.00	1211.09	1212.07	0.98	1215.80	-3.73	1214.70	-2.63
A16	3960.00	1209.38	1211.24	1.86	1213.95	-2.71	1213.29	-2.05
A17	3900.00	1208.75	1210.89	2.14	1213.07	-2.18	1212.41	-1.52
A18	3836.00	1208.09	1210.49	2.40	1212.24	-1.75	1211.58	-1.09
A19	3800.00	1207.71	1210.24	2.53	1211.80	-1.56	1211.17	-0.93
A20	3700.00	1207.31	1209.55	2.24	1211.28	-1.73	1210.62	-1.07
A21	3570.00	1206.79	1208.61	1.82	1211.46	-2.85	1210.33	-1.72
A22	3497.00	1206.49	1208.42	1.93	1210.79	-2.37	1210.13	-1.71
A23	3340.00	1205.84	1208.01	2.17	1211.48	-3.47	1210.33	-2.32
A24	2880.00	1204.82	1206.75	1.93	1210.44	-3.69	1209.78	-3.03
A25	2867.00	1204.79	1206.71	1.92	1210.42	-3.71	1209.76	-3.05
A26	2730.00	1204.49	1206.33	1.84	1210.58	-4.25	1209.44	-3.11
A27	2350.00	1203.66	1205.29	1.63	1208.73	-3.44	1208.07	-2.78
A28	2173.00	1203.27	1204.69	1.42	1209.85	-5.16	1208.68	-3.99
A29	1800.00	1202.45	1203.44	0.99	1208.94	-5.50	1208.28	-4.84
A30	1620.00	1202.05	1202.82	0.77	1208.85	-6.03	1208.19	-5.37
A31	1400.00	1201.57	1202.06	0.49	1208.22	-6.16	1207.56	-5.50
A32	1102.00	1200.91	1201.02	0.11	1207.03	-6.01	1205.65	-4.63
A33	948.00	1200.81	1200.48	-0.33	1207.00	-6.52	1205.80 *	-5.32

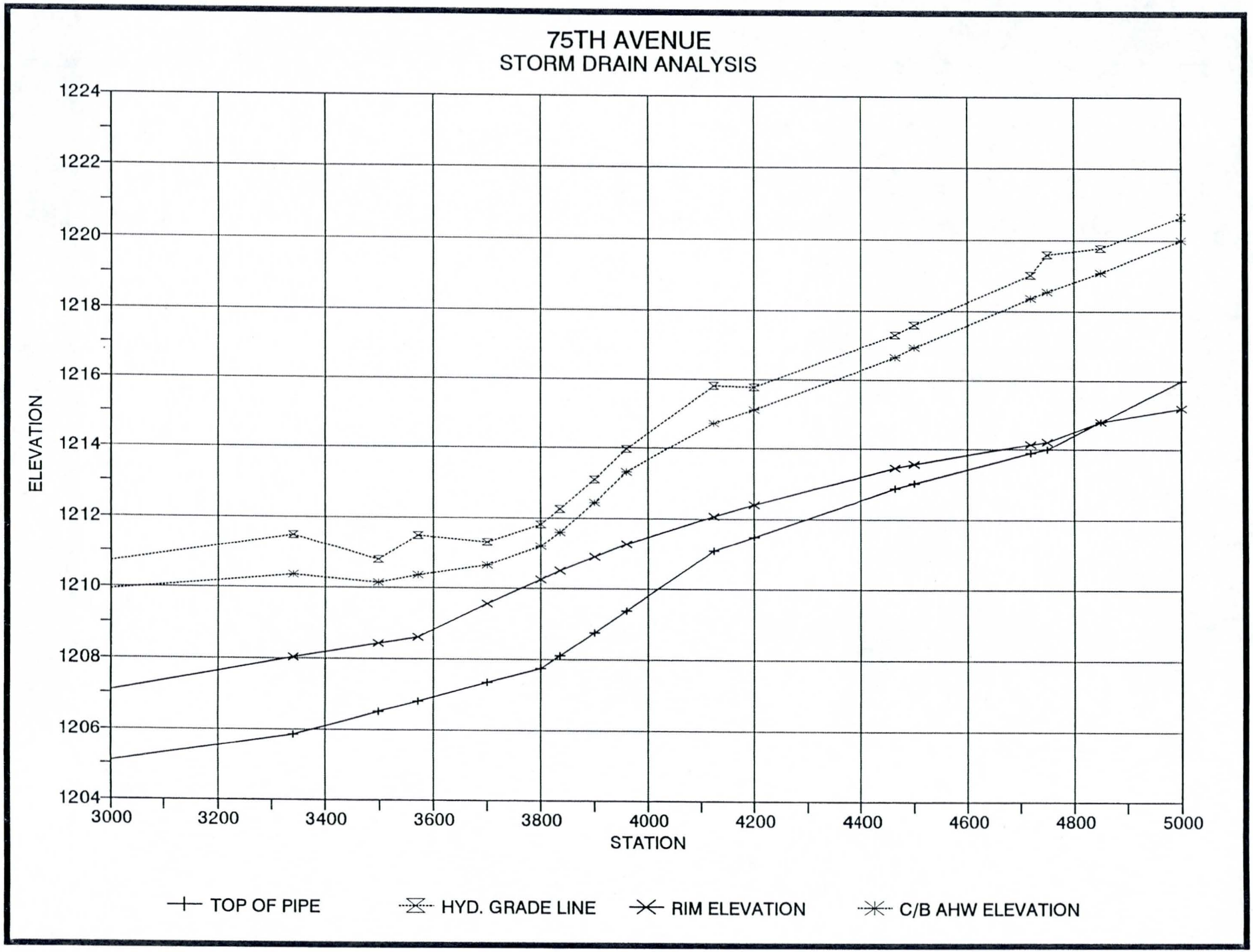
GLENDALE ID 59 STORM DRAIN
SURCHARGE ANALYSIS
FILE NAME: SUR75_I Computer File: SRCHRG2.WQ2

75TH AVENUE MAINLINE TO BELL ROAD
(ZERO SURCHARGE ON OUTFALL)

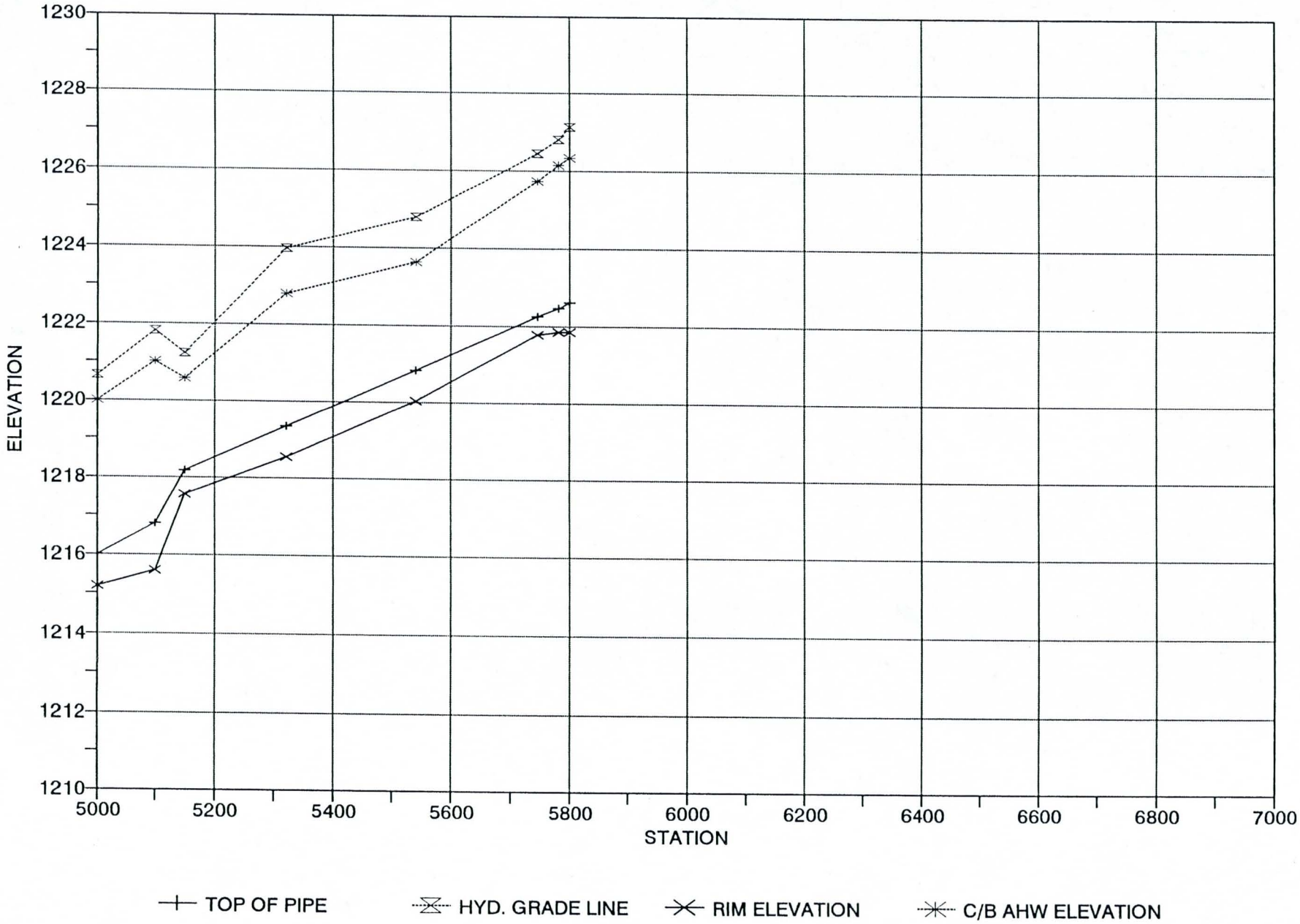
NODE	STATION	SOFFIT ELEV	HGL ELEV	SURCHARGE	RIM ELEV	DIST TO RIM	ELEV AHW-CB	DIST TO AHW-CB
B01	1600.00	1209.26	1210.67	1.41	1213.70	-3.03	1212.05	-1.38
B02	2200.00	1207.82	1210.21	2.39	1212.50	-2.29	1210.85	-0.64
B03	2760.00	1206.48	1208.49	2.01	1211.43	-2.94	1209.73	-1.24
B04	3008.00	1205.99	1208.19	2.20	1211.00	-2.81	1209.74	-1.55
A23	3083.00	1205.84	1208.01	2.17	1211.48	-3.47	1210.33	-2.32

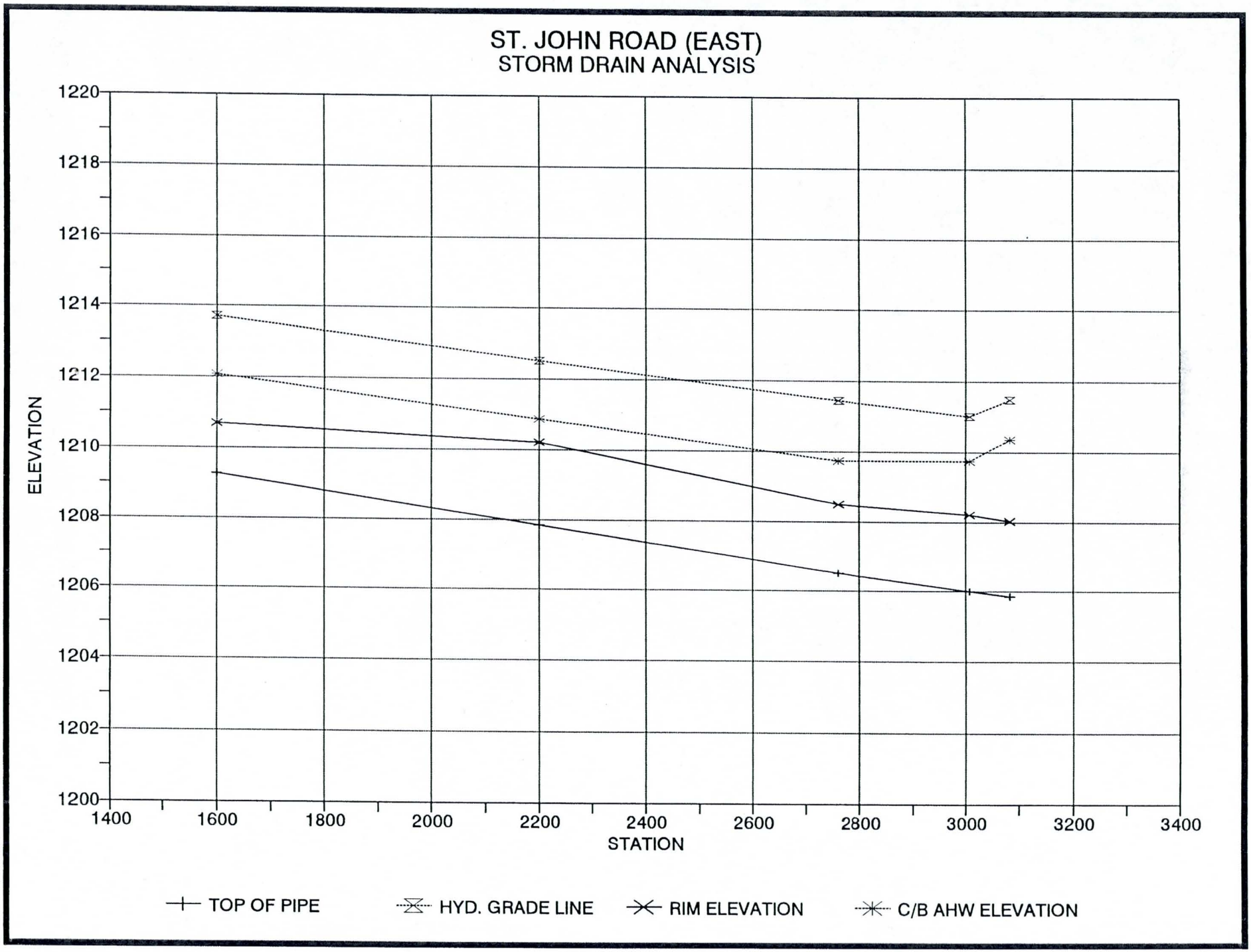
* REQUIRES NO CATCH BASIN - ELEV. ASSUMED FROM RIM ELEV. MINUS 1.16


75TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1220
1218
1216
1214
1212
1210
1208
1206
1204
1202
1200
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION

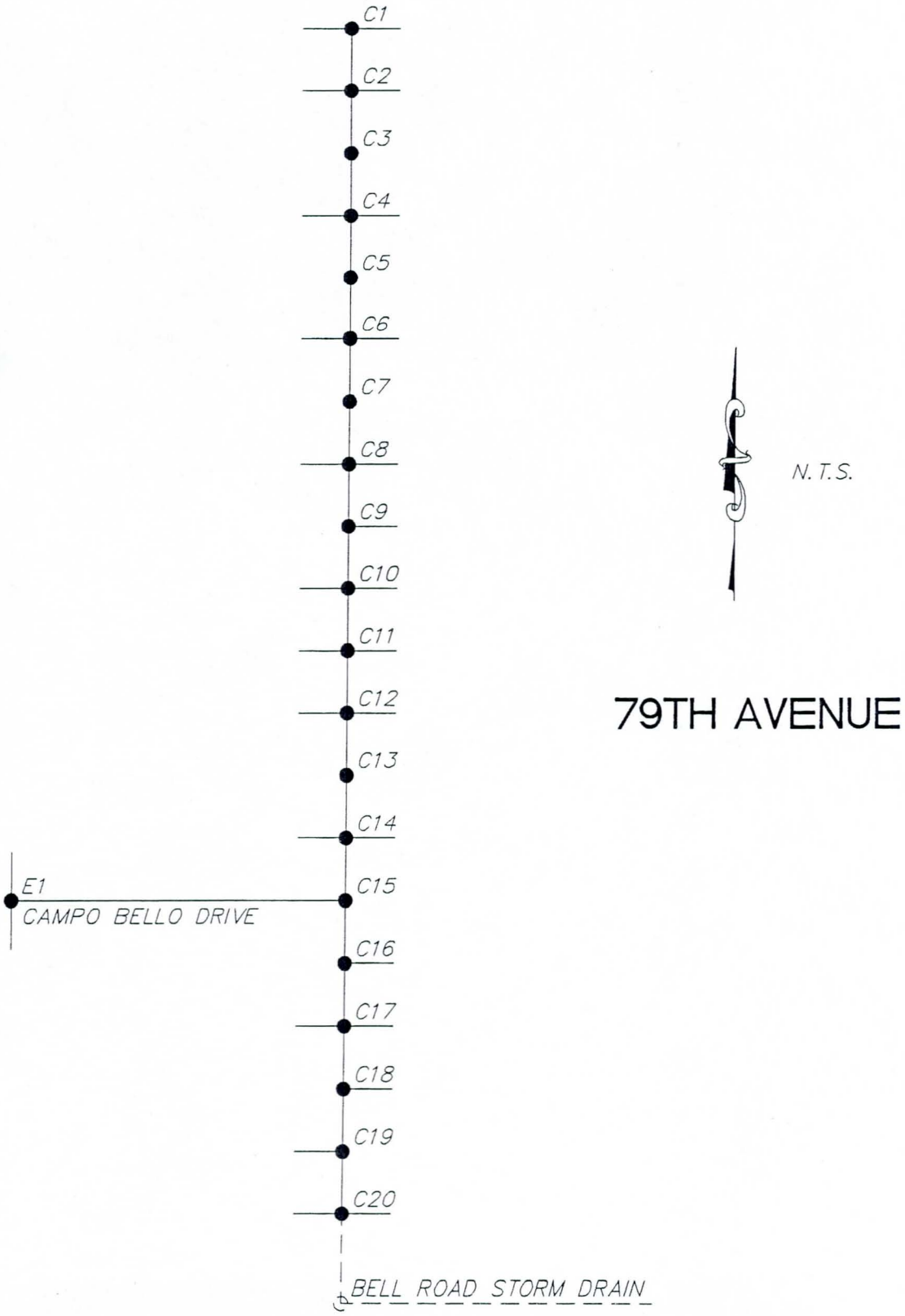

75TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1224
1222
1220
1218
1216
1214
1212
1210
1208
1206
1204
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION

75TH AVENUE
STORM DRAIN ANALYSIS




ST. JOHN ROAD (EAST)
STORM DRAIN ANALYSIS
ELEVATION
1220
1218
1216
1214
1212
1210
1208
1206
1204
1202
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION

STORM DRAIN SCHEMATIC



DATA FILE: A:79AVE_D.DAT

```
******************************
*                            *
*          THYSYS            *
*                            *
*   TEXAS HYDRAULICS SYSTEM  *
*                            *
******************************
```

```
, GLENDALE ID 59
$ STORM SEWER ANALYSIS
$
$ 79TH AVENUE MAINLINE
$    *  INCLUDES RUNOFF FROM HIDDEN MANOR NORTHWEST PORTION WHICH ENTERS THE
$       SYSTEM AT STA 40+00 (C-09).
$
$
$
$
$
$
SEWER              ANALYSIS                    SEWER     FREQUENCY=10 YR
DA C 01                                        t10.0                4.5
DA C 02                                        t10.0                3.3
DA C 04                                        t10.0                3.3
DA C 06                                        t10.0                2.5
DA C 08                                        t10.0                2.4
DA C 09                                        t10.0               12.1
DA C 10                                        t10.0                1.4
DA C 11                                        t10.0                0.7
DA C 12                                        t10.0                0.9
DA C 14                                        t10.0                0.5
DA C 16                                        t10.0                1.7
DA C 17                                        t10.0                1.1
DA C 18                                        t10.0                0.2
DA C 19                                        t10.0                0.2
DA C 20                                        t10.0                0.9
DA E 01                                        t10.0                4.1
$
JUNC C 01 TYPE=JUNCT
JUNC C 02 TYPE=JUNCT
JUNC C 03 TYPE=JUNCT
JUNC C 04 TYPE=JUNCT
JUNC C 05 TYPE=JUNCT
JUNC C 06 TYPE=JUNCT
JUNC C 07 TYPE=JUNCT
JUNC C 08 TYPE=JUNCT
JUNC C 09 TYPE=JUNCT
JUNC C 10 TYPE=JUNCT
JUNC C 11 TYPE=JUNCT
JUNC C 12 TYPE=JUNCT
JUNC C 13 TYPE=JUNCT
JUNC C 14 TYPE=JUNCT
JUNC C 15 TYPE=JUNCT
JUNC C 16 TYPE=JUNCT
JUNC C 17 TYPE=JUNCT
JUNC C 18 TYPE=JUNCT
JUNC C 19 TYPE=JUNCT
JUNC C 20 TYPE=JUNCT
JUNC E 01 TYPE=JUNCT
$
OUTLET    STATIONING     1064 T.W. ELEV  1195.70   C 21
DSGN 001  C 01 C 02 US1220.90 DS1219.14  460            .014       18 CIRC
DSGN 002  C 02 C 03 US1219.14 DS1217.75  230            .014       24 CIRC
DSGN 003  C 03 C 04 US1217.75 DS1216.25  250            .014       24 CIRC
DSGN 004  C 04 C 05 US1216.25 DS1215.39  180            .014       30 CIRC
DSGN 005  C 05 C 06 US1215.39 DS1214.66  280            .014       30 CIRC
DSGN 006  C 06 C 07 US1213.22 DS1212.10  280            .014       30 CIRC
DSGN 007  C 07 C 08 US1212.10 DS1210.52  220            .014       30 CIRC
DSGN 008  C 08 C 09 US1210.52 DS1209.20  200            .014       30 CIRC
```

```
DSGN 009  C 09 C 10 US1209.20 DS1208.25  340          .014      30 CIRC
DSGN 010  C 10 C 11 US1208.25 DS1207.10  345          .014      30 CIRC
DSGN 011  C 11 C 12 US1207.25 DS1205.61  373          .014      30 CIRC
DSGN 012  C 12 C 13 US1205.23 DS1204.50  182          .014      30 CIRC
DSGN 013  C 13 C 14 US1204.50 DS1203.30  300          .014      30 CIRC
DSGN 014  C 14 C 15 US1199.90 DS1199.74   66          .014      36 CIRC
DSGN 015  C 15 C 16 US1199.74 DS1199.10  264       -1.6 .014    36 CIRC
DSGN 016  C 16 C 17 US1199.10 DS1198.21  370          .014      36 CIRC
DSGN 017  C 17 C 18 US1198.21 DS1197.29  385          .014      36 CIRC
DSGN 018  C 18 C 19 US1197.29 DS1197.08   65          .014      36 CIRC
DSGN 019  C 19 C 20 US1197.08 DS1196.47  210          .014      36 CIRC
DSGN 020  C 20 C 21 US1196.47 DS1195.70   36          .014      36 CIRC
DSGN 101  E 01 C 15 US1204.15 DS1201.45   82          .014      18 CIRC
$
ANAL 001  C 01 C 02        18
ANAL 002  C 02 C 03        24
ANAL 003  C 03 C 04        24
ANAL 004  C 04 C 05        30
ANAL 005  C 05 C 06        30
ANAL 006  C 06 C 07        30
ANAL 007  C 07 C 08        30
ANAL 008  C 08 C 09        30
ANAL 009  C 09 C 10        30
ANAL 010  C 10 C 11        30
ANAL 011  C 11 C 12        30
ANAL 012  C 12 C 13        30
ANAL 013  C 13 C 14        30
ANAL 014  C 14 C 15        36
ANAL 015  C 15 C 16        36
ANAL 016  C 16 C 17        36
ANAL 017  C 17 C 18        36
ANAL 018  C 18 C 19        36
ANAL 019  C 19 C 20        36
ANAL 020  C 20 C 21        36
ANAL 101  E 01 C 15        18
$
ENDATA
```

SEWER

SEWER ANALYSIS

CONFIGURATION DATA

RUN	U.S. ID	D.S. ID	U.S. F.L. ELEV	D.S. F.L. ELEV	LENGTH FEET	SLOPE	BBLS	RISE	SPAN	SHAPE
001	C 1	C 2	1219.40	1217.64	460	0.00383	1	18	18	CIRC
002	C 2	C 3	1217.14	1215.75	230	0.00604	1	24	24	CIRC
003	C 3	C 4	1215.75	1214.25	250	0.00600	1	24	24	CIRC
004	C 4	C 5	1213.75	1212.89	180	0.00478	1	30	30	CIRC
005	C 5	C 6	1212.89	1212.16	280	0.00261	1	30	30	CIRC
006	C 6	C 7	1210.72	1209.60	280	0.00400	1	30	30	CIRC
007	C 7	C 8	1209.60	1208.02	220	0.00718	1	30	30	CIRC
008	C 8	C 9	1208.02	1206.70	200	0.00660	1	30	30	CIRC
009	C 9	C10	1206.70	1205.75	340	0.00279	1	30	30	CIRC
010	C10	C11	1205.75	1204.60	345	0.00333	1	30	30	CIRC
011	C11	C12	1204.75	1203.11	373	0.00440	1	30	30	CIRC
012	C12	C13	1202.73	1202.00	182	0.00401	1	30	30	CIRC
013	C13	C14	1202.00	1200.80	300	0.00400	1	30	30	CIRC
014	C14	C15	1196.90	1196.74	66	0.00242	1	36	36	CIRC
015	C15	C16	1196.74	1196.10	264	0.00242	1	36	36	CIRC
016	C16	C17	1196.10	1195.21	370	0.00241	1	36	36	CIRC
017	C17	C18	1195.21	1194.29	385	0.00239	1	36	36	CIRC
018	C18	C19	1194.29	1194.08	65	0.00323	1	36	36	CIRC
019	C19	C20	1194.08	1193.47	210	0.00290	1	36	36	CIRC
020	C20	C21	1193.47	1192.70	36	0.02139	1	36	36	CIRC
101	E 1	C15	1202.65	1199.95	82	0.03293	1	18	18	CIRC

HYDRAULIC DATA

RUN	U.S. ID	D.S. ID	'N'	JUNC LOSS	FLOW	U.S. HEAD	D.S. HEAD	HYDR. GRAD	DEPTH	VELOC.	PIPE CAPAC.	
001	C 1	C 2	0.014	0.00	4.50	1220.37	1218.61	0.00213	0.65	3.7	6.0	
002	C 2	C 3	0.014	0.00	7.80	1218.12	1216.73	0.00138	0.49	5.1	16.3	
003	C 3	C 4	0.014	0.00	7.80	1216.73	1215.23	0.00138	0.49	5.1	16.3	
004	C 4	C 5	0.014	0.00	11.10	1214.90	1214.27	0.00085	0.46	5.0	26.3	
005	C 5	C 6	0.014	0.00	11.10	1214.27	1213.77	0.00085	0.55	4.0	19.4	
006	C 6	C 7	0.014	0.00	13.60	1213.77	1213.41	0.00128	0.54	5.0	24.1	
007	C 7	C 8	0.014	0.00	13.60	1213.41	1213.13	0.00128	0.46	6.2	32.3	
008	C 8	C 9	0.014	0.00	16.00	1213.13	1212.78	0.00176	0.51	6.4	30.9	
009	C 9	C10	0.014	0.00	28.10	1212.78	1210.93	0.00544	1.00	5.7	20.1	**
010	C10	C11	0.014	0.00	29.50	1210.93	1208.86	0.00600	1.00	6.0	22.0	**
011	C11	C12	0.014	0.00	30.20	1208.86	1206.51	0.00629	1.00	6.2	25.3	**
012	C12	C13	0.014	0.00	31.10	1206.51	1205.30	0.00667	1.00	6.3	24.1	**
013	C13	C14	0.014	0.00	31.10	1205.30	1203.30	0.00667	1.00	6.3	24.1	**
014	C14	C15	0.014	0.00	31.60	1201.04	1200.87	0.00260	1.00	4.5	30.5	**
015	C15	C16	0.014	0.00	34.10	1200.87	1200.07	0.00303	1.00	4.8	30.5	**
016	C16	C17	0.014	0.00	35.80	1200.07	1198.83	0.00334	1.00	5.1	30.4	**
017	C17	C18	0.014	0.00	36.90	1198.83	1197.46	0.00355	1.00	5.2	30.3	**
018	C18	C19	0.014	0.00	37.10	1197.46	1197.23	0.00359	1.00	5.2	35.2	**
019	C19	C20	0.014	0.00	37.30	1197.23	1196.47	0.00363	1.00	5.3	33.4	**
020	C20	C21	0.014	0.00	38.20	1195.84	1195.70	0.00380	0.46	12.0	90.6	
101	E 1	C15	0.014	0.00	4.10	1203.15	1200.87	0.00177	0.33	8.1	17.7	

SEW0008--CAPACITY OF RUN 009 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 010 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 011 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 012 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 013 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 014 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 015 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 016 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 017 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 018 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 019 IS EXCEEDED.

