City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

April 10, 2003

Gilbert Aldaz, PE
Applied Engineering & Surveying, Inc.
1605 Blair Dr. NE
Albuquerque, NM 87112

RE: Winrock Villas Grading and Drainage Plan (J-19/D78)
Engineer's Stamp Dated March 10, 2003

Dear Mr. Aldaz:

The above referenced grading and drainage plan received March 11, 2003 is approved for Paving Permit. The engineer will submit grading certification per the DPM to Hydrology upon completion of the project.

If you have any questions please call me at 924-3982

Sincerely,

Carlos A. Montoya. PE
City Floodplain Administrator

C: File

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/11/2002)

J-19/D78

PROJECT TITLE: Winrock Villas ZONE MAP/DRG. FILE #: J-19

DRB #: EPC#: WORK ORDER#:

LEGAL DESCRIPTION: PARCEL "K", WINROCK CENTER ADDITION

CITY ADDRESS: Pennsylvania Street & Winrock MALL LOOP ROAD

ENGINEERING FIRM: Applied Engineering & Surveying Inc. CONTACT: Gilbert Aldaz

ADDRESS: 1605 Blair Drive NE PHONE: 237-1456

CITY, STATE: Albuq. NM ZIP CODE: 87112

OWNER: CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

ARCHITECT: CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

SURVEYOR: CONTACT:

ADDRESS PHONE:

CITY, STATE: ZIP CODE:

CONTRACTOR: CONTACT:

ADDRESS: PHONE:

CITY, STATE: ZIP CODE:

CHECK TYPE OF SUBMITTAL:

- ___ DRAINAGE REPORT
- X DRAINAGE PLAN
- ___ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ___ EROSION CONTROL PLAN
- ___ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ___ CLOMR/LOMR
- ___ TRAFFIC CIRCULATION LAYOUT (TCL)
- ___ ENGINEERS CERTIFICATION (TCL)
- ___ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ___ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ___ SIA / FINANCIAL GUARANTEE RELEASE
- ___ PRELIMINARY PLAT APPROVAL
- ___ S. DEV. PLAN FOR SUBD. APPROVAL
- ___ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ___ SECTOR PLAN APPROVAL
- ___ FINAL PLAT APPROVAL
- ___ FOUNDATION PERMIT APPROVAL
- ___ BUILDING PERMIT APPROVAL
- ___ CERTIFICATE OF OCCUPANCY (PERM.)
- ___ CERTIFICATE OF OCCUPANCY (TEMP.)
- ___ GRADING PERMIT APPROVAL
- X PAVING PERMIT APPROVAL
- ___ WORK ORDER APPROVAL
- ___ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- X YES w/ Carlos Montoya On Site
- ___ NO
- ___ COPY PROVIDED

RECEIVED
MAR 11 2003
HYDROLOGY SECTION

DATE SUBMITTED: 03-11-03 BY:

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal The particular nature , location and scope ot the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. Conceptual Grading and Drainage Plan: Required for approval of Site Development Plans greater than five
2. Drainage Plans: Required for building permits, grading permits, paving permits and site plans less than five (5)
3. Drainage Report: Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or

Applied Engineering and Surveying, Inc.
Civil Engineering, Land Planning & Surveying

TRANSMITTAL LETTER

DATE: 03-10-03

TO: (ATTENTION) Shelton Weeks 883-6132

(OFFICE) Winrock Mall Mgmt, Space No. 51

(ADDRESS) 2100 Louisiana Blvd NE

Albuq., NM 87110

FROM: Gilbert Aldaz

TRANSMITTED ARE THE FOLLOWING:

- Paving Improvements for Winrock Villas Condos, Immediately West/ Adjacent to Winrock Mall.

COMMENTS:

For Your Review.

RECEIVED
MAR 11 2003
HYDROLOGY SECTION

IF YOU HAVE ANY QUESTIONS, PLEASE DO NOT HESITATE TO CALL US AT (505) 237-1456.

THANK YOU

Gilbert Aldaz, P.E & P.S., 1605 Blair Drive NE, Albuquerque, New Mexico, 87112 (505) 237-1456, Fax (505) 237-8164, E-mail: galdaz@cs.com

Applied Engineering and Surveying, Inc.
Civil Engineering, Land Planning & Surveying

March 10, 2003

Mr. Carlos A. Montoya, P.E.
City Floodplain Administrator
Development and Building Services
City of Albuquerque
P.O. Box 1293
Albuquerque, NM 87103

RE: RESPONSES TO YOUR COMMENTS FEBRUARY 3, 2003
FOR THE GRADING AND DRAINAGE PLAN (J-19[redacted]),
ENGINEER'S STAMP DATED JUNE 10, 2002 /D78

Dear Mr. Bingham:

Please consider the following responses to address your comments:

1. Based on the platting information obtained for this site, please see general note No. 1 that identifies the existing property line. All work proposed with this plan for this site is not within the Winrock Mall's property, even though the existing wrought iron fence line is for the most part not on the property line. I will forward a copy of this plan to Shelton Weeks at Winrock Mall his phone number is 883-6132.

2. The existing inlets will remain in place with this plan, the existing inlet at the bottom of the existing spillway will continue to take flows from this site, particularly for Basin "A". The other drainage basins will flow down the new roadway spillway.

3. As mentioned in note 1, I will forward a copy of these plans to Shelton Weeks at Winrock Mall.

I have attached a new copy of the grading and drainage plan, the owners do not want to construct the dumpster enclosure pad at this time. If you should have any questions, please do not hesitate to call me at 237-1456.

RECEIVED
MAR 1 1 2003
HYDROLOGY SECTION

Sincerely,

Gilbert Aldaz

Gilbert Aldaz, P.E & P.S., 1605 Blair Drive NE, Albuquerque, New Mexico, 87112 (505) 237-1456, Fax (505) 237-8164, E-Mail: galdaz@cs.com

DROP INLET, HYDRAULIC GRADE LINE, AND STORM RUNOFF CALCULATIONS FOR THE WINROCK RING ROAD AND LOUISIANA / CONSTITUTION / SUMMER PROJECT IN ALBUQUERQUE, NEW MEXICO

CITY OF ALBUQUERQUE PROJECT # 660193

September 12, 2002

Prepared by: Gannett Fleming West, Inc.

Gannett Fleming West, Inc.
ENGINEERS AND PLANNERS

2155 Louisiana Blvd. NE, Suite 9000 Albuquerque, New Mexico 87110
Office: (505) 265-8468 Facsimile: (505) 881-2513

DROP INLET AND HYDRAULIC GRADE LINE CALCULATIONS FOR THE WINROCK RING ROAD PROJECT LOUISIANA / I-40 INTERCHANGE IN ALBUQUERQUE, NEW MEXICO

CITY OF ALBUQUERQUE PROJECT # 660193

RUNOFF BASED ON 100-YEAR, 6-HOUR STORM

This report was prepared under my direct supervision

WILFRED A. GALLEGOS
NEW MEXICO
11963
REGISTERED PROFESSIONAL ENGINEER

9-13-02

Purpose:

This report is a supplement to the drainage report for the Winrock Ring Road Project (City of Albuquerque Project No. 660193). Drop inlets were added along Street A and in the Winrock Parking Lot. Plate 1, illustrates the Hydrology Concept, which includes drainage basins and peak discharges. These drainage basins and peak discharges were taken from the Winrock Shopping Center Master Drainage Plan (J19-D58) prepared by AVID Engineering, July 1993. A total of 26cfs (surface runoff) reaches two new double II-A drop inlets on Street A (Sta. 1+273.822). These drop inlets were analyzed as a combination inlet in a sump condition. Plate 2, illustrates the drop inlet connections. Line 1 connects to the new 2100mm (84") RCP that is currently proposed in the Louisiana and I-40 Interchange Project. This new 24" RCP will connect to the existing 24" storm drain pipe and into the new 2100mm RCP. Line 2 connects the existing 24" storm drain pipe to drop inlet #3. Drop inlet #3, which is located in the Winrock parking lot, connects to a new 2.44m (8') diameter manhole with a 36" Class IV RCP. Line 3 connects drop inlet #1 to drop inlet #2 and into the 2.44m (8') diameter manhole. A 24" RCP is used to connect drop inlet #1 to drop inlet #2. The existing Macaroni Grill drop inlet connects with a 24" RCP, which includes a 30° elbow, and daylights into the new 2.44m (8') diameter manhole.

Drop Inlet Sensitivity Analysis:

This analysis was performed in order to check the results from Flow Master. The COA DPM calls for Plate 22.3 D-5 to be used in evaluating the drop inlet performance. The results are included in the report.

Results:

Line 1, the new 24" RCP is designed under pressurized conditions. Line 2 and Line 3 are analyzed for both non-pressure (open channel) and pressure conditions. The spreadsheet printouts show the hydraulic grade line results of each line. Drop inlets along Street A, have been designed to intercept the 100 year, 6 hour discharge. Haestad Methods, Flow Master, was used to calculate the performance of each drop inlet. Flow Master is based on HEC-12 and HEC-22. The drop inlets were analyzed for two cases. The first case is just the grate capacity. The second case is the grate capacity and ½ of the weir length. This weir length is the portion upstream of the grate.