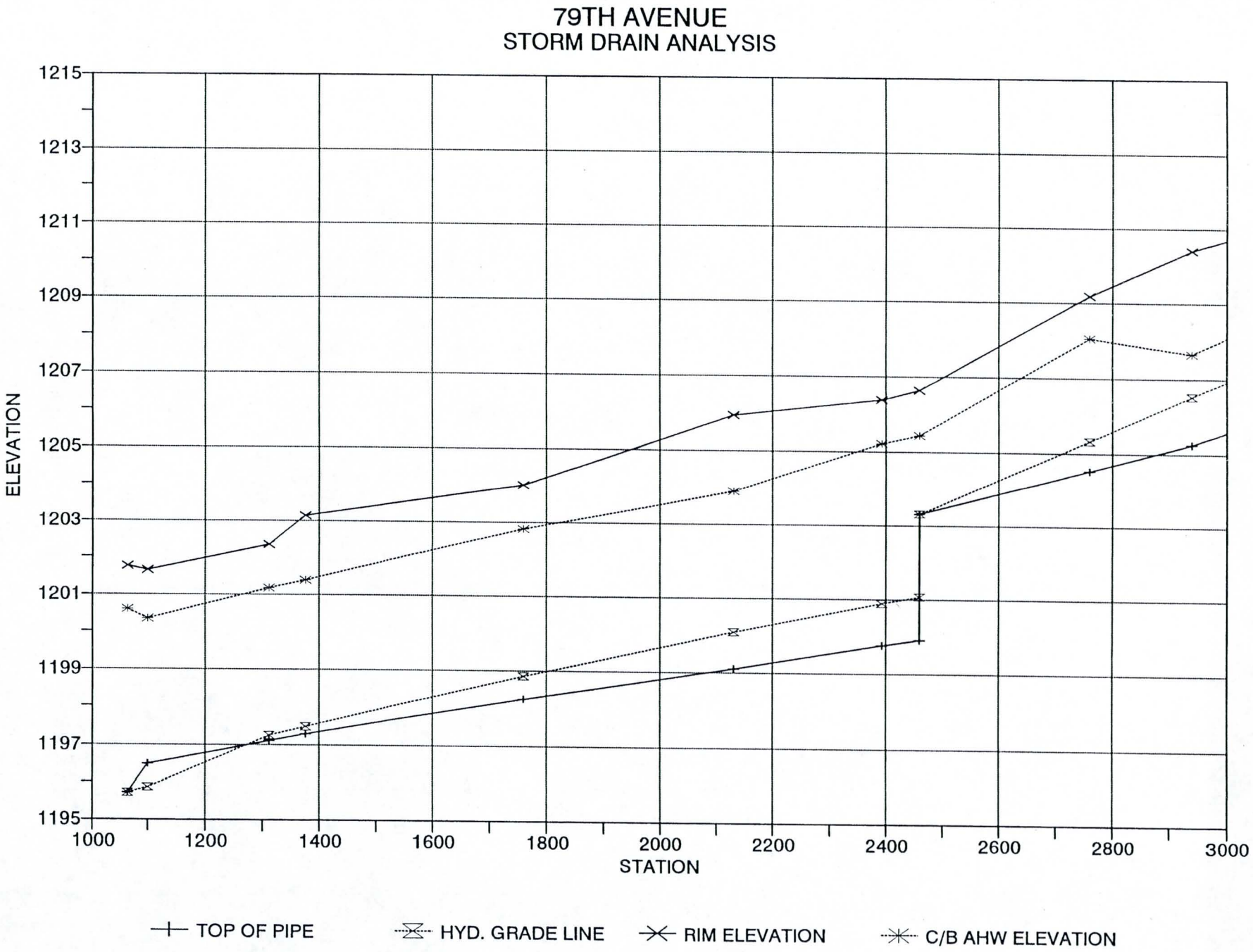
STATIONING

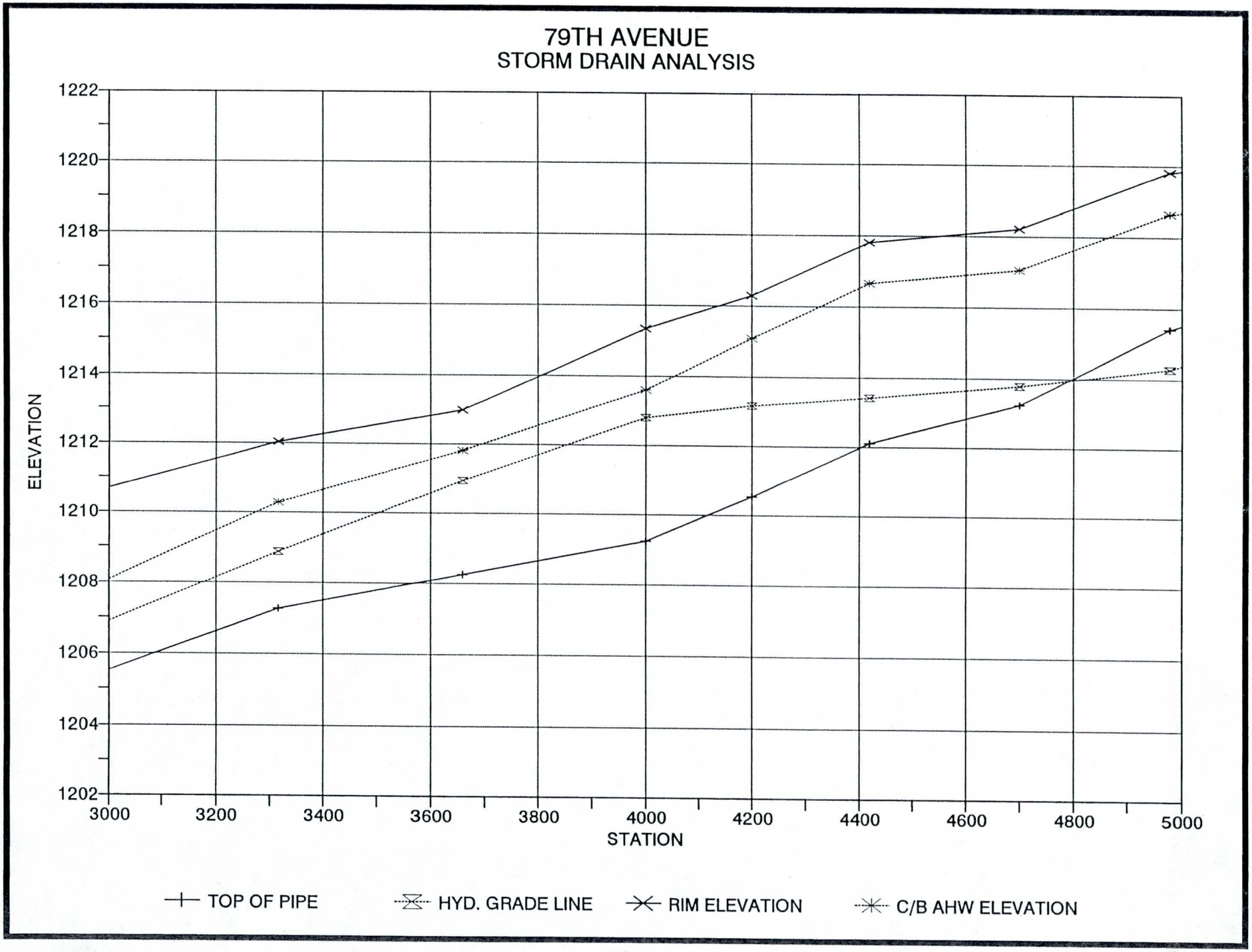
RUN	UPSTREAM JUNCTION ID	STATIONING
001	C 1	6100
002	C 2	5640
003	C 3	5410
004	C 4	5160
005	C 5	4980
006	C 6	4700
007	C 7	4420
008	C 8	4200
009	C 9	4000
010	C10	3660
011	C11	3315
012	C12	2942
013	C13	2760
014	C14	2460
015	C15	2394
016	C16	2130
017	C17	1760
018	C18	1375
019	C19	1310
020	C20	1100
101	E 1	2476

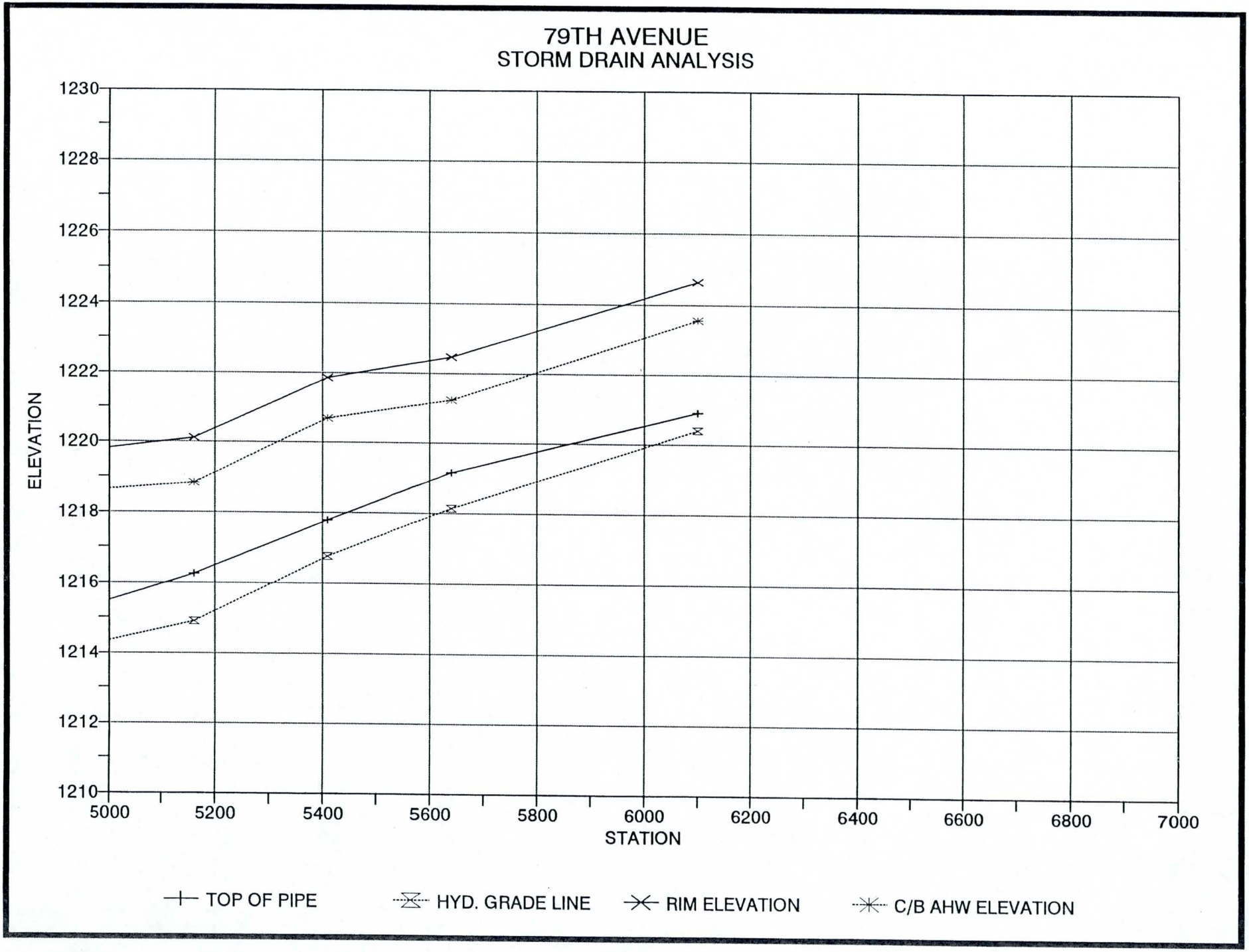
GLENDALE ID 59 STORM DRAIN
SURCHARGE ANALYSIS
FILE NAME: SUR79_D Computer File: SRCHRG2.WQ2
DATA: 79AVE_D.DAT
79TH AVENUE MAINLINE
NO SURCHARGE

NODE	STATION	SOFFIT ELEV	HGL ELEV	SURCHARGE	RIM ELEV	DIST TO RIM	ELEV AHW-CB		DIST TO AHW-CB
C01	6100.00	1220.90	1220.37	-0.53	1224.62	-4.25	1223.53		-3.16
C02	5640.00	1219.14	1218.12	-1.02	1222.46	-4.34	1221.22		-3.10
C03	5410.00	1217.75	1216.73	-1.02	1221.85	-5.12	1220.69	*	-3.96
C04	5160.00	1216.25	1214.90	-1.35	1220.08	-5.18	1218.82	*	-3.92
C05	4980.00	1215.39	1214.27	-1.12	1219.80	-5.53	1218.64		-4.37
C06	4700.00	1213.22	1213.77	0.55	1218.20	-4.43	1217.02		-3.25
C07	4420.00	1212.10	1213.41	1.31	1217.80	-4.39	1216.64	*	-3.23
C08	4200.00	1210.52	1213.13	2.61	1216.26	-3.13	1215.09		-1.96
C09	4000.00	1209.20	1212.78	3.58	1215.31	-2.53	1213.58		-0.80
C10	3660.00	1208.25	1210.93	2.68	1212.98	-2.05	1211.80		-0.87
C11	3315.00	1207.25	1208.86	1.61	1212.03	-3.17	1210.29		-1.43
C12	2942.00	1205.23	1206.51	1.28	1210.40	-3.89	1207.65		-1.14
C13	2760.00	1204.50	1205.30	0.80	1209.18	-3.88	1208.02	*	-2.72
C14 US	2460.00	1203.30	1203.30	0.00	1206.61	-3.31	1205.42		-2.12
C14 DS	2460.00	1199.90	1201.04	1.14	1206.61	-5.57	1205.42		-4.38
C15	2394.00	1199.74	1200.87	1.13	1206.37	-5.50	1205.21	*	-4.34
C16	2130.00	1199.10	1200.07	0.97	1205.94	-5.87	1203.90		-3.83
C17	1760.00	1198.21	1198.83	0.62	1204.00	-5.17	1202.81		-3.98
C18	1375.00	1197.29	1197.46	0.17	1203.11	-5.65	1201.37		-3.91
C19	1310.00	1197.08	1197.23	0.15	1202.31	-5.08	1201.15		-3.92
C20	1100.00	1196.47	1195.84	-0.63	1201.65	-5.81	1200.34		-4.50
C21	1064.00	1195.70	1195.70	0.00	1201.75	-6.05	1200.59	*	-4.89
E01	2476.00	1204.15	1203.15	-1.00	1206.90	-3.75	1205.63		-2.48
C15	2384.00	1201.45	1200.87	-0.58	1206.37	-5.50	1205.21	*	-4.34

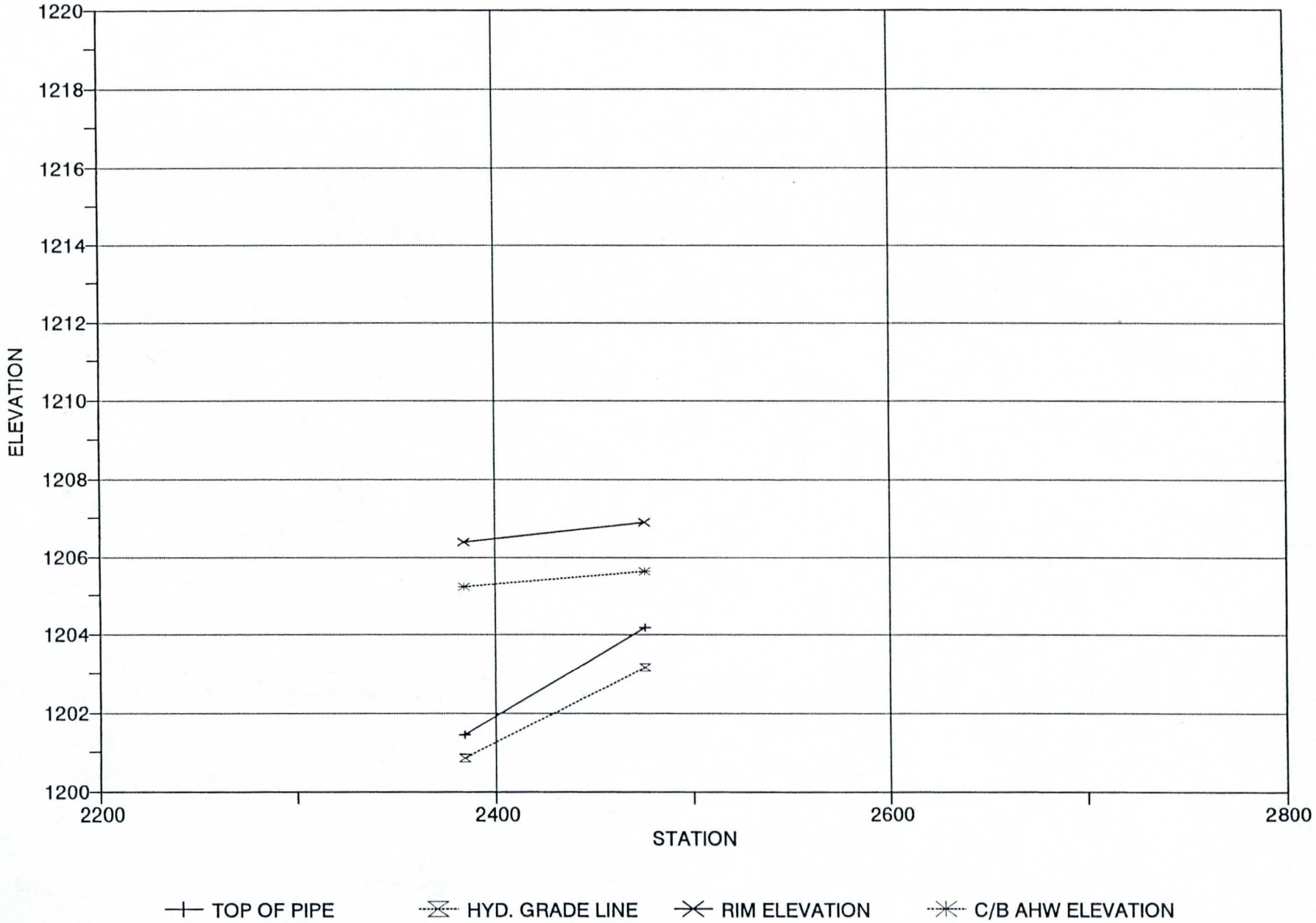
* REQUIRES NO CATCH BASIN - ELEV. ASSUMED FROM RIM ELEV. MINUS 1.16


79TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1215
1213
1211
1209
1207
1205
1203
1201
1199
1197
1195
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION

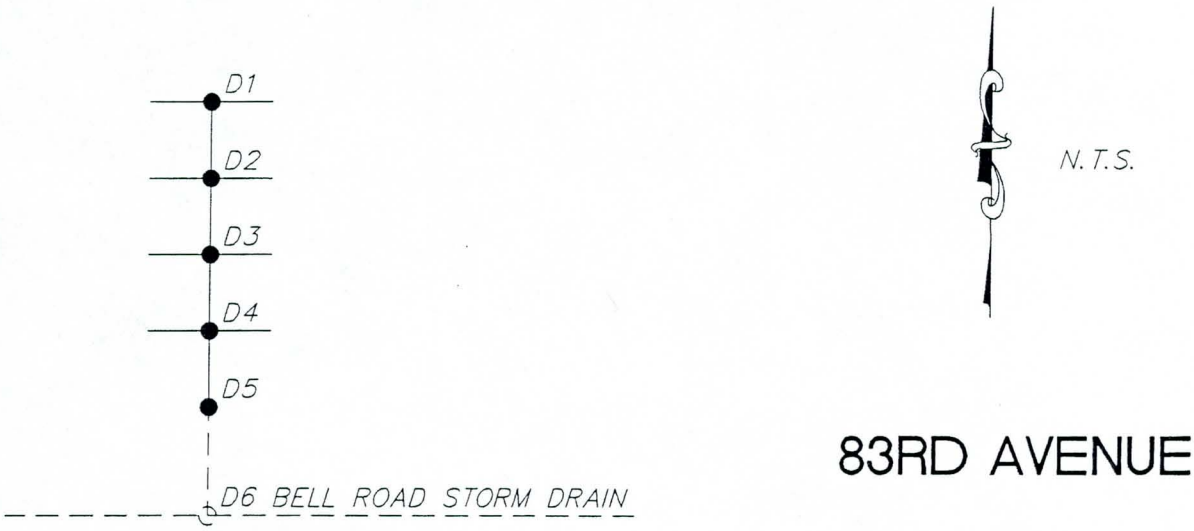

79TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1222
1220
1218
1216
1214
1212
1210
1208
1206
1204
1202
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION


79TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1230
1228
1226
1224
1222
1220
1218
1216
1214
1212
1210
5000
5200
5400
5600
5800
6000
6200
6400
6600
6800
7000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION

CAMPO BELLO DRIVE
STORM DRAIN ANALYSIS



STORM DRAIN SCHEMATIC



DATA FILE: B:83AVE.DAT

```
******************************
*                            *
*          THYSYS            *
*                            *
*   TEXAS HYDRAULICS SYSTEM  *
*                            *
******************************
```

```
$ GLENDALE ID 59
$ STORM SEWER ANALYSIS
$
  83RD AVENUE MAINLINE
$
$
$
$
$
$
$
$
$
SEWER              ANALYSIS                    SEWER     FREQUENCY=10 YR
DA D 01                                        t10.0                3.9
DA D 02                                        t10.0                2.3
DA D 03                                        t10.0                3.0
DA D 04                                        t10.0                2.2
$
JUNC D 01 TYPE=JUNCT
JUNC D 02 TYPE=JUNCT
JUNC D 03 TYPE=JUNCT
JUNC D 04 TYPE=JUNCT
JUNC D 05 TYPE=JUNCT
$
OUTLET    STATIONING     5085 T.W. ELEV  1199.53   D 06
DSGN 001  D 01 D 02 US1216.92 DS1205.70  309            .014       18 CIRC
DSGN 002  D 02 D 03 US1205.70 DS1201.51  350            .014       18 CIRC
DSGN 003  D 03 D 04 US1201.51 DS1200.91  250            .014       24 CIRC
DSGN 004  D 04 D 05 US1200.91 DS1199.73  295            .014       24 CIRC
DSGN 005  D 05 D 06 US1199.73 DS1199.53   20            .014       24 CIRC

ANAL 001  D 01 D 02          18
ANAL 002  D 02 D 03          18
ANAL 003  D 03 D 04          24
ANAL 004  D 04 D 05          24
ANAL 005  D 05 D 06          24
$
ENDATA
```

SEWER

SEWER ANALYSIS

CONFIGURATION DATA

RUN	U.S. ID	D.S. ID	U.S. F.L. ELEV	D.S. F.L. ELEV	LENGTH FEET	SLOPE	BBLS	RISE	SPAN	SHAPE
001	D 1	D 2	1215.42	1204.20	309	0.03631	1	18	18	CIRC
002	D 2	D 3	1204.20	1200.01	350	0.01197	1	18	18	CIRC
003	D 3	D 4	1199.51	1198.91	250	0.00240	1	24	24	CIRC
004	D 4	D 5	1198.91	1197.73	295	0.00400	1	24	24	CIRC
005	D 5	D 6	1197.73	1197.53	20	0.01000	1	24	24	CIRC

HYDRAULIC DATA

RUN	U.S. ID	D.S. ID	'N'	JUNC LOSS	FLOW	U.S. HEAD	D.S. HEAD	HYDR. GRAD	DEPTH	VELOC.	PIPE CAPAC.
001	D 1	D 2	0.014	0.00	3.90	1215.89	1205.02	0.00160	0.31	8.4	18.6
002	D 2	D 3	0.014	0.00	6.20	1205.02	1201.01	0.00404	0.55	6.2	10.7
003	D 3	D 4	0.014	0.00	9.20	1201.01	1200.46	0.00192	0.75	3.6	10.3
004	D 4	D 5	0.014	0.00	11.40	1200.46	1199.59	0.00295	0.72	4.7	13.3
005	D 5	D 6	0.014	0.00	11.40	1199.59	1199.53	0.00295	0.53	6.7	21.0

STATIONING

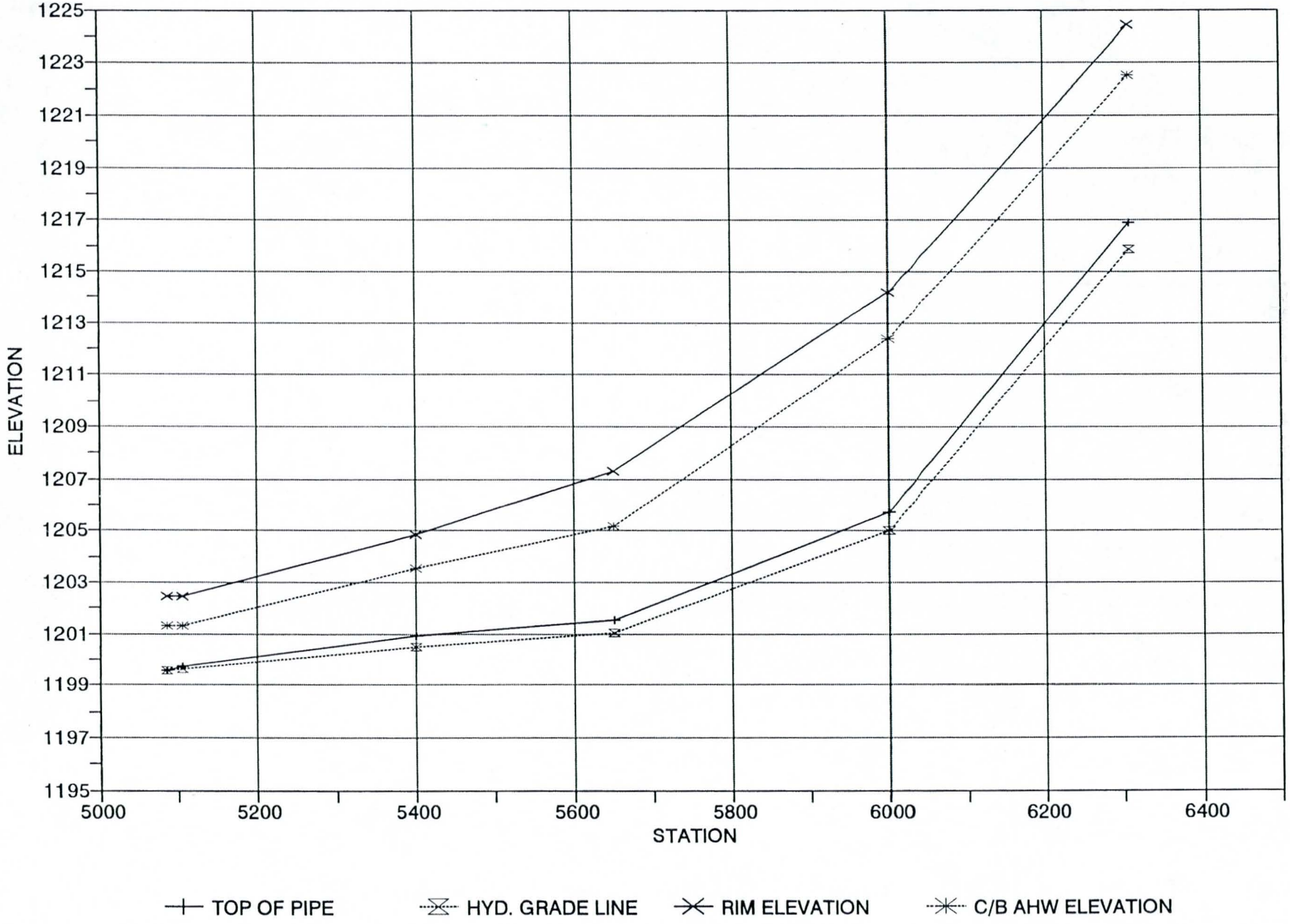
RUN	UPSTREAM JUNCTION ID	STATIONING
001	D 1	6309
002	D 2	6000
003	D 3	5650
004	D 4	5400
005	D 5	5105

GLENDALE ID 59 STORM DRAIN
SURCHARGE ANALYSIS
FILE NAME: SUR83 Computer File: SRCHRG.WQ2

83RD AVENUE MAINLINE

NODE	STATION	SOFFIT ELEV	HGL ELEV	SURCHARGE	RIM ELEV	DIST TO RIM	ELEV AHW-CB	DIST TO AHW-CB
D01	6309.00	1216.92	1215.89	-1.03	1224.40	-8.51	1222.54	-6.65
D02	6000.00	1205.70	1205.02	-0.68	1214.15	-9.13	1212.38	-7.36
D03	5650.00	1201.51	1201.01	-0.50	1207.28	-6.27	1205.16	-4.15
D04	5400.00	1200.91	1200.46	-0.45	1204.85	-4.39	1203.53	-3.07
D05	5105.00	1199.73	1199.59	-0.14	1202.46	-2.87	1201.30	-1.71
D06	5085.00	1199.53	1199.53	0.00	1202.45	-2.92	1201.29	-1.76

83RD AVENUE/BELL ROAD OUTFALL
STORM DRAIN ANALYSIS



Connecting Pipe Summary
No Surcharge Condition

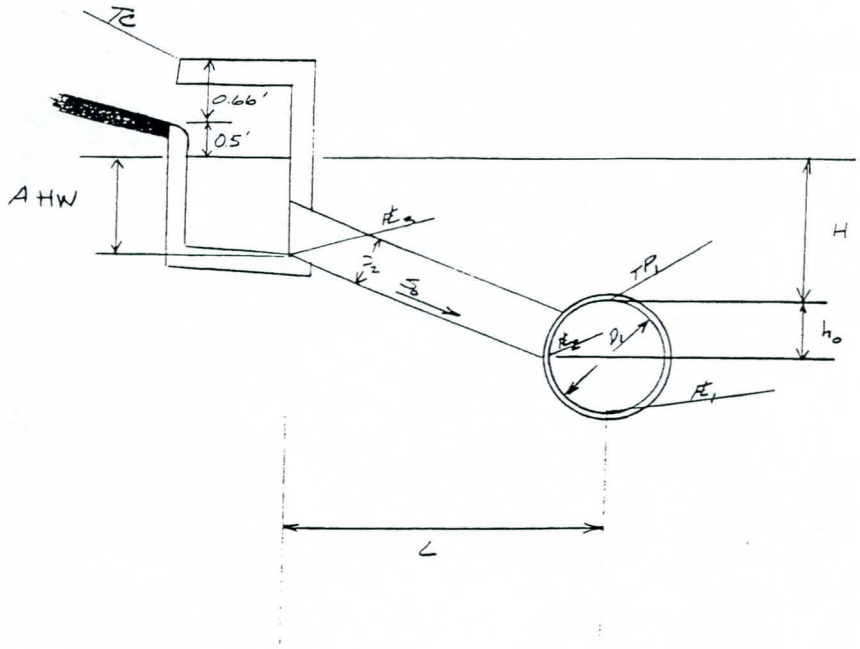
BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME Glendale I.D 59 SHEET ___ OF ___ SHEETS

SUBJECT CATCH BASIN PREPARED BY DJP DATE ___

CONNECTOR PIPE DESIGN CHECKED BY ___ DATE ___

GENERAL DESIGN CRITERIA



$TP_1 = E_1 + D_1$

$h_o = TP_1 - E_2$

$AHW = TC - 1.16 - E_3$

OUTLET CONTROL	INLET CONTROL
$H =$ (read from Nomograph)	$HW/D =$ (nomograph)
$HW = H + h_o - S_o L$	$HW = (HW/D)(D_2)$
$HW \leq AHW$	$HW \leq AHW$

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET ___ OF ___ SHEETS

SUBJECT CATCH BASIN PREPARED BY DJP DATE ___

CONNECTOR PIPE DESIGN CHECKED BY ___ DATE ___

EXAMPLE CALCULATION

79th Avenue
STA 21+30 $Q_{10} = 1.28$ cfs.

PLAN INFO:

$TC = 1205.06$ $\mathbb{E}_2 = 1197.61$ $L_0 = 50'$
$TP_1 = 1199.10$ $\mathbb{E}_3 = 1200.56$
$D_1 = 36''$ $S_0 = 1.00\%$
$\mathbb{E}_1 = 1196.10$ $D_2 = 15''$

FACTOR CALCULATIONS:

$$AHW = TC - 1.16 - \mathbb{E}_3 = 1205.06 - 1.16 - 1200.56$$

$$AHW = 3.34$$

$$h_0 = TP_1 - \mathbb{E}_2 = 1199.10 - 1197.61$$

$$h_0 = 1.49$$

INLET CONTROL

$HW/D = 0.50$ (per nomograph)

$$\therefore HW = D_2 (0.50) = (15/12)(0.50)$$

$$HW = 0.63'$$

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET ___ OF ___ SHEETS

SUBJECT CATCH BASIN PREPARED BY DJP DATE ___

CONNECTOR PIPE DESIGN CHECKED BY ___ DATE ___

OUTLET CONTROL

$H = 0.4'$ (per nomograph)

$HW = H + h_o - S_o L = 0.4 + 1.49 - (0.01)(50)$

$HW = 1.39'$

$1.39 > 0.63 \therefore$ OUTLET CONTROL

$1.39 < 3.34 \therefore$ 15" PIPE @ 1.0% IS OK

CATCH BASIN
CONNECTOR PIPE DESIGN
75th Avenue (East side)

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
58+00	E	15	1.85	0.60	0.75	28	0.0040	1.25	0.44	1.58	3.90	OUTLET	1.58
55+40	E	15	5.45	1.15	1.44	28	0.0144	1.08	0.76	1.44	3.35	INLET	1.44
50+00	E	15	3.27	0.83	1.04	28	0.0744	1.88	0.44	0.24	3.04	INLET	1.04
45+00	E	15	1.51	0.53	0.66	28	0.0760	2.13	0.44	0.44	3.17	INLET	0.66
39+00	E	15	4.93	1.08	1.35	28	0.0492	2.13	0.62	1.37	3.69	OUTLET	1.37
34+97	E	15	6.77	1.39	1.74	28	0.0857	3.88	1.07	2.55	4.43	OUTLET	2.55
38+67	E	15	5.16	1.12	1.40	28	0.0439	3.89	0.62	3.28	6.90	OUTLET	3.28
23+50	E	15	8.69	1.98	2.48	28	0.0084	3.89	1.77	5.42	7.35	OUTLET	5.42
18+00	E	15	1.08	0.50	0.63	45	0.0720	3.89	0.44	1.09	5.72	OUTLET	1.09
14+00	E	15	2.12	0.64	0.80	57	0.0804	3.88	0.44	(0.23)	4.34	INLET	0.80
10+93.79	E	15	2.42	0.69	0.86	66	0.0508	3.88	0.46	1.01	5.40	OUTLET	1.01

CATCH BASIN
CONNECTOR PIPE DESIGN
75th Avenue (East frontage road)

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
55+40	E	** COMBINED (see 75th Avenue, east side)											
48+50	E	15	10.32	2.28	2.85	31	0.0674	1.88	2.88	2.70	3.32	INLET	2.85
44+64.75	E	15	9.45	2.00	2.50	31	0.0100	1.23	2.30	3.22	3.16	OUTLET	3.22
39+60	E	15	4.12	0.94	1.18	31	0.0572	2.13	0.45	0.81	4.09	INLET	1.18
37+00	E	15	3.26	0.83	1.04	32	0.1090	3.37	0.44	0.35	2.61	INLET	1.04
34+97	E	** COMBINED (see 75th Avenue, east side)											
28+67	E	** COMBINED (see 75th Avenue, east side)											
23+50	E	** COMBINED (see 75th Avenue, east side)											

CATCH BASIN
CONNECTOR PIPE DESIGN
75th Avenue (West side)

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
57+45	W	15	1.27	0.50	0.63	33	0.0076	1.36	0.44	1.55	4.12	OUTLET	1.55
51+50	W	15	3.26	0.83	1.04	33	0.0445	1.63	0.44	0.60	2.77	INLET	1.04
47+20	W	15	1.15	0.50	0.63	33	0.0192	2.13	0.44	1.94	5.33	OUTLET	1.94
42+00	W	15	2.77	0.76	0.95	33	0.0440	2.13	0.44	1.12	3.99	OUTLET	1.12
34+97	W	15	3.74	0.90	1.13	47	0.0520	3.88	0.44	1.88	4.22	OUTLET	1.88
28+80	W	15	1.27	0.50	0.63	41	0.0940	3.88	0.44	0.47	4.34	INLET	0.63
23+50	W	15	3.51	0.86	1.08	53	0.0584	3.89	0.44	1.26	4.34	OUTLET	1.26
18+00	W	15	1.12	0.50	0.63	58	0.0748	3.89	0.44	0.03	4.33	INLET	0.63
11+02.20	W	15	5.19	1.12	1.40	59	0.0511	3.88	0.71	1.60	5.32	OUTLET	1.60

CATCH BASIN
CONNECTOR PIPE DESIGN
75th Avenue (West frontage road)

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
57+80	W	15	3.19	0.81	1.01	38	0.0142	1.38	0.44	1.28	4.59	OUTLET	1.28
51+00	W	15	4.07	0.95	1.19	37	0.0248	1.08	0.45	0.61	3.54	INLET	1.19
47+50	W	15	1.36	0.50	0.63	36	0.0440	0.88	0.44	(0.24)	3.39	INLET	0.63
41+25	W	15	3.69	0.88	1.10	37	0.0032	1.00	0.44	1.32	4.22	OUTLET	1.32
38+36	W	15	2.90	0.77	0.96	37	0.0288	2.13	0.44	1.51	4.03	OUTLET	1.51

CATCH BASIN
CONNECTOR PIPE DESIGN
79th Avenue

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
11+02.56	W	15	2.28	0.68	0.85	50	0.0100	0.98	0.40	0.88	2.84	OUTLET	0.88
11+05.56	E	15	1.75	0.59	0.74	50	0.0100	2.12	0.40	2.02	2.75	OUTLET	2.02
13+10	W	15	2.00	0.63	0.79	50	0.0100	0.93	0.40	0.83	3.35	OUTLET	0.83
13+75	E	15	1.92	0.62	0.78	50	0.0100	0.88	0.40	0.78	3.37	OUTLET	0.78
17+60	W	15	2.43	0.70	0.88	50	0.0100	0.98	0.40	0.88	3.14	OUTLET	0.88
17+60	E	15	1.57	0.56	0.70	50	0.0100	2.16	0.40	2.06	3.34	OUTLET	2.06
21+30	E	15	1.28	0.50	0.63	50	0.0100	1.49	0.40	1.39	3.34	OUTLET	1.39
24+60.46	W	15	2.38	0.69	0.86	50	0.0100	0.93	0.40	0.83	3.35	INLET	0.86
24+67.23	E	15	2.39	0.69	0.86	50	0.0100	1.79	0.40	1.69	6.27	OUTLET	1.69
29+60	W	15	1.55	0.53	0.66	50	0.0100	0.83	0.40	0.73	3.34	OUTLET	0.73
29+60	E	15	1.54	0.53	0.66	50	0.0100	0.83	0.40	0.73	3.34	OUTLET	0.73
33+15	W	15	1.54	0.53	0.66	50	0.0100	0.83	0.40	0.73	3.33	OUTLET	0.73
33+15	E	15	1.71	0.53	0.66	50	0.0100	0.85	0.40	0.75	3.33	OUTLET	0.75
36+60	W	15	2.20	0.66	0.83	50	0.0100	1.25	0.40	1.15	3.34	OUTLET	1.15
36+60	E	15	1.34	0.50	0.63	50	0.0100	0.83	0.40	0.73	3.34	OUTLET	0.73
40+00	E	15	0.99	0.40	0.50	50	0.0100	2.05	0.40	1.95	3.84	OUTLET	1.95
42+00	W	15	1.96	0.62	0.78	50	0.0100	0.88	0.40	0.78	3.39	OUTLET	0.78
42+00	E	15	2.12	0.65	0.81	50	0.0100	2.02	0.40	1.92	5.84	OUTLET	1.92
47+00	W	15	1.96	0.62	0.78	50	0.0100	0.88	0.40	0.78	3.34	OUTLET	0.78
47+00	E	15	1.78	0.60	0.75	50	0.0100	2.07	0.40	1.97	5.49	OUTLET	1.97
51+60	W	15	2.09	0.64	0.80	50	0.0100	1.15	0.40	1.05	3.42	OUTLET	1.05
51+60	E	15	1.87	0.61	0.76	50	0.0100	1.23	0.40	1.13	3.42	OUTLET	1.13
56+40	W	15	2.09	0.64	0.80	50	0.0100	1.09	0.40	0.99	2.87	OUTLET	0.99
56+40	E	15	1.89	0.61	0.76	50	0.0100	1.17	0.40	1.07	2.87	OUTLET	1.07
61+00	W	15	2.24	0.67	0.84	50	0.0100	1.57	0.40	1.47	3.44	OUTLET	1.47
61+00	E	15	2.24	0.67	0.84	50	0.0100	1.75	0.40	1.65	3.44	OUTLET	1.65

CATCH BASIN
CONNECTOR PIPE DESIGN
83rd Avenue (East side)

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
50+86	E	15	2.14	0.65	0.81	67	0.0157	1.25	0.40	0.60	2.25	INLET	0.81
54+00	E	15	1.34	0.50	0.63	54	0.0273	1.25	0.40	0.18	2.34	INLET	0.63
56+50	E	15	1.92	0.61	0.76	54	0.0368	1.25	0.40	(0.34)	2.80	INLET	0.76
60+00	E	15	1.60	0.55	0.69	44	0.1284	1.25	0.40	(4.00)	2.84	INLET	0.69
63+12.50	E	15	1.95	0.62	0.78	32	0.1259	1.25	0.40	(2.38)	2.84	INLET	0.78

CATCH BASIN
CONNECTOR PIPE DESIGN
83rd Avenue (West side)

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
50+99.5	W	15	2.97	0.78	0.98	57	0.0183	1.25	0.40	0.61	2.31	INLET	0.98
54+00	W	15	1.43	0.52	0.65	45	0.0317	1.25	0.40	0.22	2.35	INLET	0.65
56+50	W	15	2.09	0.64	0.80	45	0.0429	1.25	0.40	(0.28)	2.87	INLET	0.80
60+00	W	15	1.79	0.58	0.73	45	0.1088	1.25	0.40	(3.25)	2.71	INLET	0.73
63+12.50	W	15	1.95	0.62	0.78	28	0.1300	1.25	0.40	(1.99)	2.84	INLET	0.78

75th Ave

Sta. 35+70 E

E_1 = 1200.30

D_1 = 78"

E_2 = 1201.30

L = 90'

S = 0.006'/'

E_3 = 1201.84

T.C. = 1211.06

E_2 = 1201.55

FOR D_2 = 54"

TP_1 = 1206.80

h_0 = 5.50'

AHW = 9.92'

AHW =

FOR D_2 = 48"

TP_1 = 1206.80

h_0 = 5.25

Allowable "H" = 4.26'

FOR D_2 = 42"

E_2 = 1201.80 h_0 = 5.00

GID 59 7840
03

GROVERS AVE

CATCH BASIN

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME _____ SHEET ____ OF ____ SHEET:

SUBJECT CONNECTOR PIPE CAPACITY PREPARED BY _____ DATE _____

CHECKED BY _____ DATE _____

INLET CONDITION (2) k_e: 0.5

				INLET CONTROL				OUTLET CONTROL							
STA	DIR	DIA	Q	HW/D	HW	AHW		L	S_o	h_o	H	HW	AHW		CONTROL
35+70	E	54"	132	1.21	5.45	9.92		90'	0.006 ft/ft	5.5	1.9	6.86	9.92		OUT
35+70	E	48"	132	1.55	6.20	9.92		90'	0.006 ft/ft	5.25	3.15	7.86	9.92		OUT
35+70	E	42"	132	2.33	8.16	9.92		90'	0.006 ft/ft	5.00	6.0	10.46	9.92		OUT

Sta. 35+70 W

E_1 = 1200.21

D_1 = 78", D_2 = 42"

* E_2 = 1201.71

L = 130'

S = 0.006

E_3 = 1202.49

T.C. = 1210.96

TP_1 = 1206.79

h_o = 5.08

AHW = 8.47

AHW =

* Match ℄ elevations.

GID 59

75TH AVE

CITY PARK

S.D. INLET

7242

03

Sta. 35+70 W

E_1 = 1200.21

D_1 = 78", D_2 = 48"

E_2 = 1201.46

L = 130'

S = 0.006

E_3 = 1202.21

T.C. = 1210.96

TP_1 = 1206.79

h_o = 5.33

AHW = 8.72

AHW =

GIDEY
75th AVE
CITY PARK
S.D. INLET

72-10
03

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7240 JOB NAME GID 59 SHEET 1 OF 1 SHEETS

SUBJECT CONNECTOR PREPARED BY DJP DATE 7-3-91

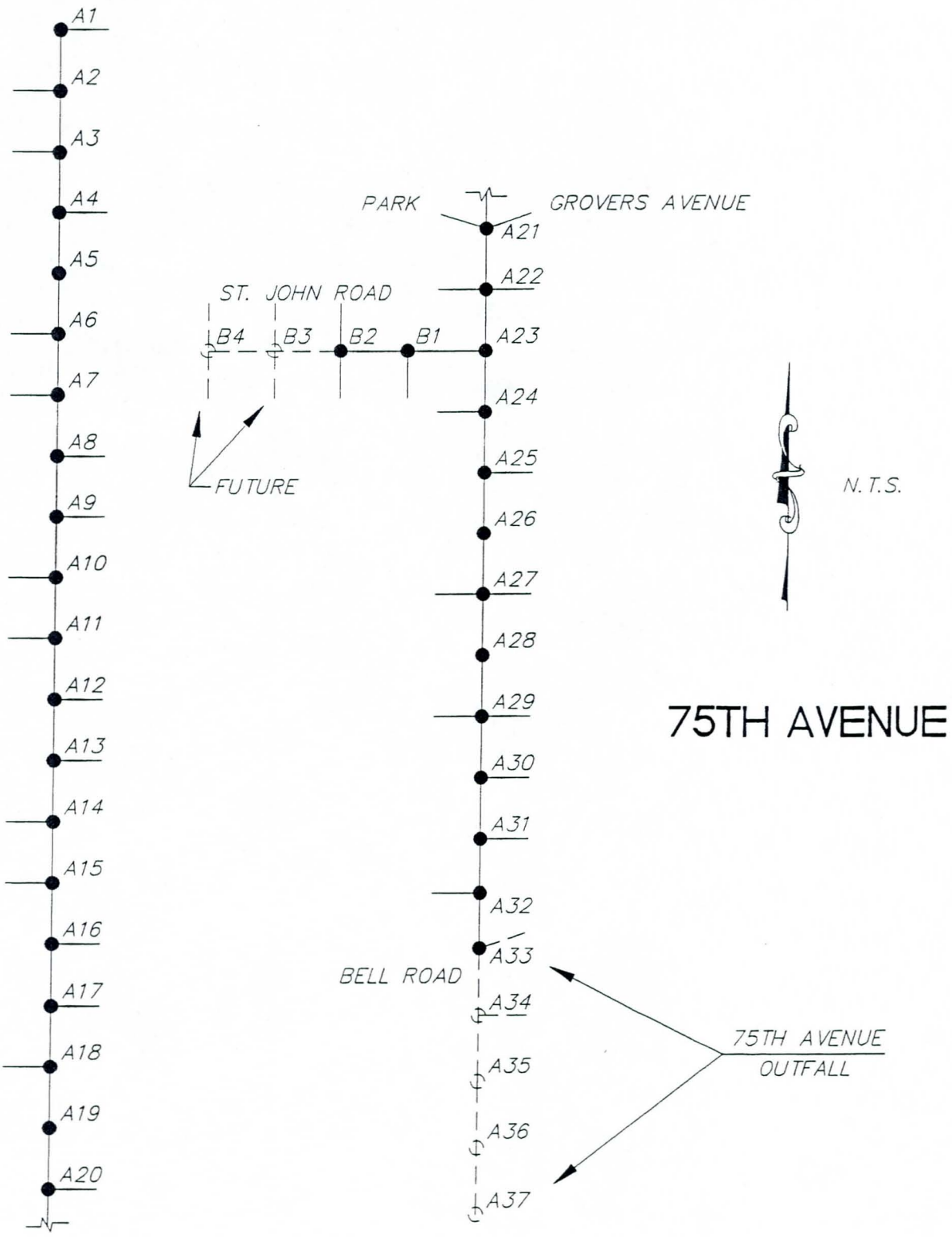
PIPE CAPACITY CHECKED BY _____ DATE _____

$K_e = 0.5$

				INLET CONTROL				OUTLET CONTROL							
STA	DIR	DIA	Q	HW/D	HW	AHW	L	S_o	h_o	H	HW	AHW	CONTROL
75+74 AVE													
35+70	W	42"	110	2.2	7.70	8.47	130	0.006	5.08	4.5	8.80	8.47	OUT
35+70	W	48"	110	1.45	5.80	8.72	130	0.006	5.33	2.23	6.78	8.72	OUT
								USE 48" DIA. PIPE					