Drop Inlet Hydraulic Summary

Station	Location	Drop Inlet	Drop Inlet Type	Q (cfs)	Intercept Flow (cfs)	Bypass Flow (cfs)	Depth (feet)	Spread (feet)	Grate Clogging (%)
1+268.303	Left	DI #1	Double Type II-A combination inlet in sag	13	13	0	0.47	87	100
1+273.822	Right	DI #2	Double Type II-A combination inlet in sag	13	13	0	0.47	87	100

PROJECT: Winrock Ring Road - Line 1
JOB # : 660193
DATE : September 12, 2002

Tailwater elevation..... 5271.65
Manning's Roughness 0.013

	DESCRIPTION		Finish Grade	Invert Elevation	Pipe Diameter (inches)	Pipe Length (feet)	Design Discharge (cfs)	friction head loss (feet)	Calculated Minor Head Losses: bend Hb	manhole Hmh	transtn Ht	junction Hj	HGL Elevation	EGL Elevation
	Connection		5278.87	5269.87									5271.65	5273.69
1	Ex. MH	Pipe 1	5283.07	5273.62	24	220.00	36	5.54					5277.19	5279.23
	Ex. MH		5283.07	5273.62					0.00	0.10	0.00	0.23	5277.52	ERR
2					24			ERR					ERR	ERR
									ERR	0.00	ERR	0.00	ERR	ERR
3								ERR					ERR	ERR
									ERR	ERR	0.00	ERR	ERR	ERR
4								ERR					ERR	ERR
									ERR	ERR	ERR	ERR	ERR	ERR
5								ERR					ERR	ERR
									ERR	ERR	ERR	ERR	ERR	ERR
6								ERR					ERR	ERR
									ERR	ERR	0.00	ERR	ERR	ERR
7								ERR					ERR	ERR
									ERR	ERR	0.00	ERR	ERR	ERR
8								ERR					ERR	ERR
									ERR	ERR	0.00	ERR	ERR	ERR

PROJECT: Line 2 - 2.44m MH to DI #3 to Existing MH in Winrock Parking Lot
JOB # : 660193
DATE : September 12, 2002

Tailwater elevation..... 5278.23
Manning's Roughness 0.013

	DESCRIPTION		Finish Grade	Invert Elevation	Pipe Diameter (inches)	Pipe Length (feet)	Design Discharge (cfs)	friction head loss (feet)	Calculated Minor Head Losses: bend Hb	manhole Hmh	transtn Ht	junction Hj	HGL Elevation	EGL Elevation
	2.44m MH		5281.99	5275.23									5278.23	5279.71
1	DI #3	Pipe 1	5281.04	5276.90	36	84.00	69	non-pressure					5278.79	5282.15
	DI #3		5281.04	5277.23					0.00	0.07	0.60	0.00	5279.47	5286.72
2	Ex. MH	Pipe 2	5284.45	5278.02	24	298.00	69	27.58					5306.81	5314.30
									1.06	0.37	0.00	7.49	5315.73	ERR
3					24			ERR					ERR	ERR
									ERR	0.00	ERR	0.00	ERR	ERR
4								ERR					ERR	ERR
									ERR	ERR	ERR	ERR	ERR	ERR
5								ERR					ERR	ERR
									ERR	ERR	ERR	ERR	ERR	ERR
6								ERR					ERR	ERR
									ERR	ERR	0.00	ERR	ERR	ERR
7								ERR					ERR	ERR

PROJECT: Line 3 - 2.44m MH to DI #2 to DI #1
JOB # : 660193
DATE : September 12, 2002

Tailwater elevation..... 5277.23
Manning's Roughness 0.013

	DESCRIPTION		Finish Grade	Invert Elevation	Pipe Diameter (inches)	Pipe Length (feet)	Design Discharge (cfs)	friction head loss (feet)	Calculated Minor Head Losses: bend Hb	manhole Hmh	transtn Ht	junction Hj	HGL Elevation	EGL Elevation
	2.44m MH		5281.99	5275.23									5277.23	5278.29
1	DI #2	Pipe 1	5280.25	5276.97	24	14.00	26	non-pressure					5277.75	5285.91
	DI #2		5280.25	5277.07					0.00	0.05	0.00	0.80	5278.60	5286.76
2	DI #1	Pipe 2	5280.25	5277.26	24	36.00	13	non-pressure					5278.60	5279.13
			5280.25	5277.26					0.00	0.00	0.00	0.00	5278.60	ERR
3					24	1.00	13	ERR					ERR	ERR
									ERR	0.00	ERR	0.27	ERR	ERR
4								ERR					ERR	ERR
									ERR	ERR	ERR	ERR	ERR	ERR
5								ERR					ERR	ERR
									ERR	ERR	ERR	ERR	ERR	ERR
6								ERR					ERR	ERR
									ERR	ERR	0.00	ERR	ERR	ERR
7								ERR					ERR	ERR

DI in Sag of Vertical Curve - Street A
Worksheet for Combination Inlet In Sag

Project Description	
Worksheet	Combination Inlet - 1
Type	Combination Inlet In
Solve For	Spread

Input Data		
Discharge	13.00	cfs
Local Depression	2.7	in
Local Depression \	3.33	ft
Gutter Width	2.08	ft
Gutter Cross Slope	0.020000	ft/ft
Road Cross Slope	0.005000	ft/ft
Curb Opening Len	13.66	ft
Opening Height	0.50	ft
Curb Throat Type	Inclined	
Throat Incline Angl	30.00	degree
Grate Width	2.08	ft
Grate Length	6.66	ft
Grate Type	0 mm (P-1-7/8")	
Clogging	100.0	%

Options
Calculation Opt se Both

Results		
Spread	37.09	ft
Depth	0.47	ft
Gutter Depression	0.4	in
Total Depression	3.1	in
Open Grate Area	0.0	ft²
Active Grate Weir Le	6.66	ft

D.I. @ STA. 1+268.203 RT.
& STA. 1+273.822 LT

COMBINATION INLET IN SAG

100% GRATE AREA clogged

curb opening only?

USED TO CHECK
FROM MASTER RESULTS

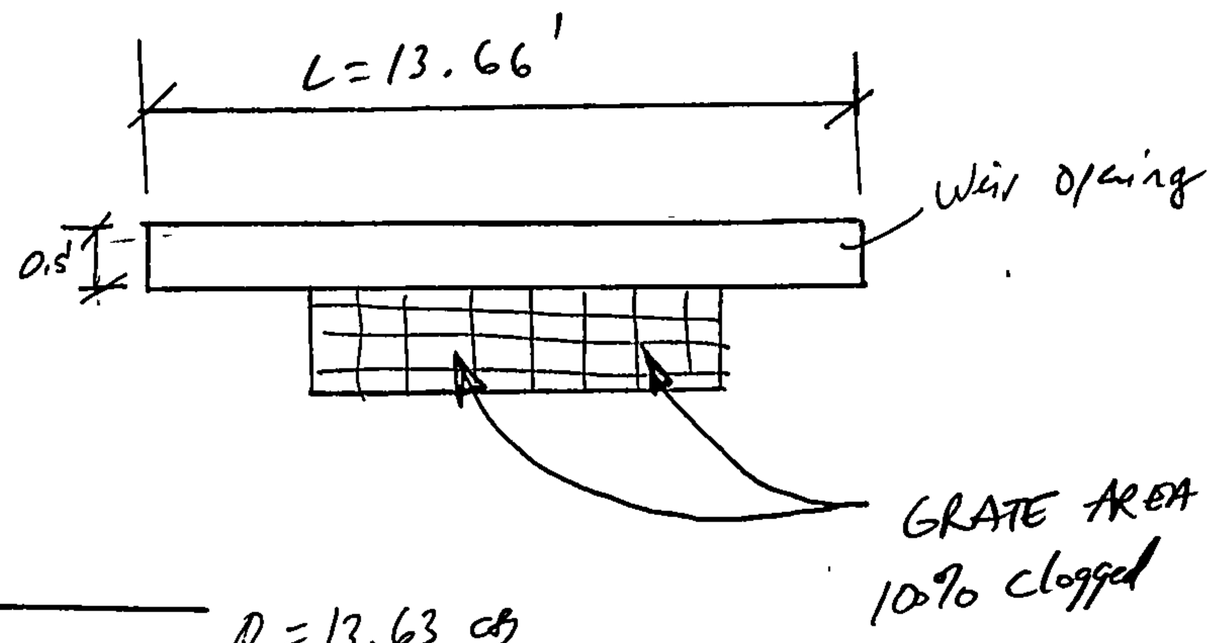
DI IN SAG
STA. 1+273.822

Slot Capacity

Equation used Weir Eqn: $Q = CLH^{3/2}$

Constant (C) = 3
Length of Weir (L) = 13.66 feet

Height h (feet)	Discharge Q (ft^3/sec)
0	0.00
0.05	0.46
0.1	1.30
0.15	2.38
0.2	3.67
0.25	5.12
0.3	6.73
0.35	8.49
0.4	10.37
0.44	11.96
0.45	12.37
0.46	12.79
0.47	13.20
0.48	13.63
0.49	14.06
0.5	14.49
0.55	16.72
0.6	19.05
0.65	21.48
0.66	21.97
0.67	22.47
0.68	22.98
0.69	23.49
0.7	24.00
0.75	26.62
0.8	29.32
0.85	32.11
0.9	34.99



Q = 13.63 cfs
depth = 0.48 feet

Drop Inlet Sensitivity Analysis

Case 1 - Lower Discharge

	Discharge (cfs)	Frequency	Depth (feet)	Spread (feet)	Intercept Flow (cfs)	Curb Length (feet)
Weir Equation and Plate 22.3 D-5	18	100 yr	0.44	18.27	8.9	3.25
Weir (Weir Equation)		*100 yr*	*0.44*		*2.9*	*3.25*
Plate 22.3 D-5 (S=0.0134)		*100 yr*	*0.44*		*6*	---
Flowmaster - 0% Clogging	18	100 yr	0.44	18.27	8.31	6.5
Flowmaster - 50% Weir Reduction	18	100 yr	0.45	18.27	6.65	3.25

Case 2 - Higher Discharge

	Discharge (cfs)	Frequency	Depth (feet)	Spread (feet)	Intercept Flow (cfs)	Curb Length (feet)
Weir Equation and Plate 22.3 D-5	48.3	100 yr	0.68	30.81	20.9	5
Weir (Weir Equation)		*100 yr*	*0.68*		*8.4*	*5*
Plate 22.3 D-5 (S=0.0134)		*100 yr*	*0.68*		*12.5*	---
Flowmaster - 0% Clogging	48.3	100 yr	0.68	30.81	25.49	10
Flowmaster - 50% Weir Reduction	48.3	100 yr	0.71	30.81	22.58	5

CASE 1

1/2 weir length

Slot Capacity

Equation used Weir Eqn: $Q = CLH^{3/2}$

Constant (C) = 3

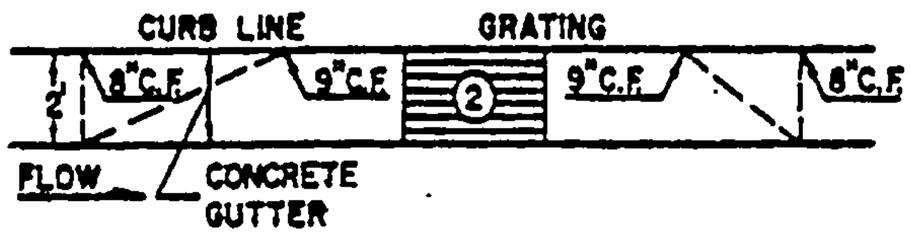
Length of Weir (L) = 3.25 feet

Height h (feet)	Discharge Q (ft^3/sec)
0	0.00
0.05	0.11
0.1	0.31
0.15	0.57
0.2	0.87
0.25	1.22
0.3	1.60
0.35	2.02
0.4	2.47
0.44	2.85
0.45	2.94
0.46	3.04
0.47	3.14
0.48	3.24
0.49	3.34
0.5	3.45
0.55	3.98
0.6	4.53
0.65	5.11
0.66	5.23
0.67	5.35
0.68	5.47
0.69	5.59
0.7	5.71
0.75	6.33
0.8	6.98
0.85	7.64
0.9	8.32