Hydraulic Grade Line Calculations
Surcharge Condition

STORM DRAIN SCHEMATIC



DATA FILE: A:75AVE_H.DAT

```
*****************************
*                           *
*          THYSYS           *
*                           *
*   TEXAS HYDRAULICS SYSTEM *
*                           *
*****************************
```

```
GLENDALE ID 59
$ STORM SEWER ANALYSIS
$
$ 75TH AVENUE MAINLINE
$ WITH OUTFALL TO SKUNK CREEK (per Donohue's plans)
$     * FLOW VALUES FOR STORM DRAIN INLETS ON BELL ROAD
$       PER DONOHUE'S MAY 1991 REPORT.
$     * ADDED THE ST. JOHN RD. STORM DRAIN INTO THE ANALYSIS.
$
$
$
SEWER              ANALYSIS                    SEWER     FREQUENCY=10YR
DA A 01                                        t10.0                1.9
DA A 02                                        t10.0                3.2
DA A 03                                        t10.0                1.3
DA A 04                                        t10.0                5.2
DA A 06                                        t10.0                2.1
DA A 07                                        t10.0                3.7
DA A 08                                        t10.0                2.4
DA A 09                                        t10.0                9.2
DA A 10                                        t10.0                2.0
DA A 11                                        t10.0                0.9
DA A 12                                        t10.0                0.7
DA A 13                                        t10.0                6.4
DA A 14                                        t10.0                1.6
DA A 15                                        t10.0                3.3
DA A 16                                        t10.0                3.0
    . 17                                       t10.0                2.5
  A 18                                         t10.0                2.0
DA A 20                                        t10.0                1.4
DA A 21                                        t10.0              195.4
DA A 22                                        t10.0                2.9
DA A 24                                        t10.0                0.6
DA A 25                                        t10.0                1.0
DA A 27                                        t10.0               26.7
DA A 29                                        t10.0                4.3
DA A 31                                        t10.0                1.0
DA A 32                                        t10.0                0.6
DA A 33                                        t10.0                8.0
DA A 34                                        t10.0               20.0
DA B 01                                        t10.0                2.7
DA B 02                                        t10.0                2.7
DA B 03                                        t10.0                2.7
DA B 04                                        t10.0                0.1
$
JUNC A 05 TYPE=JUNCT
JUNC A 19 TYPE=JUNCT
JUNC A 26 TYPE=JUNCT
JUNC A 28 TYPE=JUNCT
JUNC A 30 TYPE=JUNCT
JUNC A 34 TYPE=JUNCT
JUNC A 35 TYPE=JUNCT
JUNC B 01 TYPE=JUNCT
JUNC B 02 TYPE=JUNCT
JUNC B 03 TYPE=JUNCT
  : B 04 TYPE=JUNCT

OUTLET    STATIONING     0050 T.W. ELEV  1198.50   A 38
DSGN 001  A 01 A 02 US1222.60 DS1222.46   20          .014        18 CIRC
DSGN 002  A 02 A 03 US1222.46 DS1222.23   35          .014        18 CIRC
DSGN 003  A 03 A 04 US1222.23 DS1220.83  205          .014        18 CIRC
```

```
DSGN 004  A 04 A 05 US1220.83 DS1219.34  220          .014        24 CIRC
DSGN 005  A 05 A 06 US1219.34 DS1218.18  170          .014        24 CIRC
DSGN 006  A 06 A 07 US1218.18 DS1217.84   50          .014        24 CIRC
DSGN 007  A 07 A 08 US1216.80 DS1216.00  100          .014        30 CIRC
  ! 008  A 08 A 09 US1216.00 DS1214.80  150          .014        30 CIRC
 ,N 009  A 09 A 10 US1214.80 DS1214.00  100          .014        30 CIRC
DSGN 010  A 10 A 11 US1214.00 DS1213.88   30          .014        36 CIRC
DSGN 011  A 11 A 12 US1213.88 DS1213.00  220          .014        36 CIRC
DSGN 012  A 12 A 13 US1213.00 DS1212.86   35          .014        36 CIRC
DSGN 013  A 13 A 14 US1212.86 DS1211.48  265          .014        36 CIRC
DSGN 014  A 14 A 15 US1211.48 DS1211.09   75          .014        36 CIRC
DSGN 015  A 15 A 16 US1211.09 DS1209.38  165          .014        36 CIRC
DSGN 016  A 16 A 17 US1209.38 DS1208.75   60          .014        36 CIRC
DSGN 017  A 17 A 18 US1208.75 DS1208.09   64          .014        36 CIRC
DSGN 018  A 18 A 19 US1208.09 DS1207.71   36          .014        36 CIRC
DSGN 019  A 19 A 20 US1207.71 DS1207.31  100          .014        36 CIRC
DSGN 020  A 20 A 21 US1207.31 DS1206.79  130          .014        36 CIRC
DSGN 021  A 21 A 22 US1206.79 DS1206.49   73          .014        78 CIRC
DSGN 022  A 22 A 23 US1206.49 DS1205.84  153          .014        78 CIRC
DSGN 023  A 23 A 24 US1205.84 DS1204.82  464     -5.5 .014        78 CIRC
DSGN 024  A 24 A 25 US1204.82 DS1204.79   13          .014        78 CIRC
DSGN 025  A 25 A 26 US1204.79 DS1204.49  137          .014        78 CIRC
DSGN 026  A 26 A 27 US1204.49 DS1203.66  380          .014        78 CIRC
DSGN 027  A 27 A 28 US1203.66 DS1203.27  177          .014        78 CIRC
DSGN 028  A 28 A 29 US1203.27 DS1202.45  373          .014        78 CIRC
DSGN 029  A 29 A 30 US1202.45 DS1202.05  180          .014        78 CIRC
DSGN 030  A 30 A 31 US1202.05 DS1201.57  220          .014        78 CIRC
DSGN 031  A 31 A 32 US1201.57 DS1200.91  298          .014        78 CIRC
DSGN 032  A 32 A 33 US1200.91 DS1200.48  154          .014        78 CIRC
DSGN 033  A 33 A 34 US1200.48 DS1200.45   18          .014        78 CIRC
DSGN 034  A 34 A 35 US1200.45 DS1199.54  440          .014        78 CIRC
DSGN 035  A 35 A 36 US1199.54 DS1199.20  150          .014        78 CIRC
  ! 036  A 36 A 37 US1199.20 DS1198.85  155          .014        78 CIRC
 ,N 037  A 37 A 38 US1198.85 DS1198.55  135          .014        78 CIRC
DSGN 101  B 01 B 02 US1209.26 DS1207.82  600          .014        18 CIRC
DSGN 102  B 02 B 03 US1207.82 DS1206.48  560          .014        18 CIRC
DSGN 103  B 03 B 04 US1206.48 DS1205.99  248          .014        24 CIRC
DSGN 104  B 04 A 23 US1205.99 DS1205.84   75          .014        24 CIRC
$
ANAL 001  A 01 A 02        18
ANAL 002  A 02 A 03        18
ANAL 003  A 03 A 04        18
ANAL 004  A 04 A 05        24
ANAL 005  A 05 A 06        24
ANAL 006  A 06 A 07        24
ANAL 007  A 07 A 08        30
ANAL 008  A 08 A 09        30
ANAL 009  A 09 A 10        30
ANAL 010  A 10 A 11        36
ANAL 011  A 11 A 12        36
ANAL 012  A 12 A 13        36
ANAL 013  A 13 A 14        36
ANAL 014  A 14 A 15        36
ANAL 015  A 15 A 16        36
ANAL 016  A 16 A 17        36
ANAL 017  A 17 A 18        36
ANAL 018  A 18 A 19        36
ANAL 019  A 19 A 20        36
ANAL 020  A 20 A 21        36
ANAL 021  A 21 A 22        78
  . 022  A 22 A 23        78
 .L 023  A 23 A 24        78
ANAL 024  A 24 A 25        78
ANAL 025  A 25 A 26        78
ANAL 026  A 26 A 27        78
ANAL 027  A 27 A 28        78
```

```
ANAL 028  A 28 A 29        78
ANAL 029  A 29 A 30        78
ANAL 030  A 30 A 31        78
ANAL 031  A 31 A 32        78
     . 032  A 32 A 33      78
 .AL 033  A 33 A 34        78
ANAL 034  A 34 A 35        78
ANAL 035  A 35 A 36        78
ANAL 036  A 36 A 37        78
ANAL 037  A 37 A 38        78
ANAL 101  B 01 B 02        18
ANAL 102  B 02 B 03        18
ANAL 103  B 03 B 04        24
ANAL 104  B 04 A 23        24
$
ENDATA
```

SEWER

SEWER ANALYSIS

CONFIGURATION DATA

RUN	U.S. ID	D.S. ID	U.S. F.L. ELEV	D.S. F.L. ELEV	LENGTH FEET	SLOPE	BBLS	RISE	SPAN	SHAPE
001	A 1	A 2	1221.10	1220.96	20	0.00700	1	18	18	CIRC
002	A 2	A 3	1220.96	1220.73	35	0.00657	1	18	18	CIRC
003	A 3	A 4	1220.73	1219.33	205	0.00683	1	18	18	CIRC
004	A 4	A 5	1218.83	1217.34	220	0.00677	1	24	24	CIRC
005	A 5	A 6	1217.34	1216.18	170	0.00682	1	24	24	CIRC
006	A 6	A 7	1216.18	1215.84	50	0.00680	1	24	24	CIRC
007	A 7	A 8	1214.30	1213.50	100	0.00800	1	30	30	CIRC
008	A 8	A 9	1213.50	1212.30	150	0.00800	1	30	30	CIRC
009	A 9	A10	1212.30	1211.50	100	0.00800	1	30	30	CIRC
010	A10	A11	1211.00	1210.88	30	0.00400	1	36	36	CIRC
011	A11	A12	1210.88	1210.00	220	0.00400	1	36	36	CIRC
012	A12	A13	1210.00	1209.86	35	0.00400	1	36	36	CIRC
013	A13	A14	1209.86	1208.48	265	0.00521	1	36	36	CIRC
014	A14	A15	1208.48	1208.09	75	0.00520	1	36	36	CIRC
015	A15	A16	1208.09	1206.38	165	0.01036	1	36	36	CIRC
016	A16	A17	1206.38	1205.75	60	0.01050	1	36	36	CIRC
017	A17	A18	1205.75	1205.09	64	0.01031	1	36	36	CIRC
018	A18	A19	1205.09	1204.71	36	0.01056	1	36	36	CIRC
019	A19	A20	1204.71	1204.31	100	0.00400	1	36	36	CIRC
020	A20	A21	1204.31	1203.79	130	0.00400	1	36	36	CIRC
021	A21	A22	1200.29	1199.99	73	0.00411	1	78	78	CIRC
022	A22	A23	1199.99	1199.34	153	0.00425	1	78	78	CIRC
023	A23	A24	1199.34	1198.32	464	0.00220	1	78	78	CIRC
024	A24	A25	1198.32	1198.29	13	0.00230	1	78	78	CIRC
025	A25	A26	1198.29	1197.99	137	0.00219	1	78	78	CIRC
026	A26	A27	1197.99	1197.16	380	0.00218	1	78	78	CIRC
027	A27	A28	1197.16	1196.77	177	0.00220	1	78	78	CIRC
028	A28	A29	1196.77	1195.95	373	0.00220	1	78	78	CIRC
029	A29	A30	1195.95	1195.55	180	0.00222	1	78	78	CIRC
030	A30	A31	1195.55	1195.07	220	0.00218	1	78	78	CIRC
031	A31	A32	1195.07	1194.41	298	0.00221	1	78	78	CIRC
032	A32	A33	1194.41	1193.98	154	0.00279	1	78	78	CIRC
033	A33	A34	1193.98	1193.95	18	0.00167	1	78	78	CIRC
034	A34	A35	1193.95	1193.04	440	0.00207	1	78	78	CIRC
035	A35	A36	1193.04	1192.70	150	0.00227	1	78	78	CIRC
036	A36	A37	1192.70	1192.35	155	0.00226	1	78	78	CIRC
037	A37	A38	1192.35	1192.05	135	0.00222	1	78	78	CIRC
101	B 1	B 2	1207.76	1206.32	600	0.00240	1	18	18	CIRC

RUN	U.S. ID	D.S. ID	U.S. F.L. ELEV	D.S. F.L. ELEV	LENGTH FEET	SLOPE	BBLS	RISE	SPAN	SHAPE
102	B 2	B 3	1206.32	1204.98	560	0.00239	1	18	18	CIRC
103	B 3	B 4	1204.48	1203.99	248	0.00198	1	24	24	CIRC
104	B 4	A23	1203.99	1203.84	75	0.00200	1	24	24	CIRC

HYDRAULIC DATA

RUN	U.S. ID	D.S. ID	'N'	JUNC LOSS	FLOW	U.S. HEAD	D.S. HEAD	HYDR. GRAD	DEPTH	VELOC.	PIPE CAPAC.
001	A 1	A 2	0.014	0.00	1.90	1221.85	1221.85	0.00038	0.33	3.7	8.2
002	A 2	A 3	0.014	0.00	5.10	1221.85	1221.75	0.00273	0.59	4.7	7.9
003	A 3	A 4	0.014	0.00	6.40	1221.75	1220.35	0.00431	0.68	5.0	8.1
004	A 4	A 5	0.014	0.00	11.60	1220.03	1218.54	0.00305	0.60	5.9	17.3
005	A 5	A 6	0.014	0.00	11.60	1218.54	1217.54	0.00305	0.60	5.9	17.4
006	A 6	A 7	0.014	0.00	13.70	1217.54	1217.24	0.00425	0.68	6.0	17.3
007	A 7	A 8	0.014	0.00	17.40	1217.24	1217.03	0.00209	0.51	6.9	34.1
008	A 8	A 9	0.014	0.00	19.80	1217.03	1216.62	0.00270	0.55	7.2	34.1
009	A 9	A10	0.014	0.00	29.00	1216.62	1216.04	0.00580	0.72	7.7	34.1
010	A10	A11	0.014	0.00	31.00	1216.04	1215.97	0.00251	0.68	6.1	39.2
011	A11	A12	0.014	0.00	31.90	1215.97	1215.38	0.00265	0.69	6.1	39.2
012	A12	A13	0.014	0.00	32.60	1215.38	1215.29	0.00277	0.70	6.2	39.2
013	A13	A14	0.014	0.00	39.00	1215.29	1214.23	0.00397	0.73	7.1	44.7
014	A14	A15	0.014	0.00	40.60	1214.23	1213.91	0.00430	0.76	7.0	44.7
015	A15	A16	0.014	0.00	43.90	1213.91	1213.08	0.00502	0.62	9.5	63.0
016	A16	A17	0.014	0.00	46.90	1213.08	1212.74	0.00573	0.64	9.8	63.5
017	A17	A18	0.014	0.00	49.40	1212.74	1212.33	0.00636	0.67	9.8	62.9
018	A18	A19	0.014	0.00	51.40	1212.33	1212.08	0.00689	0.69	9.9	63.6
019	A19	A20	0.014	0.00	51.40	1212.08	1211.40	0.00689	1.00	7.3	39.2 **
020	A20	A21	0.014	0.00	52.80	1211.40	1210.45	0.00727	1.00	7.5	39.2 **
021	A21	A22	0.014	0.00	248.20	1210.45	1210.26	0.00260	0.68	10.3	312.1
022	A22	A23	0.014	0.00	251.10	1210.26	1209.85	0.00266	0.68	10.4	317.3
023	A23	A24	0.014	0.00	253.80	1209.85	1208.59	0.00272	1.00	7.6	228.3 **
024	A24	A25	0.014	0.00	254.40	1208.59	1208.56	0.00273	1.00	7.7	233.5 **
025	A25	A26	0.014	0.00	255.40	1208.56	1208.18	0.00275	1.00	7.7	227.8 **
026	A26	A27	0.014	0.00	255.40	1208.18	1207.13	0.00275	1.00	7.7	227.5 **
027	A27	A28	0.014	0.00	282.10	1207.13	1206.54	0.00336	1.00	8.5	228.5 **
028	A28	A29	0.014	0.00	282.10	1206.54	1205.29	0.00336	1.00	8.5	228.3 **
029	A29	A30	0.014	0.00	286.40	1205.29	1204.66	0.00346	1.00	8.6	229.5 **
030	A30	A31	0.014	0.00	286.40	1204.66	1203.90	0.00346	1.00	8.6	227.4 **
031	A31	A32	0.014	0.00	287.40	1203.90	1202.86	0.00349	1.00	8.7	229.1 **
032	A32	A33	0.014	0.00	288.00	1202.86	1202.32	0.00350	1.00	8.7	257.3 **
033	A33	A34	0.014	0.00	296.00	1202.32	1202.26	0.00370	1.00	8.9	198.8 **
034	A34	A35	0.014	0.00	316.00	1202.26	1200.40	0.00421	1.00	9.5	221.4 **
035	A35	A36	0.014	0.00	316.00	1200.40	1199.77	0.00421	1.00	9.5	231.8 **

RUN	U.S. ID	D.S. ID	'N'	JUNC LOSS	FLOW	U.S. HEAD	D.S. HEAD	HYDR. GRAD	DEPTH	VELOC.	PIPE CAPAC.	
036	A36	A37	0.014	0.00	316.00	1199.77	1199.12	0.00421	1.00	9.5	231.3	**
037	A37	A38	0.014	0.00	316.00	1199.12	1198.55	0.00421	1.00	9.5	229.5	**
101	B 1	B 2	0.014	0.00	2.70	1212.51	1212.05	0.00077	0.54	2.8	4.8	
102	B 2	B 3	0.014	0.00	5.40	1212.05	1210.34	0.00307	1.00	3.1	4.8	**
103	B 3	B 4	0.014	0.00	8.10	1210.34	1209.97	0.00149	0.73	3.3	9.3	
104	B 4	A23	0.014	0.00	8.20	1209.97	1209.85	0.00152	0.73	3.3	9.4	

```
W0008--CAPACITY OF RUN 019 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 020 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 023 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 024 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 025 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 026 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 027 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 028 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 029 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 030 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 031 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 032 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 033 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 034 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 035 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 036 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 037 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 102 IS EXCEEDED.
```

STATIONING

RUN	UPSTREAM JUNCTION ID	STATIONING
001	A 1	5800
002	A 2	5780
003	A 3	5745
004	A 4	5540
005	A 5	5320
006	A 6	5150
007	A 7	5100
008	A 8	5000
009	A 9	4850
010	A10	4750
011	A11	4720
012	A12	4500
013	A13	4465
014	A14	4200
015	A15	4125
016	A16	3960
017	A17	3900
018	A18	3836
019	A19	3800
020	A20	3700
021	A21	3570
022	A22	3497
023	A23	3344
024	A24	2880
025	A25	2867
026	A26	2730
027	A27	2350
028	A28	2173
029	A29	1800
030	A30	1620
031	A31	1400
032	A32	1102
033	A33	948
034	A34	930
035	A35	490
036	A36	340
037	A37	185
101	B 1	4827
102	B 2	4227
103	B 3	3667
104	B 4	3419

GLENDALE ID 59 STORM DRAIN
SURCHARGE ANALYSIS
FILE NAME: SUR75_H Computer File: SRCHRG2.WQ2

75TH AVENUE MAINLINE
(INCLUDING EXTENTION TO SKUNK CREEK)

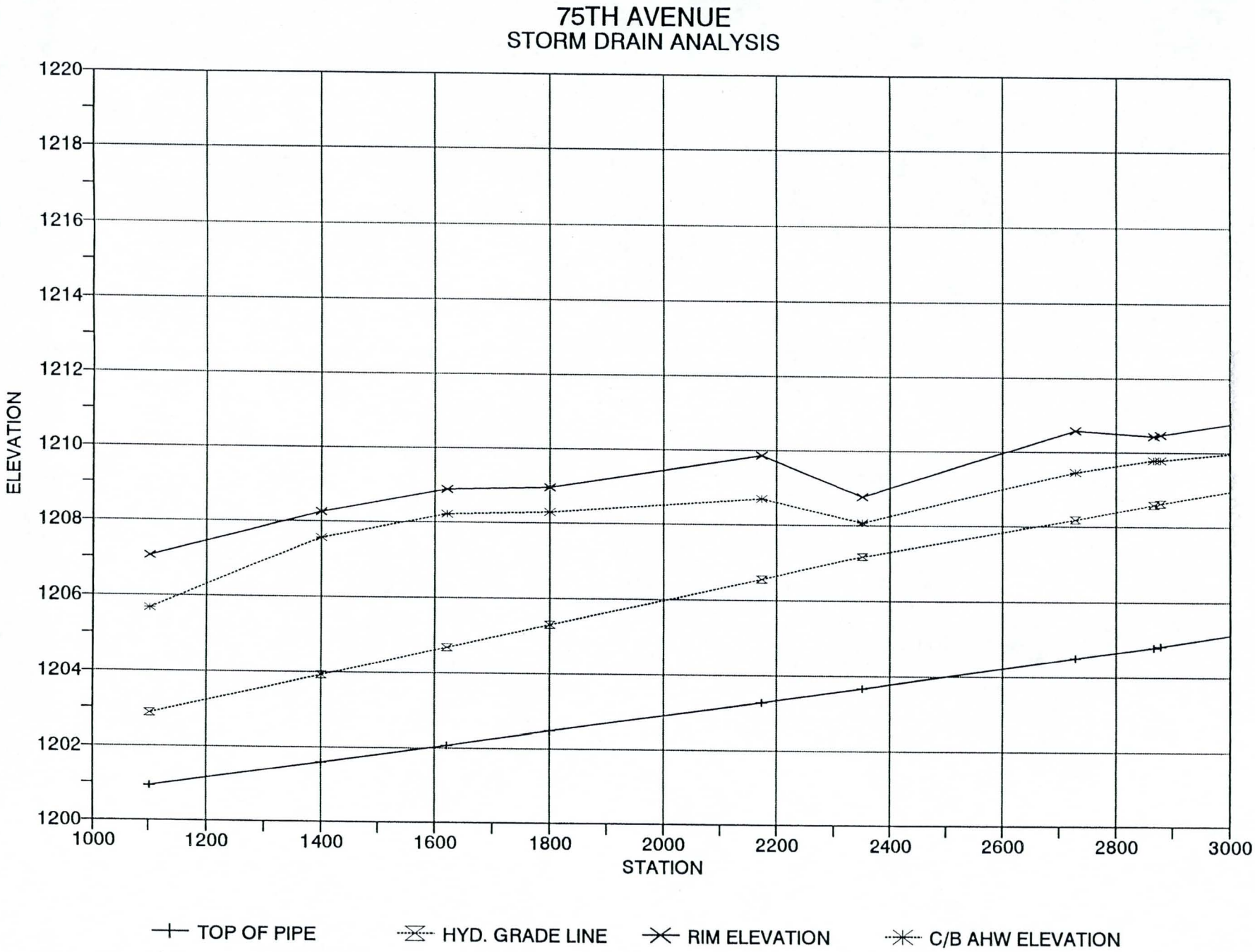
NODE	STATION	SOFFIT ELEV	HGL ELEV	SURCHARGE	RIM ELEV	DIST TO RIM	ELEV AHW-CB		DIST TO AHW-CB
A01	5800.00	1222.60	1221.85	-0.75	1227.10	-5.25	1226.30		-4.45
A02	5780.00	1222.46	1221.85	-0.61	1226.79	-4.94	1226.13		-4.28
A03	5745.00	1222.23	1221.75	-0.48	1226.40	-4.65	1225.74		-3.99
A04	5540.00	1220.83	1220.03	-0.80	1224.80	-4.77	1223.62		-3.59
A05	5320.00	1219.34	1218.54	-0.80	1223.95	-5.41	1222.79		-4.25
A06	5150.00	1218.18	1217.54	-0.64	1221.23	-3.69	1220.57		-3.03
A07	5100.00	1216.80	1217.24	0.44	1221.80	-4.56	1220.99		-3.75
A08	5000.00	1216.00	1217.03	1.03	1220.63	-3.60	1219.97		-2.94
A09	4850.00	1214.80	1216.62	1.82	1219.75	-3.13	1219.09		-2.47
A10	4750.00	1214.00	1216.04	2.04	1219.60	-3.56	1218.51		-2.47
A11	4720.00	1213.88	1215.97	2.09	1219.00	-3.03	1218.34		-2.37
A12	4500.00	1213.00	1215.38	2.38	1217.60	-2.22	1216.94		-1.56
A13	4465.00	1212.86	1215.29	2.43	1217.30	-2.01	1216.64		-1.35
A14	4200.00	1211.48	1214.23	2.75	1215.78	-1.55	1215.12		-0.89
A15	4125.00	1211.09	1213.91	2.82	1215.80	-1.89	1214.70		-0.79
A16	3960.00	1209.38	1213.08	3.70	1213.95	-0.87	1213.29		-0.21
A17	3900.00	1208.75	1212.74	3.99	1213.07	-0.33	1212.41		0.33
A18	3836.00	1208.09	1212.33	4.24	1212.24	0.09	1211.58		0.75
A19	3800.00	1207.71	1212.08	4.37	1211.80	0.28	1211.17		0.91
A20	3700.00	1207.31	1211.40	4.09	1211.28	0.12	1210.62		0.78
A21	3570.00	1206.79	1210.45	3.66	1211.46	-1.01	1210.33		0.12
A22	3497.00	1206.49	1210.26	3.77	1210.79	-0.53	1210.13		0.13
A23	3340.00	1205.84	1209.85	4.01	1211.48	-1.63	1210.33		-0.48
A24	2880.00	1204.82	1208.59	3.77	1210.44	-1.85	1209.78		-1.19
A25	2867.00	1204.79	1208.56	3.77	1210.42	-1.86	1209.76		-1.20
A26	2730.00	1204.49	1208.18	3.69	1210.58	-2.40	1209.44		-1.26
A27	2350.00	1203.66	1207.13	3.47	1208.73	-1.60	1208.07		-0.94
A28	2173.00	1203.27	1206.54	3.27	1209.85	-3.31	1208.68		-2.14
A29	1800.00	1202.45	1205.29	2.84	1208.94	-3.65	1208.28		-2.99
A30	1620.00	1202.05	1204.66	2.61	1208.85	-4.19	1208.19		-3.53
A31	1400.00	1201.57	1203.90	2.33	1208.22	-4.32	1207.56		-3.66
A32	1102.00	1200.91	1202.86	1.95	1207.03	-4.17	1205.65		-2.79
A33	948.00	1200.81	1202.32	1.51	1207.00	-4.68	1205.80	*	-3.48
A34	930.00	1200.77	1202.26	1.49	1207.00	-4.74	1205.80	*	-3.54
A35	490.00	1199.80	1200.40	0.60	1205.50	-5.10	1204.30	*	-3.90
A36	340.00	1199.47	1199.77	0.30	1205.00	-5.23	1203.80	*	-4.03
A37	185.00	1199.13	1199.12	-0.01	1205.00	-5.88	1203.80	*	-4.68

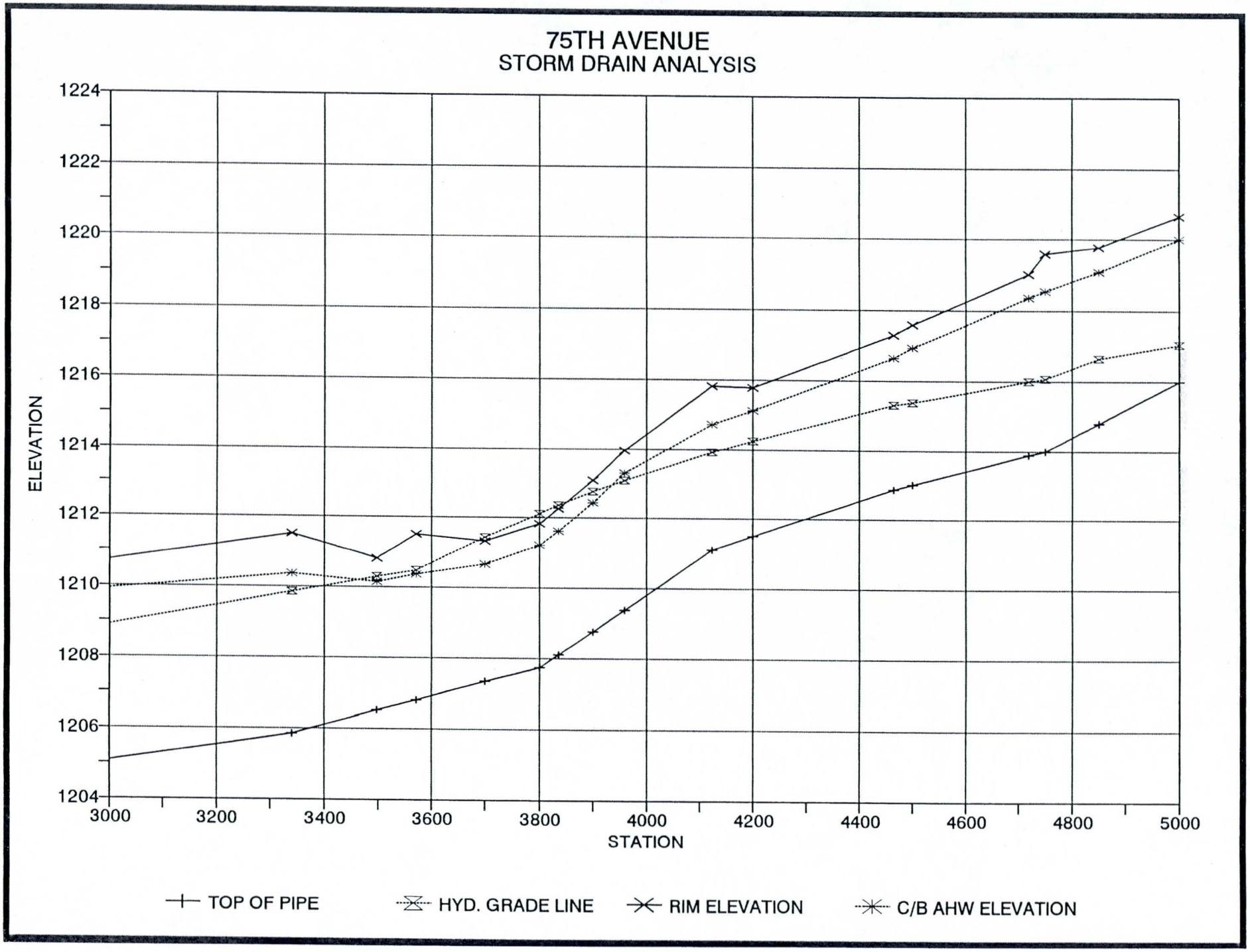
GLENDALE ID 59 STORM DRAIN
SURCHARGE ANALYSIS
FILE NAME: SUR75_H Computer File: SRCHRG2.WQ2

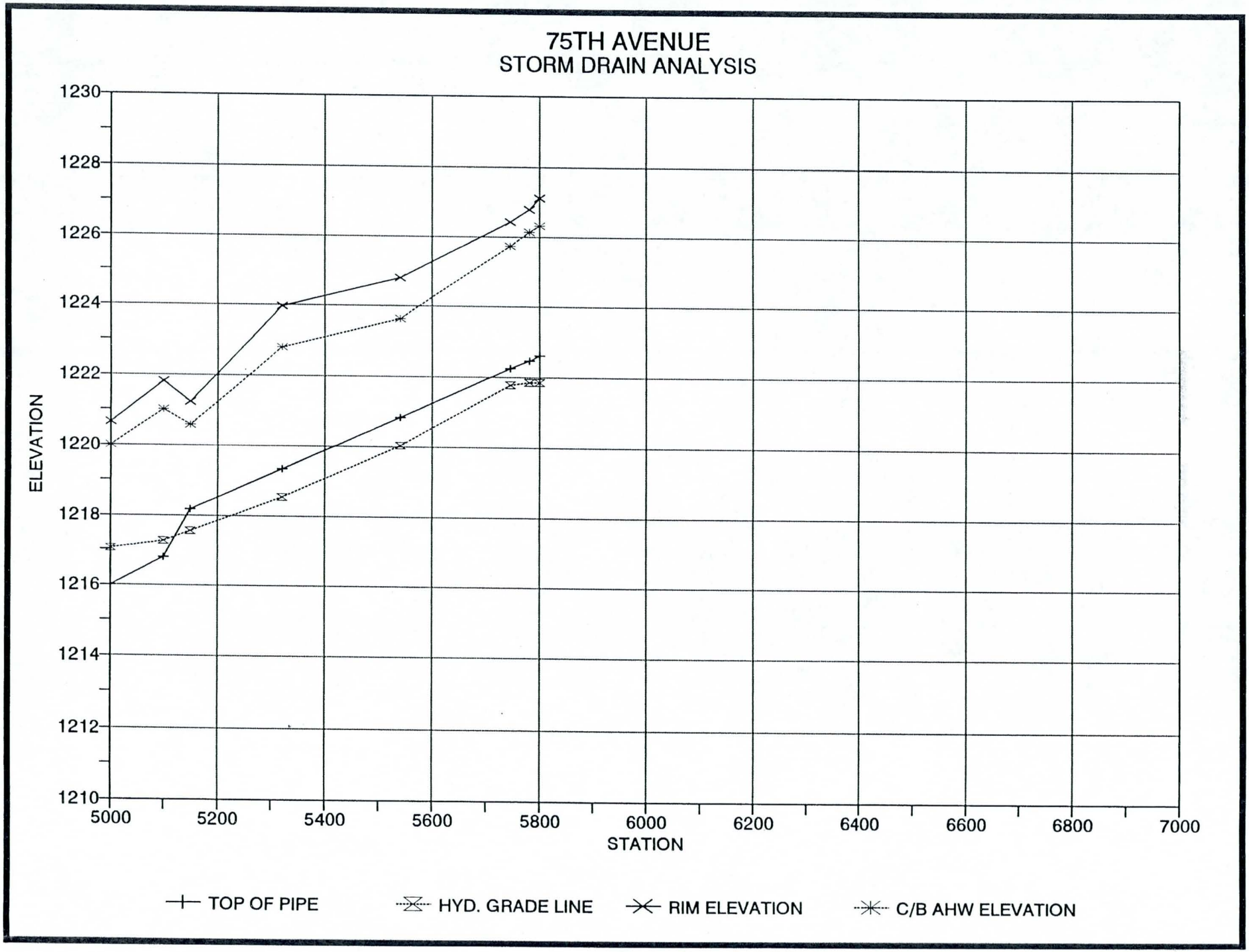
75TH AVENUE MAINLINE
(INCLUDING EXTENTION TO SKUNK CREEK)

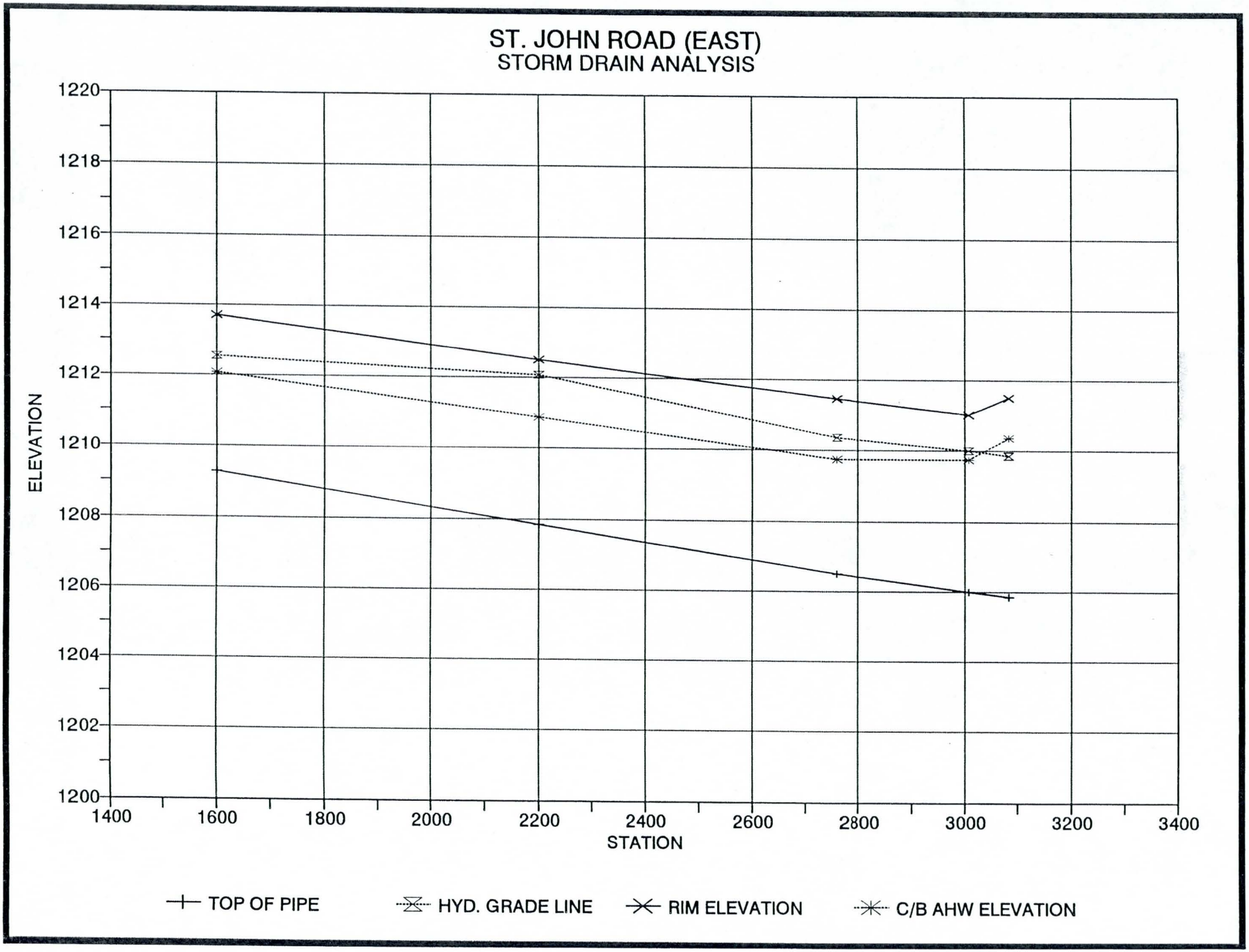
NODE	STATION	SOFFIT ELEV	HGL ELEV	SURCHARGE	RIM ELEV	DIST TO RIM	ELEV AHW-CB	DIST TO AHW-CB
B01	1600.00	1209.26	1212.51	3.25	1213.70	-1.19	1212.05	0.46
B02	2200.00	1207.82	1212.05	4.23	1212.50	-0.45	1210.85	1.20
B03	2760.00	1206.48	1210.34	3.86	1211.43	-1.09	1209.73	0.61
B04	3008.00	1205.99	1209.97	3.98	1211.00	-1.03	1209.74	0.23
A23	3083.00	1205.84	1209.85	4.01	1211.48	-1.63	1210.33	-0.48

* REQUIRES NO CATCH BASIN - ELEV. ASSUMED FROM RIM ELEV. MINUS 1.16

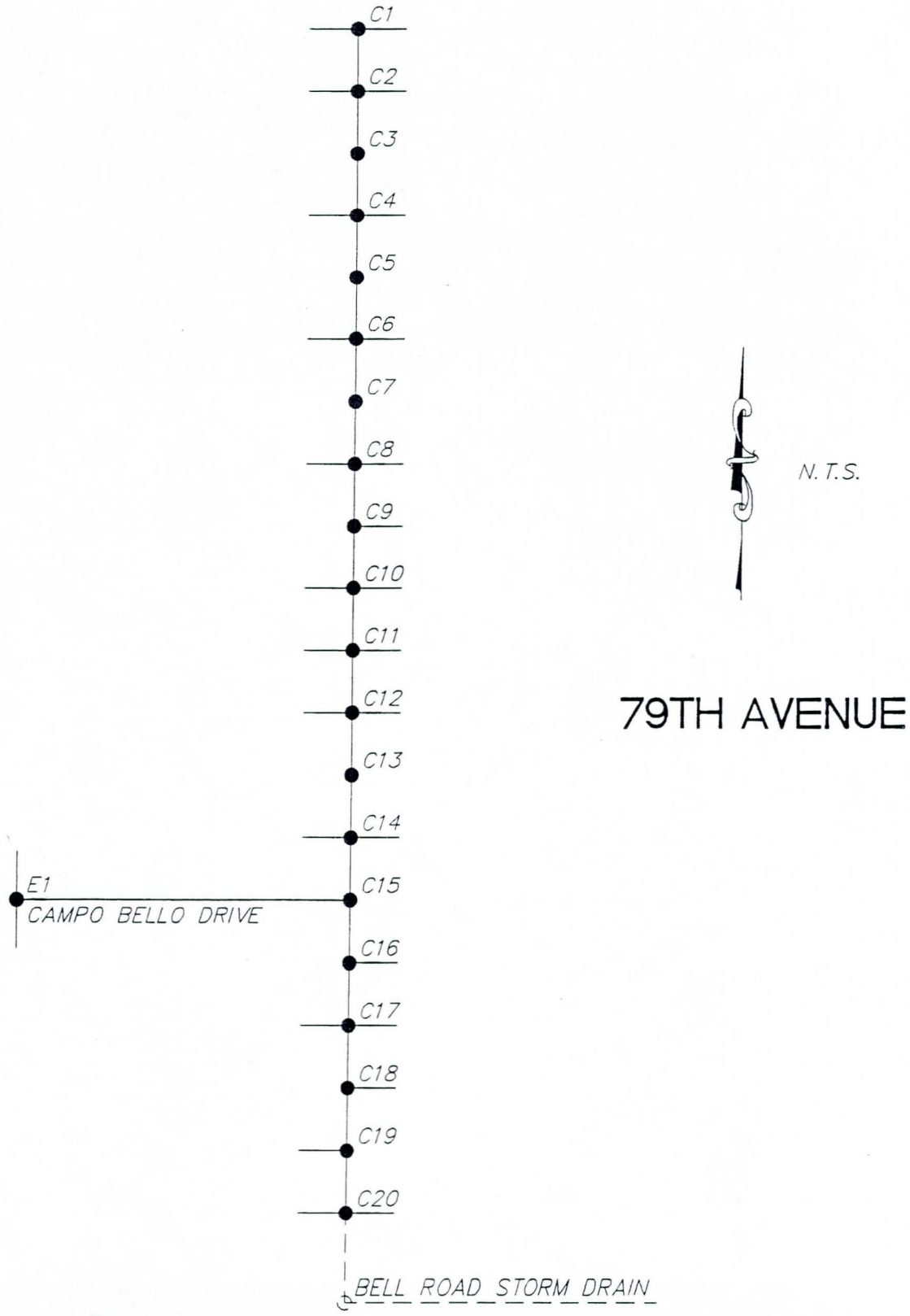

75TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1220
1218
1216
1214
1212
1210
1208
1206
1204
1202
1200
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION


75TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1224
1222
1220
1218
1216
1214
1212
1210
1208
1206
1204
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION


75TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1230
1228
1226
1224
1222
1220
1218
1216
1214
1212
1210
5000
5200
5400
5600
5800
6000
6200
6400
6600
6800
7000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION


ST. JOHN ROAD (EAST)
STORM DRAIN ANALYSIS
ELEVATION
1220
1218
1216
1214
1212
1210
1208
1206
1204
1202
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION

STORM DRAIN SCHEMATIC



DATA FILE: A:79AVE_C.DAT

```
******************************
*                            *
*          THYSYS            *
*                            *
*   TEXAS HYDRAULICS SYSTEM  *
*                            *
******************************
```

```
$ GLENDALE ID 59
$ STORM SEWER ANALYSIS
$
$ 79TH AVENUE MAINLINE
$    *  BASED ON A 2.0' SURCHARGE AT THE OUTFALL (BELL RD STORM SEWER).
$    *  INCLUDES RUNOFF FROM HIDDEN MANOR NORTHWEST PORTION WHICH ENTERS THE SYS
$       AT STA 40+00 (C-09).
$
$
$
$
$
$
SEWER              ANALYSIS                    SEWER     FREQUENCY=10 YR
DA C 01                                        t10.0                4.5
DA C 02                                        t10.0                3.3
DA C 04                                        t10.0                3.3
DA C 06                                        t10.0                2.5
DA C 08                                        t10.0                2.4
DA C 09                                        t10.0               12.1
DA C 10                                        t10.0                1.4
DA C 11                                        t10.0                0.7
DA C 12                                        t10.0                0.9
DA C 14                                        t10.0                0.5
DA C 16                                        t10.0                1.7
DA C 17                                        t10.0                1.1
DA C 18                                        t10.0                0.2
DA C 19                                        t10.0                0.2
DA C 20                                        t10.0                0.9
DA E 01                                        t10.0                4.1
$
JUNC C 01 TYPE=JUNCT
JUNC C 02 TYPE=JUNCT
JUNC C 03 TYPE=JUNCT
JUNC C 04 TYPE=JUNCT
JUNC C 05 TYPE=JUNCT
JUNC C 06 TYPE=JUNCT
JUNC C 07 TYPE=JUNCT
JUNC C 08 TYPE=JUNCT
JUNC C 09 TYPE=JUNCT
JUNC C 10 TYPE=JUNCT
JUNC C 11 TYPE=JUNCT
JUNC C 12 TYPE=JUNCT
JUNC C 13 TYPE=JUNCT
JUNC C 14 TYPE=JUNCT
JUNC C 15 TYPE=JUNCT
JUNC C 16 TYPE=JUNCT
JUNC C 17 TYPE=JUNCT
JUNC C 18 TYPE=JUNCT
JUNC C 19 TYPE=JUNCT
JUNC C 20 TYPE=JUNCT
JUNC E 01 TYPE=JUNCT
$
OUTLET    STATIONING     1064 T.W. ELEV  1197.70   C 21
DSGN 001  C 01 C 02 US1220.90 DS1219.14  460            .014       18 CIRC
DSGN 002  C 02 C 03 US1219.14 DS1217.75  230            .014       24 CIRC
DSGN 003  C 03 C 04 US1217.75 DS1216.25  250            .014       24 CIRC
DSGN 004  C 04 C 05 US1216.25 DS1215.39  180            .014       30 CIRC
DSGN 005  C 05 C 06 US1215.39 DS1214.66  280            .014       30 CIRC
DSGN 006  C 06 C 07 US1213.22 DS1212.10  280            .014       30 CIRC
DSGN 007  C 07 C 08 US1212.10 DS1210.52  220            .014       30 CIRC
```

```
DSGN 008  C 08 C 09 US1210.52 DS1209.20  200            .014       30 CIRC
DSGN 009  C 09 C 10 US1209.20 DS1208.25  340            .014       30 CIRC
DSGN 010  C 10 C 11 US1208.25 DS1207.10  345            .014       30 CIRC
  N 011  C 11 C 12 US1207.25 DS1205.61  373            .014       30 CIRC
  4 012  C 12 C 13 US1205.23 DS1204.50  182            .014       30 CIRC
SGN 013  C 13 C 14 US1204.50 DS1203.30  300            .014       30 CIRC
DSGN 014  C 14 C 15 US1199.90 DS1199.74   66            .014       36 CIRC
DSGN 015  C 15 C 16 US1199.74 DS1199.10  264       -1.6 .014       36 CIRC
DSGN 016  C 16 C 17 US1199.10 DS1198.21  370            .014       36 CIRC
DSGN 017  C 17 C 18 US1198.21 DS1197.29  385            .014       36 CIRC
DSGN 018  C 18 C 19 US1197.29 DS1197.08   65            .014       36 CIRC
DSGN 019  C 19 C 20 US1197.08 DS1196.47  210            .014       36 CIRC
DSGN 020  C 20 C 21 US1196.47 DS1195.70   36            .014       36 CIRC
DSGN 101  E 01 C 15 US1204.15 DS1201.45   82            .014       18 CIRC
$
ANAL 001  C 01 C 02          18
ANAL 002  C 02 C 03          24
ANAL 003  C 03 C 04          24
ANAL 004  C 04 C 05          30
ANAL 005  C 05 C 06          30
ANAL 006  C 06 C 07          30
ANAL 007  C 07 C 08          30
ANAL 008  C 08 C 09          30
ANAL 009  C 09 C 10          30
ANAL 010  C 10 C 11          30
ANAL 011  C 11 C 12          30
ANAL 012  C 12 C 13          30
ANAL 013  C 13 C 14          30
ANAL 014  C 14 C 15          36
ANAL 015  C 15 C 16          36
ANAL 016  C 16 C 17          36
ANAL 017  C 17 C 18          36
  . 018  C 18 C 19          36
NAL 019  C 19 C 20          36
ANAL 020  C 20 C 21          36
ANAL 101  E 01 C 15          18
$
ENDATA
```

SEWER

SEWER ANALYSIS

CONFIGURATION DATA

RUN	U.S. ID	D.S. ID	U.S. F.L. ELEV	D.S. F.L. ELEV	LENGTH FEET	SLOPE	BBLS	RISE	SPAN	SHAPE
001	C 1	C 2	1219.40	1217.64	460	0.00383	1	18	18	CIRC
002	C 2	C 3	1217.14	1215.75	230	0.00604	1	24	24	CIRC
003	C 3	C 4	1215.75	1214.25	250	0.00600	1	24	24	CIRC
004	C 4	C 5	1213.75	1212.89	180	0.00478	1	30	30	CIRC
005	C 5	C 6	1212.89	1212.16	280	0.00261	1	30	30	CIRC
006	C 6	C 7	1210.72	1209.60	280	0.00400	1	30	30	CIRC
007	C 7	C 8	1209.60	1208.02	220	0.00718	1	30	30	CIRC
008	C 8	C 9	1208.02	1206.70	200	0.00660	1	30	30	CIRC
009	C 9	C10	1206.70	1205.75	340	0.00279	1	30	30	CIRC
010	C10	C11	1205.75	1204.60	345	0.00333	1	30	30	CIRC
011	C11	C12	1204.75	1203.11	373	0.00440	1	30	30	CIRC
012	C12	C13	1202.73	1202.00	182	0.00401	1	30	30	CIRC
013	C13	C14	1202.00	1200.80	300	0.00400	1	30	30	CIRC
014	C14	C15	1196.90	1196.74	66	0.00242	1	36	36	CIRC
015	C15	C16	1196.74	1196.10	264	0.00242	1	36	36	CIRC
016	C16	C17	1196.10	1195.21	370	0.00241	1	36	36	CIRC
017	C17	C18	1195.21	1194.29	385	0.00239	1	36	36	CIRC
018	C18	C19	1194.29	1194.08	65	0.00323	1	36	36	CIRC
019	C19	C20	1194.08	1193.47	210	0.00290	1	36	36	CIRC
020	C20	C21	1193.47	1192.70	36	0.02139	1	36	36	CIRC
101	E 1	C15	1202.65	1199.95	82	0.03293	1	18	18	CIRC

HYDRAULIC DATA

RUN	U.S. ID	D.S. ID	'N'	JUNC LOSS	FLOW	U.S. HEAD	D.S. HEAD	HYDR. GRAD	DEPTH	VELOC.	PIPE CAPAC.	
001	C 1	C 2	0.014	0.00	4.50	1220.37	1218.61	0.00213	0.65	3.7	6.0	
002	C 2	C 3	0.014	0.00	7.80	1218.12	1216.73	0.00138	0.49	5.1	16.3	
003	C 3	C 4	0.014	0.00	7.80	1216.73	1215.23	0.00138	0.49	5.1	16.3	
004	C 4	C 5	0.014	0.00	11.10	1214.90	1214.27	0.00085	0.46	5.0	26.3	
005	C 5	C 6	0.014	0.00	11.10	1214.27	1213.77	0.00085	0.55	4.0	19.4	
006	C 6	C 7	0.014	0.00	13.60	1213.77	1213.41	0.00128	0.54	5.0	24.1	
007	C 7	C 8	0.014	0.00	13.60	1213.41	1213.13	0.00128	0.46	6.2	32.3	
008	C 8	C 9	0.014	0.00	16.00	1213.13	1212.78	0.00176	0.51	6.4	30.9	
009	C 9	C10	0.014	0.00	28.10	1212.78	1210.93	0.00544	1.00	5.7	20.1	**
010	C10	C11	0.014	0.00	29.50	1210.93	1208.86	0.00600	1.00	6.0	22.0	**
011	C11	C12	0.014	0.00	30.20	1208.86	1206.51	0.00629	1.00	6.2	25.3	**
012	C12	C13	0.014	0.00	31.10	1206.51	1205.30	0.00667	1.00	6.3	24.1	**
013	C13	C14	0.014	0.00	31.10	1205.30	1203.30	0.00667	1.00	6.3	24.1	**
014	C14	C15	0.014	0.00	31.60	1202.41	1202.24	0.00260	1.00	4.5	30.5	**
015	C15	C16	0.014	0.00	34.10	1202.24	1201.43	0.00303	1.00	4.8	30.5	**
016	C16	C17	0.014	0.00	35.80	1201.43	1200.20	0.00334	1.00	5.1	30.4	**
017	C17	C18	0.014	0.00	36.90	1200.20	1198.83	0.00355	1.00	5.2	30.3	**
018	C18	C19	0.014	0.00	37.10	1198.83	1198.60	0.00359	1.00	5.2	35.2	**
019	C19	C20	0.014	0.00	37.30	1198.60	1197.84	0.00363	1.00	5.3	33.4	**
020	C20	C21	0.014	0.00	38.20	1197.84	1197.70	0.00380	0.46	12.0	90.6	
101	E 1	C15	0.014	0.00	4.10	1203.15	1202.24	0.00177	0.33	8.1	17.7	

```
_W0008--CAPACITY OF RUN 009 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 010 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 011 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 012 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 013 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 014 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 015 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 016 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 017 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 018 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 019 IS EXCEEDED.
```