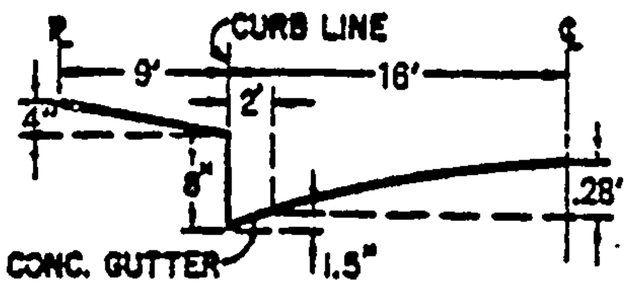
d = 0.44'

Q = 2.85 cfs

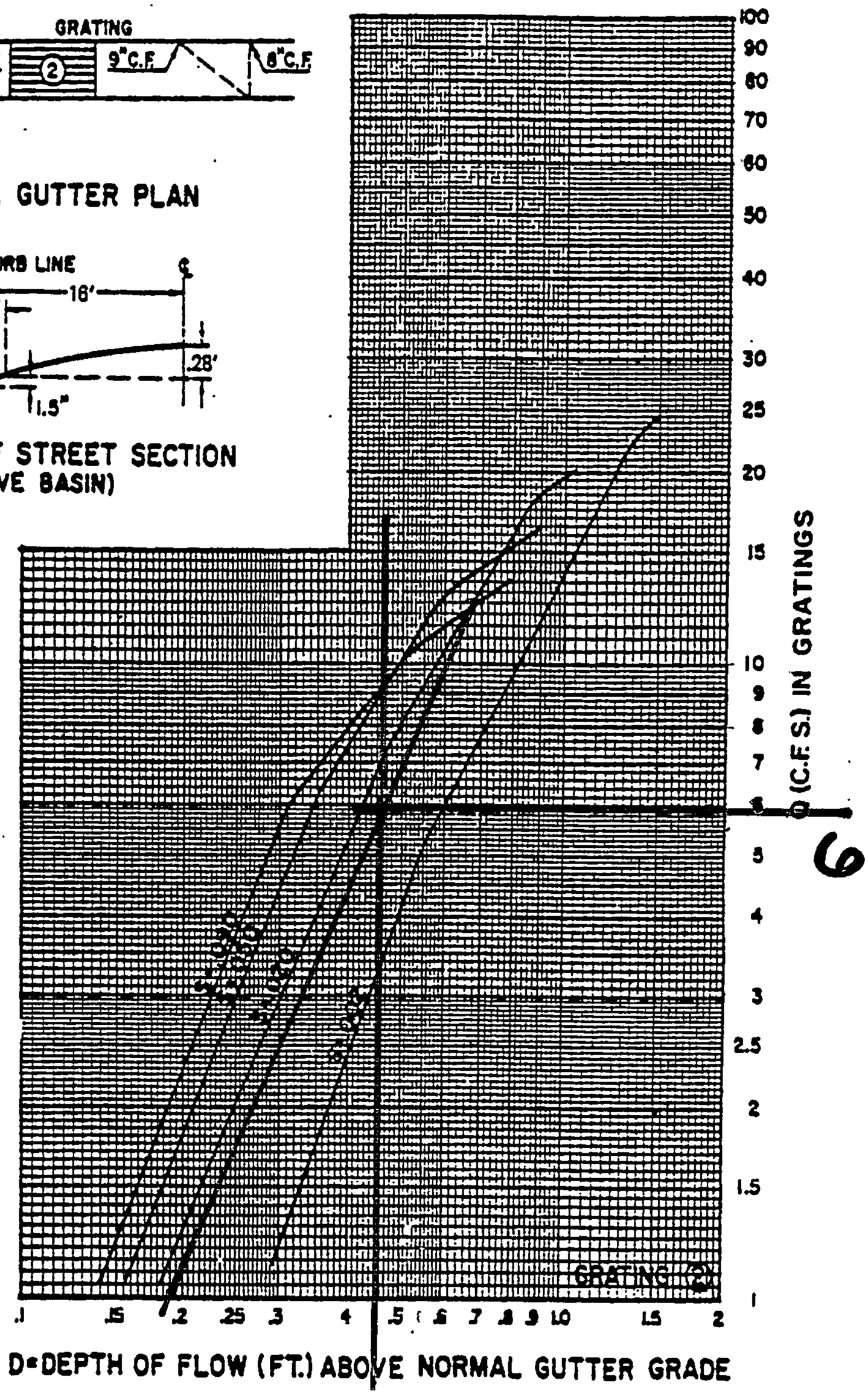
GRATING CAPACITIES FOR TYPE 'A', 'C' and 'D'



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)



D@PN .44 FT

S = 0.0134

PLATE 22.3 D-5

0% Clogging - Louisiana / I40
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	Copy of Combination Inl
Type	Combination Inlet On Gr
Solve For	Efficiency

Input Data		
Discharge	18.00	cfs
Local Depression	1.0	in
Local Depression \	2.00	ft
Slope	0.013400	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.065000	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.013	
Curb Opening Len	6.50	ft
Grate Width	2.00	ft
Grate Length	3.00	ft
Grate Type	0 mm (P-1-7/8")	
Clogging	0.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	lude None

Results		
Efficiency	0.46	
Intercepted Flow	8.31	cfs
Bypass Flow	9.69	cfs
Spread	18.27	ft
Depth	0.44	ft
Flow Area	3.1	ft²
Gutter Depression	1.1	in
Total Depression	2.1	in
Velocity	5.08	ft/s
Splash Over Velocity	9.97	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.08	
Grate Flow Ratio	0.33	
Equivalent Cross Slo	046749	ft/ft
Active Grate Length	3.00	ft
Length Factor	0.07	
Total Interception Ler	47.13	ft

50% Weir Reduction - Louisiana / I40
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	Copy of Combination Inl
Type	Combination Inlet On Gr
Solve For	Efficiency

Input Data		
Discharge	18.00	cfs
Local Depression	1.0	in
Local Depression \	2.00	ft
Slope	0.013400	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.065000	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.013	
Curb Opening Len	3.25	ft
Grate Width	2.00	ft
Grate Length	3.00	ft
Grate Type	0 mm (P-1-7/8")	
Clogging	0.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	lude None

Results		
Efficiency	0.37	
Intercepted Flow	6.65	cfs
Bypass Flow	11.35	cfs
Spread	18.27	ft
Depth	0.45	ft
Flow Area	3.4	ft²
Gutter Depression	1.1	in
Total Depression	2.1	in
Velocity	5.24	ft/s
Splash Over Velocity	9.97	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.08	
Grate Flow Ratio	0.31	
Equivalent Cross Slo	046749	ft/ft
Active Grate Length	3.00	ft
Length Factor	0.01	
Total Interception Ler	47.13	ft

CASE 2

1/2 weir Length.

Slot Capacity

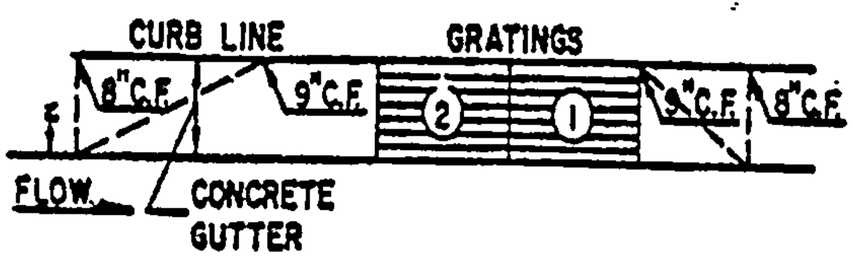
Equation used Weir Eqn: $Q = CLH^{3/2}$

Constant (C) =	3	
Length of Weir (L) =	5	feet

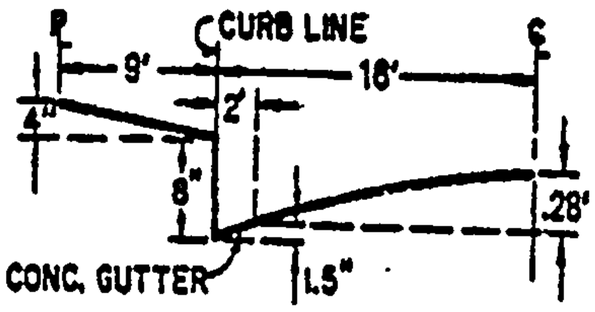
Height h (feet)	Discharge Q (ft^3/sec)
0	0.00
0.05	0.17
0.1	0.47
0.15	0.87
0.2	1.34
0.25	1.88
0.3	2.46
0.35	3.11
0.4	3.79
0.44	4.38
0.45	4.53
0.46	4.68
0.47	4.83
0.48	4.99
0.49	5.15
0.5	5.30
0.55	6.12
0.6	6.97
0.65	7.86
0.66	8.04
0.67	8.23
0.68	8.41
0.69	8.60
0.7	8.78
0.75	9.74
0.8	10.73
0.85	11.75
0.9	12.81

d = 0.68'
Q = 8.41 cfs

GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

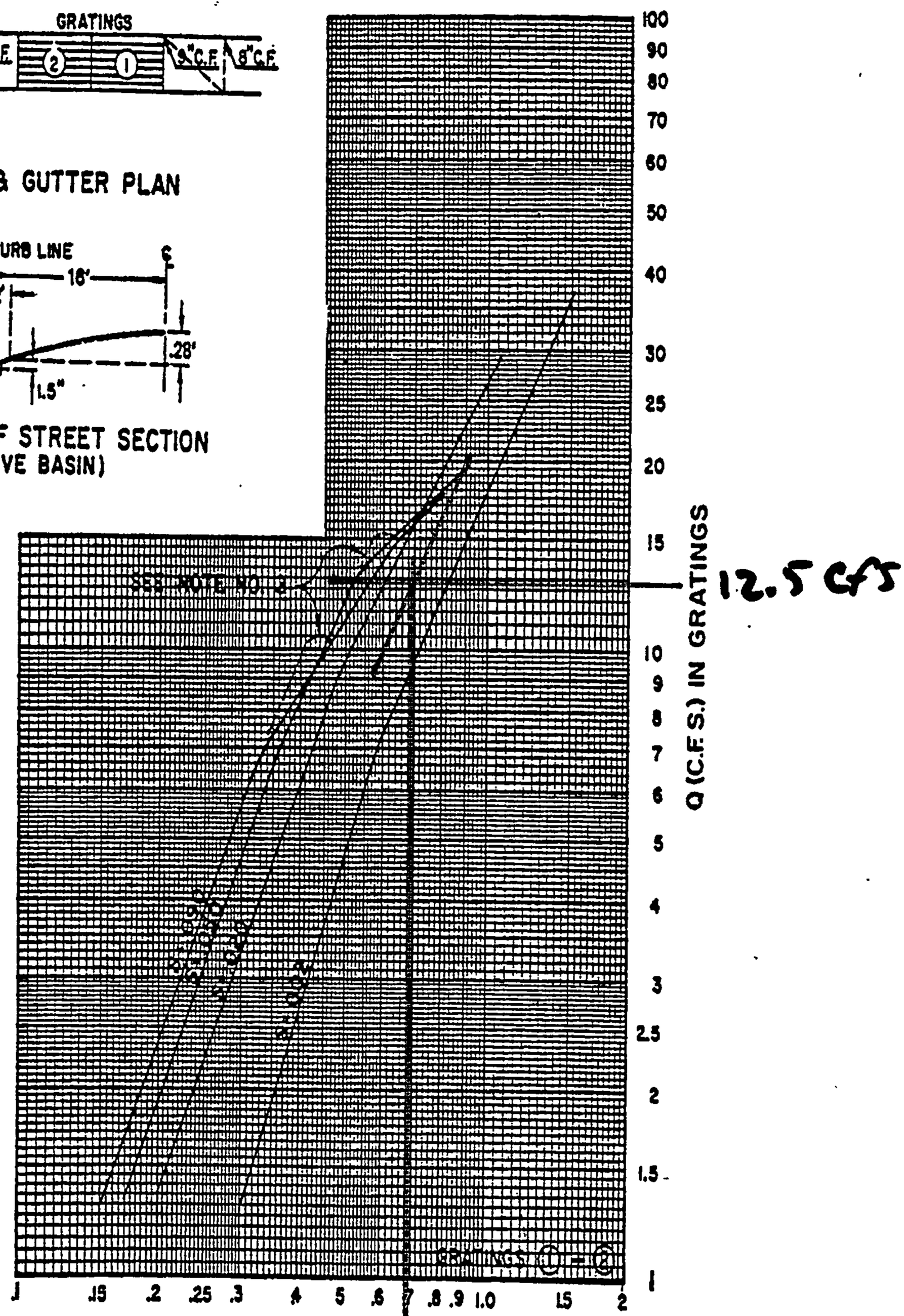


PLATE 22.3 D-6

S=0.004 ft/ft

0% Clogging - Louisiana / I40
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	Copy of Combination Inl
Type	Combination Inlet On Gr
Solve For	Efficiency

Input Data		
Discharge	48.30	cfs
Local Depression	1.0	in
Local Depression \	2.00	ft
Slope	0.006400	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.065000	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.013	
Curb Opening Len	10.00	ft
Grate Width	2.00	ft
Grate Length	6.50	ft
Grate Type	0 mm (P-1-7/8")	
Clogging	0.0	%

Options	
Calculation Opt	Use Both
Grate Flow Opti	lude None

Results		
Efficiency	0.53	
Intercepted Flow	25.49	cfs
Bypass Flow	22.81	cfs
Spread	30.81	ft
Depth	0.68	ft
Flow Area	8.9	ft^2
Gutter Depression	1.1	in
Total Depression	2.1	in
Velocity	4.92	ft/s
Splash Over Velocity	16.26	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.36	
Grate Flow Ratio	0.19	
Equivalent Cross Slo	035726	ft/ft
Active Grate Length	6.50	ft
Length Factor	0.05	
Total Interception Ler	67.16	ft

50% Weir Reduction - Louisiana / I40
Worksheet for Combination Inlet On Grade

Project Description	
Worksheet	Copy of Combination Inl
Type	Combination Inlet On Gr
Solve For	Efficiency

Input Data		
Discharge	48.30	cfs
Local Depression	1.0	in
Local Depression \	2.00	ft
Slope	0.006400	ft/ft
Gutter Width	2.00	ft
Gutter Cross Slope	0.065000	ft/ft
Road Cross Slope	0.020000	ft/ft
Mannings Coefficie	0.013	
Curb Opening Len	5.00	ft
Grate Width	2.00	ft
Grate Length	6.50	ft
Grate Type	0 mm (P-1-7/8")	
Clogging	0.0	%

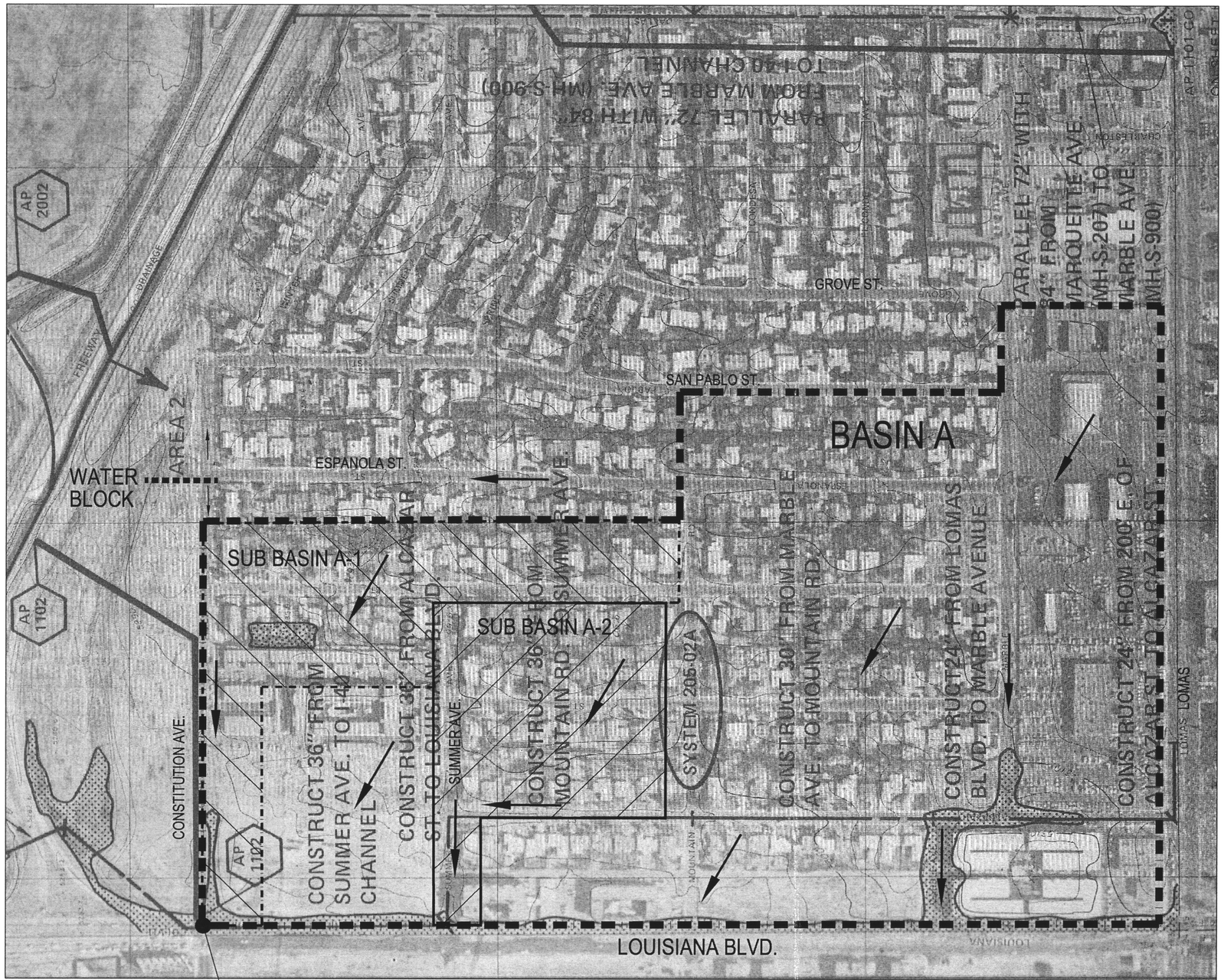
Options	
Calculation Opt	Use Both
Grate Flow Opti	lude None

Results		
Efficiency	0.47	
Intercepted Flow	22.58	cfs
Bypass Flow	25.72	cfs
Spread	30.81	ft
Depth	0.71	ft
Flow Area	9.6	ft²
Gutter Depression	1.1	in
Total Depression	2.1	in
Velocity	5.04	ft/s
Splash Over Velocity	16.26	ft/s
Frontal Flow Factor	1.00	
Side Flow Factor	0.35	
Grate Flow Ratio	0.18	
Equivalent Cross Slo	035726	ft/ft
Active Grate Length	6.50	ft
Length Factor	0.00	
Total Interception Ler	0.00	ft

STORM RUNOFF CALCULATIONS FOR LOUISIANA/CONSTITUTION/SUMMER IN ALBUQUERQUE, NEW MEXICO

CITY OF ALBUQUERQUE PROJECT # 660193

RUNOFF BASED ON 100-YEAR, 6 HOUR STORM



AP=204 CFS

ALBUQUERQUE MASTER DRAINGE STUDY MAP J-19

BASIN A IS THE ENTIRE DRAINAGE BASIN UNDER CONSIDERATION
A= 78.51 AC, 0.1227 sq.mi.
Qp= 204 cfs

SUB BASIN A-1 IS THE PORTION OF SUB BASIN A THAT WILL DRAIN ONTO CONSTITUTION.
A= 13.77AC, 0.01215 sq.mi.
Qp= 56 cfs

SUB BASIN A-2 IS THE PORTION OF BASIN A THAT WILL DRAIN ONTO SUMMER AVE.
A=8.953 AC, 0.01399 sq.mi.
Qp=36 cfs

DRAINAGE ONTO LOUISIANA
204 cfs - 56 cfs - 36 cfs = 112 cfs

PEAK FLOWS ARE BASED ON THE 100 YEAR STORM BASIN A FLOW DERIVED USING AHYMO
SUB BASINS A-1 & A-2 FLOW DERIVED USING RATIONAL METHOD AS PER COA DPM

LAND TREATMENT PROPORTIONS FOR ALL BASINS ARE B=30% C=15% D=55%

300 150 0 300

AS BUILT INFORMATION
CONTRACTOR DATE
WORK STAKED BY DATE
INSPECTOR'S ACCEPTANCE BY DATE
FIELD VERIFICATION BY DATE
DRAWINGS CORRECTED BY DATE
MICRO-FILM INFORMATION
RECORDED BY DATE
NO.