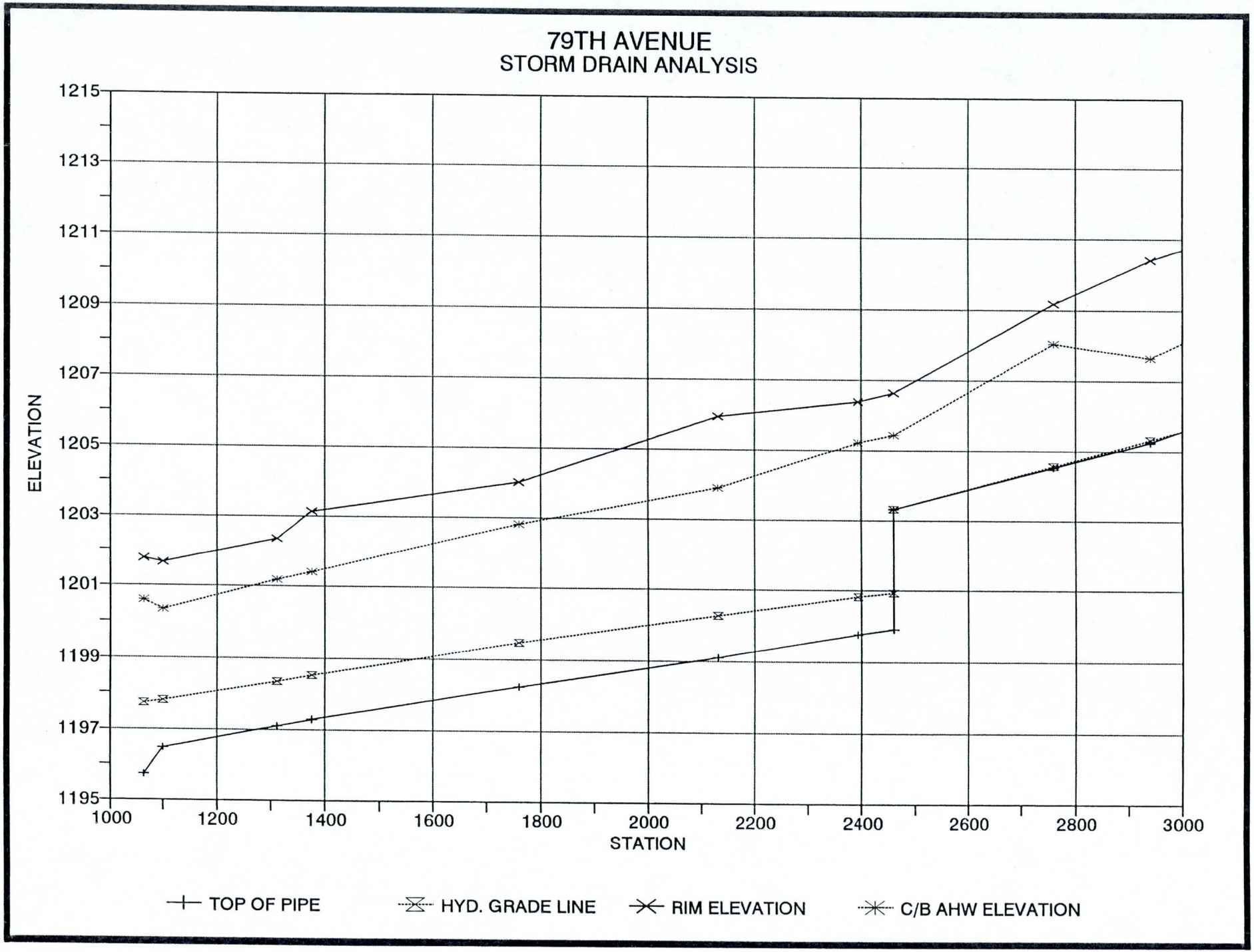
STATIONING

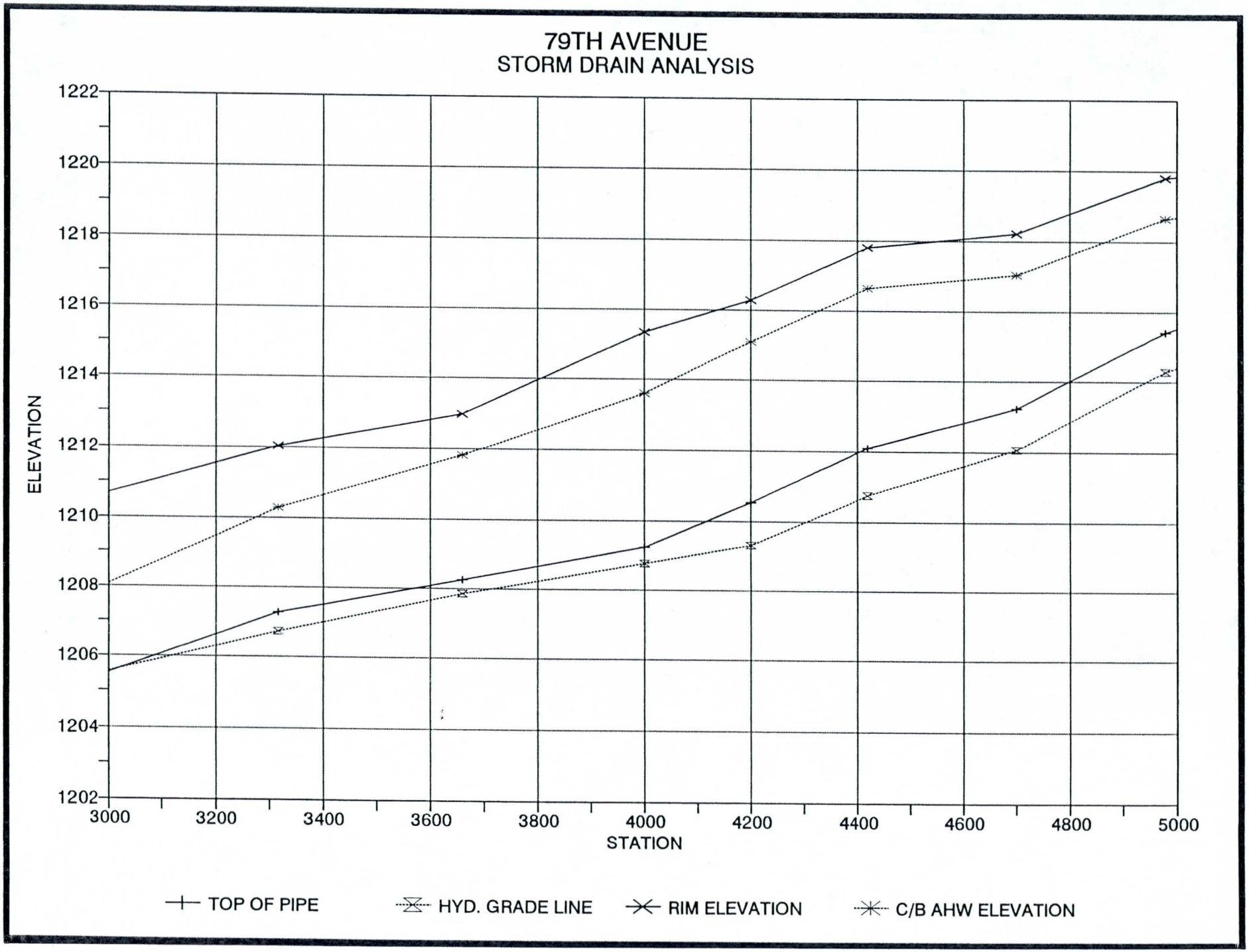
RUN	UPSTREAM JUNCTION ID	STATIONING
001	C 1	6100
002	C 2	5640
003	C 3	5410
004	C 4	5160
005	C 5	4980
006	C 6	4700
007	C 7	4420
008	C 8	4200
009	C 9	4000
010	C10	3660
011	C11	3315
012	C12	2942
013	C13	2760
014	C14	2460
015	C15	2394
016	C16	2130
017	C17	1760
018	C18	1375
019	C19	1310
020	C20	1100
101	E 1	2476

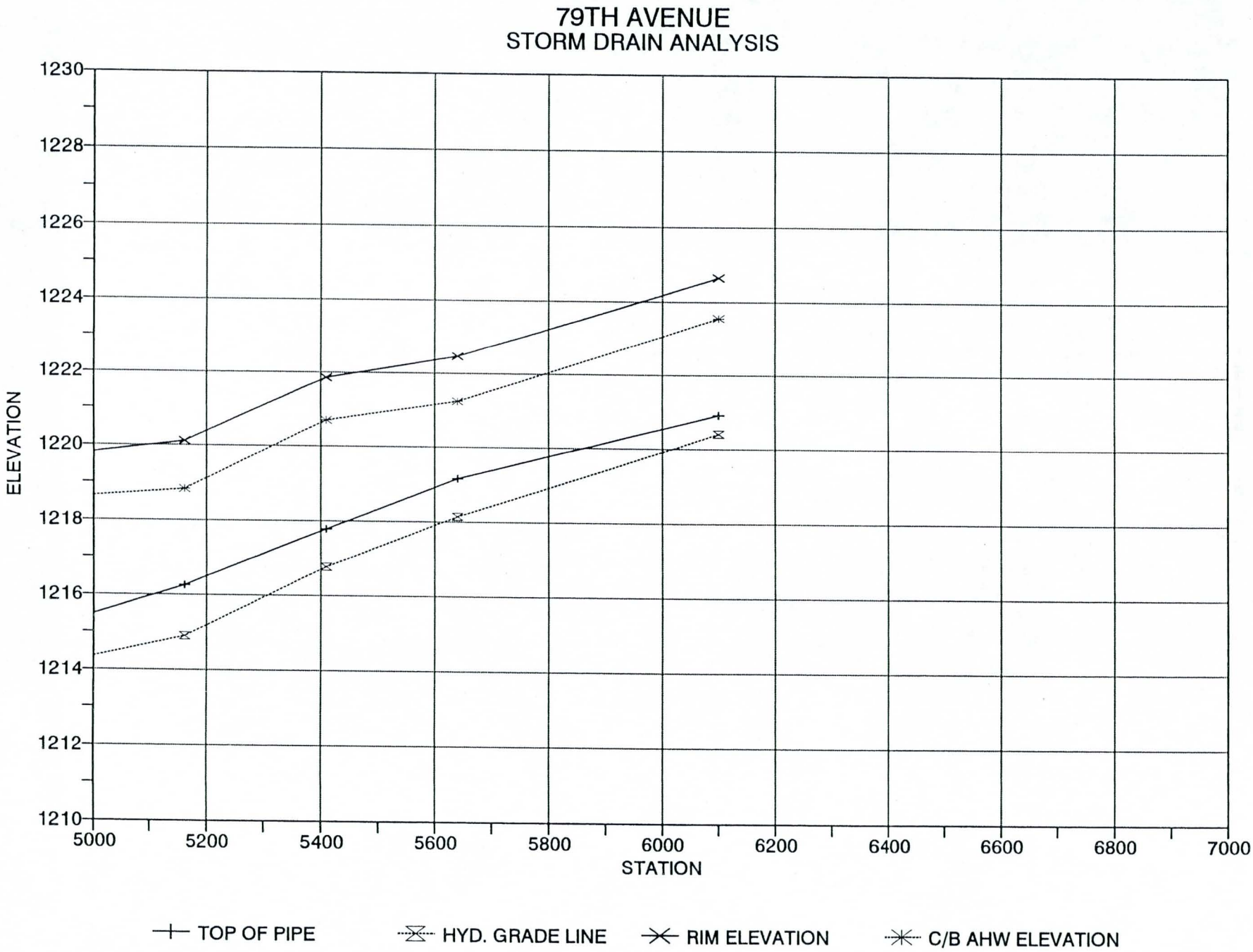
GLENDALE ID 59 STORM DRAIN
SURCHARGE ANALYSIS
FILE NAME: SUR79_C Computer File: SRCHRG2.WQ3
DATA: 79AVE_C.DAT
79TH AVENUE MAINLINE

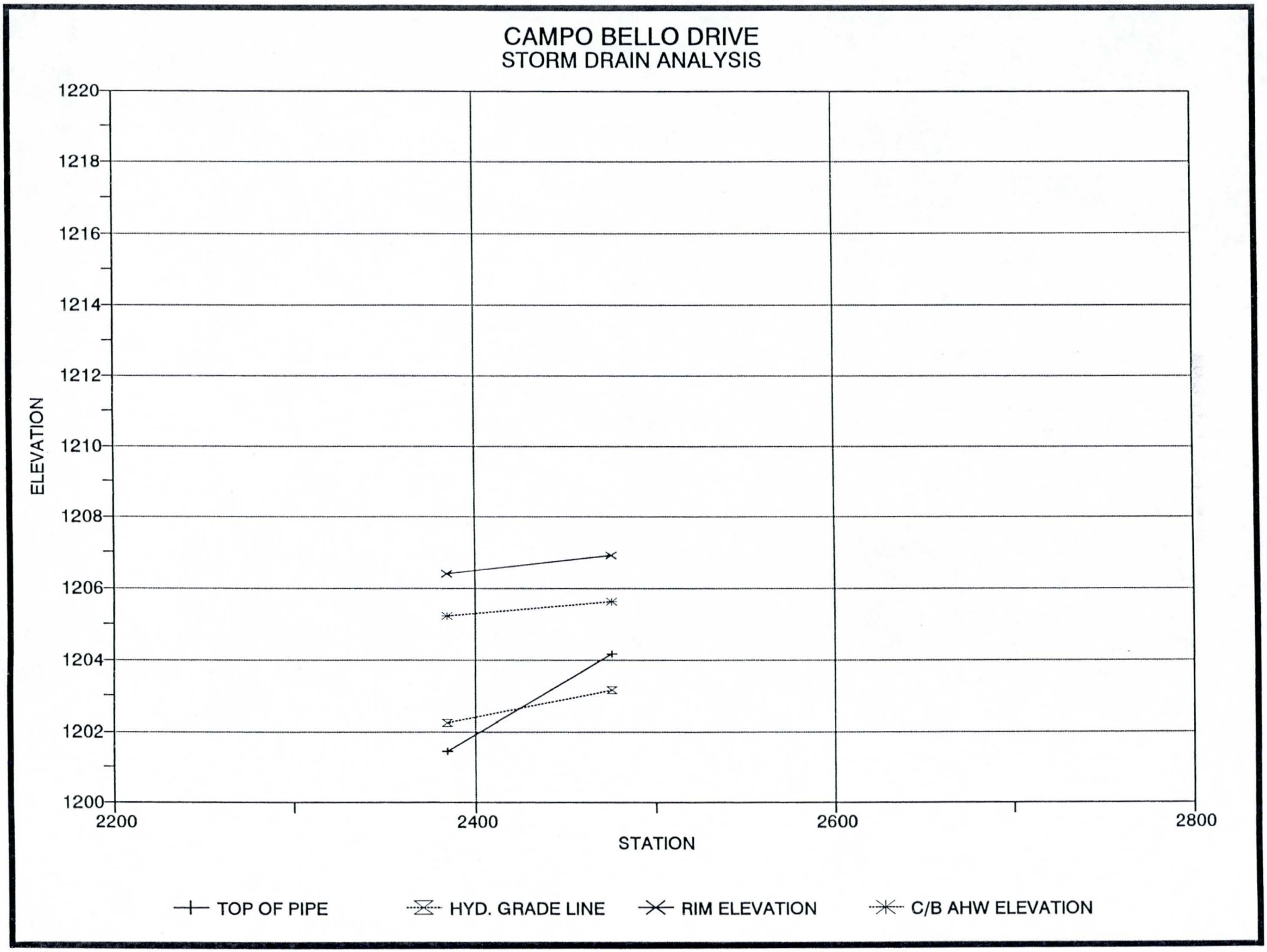
NODE	STATION	SOFFIT ELEV	HGL ELEV	SURCHARGE	RIM ELEV	DIST TO RIM	ELEV AHW-CB		DIST TO AHW-CB
C01	6100.00	1220.90	1220.37	-0.53	1224.62	-4.25	1223.53		-3.16
C02	5640.00	1219.14	1218.12	-1.02	1222.46	-4.34	1221.22		-3.10
C03	5410.00	1217.75	1216.73	-1.02	1221.85	-5.12	1220.69	*	-3.96
C04	5160.00	1216.25	1214.90	-1.35	1220.08	-5.18	1218.82	*	-3.92
C05	4980.00	1215.39	1214.27	-1.12	1219.80	-5.53	1218.64		-4.37
C06	4700.00	1213.22	1213.77	0.55	1218.20	-4.43	1217.02		-3.25
C07	4420.00	1212.10	1213.41	1.31	1217.80	-4.39	1216.64	*	-3.23
C08	4200.00	1210.52	1213.13	2.61	1216.26	-3.13	1215.09		-1.96
C09	4000.00	1209.20	1212.78	3.58	1215.31	-2.53	1213.58		-0.80
C10	3660.00	1208.25	1210.93	2.68	1212.98	-2.05	1211.80		-0.87
C11	3315.00	1207.25	1208.86	1.61	1212.03	-3.17	1210.29		-1.43
C12	2942.00	1205.23	1206.51	1.28	1210.40	-3.89	1207.65		-1.14
C13	2760.00	1204.50	1205.30	0.80	1209.18	-3.88	1208.02	*	-2.72
C14 US	2460.00	1203.30	1203.30	0.00	1206.61	-3.31	1205.42		-2.12
C14 DS	2460.00	1199.90	1202.41	2.51	1206.61	-4.20	1205.42		-3.01
C15	2394.00	1199.74	1202.24	2.50	1206.37	-4.13	1205.21	*	-2.97
C16	2130.00	1199.10	1201.43	2.33	1205.94	-4.51	1203.90		-2.47
C17	1760.00	1198.21	1200.20	1.99	1204.00	-3.80	1202.81		-2.61
C18	1375.00	1197.29	1198.83	1.54	1203.11	-4.28	1201.37		-2.54
C19	1310.00	1197.08	1198.60	1.52	1202.31	-3.71	1201.15		-2.55
C20	1100.00	1196.47	1197.84	1.37	1201.65	-3.81	1200.34		-2.50
C21	1064.00	1195.70	1197.70	2.00	1201.75	-4.05	1200.59	*	-2.89
E01	2476.00	1204.15	1203.15	-1.00	1206.90	-3.75	1205.63		-2.48
C15	2384.00	1201.45	1202.24	0.79	1206.37	-4.13	1205.21	*	-2.97

* REQUIRES NO CATCH BASIN - ELEV. ASSUMED FROM RIM ELEV. MINUS 1.16


79TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1215
1213
1211
1209
1207
1205
1203
1201
1199
1197
1195
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION


79TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1222
1220
1218
1216
1214
1212
1210
1208
1206
1204
1202
3000
3200
3400
3600
3800
4000
4200
4400
4600
4800
5000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION


79TH AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1230
1228
1226
1224
1222
1220
1218
1216
1214
1212
1210
5000
5200
5400
5600
5800
6000
6200
6400
6600
6800
7000
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION


CAMPO BELLO DRIVE
STORM DRAIN ANALYSIS
ELEVATION
1220
1218
1216
1214
1212
1210
1208
1206
1204
1202
1200
2200
2400
2600
2800
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION

STORM DRAIN SCHEMATIC

DATA FILE: b:\83ave_b.dat

```
******************************
*                            *
*          THYSYS            *
*                            *
*   TEXAS HYDRAULICS SYSTEM  *
*                            *
******************************
```

```
$ GLENDALE ID 59
$ STORM SEWER ANALYSIS
$
$ 83RD AVENUE MAINLINE
$     *  Includes the outfall run for the Bell Rd storm sewer
$        which discharges into the intercept channel on the east
$        side of the freeway.
$
$
$
$
$
$
$
SEWER              ANALYSIS                    SEWER     FREQUENCY=10 YR
DA D 01                                        t10.0              3.9
DA D 02                                        t10.0              2.3
DA D 03                                        t10.0              3.0
DA D 04                                        t10.0              2.2
DA G 01                                        t10.0              1.0
DA G 02                                        t10.0              1.3
DA G 04                                        t10.0              0.8
DA G 06                                        t10.0              4.8
DA G 07                                        t10.0              5.5
$
JUNC D 01 TYPE=JUNCT
JUNC D 02 TYPE=JUNCT
JUNC D 03 TYPE=JUNCT
JUNC D 04 TYPE=JUNCT
JUNC D 05 TYPE=JUNCT
JUNC G 01 TYPE=JUNCT
JUNC G 02 TYPE=JUNCT
JUNC G 03 TYPE=JUNCT
JUNC G 04 TYPE=JUNCT
JUNC G 05 TYPE=JUNCT
JUNC G 06 TYPE=JUNCT
JUNC G 07 TYPE=JUNCT
JUNC G 08 TYPE=JUNCT
JUNC G 09 TYPE=JUNCT
JUNC G 10 TYPE=JUNCT
$
OUTLET    STATIONING     4156 T.W. ELEV  1198.00   G 11
DSGN 001  D 01 D 02 US1216.92 DS1205.70  309          .014      18 CIRC
DSGN 002  D 02 D 03 US1205.70 DS1201.51  350          .014      18 CIRC
DSGN 003  D 03 D 04 US1201.51 DS1200.91  250          .014      24 CIRC
DSGN 004  D 04 D 05 US1200.91 DS1199.73  295          .014      24 CIRC
DSGN 005  D 05 G 05 US1199.73 DS1199.53   20          .014      24 CIRC
DSGN 201  G 01 G 02 US1201.10 DS1200.60  133          .014      15 CIRC
DSGN 202  G 02 G 03 US1200.40 DS1200.30   18          .014      18 CIRC
DSGN 203  G 03 G 04 US1200.30 DS1200.10   80          .014      18 CIRC
DSGN 204  G 04 G 05 US1200.10 DS1199.50  117          .014      18 CIRC
DSGN 205  G 05 G 06 US1199.50 DS1199.40   94          .014      27 CIRC
DSGN 206  G 06 G 07 US1199.40 DS1199.30   80          .014      30 CIRC
DSGN 207  G 07 G 08 US1199.30 DS1199.20  155          .014      30 CIRC
DSGN 208  G 08 G 09 US1199.20 DS1199.00  265          .014      30 CIRC
DSGN 209  G 09 G 10 US1199.00 DS1198.70  300          .014      30 CIRC
DSGN 210  G 10 G 11 US1197.20 DS1197.00   35          .014      48 CIRC
$
ANAL 001  D 01 D 02        18
ANAL 002  D 02 D 03        18
ANAL 003  D 03 D 04        24
ANAL 004  D 04 D 05        24
ANAL 005  D 05 G 04        24
ANAL 201  G 01 G 02        15
ANAL 202  G 02 G 03        18
```

* Surcharged 2.5 ft at Bell Rd & 83rd Ave.

```
ANAL 204  G 04 G 05        18
ANAL 205  G 05 G 06        27
ANAL 206  G 06 G 07        30
ANAL 207  G 07 G 08        30
ANAL 208  G 08 G 09        30
ANAL 209  G 09 G 10        30
ANAL 210  G 10 G 11        48

ENDATA
```

SEWER

SEWER ANALYSIS

CONFIGURATION DATA

RUN	U.S. ID	D.S. ID	U.S. F.L. ELEV	D.S. F.L. ELEV	LENGTH FEET	SLOPE	BBLS	RISE	SPAN	SHAPE
001	D 1	D 2	1215.42	1204.20	309	0.03631	1	18	18	CIRC
002	D 2	D 3	1204.20	1200.01	350	0.01197	1	18	18	CIRC
003	D 3	D 4	1199.51	1198.91	250	0.00240	1	24	24	CIRC
004	D 4	D 5	1198.91	1197.73	295	0.00400	1	24	24	CIRC
005	D 5	G 5	1197.73	1197.53	20	0.01000	1	24	24	CIRC
201	G 1	G 2	1199.85	1199.35	133	0.00376	1	15	15	CIRC
202	G 2	G 3	1198.90	1198.80	18	0.00555	1	18	18	CIRC
203	G 3	G 4	1198.80	1198.60	80	0.00250	1	18	18	CIRC
204	G 4	G 5	1198.60	1198.00	117	0.00513	1	18	18	CIRC
205	G 5	G 6	1197.25	1197.15	94	0.00106	1	27	27	CIRC
206	G 6	G 7	1196.90	1196.80	80	0.00125	1	30	30	CIRC
207	G 7	G 8	1196.80	1196.70	155	0.00065	1	30	30	CIRC
208	G 8	G 9	1196.70	1196.50	265	0.00075	1	30	30	CIRC
209	G 9	G10	1196.50	1196.20	300	0.00100	1	30	30	CIRC
210	G10	G11	1193.20	1193.00	35	0.00571	1	48	48	CIRC

HYDRAULIC DATA

RUN	U.S. ID	D.S. ID	'N'	JUNC LOSS	FLOW	U.S. HEAD	D.S. HEAD	HYDR. GRAD	DEPTH	VELOC.	PIPE CAPAC.
001	D 1	D 2	0.014	0.00	3.90	1215.89	1205.02	0.00160	0.31	8.4	18.6
002	D 2	D 3	0.014	0.00	6.20	1205.02	1203.60	0.00404	0.55	6.2	10.7
003	D 3	D 4	0.014	0.00	9.20	1203.60	1203.13	0.00192	0.75	3.6	10.3
004	D 4	D 5	0.014	0.00	11.40	1203.13	1202.26	0.00295	0.72	4.7	13.3
005	D 5	G 5	0.014	0.00	11.40	1202.26	1202.20	0.00295	0.53	6.7	21.0
201	G 1	G 2	0.014	0.00	1.00	1202.41	1202.37	0.00028	0.36	2.5	3.7
202	G 2	G 3	0.014	0.00	2.30	1202.37	1202.36	0.00056	0.39	3.6	7.3
203	G 3	G 4	0.014	0.00	2.30	1202.36	1202.32	0.00056	0.49	2.7	4.9
204	G 4	G 5	0.014	0.00	3.10	1202.32	1202.20	0.00101	0.47	3.8	7.0
205	G 5	G 6	0.014	0.00	14.50	1202.20	1201.96	0.00254	1.00	3.6	9.4 **
206	G 6	G 7	0.014	0.00	19.30	1201.96	1201.75	0.00257	1.00	3.9	13.5 **
207	G 7	G 8	0.014	0.00	24.80	1201.75	1201.10	0.00424	1.00	5.1	9.7 **
208	G 8	G 9	0.014	0.00	24.80	1201.10	1199.97	0.00424	1.00	5.1	10.5 **
209	G 9	G10	0.014	0.00	24.80	1199.97	1198.70	0.00424	1.00	5.1	12.0 **
210	G10	G11	0.014	0.00	24.80	1198.01	1198.00	0.00035	0.34	6.6	100.8

SEW0008--CAPACITY OF RUN 205 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 206 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 207 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 208 IS EXCEEDED.
SEW0008--CAPACITY OF RUN 209 IS EXCEEDED.