BENCH MARKS

SURVEY INFORMATION
FIELD NOTES
NO. BY DATE

ENGINEER'S SEAL
PRELIMINARY
NOT FOR CONSTRUCTION

NO.	DATE	REMARKS	BY
		REVISIONS	
		DESIGN	

DESIGNED BY MPG DATE 08/113/2002
DRAWN BY MPG DATE 08/13/2002
CHECKED BY DATE

Gannett Fleming West, Inc.
2155 Louisiana NE, Suite 9000 Albuquerque, New Mexico 87110
Office: (505) 265-8468 Facsimile: (505) 881-2513

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT
ENGINEERING DEVELOPMENT GROUP

TITLE: SUMMER AVENUE TO CONSTITUTION AVENUE STORM DRAIN IMPROVEMENTS DRAINAGE BASIN

Design Review Committee | City Engineer Approval | Last Design Update | Mo./Day/Yr. | Mo./Day/Yr.

City Project No. 660193 | Zone Map No. J-19 | Sheet OF

Time: 9:21:31
Date: 8/26/2002 MPG
Drawing File: K:\PROJECTS\37798\Scans\LouisianaDrainage.dwg

Gannett Fleming

SUBJECT CONSTITUTION / LOUISIANA DRAINAGE

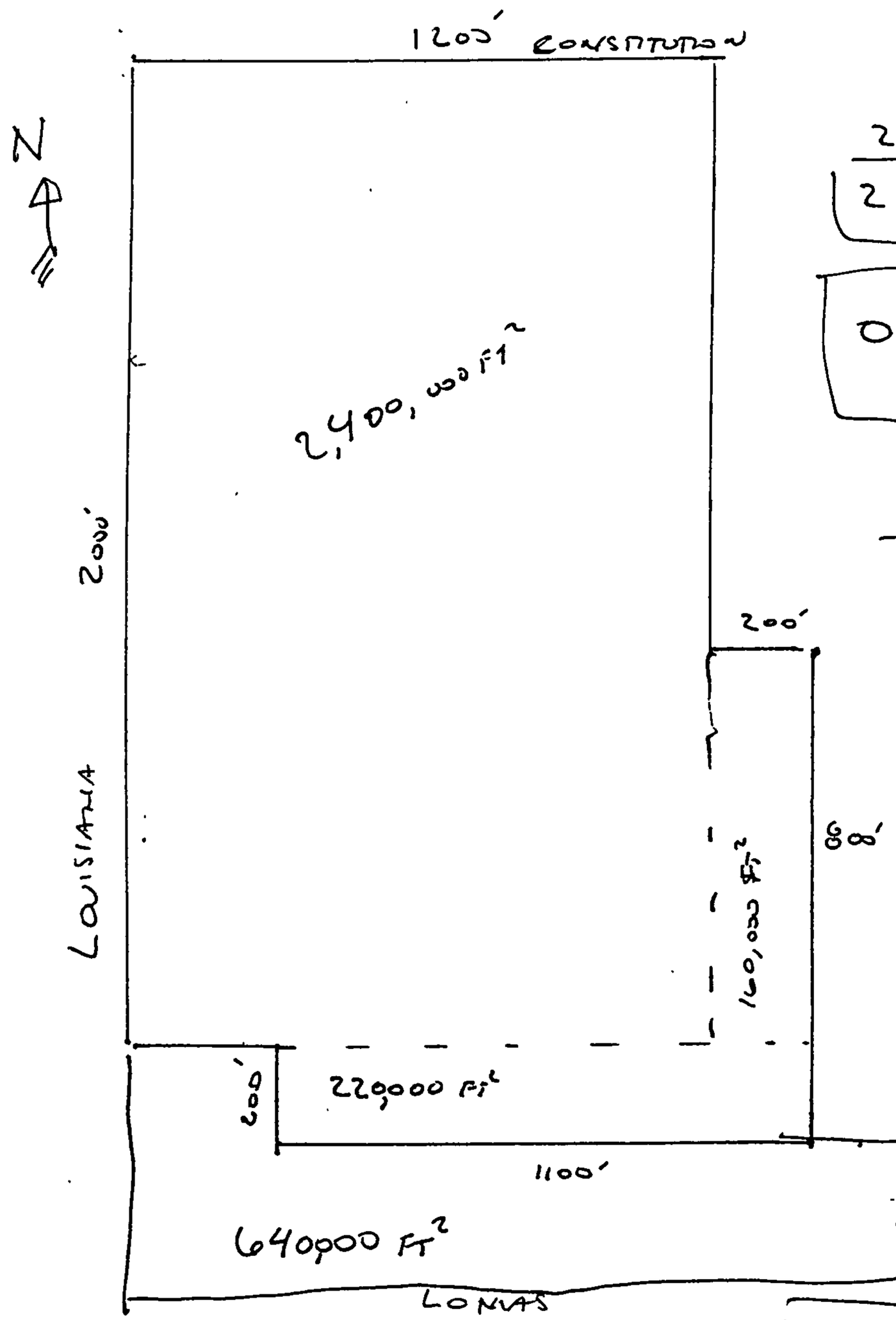
BY WPL DATE 7/26 CHKD. BY DATE

SHEET NO. 1 OF

JOB NO. 37788

SUBBASIN A

TOTAL AREA OF RUNOFF ONTO LOUISIANA



TOTAL AREA

220 000 ft²
160 000 ft²
2400 000 ft²

2,780,000 ft²

0.09972 mi²
63.82 AC

+ 640000 ft²

3,420,000 ft²

78.51 AC
0.1227 mi²

ADD AFTER DRAINING AREA WPL 7-26

ANYMO = ~~165.00 = 166 CFS~~ WPL 7-26

= 204 CFS

```
*******************ONE HUNDRED YEAR TWENTY FOUR HOUR STORM *******************
* THIS HYDROLOGY INPUT FILE IS FOR BASIN A FROM LOMAS TO CONSTITUTION AVE.    *
* (NORTH TO SOUTH)AND LOUISIANA BLVD. TO SAN PABLO ST. (EAST TO WEST)
* 100 YEAR RAINFALL AMOUNTS                                                  *
*****************************************************************************
RAINFALL              TYPE=1  RAIN QUARTER=0.0 IN
                      RAIN ONE=2.14 IN  RAIN SIX=2.60 IN
                      RAIN DAY=3.10 IN  DT=0.033333 HRS

                      COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT
1.40 HR.

                      DT =     .033333 HOURS        END TIME =     5.999940 HOURS
                         .0000   .0027   .0055   .0084   .0113   .0143   .0173
                         .0204   .0236   .0269   .0302   .0337   .0372   .0408
                         .0445   .0484   .0523   .0564   .0606   .0649   .0694
                         .0741   .0789   .0839   .0892   .0946   .1004   .1063
                         .1126   .1193   .1263   .1322   .1385   .1453   .1598
                         .1923   .2424   .3142   .4123   .5412   .7055   .9101
                        1.1598  1.3908  1.4874  1.5691  1.6417  1.7077  1.7685
                        1.8250  1.8777  1.9272  1.9737  2.0176  2.0591  2.0984
                        2.1356  2.1708  2.2043  2.2361  2.2662  2.2737  2.2808
                        2.2875  2.2939  2.3001  2.3061  2.3118  2.3173  2.3226
                        2.3278  2.3328  2.3376  2.3424  2.3470  2.3515  2.3558
                        2.3601  2.3643  2.3684  2.3724  2.3763  2.3801  2.3838
                        2.3875  2.3911  2.3947  2.3982  2.4016  2.4050  2.4083
                        2.4116  2.4148  2.4179  2.4210  2.4241  2.4271  2.4301
                        2.4331  2.4360  2.4388  2.4417  2.4445  2.4472  2.4499
                        2.4526  2.4553  2.4579  2.4605  2.4631  2.4656  2.4682
                        2.4706  2.4731  2.4755  2.4780  2.4803  2.4827  2.4851
                        2.4874  2.4897  2.4919  2.4942  2.4964  2.4986  2.5008
                        2.5030  2.5052  2.5073  2.5094  2.5115  2.5136  2.5157
                        2.5177  2.5198  2.5218  2.5238  2.5258  2.5278  2.5297
                        2.5317  2.5336  2.5355  2.5374  2.5393  2.5412  2.5431
                        2.5449  2.5468  2.5486  2.5504  2.5522  2.5540  2.5558
                        2.5575  2.5593  2.5610  2.5628  2.5645  2.5662  2.5679
                        2.5696  2.5713  2.5730  2.5746  2.5763  2.5779  2.5795
                        2.5812  2.5828  2.5844  2.5860  2.5876  2.5892  2.5907
                        2.5923  2.5939  2.5954  2.5969  2.5985  2.6000

*
**************
* BASIN 100          *
**************
COMPUTE NM HYD        ID=1 HYD NO=100.0 DA=0.122677 SQ MI
                      PER A=0.0 PER B=30.0 PER C=15.0 PER D=55.0
                      TP=-0.2926 HR MASS RAIN=-1

                      K =   .160526HR    TP =   .292600HR    K/TP RATIO =   .548620     SHAPE
CONSTANT, N =  7.046447
                      UNIT PEAK =   120.71    CFS   UNIT VOLUME =    .9998       B =   523.45      P60
= 2.1400
                      AREA =      .067472 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER
HOUR
                      RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =
.033333
```

K = .266588HR TP = .292600HR K/TP RATIO = .911102 SHAPE CONSTANT, N = 3.887004
UNIT PEAK = 65.575 CFS UNIT VOLUME = .9998 B = 347.56 P60 = 2.1400
AREA = .055205 SQ MI IA = .45000 INCHES INF = 1.11000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = .033333

PRINT HYD ID=1 CODE=20

PARTIAL HYDROGRAPH 100.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	2.000	103.6	4.000	3.5	6.000	2.0
8.000	.0						
.667	.0	2.667	18.2	4.667	2.4	6.667	.3
8.667	.0						
1.333	13.9	3.333	7.0	5.333	2.0	7.333	.1

RUNOFF VOLUME = 1.75908 INCHES = 11.5092 ACRE-FEET
PEAK DISCHARGE RATE = 204.10 CFS AT 1.667 HOURS BASIN AREA = .1227 SQ. MI.