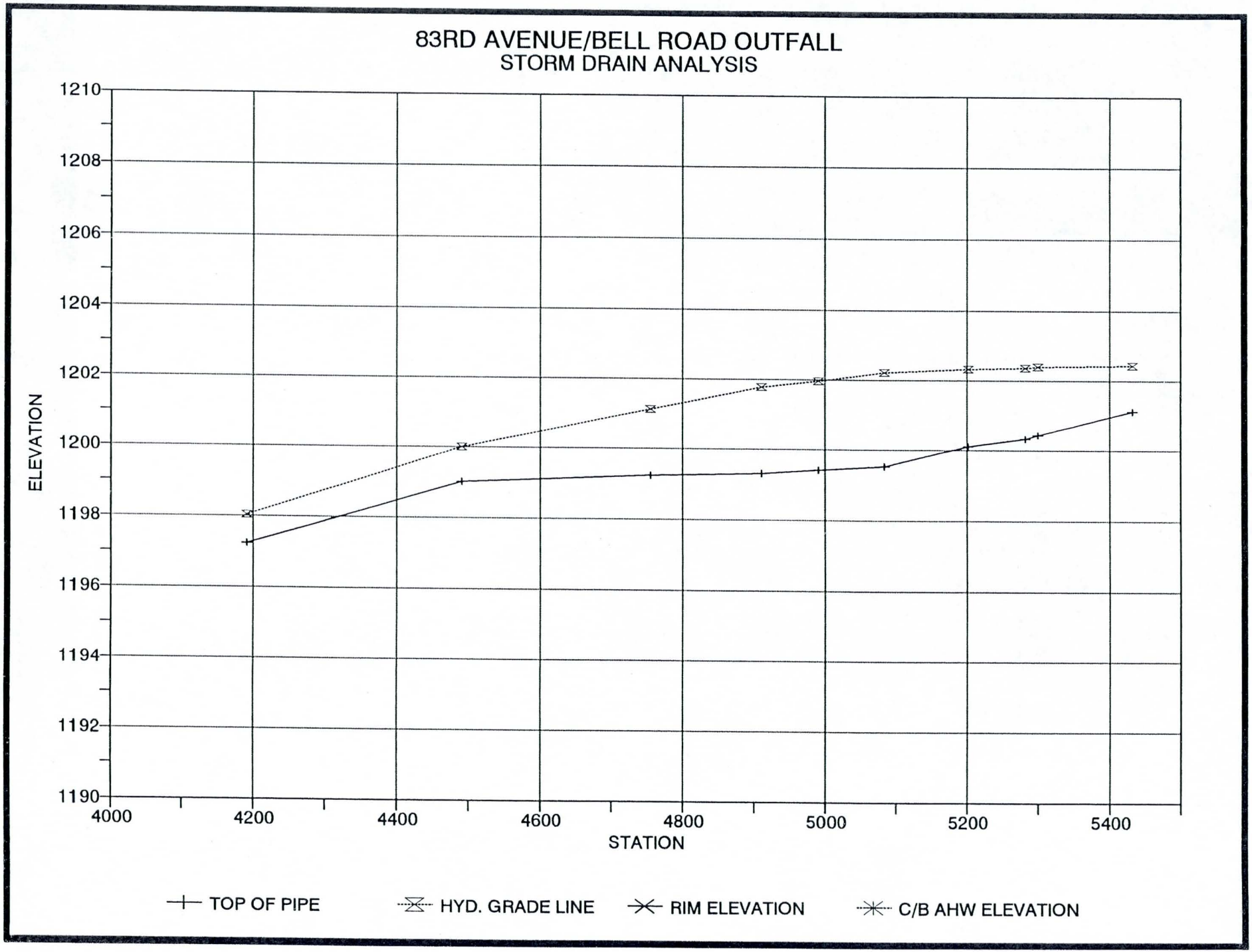
STATIONING

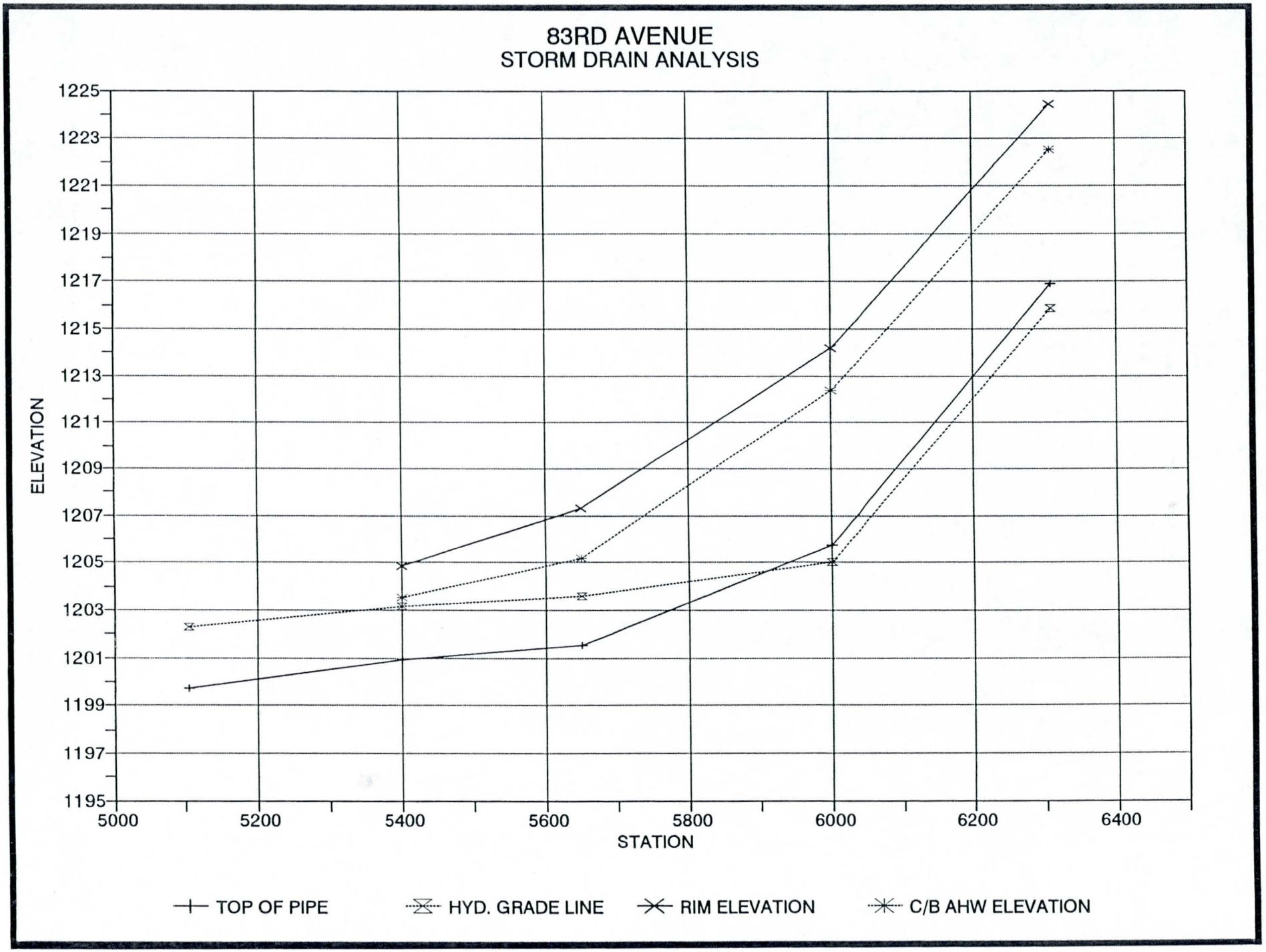
RUN	UPSTREAM JUNCTION ID	STATIONING
001	D 1	6309
002	D 2	6000
003	D 3	5650
004	D 4	5400
005	D 5	5105
201	G 1	5433
202	G 2	5300
203	G 3	5282
204	G 4	5202
205	G 5	5085
206	G 6	4991
207	G 7	4911
208	G 8	4756
209	G 9	4491
210	G10	4191

GLENDALE ID 59 STORM DRAIN
SURCHARGE ANALYSIS
FILE NAME: SUR83_B Computer File: SRCHRG.WQ3

83RD AVENUE MAINLINE

NODE	STATION	SOFFIT ELEV	HGL ELEV	SURCHARGE	RIM ELEV	DIST TO RIM	ELEV AHW-CB	DIST TO AHW-CB
D01	6309.00	1216.92	1215.89	-1.03	1224.40	-8.51	1222.54	-6.65
D02	6000.00	1205.70	1205.02	-0.68	1214.15	-9.13	1212.38	-7.36
D03	5650.00	1201.51	1203.60	2.09	1207.28	-3.68	1205.16	-1.56
D04	5400.00	1200.91	1203.13	2.22	1204.85	-1.72	1203.53	-0.40
D05	5105.00	1199.73	1202.26	2.53	N/A	N/A	N/A	N/A
G01	5433.00	1201.10	1202.41	1.31		1202.41		1202.41
G02	5300.00	1200.40	1202.37	1.97		1202.37		1202.37
G03	5282.00	1200.30	1202.36	2.06		1202.36		1202.36
G04	5202.00	1200.10	1202.32	2.22		1202.32		1202.32
G05	5085.00	1199.50	1202.20	2.70		1202.20		1202.20
G06	4991.00	1199.40	1201.96	2.56		1201.96		1201.96
G07	4911.00	1199.30	1201.75	2.45		1201.75		1201.75
G08	4756.00	1199.20	1201.10	1.90		1201.10		1201.10
G09	4491.00	1199.00	1199.97	0.97		1199.97		1199.97
G10	4191.00	1197.20	1198.01	0.81		1198.01		1198.01


83RD AVENUE/BELL ROAD OUTFALL
STORM DRAIN ANALYSIS
ELEVATION
1210
1208
1206
1204
1202
1200
1198
1196
1194
1192
1190
4000
4200
4400
4600
4800
5000
5200
5400
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION


83RD AVENUE
STORM DRAIN ANALYSIS
ELEVATION
1225
1223
1221
1219
1217
1215
1213
1211
1209
1207
1205
1203
1201
1199
1197
1195
5000
5200
5400
5600
5800
6000
6200
6400
STATION
TOP OF PIPE
HYD. GRADE LINE
RIM ELEVATION
C/B AHW ELEVATION

Connecting Pipe Summary
Surcharge Condition

CATCH BASIN
CONNECTOR PIPE DESIGN
75th Avenue (East side)

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
58+00	E	15	1.85	0.60	0.75	28	0.0040	1.25	0.44	1.58	3.90	OUTLET	1.58
55+40	E	15	5.45	1.15	1.44	28	0.0144	1.08	0.76	1.44	3.35	INLET	1.44
50+00	E	15	3.27	0.83	1.04	28	0.0744	2.83	0.44	1.19	3.04	OUTLET	1.19
45+00	E	15	1.51	0.53	0.66	28	0.0760	4.51	0.44	2.82	3.17	OUTLET	2.82
39+00	E	15	4.93	1.08	1.35	28	0.0492	6.12	0.65	5.39	3.69	OUTLET	5.39
34+97	E	15	6.77	1.39	1.74	28	0.0857	2.68	1.07	1.35	4.43	INLET	1.74
38+36	E	15	5.16	1.12	1.40	28	0.0439	6.38	0.62	5.77	6.90	OUTLET	5.77
23+50	E	15	8.69	1.98	2.48	28	0.0084	7.57	0.45	7.78	7.35	OUTLET	7.78
18+00	E	15	1.08	0.50	0.63	45	0.0720	6.74	0.44	3.94	5.72	OUTLET	3.94
14+00	E	15	2.12	0.64	0.80	57	0.0804	6.23	0.40	2.08	4.34	OUTLET	2.08
10+93.7	E	15	2.42	0.69	0.86	66	0.0508	5.85	0.46	2.98	5.40	OUTLET	2.98

CATCH BASIN
CONNECTOR PIPE DESIGN
75th Avenue (East frontage road)

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
55+40	E	** COMBINED (see 75th Avenue, east side)											
48+50	E	15	10.32	2.28	2.85	31	0.0674	3.70	2.88	4.52	3.32	OUTLET	4.52
44+64.7	E	15	9.45	2.00	2.50	31	0.0100	2.63	2.30	4.62	3.16	OUTLET	4.62
39+60	E	15	4.12	0.94	1.18	31	0.0572	5.84	0.45	4.52	4.09	OUTLET	4.52
37+00	E	15	3.26	0.83	1.04	32	0.0698	7.46	0.40	5.64	2.61	OUTLET	5.64
34+97	E	** COMBINED (see 75th Avenue, east side)											

CATCH BASIN
CONNECTOR PIPE DESIGN
75th Avenue (West side)

				INLET CONTROL		OUTLET CONTROL							CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
57+45	W	15	1.27	0.50	0.63	33	0.0076	1.36	0.44	1.55	4.12	OUTLET	1.55
51+50	W	15	3.26	0.83	1.04	33	0.0445	1.63	0.44	0.60	2.77	INLET	1.04
47+20	W	15	1.15	0.50	0.63	33	0.0192	4.22	0.44	4.03	5.33	OUTLET	4.03
42+00	W	15	2.77	0.76	0.95	33	0.0440	4.88	0.44	3.87	3.99	OUTLET	3.87
34+97	W	15	3.74	0.90	1.13	47	0.0520	7.66	0.44	5.66	4.22	OUTLET	5.66
28+80	W	15	1.27	0.50	0.63	41	0.0940	7.66	0.44	4.25	4.34	OUTLET	4.25
23+50	W	15	3.51	0.86	1.08	53	0.0584	7.37	0.44	4.74	4.34	OUTLET	4.74
18+00	W	15	1.12	0.50	0.63	58	0.0748	6.74	0.44	2.88	4.33	OUTLET	2.88
11+02.2	W	15	5.19	1.12	1.40	59	0.0511	5.84	0.71	3.56	5.32	OUTLET	3.56

CATCH BASIN
CONNECTOR PIPE DESIGN
75th Avenue (West frontage road)

				INLET CONTROL		OUTLET CONTROL							CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
57+80	W	15	3.19	0.81	1.01	38	0.0142	1.38	0.44	1.28	4.59	OUTLET	1.28
51+00	W	15	4.07	0.95	1.19	37	0.0248	0.68	0.45	0.21	3.54	INLET	1.19
47+50	W	15	1.36	0.50	0.63	36	0.0440	2.39	0.44	1.27	3.39	OUTLET	1.27
41+25	W	15	3.69	0.88	1.10	37	0.0032	3.72	0.44	4.04	4.22	OUTLET	4.04
38+36	W	15	2.90	0.77	0.96	37	0.0288	6.38	0.44	5.76	4.03	OUTLET	5.76

CATCH BASIN
CONNECTOR PIPE DESIGN
79th Avenue

				INLET CONTROL		OUTLET CONTROL							CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
11+02.5	W	15	2.28	0.68	0.85	50	0.0100	0.98	0.40	0.88	2.84	OUTLET	0.88
11+05.5	E	15	1.75	0.59	0.74	38	0.0100	3.49	0.40	3.51	2.75	OUTLET	3.51
13+10	W	15	2.00	0.63	0.79	50	0.0100	1.22	0.40	1.12	3.35	OUTLET	1.12
13+75	E	15	1.92	0.62	0.78	50	0.0100	0.88	0.40	0.78	3.37	OUTLET	0.78
17+60	W	15	2.43	0.70	0.88	50	0.0100	0.98	0.40	0.88	3.14	OUTLET	0.88
17+60	E	15	1.57	0.56	0.70	50	0.0100	4.15	0.40	4.05	3.34	OUTLET	4.05
21+30	E	15	1.28	0.50	0.63	50	0.0100	3.82	0.40	3.72	3.34	OUTLET	3.72
24+60.4	W	15	2.38	0.69	0.86	50	0.0100	0.93	0.40	0.83	3.35	INLET	0.86
24+67.2	E	15	2.39	0.69	0.86	50	0.0100	4.30	0.40	4.20	6.27	OUTLET	4.20
29+60	W	15	1.55	0.53	0.66	50	0.0100	1.42	0.40	1.32	3.34	OUTLET	1.32
29+60	E	15	1.54	0.53	0.66	50	0.0100	1.50	0.40	1.40	3.34	OUTLET	1.40
33+15	W	15	1.54	0.53	0.66	50	0.0100	2.09	0.40	1.99	3.33	OUTLET	1.99
33+15	E	15	1.71	0.53	0.66	50	0.0100	2.39	0.40	2.29	3.33	OUTLET	2.29
36+60	W	15	2.20	0.66	0.83	50	0.0100	3.93	0.40	3.83	3.34	OUTLET	3.83
36+60	E	15	1.34	0.50	0.63	50	0.0100	2.84	0.40	2.74	3.34	OUTLET	2.74
40+00	E	15	0.99	0.40	0.50	50	0.0100	5.63	0.40	5.53	3.84	OUTLET	5.53
42+00	W	15	1.96	0.62	0.78	50	0.0100	1.73	0.40	1.63	3.39	OUTLET	1.63
42+00	E	15	2.12	0.65	0.81	50	0.0100	4.63	0.40	4.53	5.84	OUTLET	4.53
47+00	W	15	1.96	0.62	0.78	50	0.0100	0.88	0.40	0.78	3.34	OUTLET	0.78
47+00	E	15	1.78	0.60	0.75	50	0.0100	2.62	0.40	2.52	5.49	OUTLET	2.52
51+60	W	15	2.09	0.64	0.80	50	0.0100	1.15	0.40	1.05	3.42	OUTLET	1.05
51+60	E	15	1.87	0.61	0.76	50	0.0100	1.23	0.40	1.13	3.42	OUTLET	1.13
56+40	W	15	2.09	0.64	0.80	50	0.0100	1.09	0.40	0.99	2.87	OUTLET	0.99
56+40	E	15	1.89	0.61	0.76	50	0.0100	1.17	0.40	1.07	2.87	OUTLET	1.07
61+00	W	15	2.24	0.67	0.84	50	0.0100	1.57	0.40	1.47	3.44	OUTLET	1.47
61+00	E	15	2.24	0.67	0.84	50	0.0100	1.75	0.40	1.65	3.44	OUTLET	1.65

CATCH BASIN
CONNECTOR PIPE DESIGN
83rd Avenue (East side)

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
50+86	E	15	2.14	0.65	0.81	67	0.0157	3.78	0.40	3.13	2.25	OUTLET	3.13
54+00	E	15	1.34	0.50	0.63	54	0.0273	3.47	0.40	2.40	2.34	OUTLET	2.40
56+50	E	15	1.92	0.61	0.76	54	0.0368	3.34	0.40	1.75	2.80	OUTLET	1.75
60+00	E	15	1.60	0.55	0.69	44	0.1284	1.25	0.40	(4.00)	2.84	INLET	0.69
63+12.5	E	15	1.95	0.62	0.78	32	0.1259	1.25	0.40	(2.38)	2.84	INLET	0.78

CATCH BASIN
CONNECTOR PIPE DESIGN
83rd Avenue (West side)

				INLET CONTROL			OUTLET CONTROL						CONTROL
Station	Dir	Dia (in)	Q (10-YR) (cfs)	HW/D	HW (ft)	L (ft)	S (o) (ft/ft)	h (o) (ft)	H (ft)	HW (ft)	AHW (ft)	CONTROL	HW (ft)
50+99.5	W	15	2.97	0.78	0.98	57	0.0183	3.78	0.40	3.14	2.31	OUTLET	3.14
54+00	W	15	1.43	0.52	0.65	45	0.0317	3.47	0.40	2.44	2.35	OUTLET	2.44
56+50	W	15	2.09	0.64	0.80	45	0.0429	3.34	0.40	1.81	2.87	OUTLET	1.81
60+00	W	15	1.79	0.58	0.73	45	0.1088	1.25	0.40	(3.25)	2.71	INLET	0.73
63+12.5	W	15	1.95	0.62	0.78	28	0.1300	1.25	0.40	(1.99)	2.84	INLET	0.78

75th Ave

Sta. 35+70 E

E_1 = 1200.30

D_1 = 78"

E_2 = 1201.55

L = 90'

S = 0.006 1/1

E_3 = 1202.09

T.C. = 1211.06

FOR D_2 = 48" HGL = 1210.45

TP_1 = 1206.80

h_0 = 8.90

= 1210.45 −

AHW = 7.81'

AHW =

GID 59

GROVERS AVE

CATCH BASIN

784C

02

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME _____ SHEET ____ OF _____ SHEET

SUBJECT CONNECTOR PIPE CAPACITY PREPARED BY _____ DATE _____

CHECKED BY _____ DATE _____

INLET CONDITION (2)

Ke: 0.5

STA	DIR	DIA	Q	INLET CONTROL					OUTLET CONTROL							
				HW/D	HW	AHW		L	S_o	h_o	H	HW	AHW		CONTROL
35+70	E	48"	132	1.55	6.20	7.81		90'	0.006 ft	8.90	3.15	11.51	7.81		OUT

Sta. 35+70 W

E_1 = 1200.21

D_1 = 78", D_2 - 48"

E_2 = 1201.46

L = 130'

S = 0.006'

E_3 = 1202.24

T.C. = 1210.96

HGL = 1210.45

TP_1 = 1206.79

h_o = 8.99

AHW = 7.56

AHW =

GIDEA

75th AVE

CITY PARK

S.D. INLET

784

a

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7240 JOB NAME GID 59 SHEET 1 OF 1 SHEET

SUBJECT CONNECTOR PREPARED BY DJP DATE 7-3-9

PIPE CAPACITY CHECKED BY _____ DATE _____

$K_e = 0.5$

				INLET CONTROL				OUTLET CONTROL							
STA.	DIR	DIA	Q		HW/D	HW	AHW		L	S_o	h_o	H	HW	AHW		CONTROL
75+4 AVE																
35+70	W	48"	110		1.45	5.80	7.56		130	0.006	8.99	2.23	10.44	7.56		OUT
										USE 48" DIA PIPE						

Hidden Manor Northwest
Drainage Channel

GLENDALE DRAINAGE CHENNEL

Project: GLEN_B Tue Dec 7 14:30:30 1993
Vertical alignment station report.
Alignment: meander3 Vertical Alignment: FGC Surface: eg

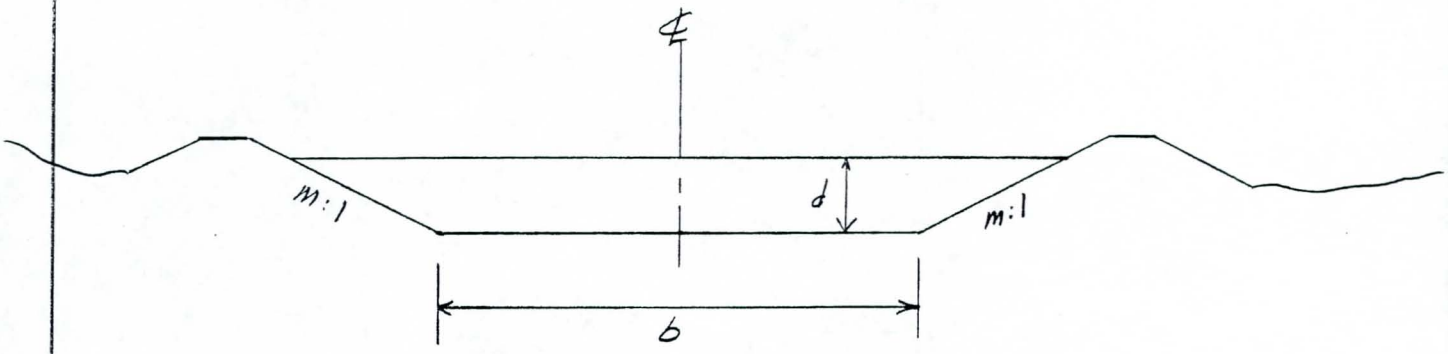
Station	Elevation	Curve Length	Grade
0+00	1215.20		
			0.00
0+52.25	1215.20		
			0.45
2+00	1215.87		
			0.44
2+50	1216.09		
			0.44
5+00	1217.20		
			0.35
12+00	1219.65		
			0.20
15+90	1220.43		

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET 1 OF ____ SHEETS

SUBJECT Drainage Channel PREPARED BY DJP DATE 12-8-93

Hidden Manor CHECKED BY ____ DATE ____



Definitions

b = bottom width
d = depth of flow
m = side slope; 3:1, 4:1, etc.

s = Longitudinal Channel Slope
n = Mannings "n" value

SECTION	b	d	m	s	n	V	Q
① STA 15+90 to 12+00	15'	0.8'	4	0.002 ft/ft	0.030	1.7 fps	24.7 cfs
② STA 12+00 to 5+00	10'	0.85'	4	0.0035 ft/ft	0.030	2.2 fps	25.6 cfs.
③ STA 5+00 to 0+52	8'	0.85'	4	0.0044 ft/ft	0.030	2.4 fps	23.8 cfs.

SEE SAMPLE CALCULATION FOR SECTION ① ON SHEET 2.

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET 2 OF _____ SHEETS

SUBJECT Drainage Channel PREPARED BY DJP DATE 12-8-93

Hidden Manor CHECKED BY _____ DATE _____

Hydraulic Calculations

SECTION ①; STA 15+90 to STA 12+00

$b = 15'$

$m = 4$ (side slope = 4:1)

$Q_{DESIGN} = 23.2$ cfs

$S = 0.0020$ ft/ft

$n = 0.030$

Try $d = 0.8'$

$$Area = 15(0.8) + 4(0.8)(0.8) = 14.56 \text{ s.f.}$$

$$W_p = 15 + 2\sqrt{[(4)(0.8)]^2 + (0.8)^2} = 21.60 \text{ l.f.}$$

$$R_h = A/W_p = 14.56/21.60 = 0.67 \text{ l.f.}$$

$$V = \frac{1.486 R_h^{2/3} S^{1/2}}{n} = \frac{1.486 (0.67)^{2/3} (0.002)^{1/2}}{0.030}$$

$$\underline{\underline{V = 1.70 \text{ fps}}}$$

$$Q = AV = 14.56 (1.70)$$

$$\underline{\underline{Q = 24.7 > 23.2 \quad OK}}$$

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET 3 OF ____ SHEETS

SUBJECT Drainage Channel PREPARED BY DJP DATE 12-8-92

Hidden Manor CHECKED BY ____ DATE ____

Maximum Depth Capacities

Minimum constructed channel depth is 1.0' from top of bank to channel flowline. Based on Manning's Equation using a d= 1.0', the maximum capacities of each channel section are as follows:

SECTION 1 STA 15+90 to 12+00 Q_{max} = 36.8 cfs

SECTION 2 STA 12+00 to 5+00 Q_{max} = 34.4 cfs

SECTION 3 STA 5+00 to 0+52 Q_{max} = 32.2 cfs.