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 12:44:10

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =07/26/2002

INPUT FILE = c:\a100.dat USER NO.= AHYMO-I-9702a0100017Q-SH

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)
START								
TIME= .00								
RAINFALL TYPE= 1								
RAIN6= 2.600								
COMPUTE NM HYD	100.00	-	1	.12268	204.10	11.509	1.75908	1.667
2.600 PER IMP= 55.00								
FINISH								

CFS PAGE = 1

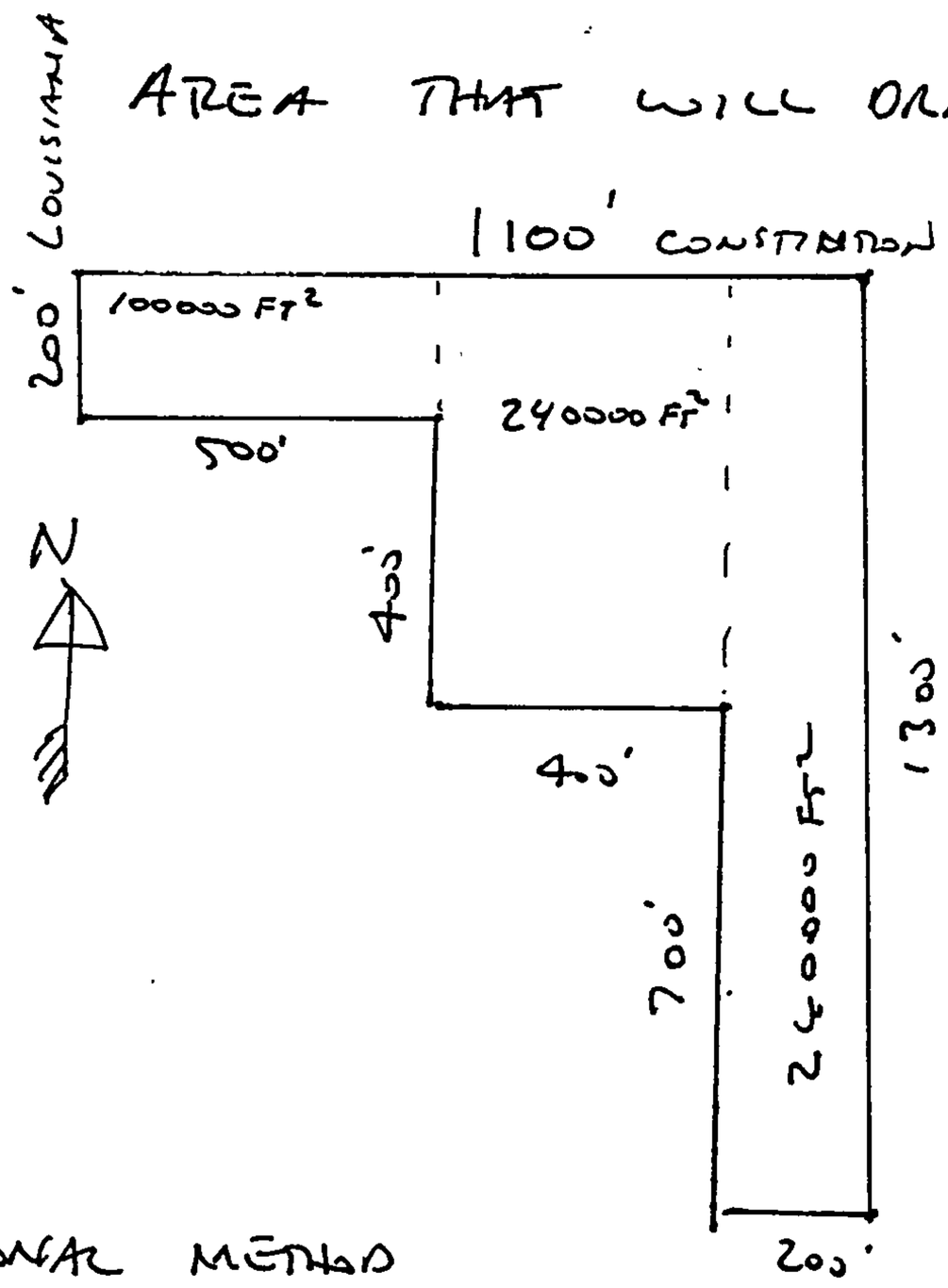
PER ACRE NOTATION

Gannett Fleming

SUBJECT CONSTITUTION/LOUISIANA DRAINAGE | SHEET NO. 2 OF
JOB NO. 37798
BY MOB DATE 7/26 CHKD. BY DATE

SUBBASIN A-1

AREA THAT WILL DRAIN TO CONSTITUTION



1100' CONSTITUTION 100000
240000
+ 260000
600000 FT²
13.77 AC
0.02152 MI²

RATIONAL METHOD

ZONE 3 COA DPM
$I_p = 5.3"$ TAB. A-10

LAND TREATMENT ASSUMPTIONS			COEFFICIENT C (A-11)
A	0%	= 0 AC	0.35
B	30%	= 4.131 AC	0.48
C	15%	= 2.066 AC	0.64
D	55%	= 7.574 AC	0.93
	100%	13.77 AC	

$Q_p = CIA$

$[(4.131 * .48) + (2.066 * .64) + (7.574 * .93)]\ 5.3"$

$Q_p =$ 55.67 CFS

USE 56 CFS

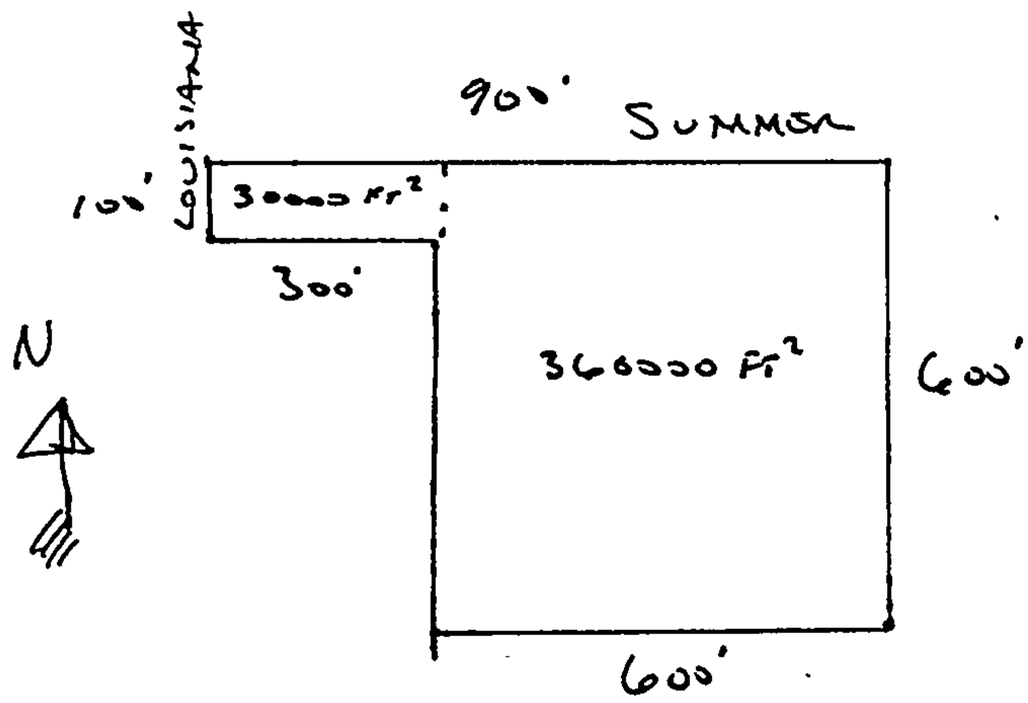
Gannett Fleming

SUBJECT CONSTITUTION/ LOUISIANA DRAINAGE
BY WDL DATE 7/26 CHKD. BY DATE

SHEET NO. 3 OF
JOB NO. 37798

SUBBASIN A-2

AREA THAT WILL DRAIN TO SUMMER AVE



30000 Ft²
+ 360000
390000 Ft²
8.953 AC
0.01399 mi²

RATIONAL METHOD

ZONE 3 I_p = 5.38 COA DPM TAB A-10

LAND TREATMENT ASSUMPTION			COEFFICIENT C (A-11)
A	0% =	0 AC	0.35
B	30% =	2.69 AC	0.48
C	15% =	1.343 AC	0.64
D	55% =	4.924 AC	0.93
	100%	8.953 AC	

$Q_p = CIA$

$[(2.69 * .48) + (1.343 * .64) + (4.924 * .93)]\ 5.38$

Q_p = 36.2 CFS

USE 36 CFS

Gannett Fleming

SUBJECT Constantan/ Louisiana

SHEET NO. 4 OF

JOB NO. 37798

BY WPL DATE 7/22 CHKD. BY DATE

Q_p BY SUBBASIN

SUBBASIN	A	204	CFS	TOTAL
	A-1	56	CFS	Constantan
	A-2	36	CFS	Summit

Q_p ON TO LOUISIANA

A - (A-1) - (A-2)

204 - 56 - 36 = **112 CFS**

Q_p ON LOUSIANA AT CONSTANTAN

A - (A-1) ~~+ (A-2)~~ =

204 - 56 = **148 CFS**

By: G CLARKE

PROJECT: Louisiana Storm Drain - 60" RCP
JOB # : 37798.2
DATE : October 14, 2002

Tailwater elevation..... 5273.00
Manning's Roughness 0.013

	DESCRIPTION		Finish Grade	Invert Elevation	Pipe Diameter (inches)	Pipe Length (feet)	Design Discharge (cfs)	Friction Head Loss (feet)	Calculated Minor Head Losses bend Hb	manhole Hmh	transtn Ht	junction Hj	HGL Elevation	EGL Elevation
	AMAFCA		5272.00	5264.32									5273.00	5275.64
1	Collar	Pipe 1	5275.60	5266.76	60	89.00	256	0.86		-			5273.86	5276.49
	Collar		5275.60	5266.76					0.32	0.00	0.00	0.00	5274.17	5276.81
2	PC	Pipe 2		5268.73	60	189.00	256	1.82					5275.99	5278.63
	PC			5268.73					0.53	0.00	0.00	0.00	5276.52	5279.16
3	PT	Pipe 2		5269.96	60	118.00	256	1.13					5277.65	5280.29
	PT			5269.96					0.00	0.00	0.00	0.00	5277.65	5280.29
4	1+398 MH	Pipe 2	5278.41	5271.26	60	125.00	256	1.20					5278.85	5281.49
	1+398 MH		5278.41	5271.26					0.00	0.13	0.00	0.77	5279.76	5282.40
5	1+320 MH	Pipe 3	5283.80	5272.84	60	256.00	204	1.56					5282.29	5283.96
	1+320 MH		5283.80	5272.94					0.00	0.08	0.00	0.00	5282.37	5284.05
6	1+205 MH	Pipe 4	5287.16	5276.39	60	372.00	196	2.10					5284.59	5286.14
	1+205 MH		5287.16	5276.46					0.17	0.08	0.02	0.00	5284.87	5286.41
7	1+189 MH	Pipe 5	5287.51	5276.75	54	46.00	146	0.25					5285.36	5286.67
	1+189 MH		5287.51	5276.79					0.00	0.07	0.00	0.00	5285.42	5286.73
8	1+158 MH	Pipe 6	5287.82	5277.37	54	98.00	136	0.47					5286.06	5287.20
	1+158 MH		5287.82	5277.40					0.00	0.06	0.00	0.00	5286.12	5287.25
9	1+114 MH	Pipe 7	5288.42	5278.24	54	140.00	117	0.49					5286.91	5287.75
	1+114 MH		5288.42	5278.27					0.00	0.04	0.00	0.00	5286.95	5287.79
10	1+068 MH	Pipe 8	5289.21	5279.13	54	143.00	85	0.27					5287.61	5288.05
	1+068 MH		5289.21	5279.16					0.00	0.02	0.00	0.00	5287.63	5288.08
11	1+000 MH	Pipe 9	5290.21	5280.48	54	220.00	34	0.07					5288.07	5288.14
	1+000 MH		5290.21	5284.78					0.01	0.00	0.03	0.00	5288.12	5288.19
12	1+019 MH	Summer	5290.04	5285.40	36	61.00	34	non-pressure					5286.90	5288.34
	1+019 MH		5290.04	5285.49					0.00	0.02	0.00	0.00	5286.92	5288.35
13	1+050 MH	Pipe 11	5292.66	5286.40	36	96.00	17	non-pressure					5287.42	5288.42
	1+050 MH		5292.66	5286.40					0.00	0.00	0.00	0.00	5287.42	ERR
14		end of run	5292.66	5286.40	36	96.00	34	ERR					ERR	ERR
									ERR	0.02	ERR	0.36	ERR	ERR
15								ERR					ERR	ERR
									ERR	ERR	0.00	ERR	ERR	ERR
16								ERR					ERR	ERR

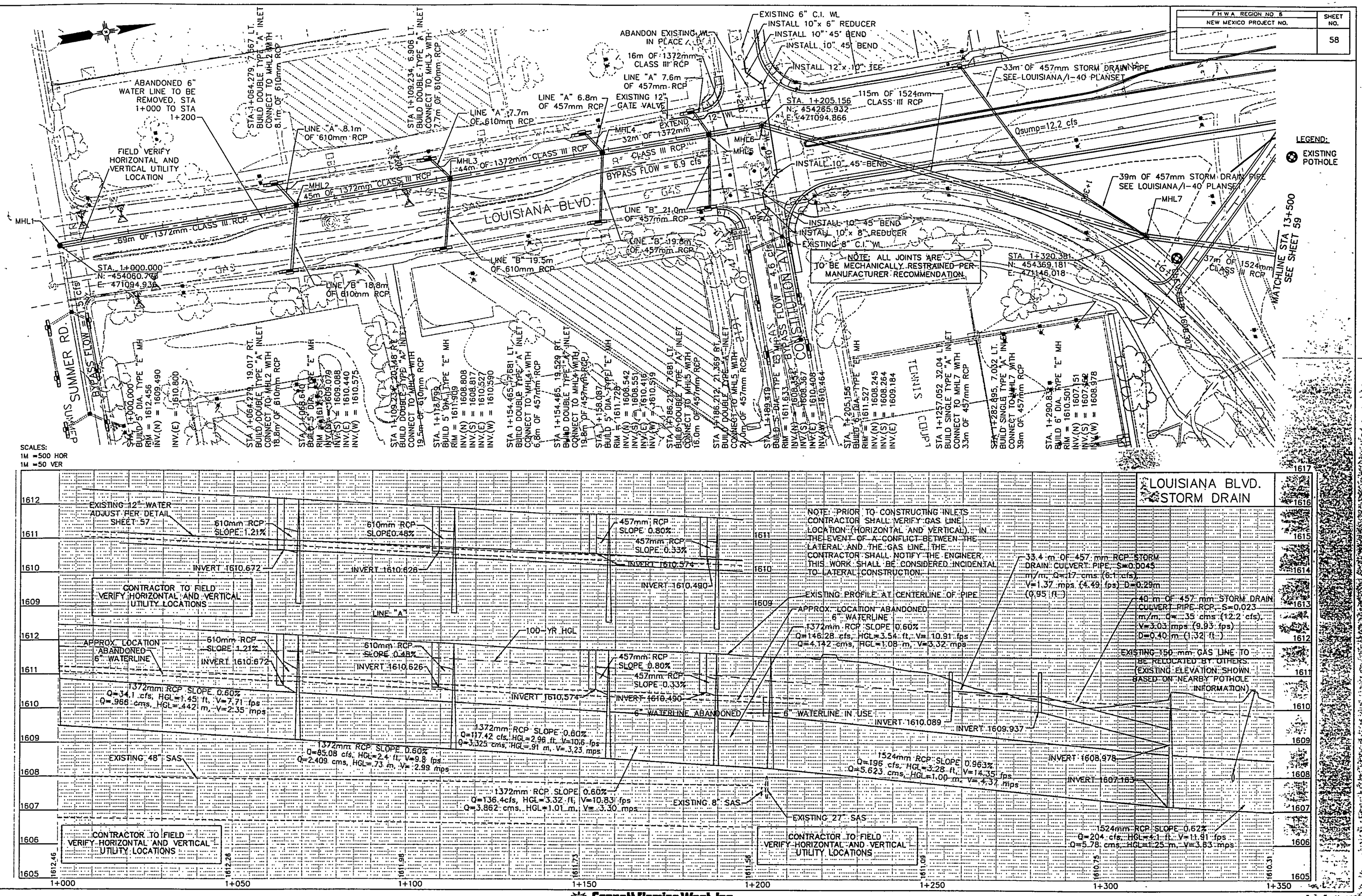
By: G. CLARKE

PROJECT: Constitution Drain - 36" RCP
JOB # : 37798.2
DATE : October 14, 2002

Tailwater elevation..... 5284.87
Manning's Roughness 0.013

	DESCRIPTION		Finish Grade	Invert Elevation	Pipe Diameter (inches)	Pipe Length (feet)	Design Discharge (cfs)	Friction Head Loss (feet)	Calculated Minor Head Losses: bend Hb	manhole Hmh	transtn Ht	junction Hj	HGL Elevation	EGL Elevation
	1+205 MH		5287.16	5276.39									5284.87	5285.71
1	1+033 MH	Constitu	5286.73	5280.23	36	104.00	52	0.63					5285.50	5286.34
	1+033 MH		5286.73	5280.26					0.00	0.04	0.00	0.00	5285.54	5286.38
2	1+064 MH	Pipe 2	5287.16	5280.96	36	97.50	34	0.25					5286.27	5286.63
	1+064 MH		5287.16	5280.96					0.00	0.00	0.00	0.00	5286.27	ERR
3		end of run	5287.16	5280.96	36	118.00	256	ERR					ERR	ERR
									ERR	0.00	3.55	0.00	ERR	ERR
4					60	125.00	256	ERR					ERR	ERR
									ERR	0.13	0.00	0.77	ERR	ERR
5					60	256.00	204	ERR					ERR	ERR
									ERR	0.08	0.00	0.00	ERR	ERR
6					60	372.00	196	ERR					ERR	ERR
									ERR	0.08	0.02	0.00	ERR	ERR
7					54	46.00	146	ERR					ERR	ERR
									ERR	0.07	0.00	0.00	ERR	ERR
8					54	98.00	136	ERR					ERR	ERR

FHWA REGION NO. 6	SHEET NO.
NEW MEXICO PROJECT NO.	58



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Date: 9/24/2002 MPC
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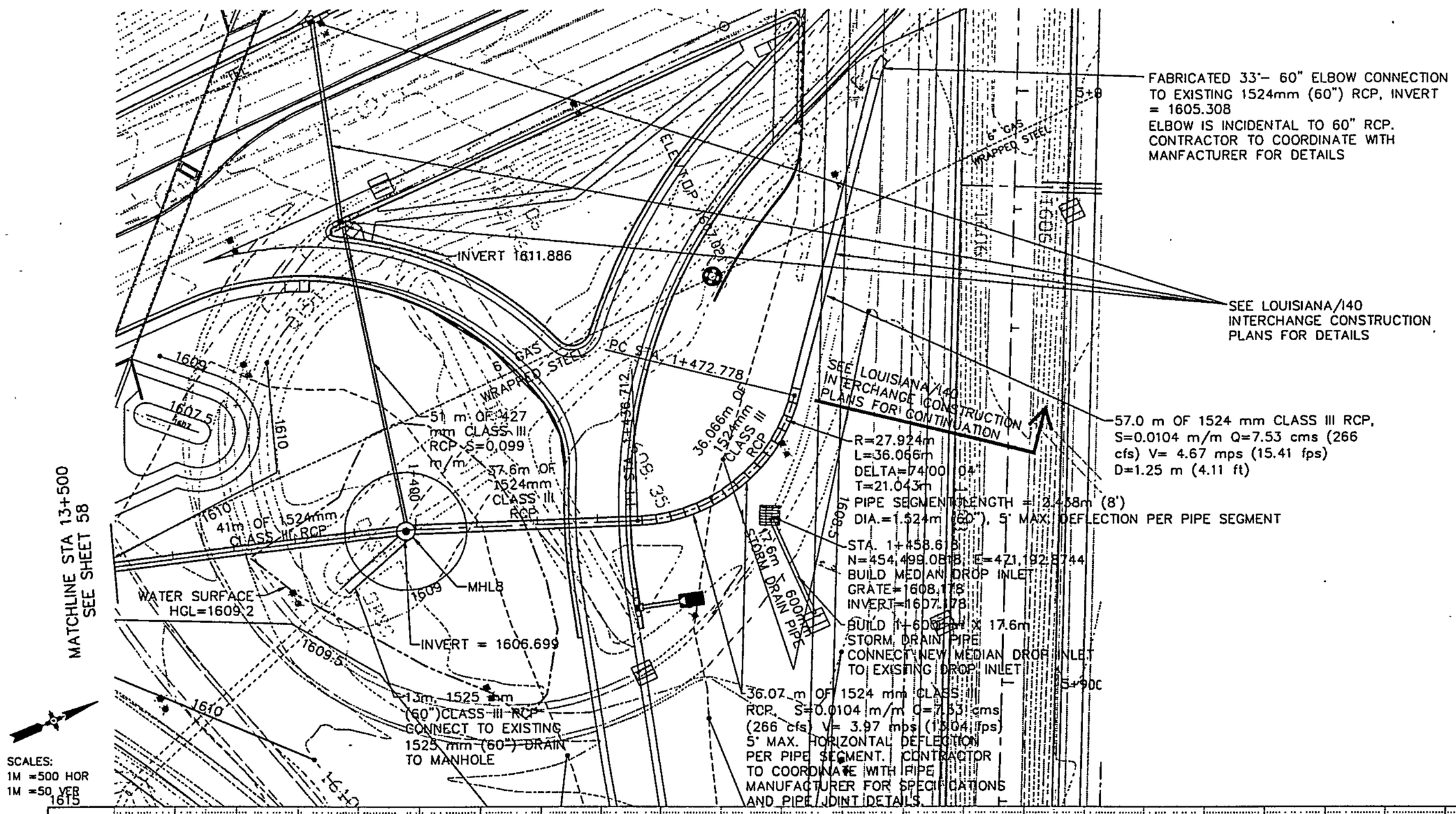
ENGR. FILE: _____