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET 4 OF ____ SHEETS

SUBJECT Drainage Channel PREPARED BY DJP DATE 12-8-93

Hidden Manor CHECKED BY ____ DATE ____

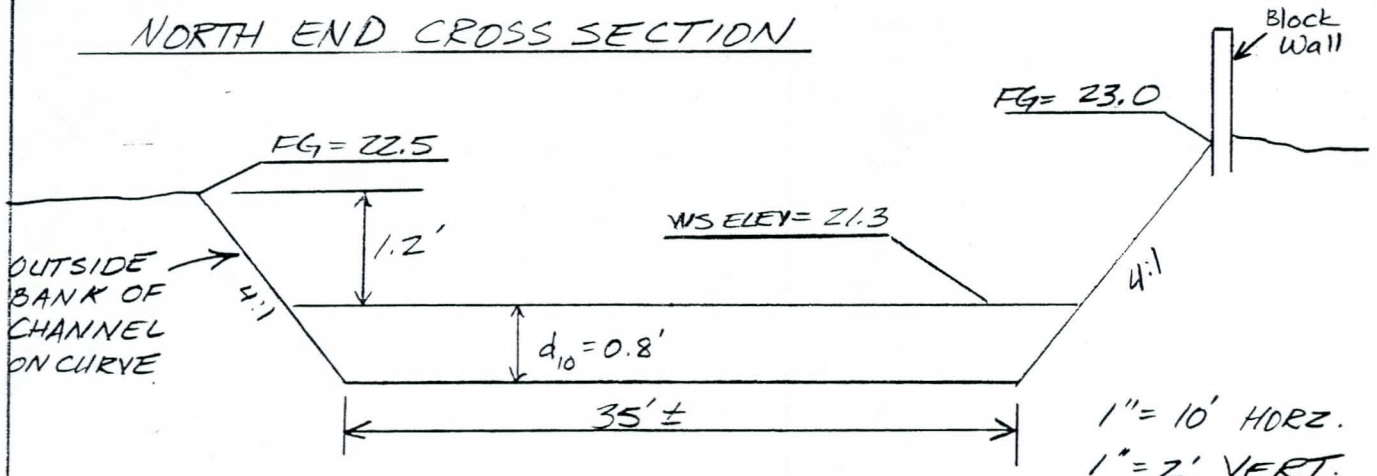
Super Elevation

Two sections of channel have curved alignments. (See Sheet 5)

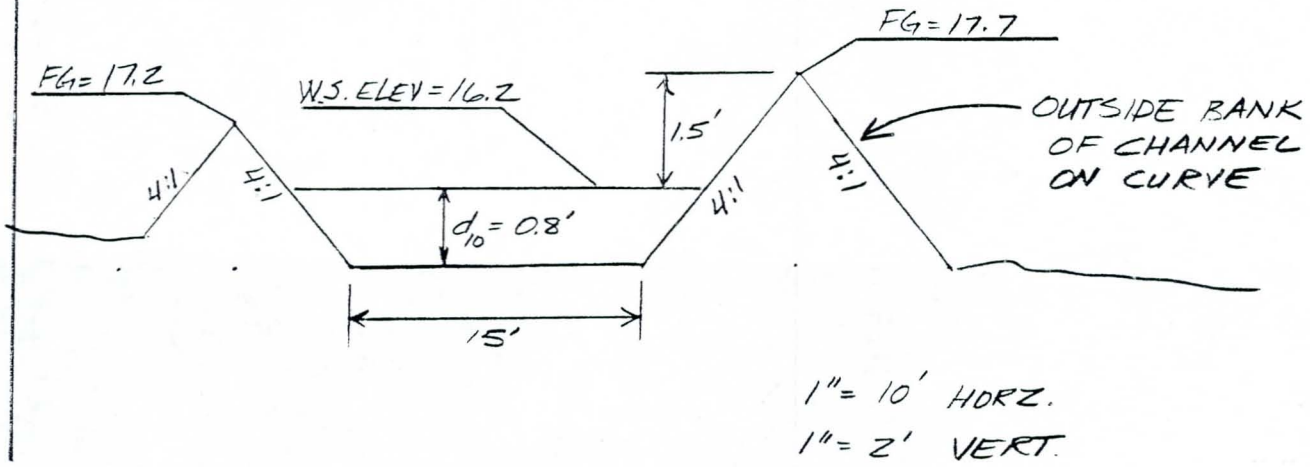
- The north end section has a 15' radius on the outside edge of the channel bottom
- The south end section has a 40' radius on the outside edge of the channel bottom.

To accomodate for superelevation, the outside banks of the channel at both locations are substantially higher than the typical 1.0 feet.

NORTH END CROSS SECTION



SOUTH END CROSS SECTION



BURGESS & NIPLE, INC. - COMPUTATION SHEET

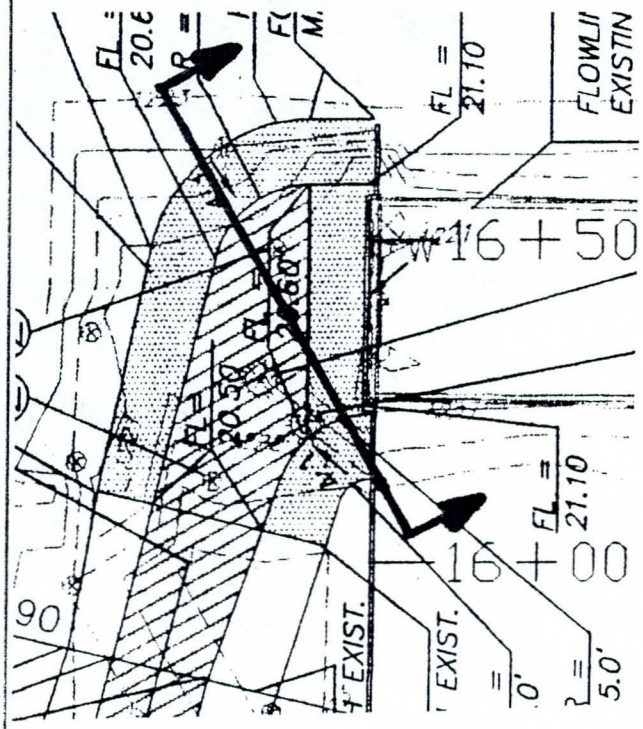
JOB NO. 7840 JOB NAME Glendale I.D. 59 SHEET 5 OF _____ SHEETS

SUBJECT Drainage Channel PREPARED BY DJP DATE 12-8-93

Hidden Manor CHECKED BY _____ DATE _____

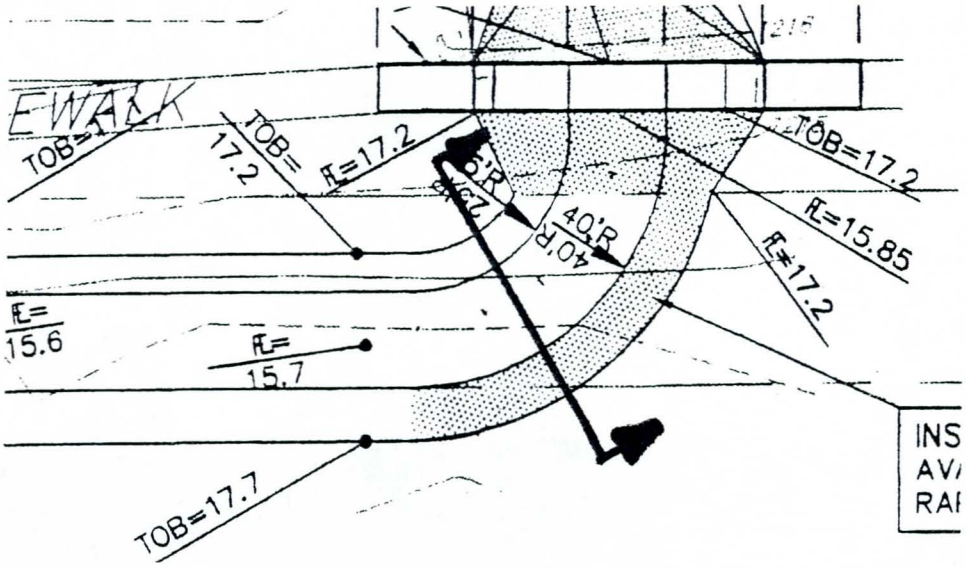
CURVED CHANNEL
CROSS SECTION LOCATIONS.

North End



SCALE
1" = 30'

South End



BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME GLENDALE I.D. 59 SHEET ___ OF ___ SHEETS

SUBJECT 79th Avenue Storm Drn PREPARED BY DJ PEHRSON DATE 10-20-93

Hidden Manor Runoff Addition CHECKED BY ___ DATE ___

HIDDEN MANOR (NW Portion)

* NW Portion of Hidden Manor drains to the west into the landscaping buffer along the west side of the subdivision

* At the point of discharge from the subdivision, the hydrologic data is as follows:

$\Sigma CA = 10.09$ Acres
$t_c = 27.6$ mins.
$i_{10} = 2.30$ in/hr.
$Q_{10} = 23.2$ cfs

* In the landscape buffer, the flows will travel an additional (1640+400) = 2040 linear feet.

* The additional area in the landscape buffer is (60 x 1560)/43560 = 2.15 acres.

* The "C" value for the landscaped buffer is considered to be 0.30.
∴ Additional CA = 2.15 x 0.30 = 0.64 acres

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. 7840 JOB NAME GLENDALE I.D. 59 SHEET ___ OF ___ SHEETS

SUBJECT 79th Avenue Storm Drn PREPARED BY JT PEHRSON DATE 10-20-93

Hidden Manor Runoff Condition CHECKED BY ___ DATE ___

CONDITIONS

1. Hidden Manor Runoff will enter the 79th Avenue Storm drain @ STA 42+00.

ANALYSIS

@ 79th Ave. & St. John Rd.

For Hidden Manor:

t_c

Assume V = 2.0 fps in landscape buffer

Additional t_c = 2040 l.f. / [(2.0 fps)(60 sec/min)]

Additional t_c = 17.00 mins.

TOTAL t_c = 27.6 + 17.0 = 44.6 mins.

ΣCA

TOTAL ΣCA = 10.09 + 0.64 = 10.73 acres.

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME _____ SHEET ____ OF _____ SHEETS

SUBJECT _____ PREPARED BY _____ DATE _____

_____ CHECKED BY _____ DATE _____

i_{10}

@ $t_c = 44.6$ mins, $i_{10} = 1.67$

Q_{10}

$Q_{10} = (\Sigma CA)(i_{10}) = 10.73(1.67) = 17.92$ cfs.

New Hydrologic Data for Hidden Manor
(@ 79th Ave & St. John Rd.)

$\Sigma CA = 10.73$ acres
$t_c = 44.6$ mins
$i_{10} = 1.67$ in/hr
$Q_{10} = 17.92$ cfs

Combine Hidden Manor Drainage Area (NW) into 79th Ave Storm Drain Hydrology & Hydraulics

For 79th Ave @ St. John Rd.

$\Sigma CA = 4.70$ acres
$t_c = 14.02$ mins
$i_{10} = 3.4$ in/hr
$Q_{10} = 15.98$ cfs.

BURGESS & NIPLE, INC. - COMPUTATION SHEET

JOB NO. _____ JOB NAME _____ SHEET ____ OF _____ SHEETS

SUBJECT _____ PREPARED BY _____ DATE _____

_____ CHECKED BY _____ DATE _____

After Combining Hidden Manor Drainage Area:

$\Sigma CA = 4.70 + 10.73 = 15.53$

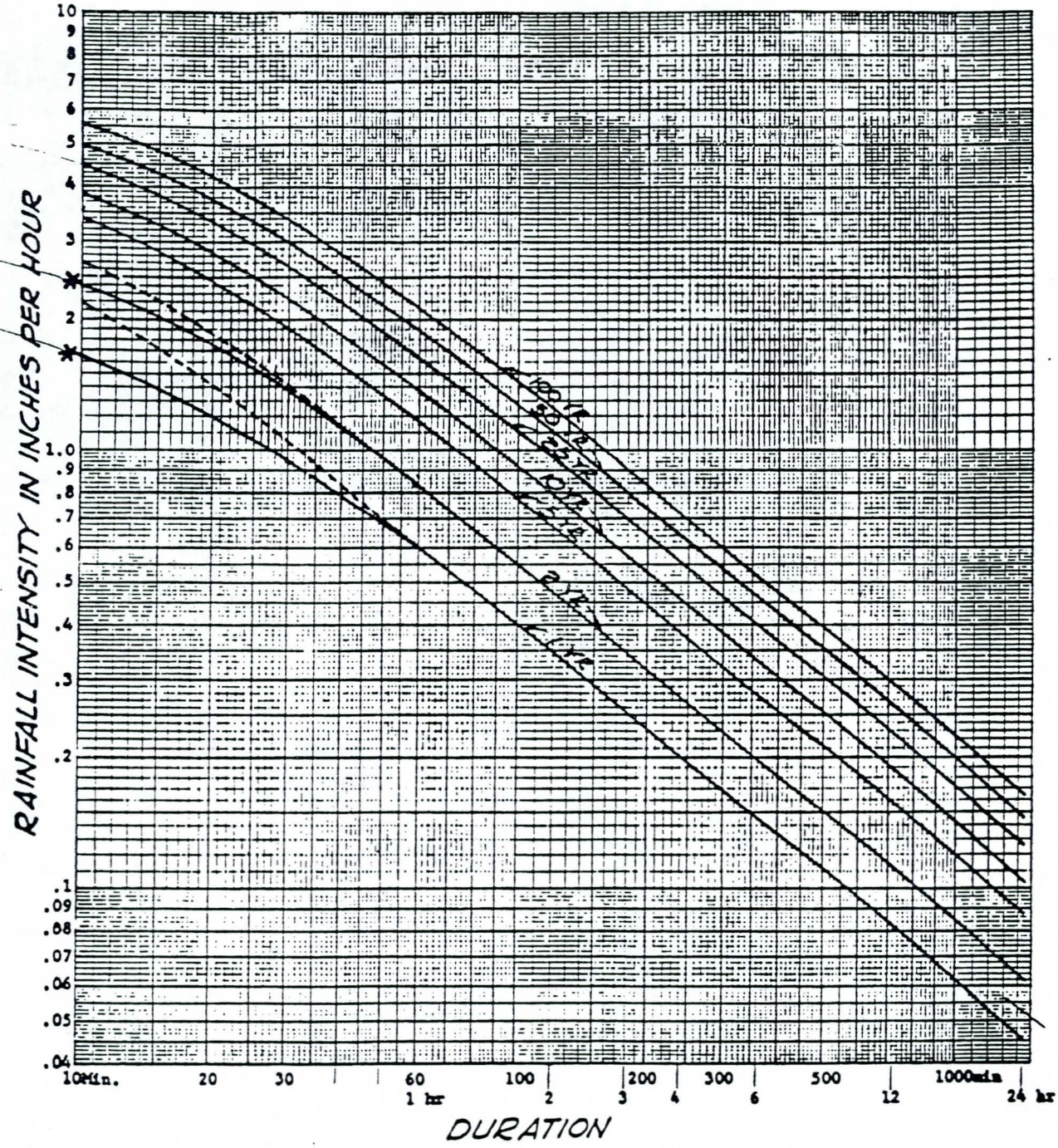
t_c: $44.6 > 14.02$; Use $t_c = 44.6$ mins

$i_{10} = 1.67$ in/hr

$Q_{10} = 25.94$ cfs.

APPENDIX 4

Reference Design Information



RAINFALL INTENSITY-DURATION-FREQUENCY RELATION
FOR PHOENIX, ARIZONA
(Partial Duration Series)

Curves are based on methods of U.S. Weather Bureau Technical Papers Nos. 28 and 40 and rainfall data prepared by U.S. Weather Bureau Office of Hydrology for the Soil Conservation Service, March 1967

* Curves revised June 1975 to reflect new information from WR-44

OUTLET
CONTROL

FIGURE 38

HEAD FOR CIRCULAR CONCRETE PIPE CULVERTS FLOWING FULL
n = 0.012

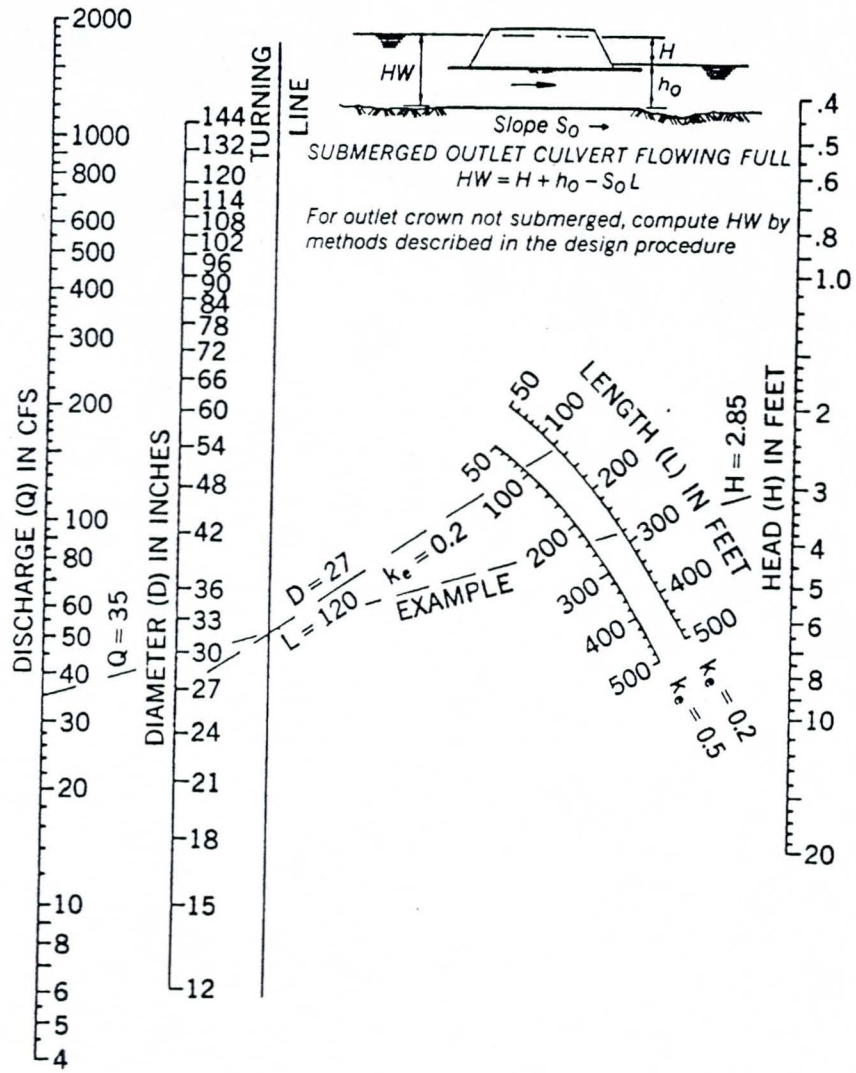
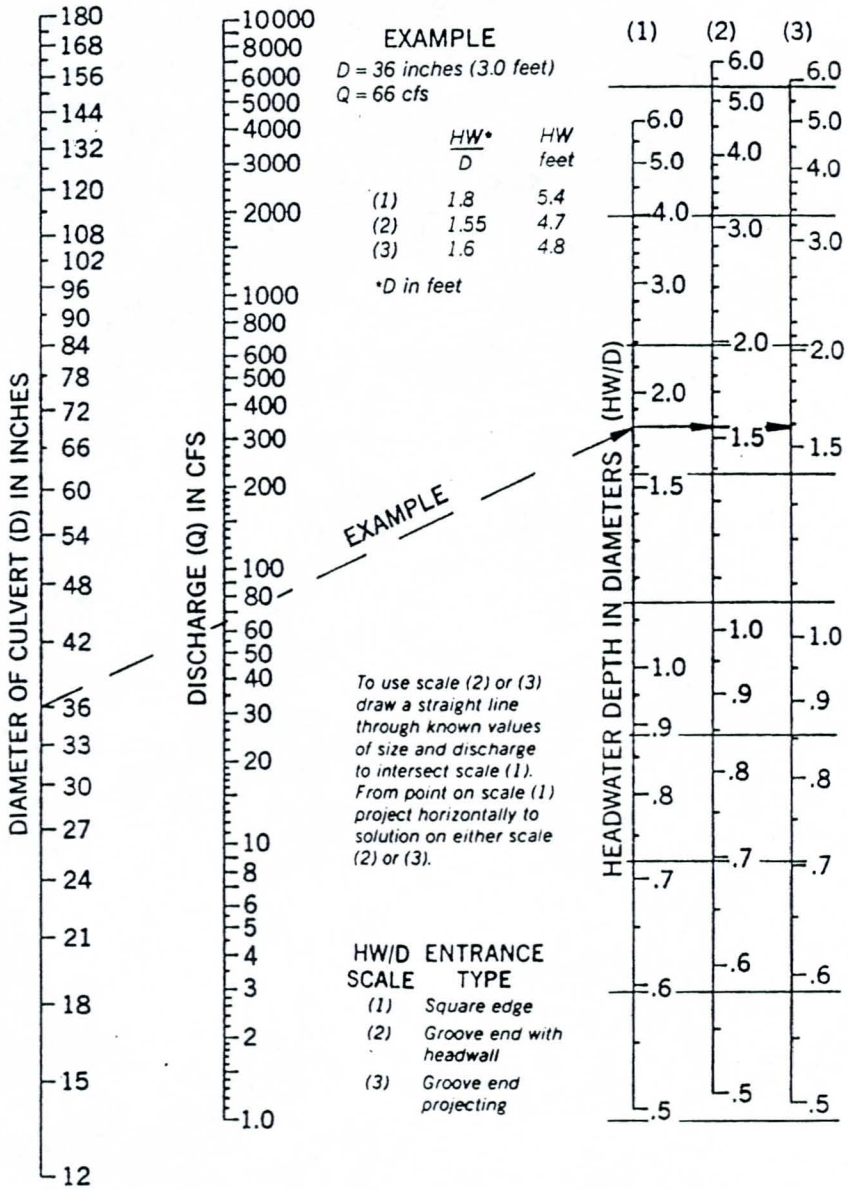


FIGURE 33

HEADWATER DEPTH FOR CIRCULAR CONCRETE PIPE CULVERTS WITH INLET CONTROL

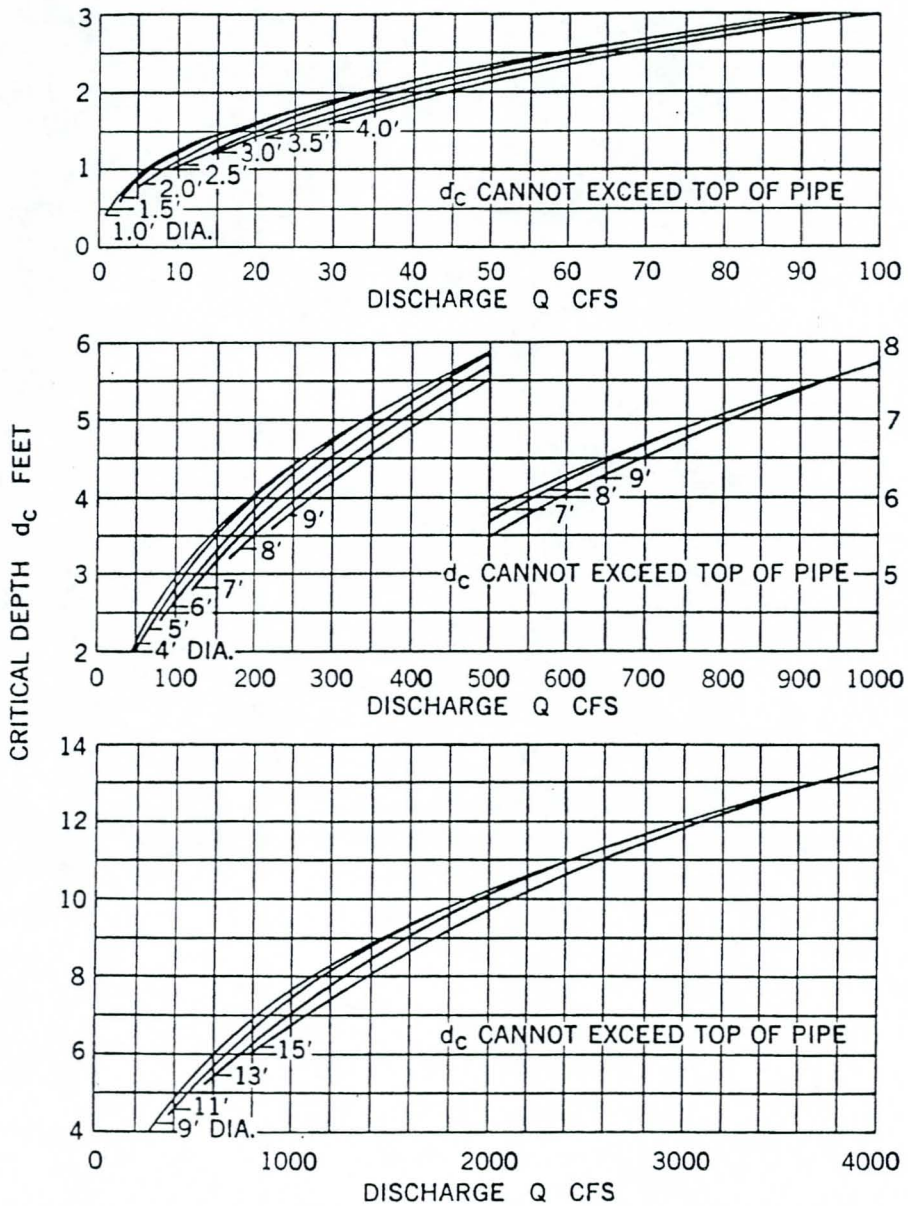


BUREAU OF PUBLIC ROADS JAN. 1963

HEADWATER SCALES 2&3
REVISED MAY 1964

FIGURE 28

CRITICAL DEPTH
CIRCULAR PIPE



BUREAU OF PUBLIC ROADS JAN. 1964