Gannett Fleming West, Inc.
ENGINEERS AND PLANNERS

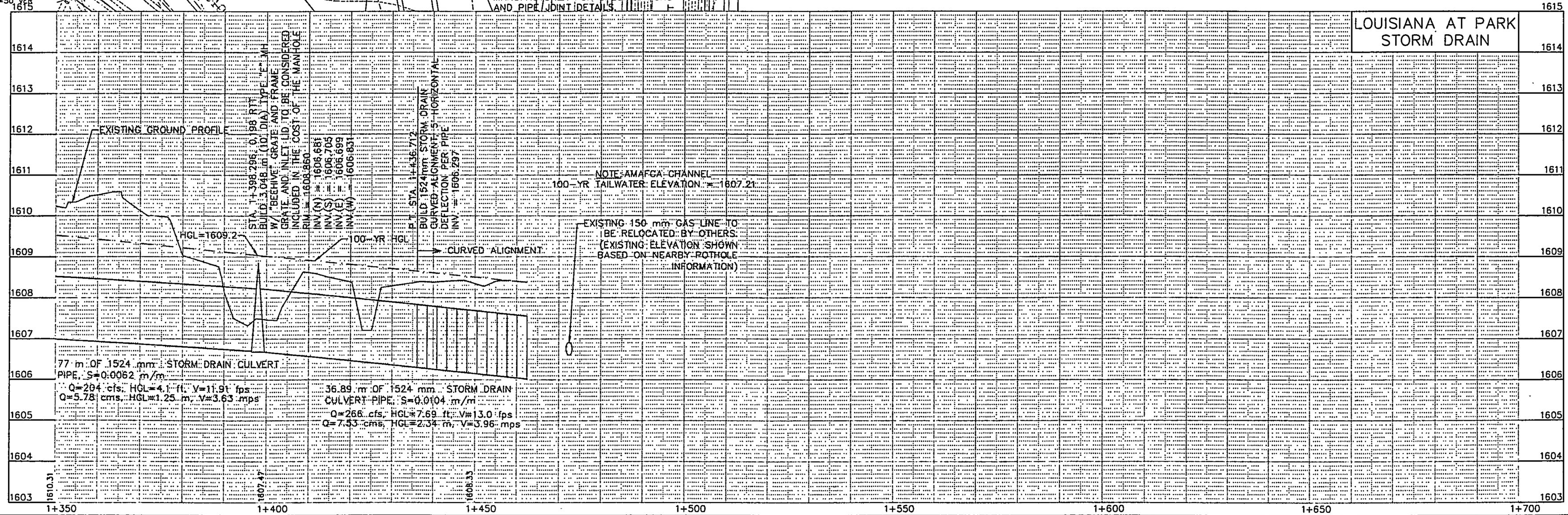
N.M. PROJECT NO. IM-NH-TPU-040-3(90)163, CN 2633 SHEET 58 OF 61

F.H.W.A. REGION NO. 6	SHEET NO
NEW MEXICO PROJECT NO.	59



LEGEND:

⊗ EXISTING POTHOLE



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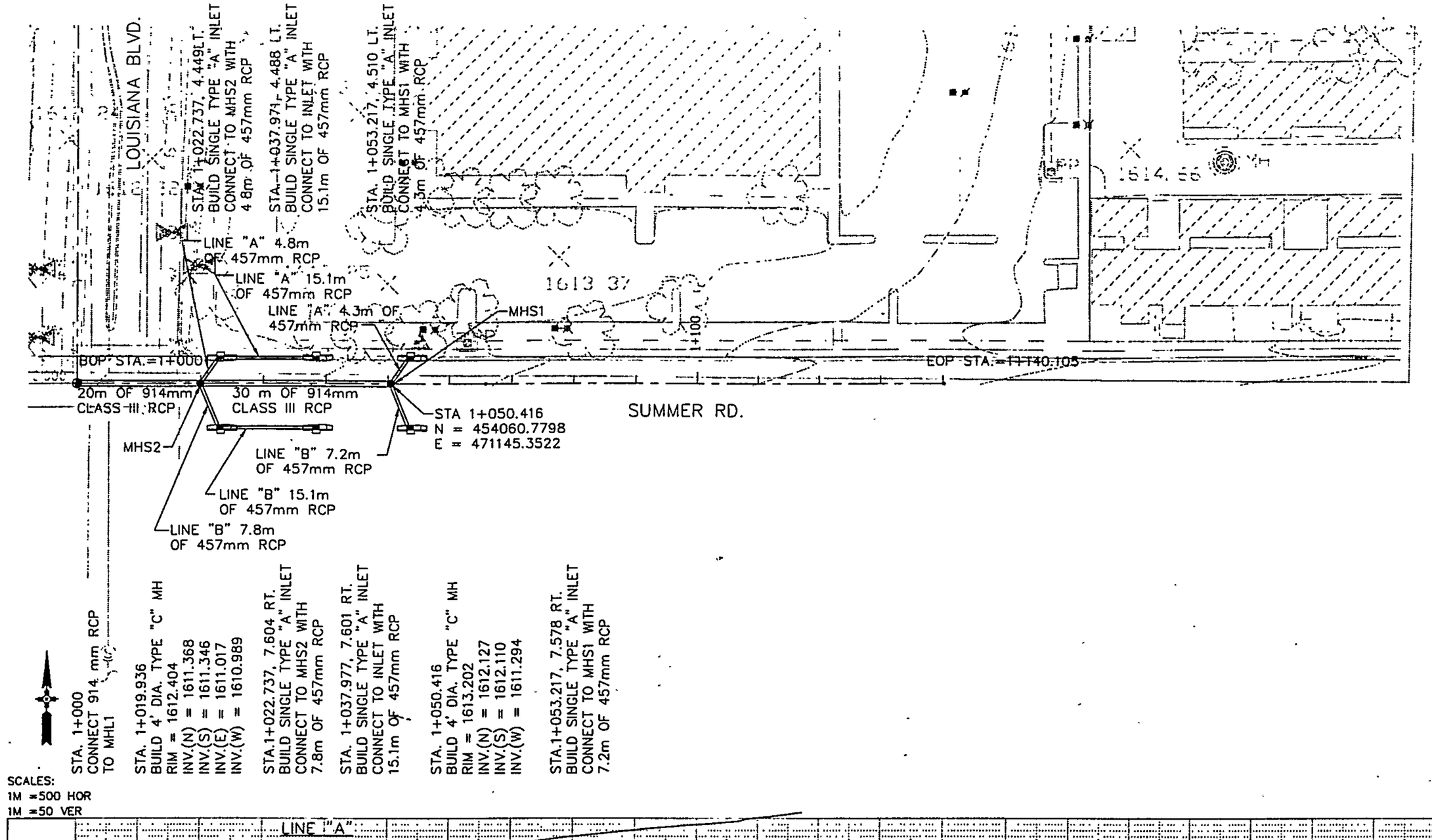
ENGR. FILE:

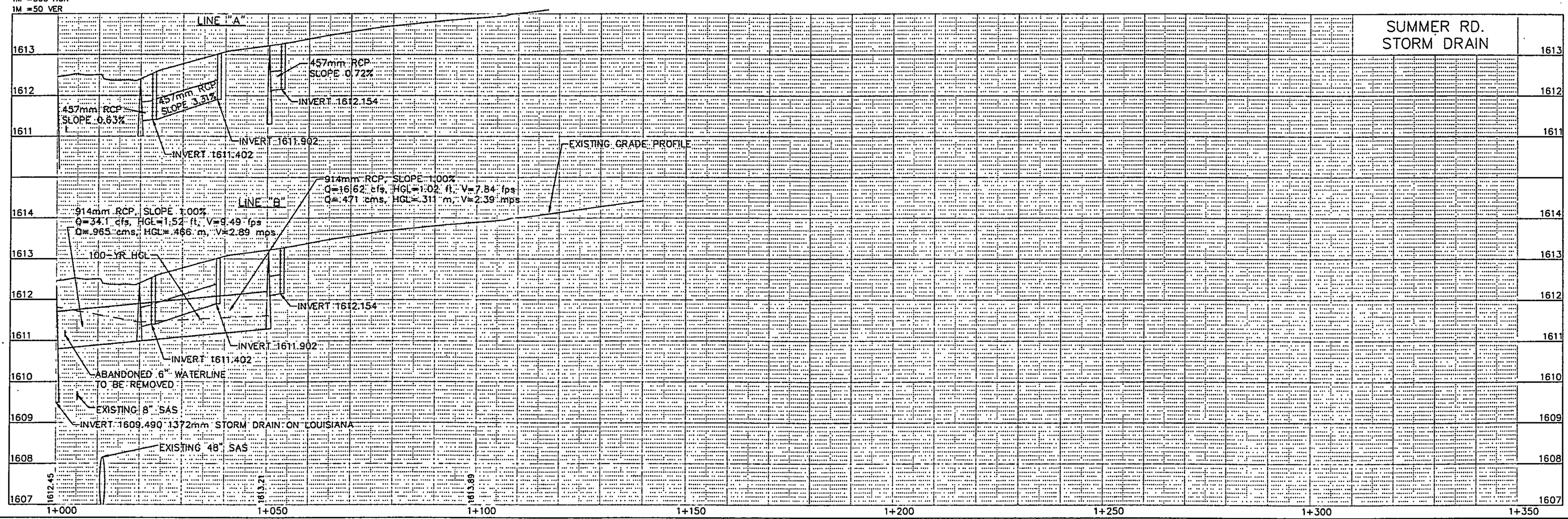
Connett Fleming West, Inc.
ENGINEERS AND PLANNERS

N.M. PROJECT NO. IM-NH-TPU-040-3(90)163, CN 2633 SHEET 59 OF 61

F.H.W.A. REGION NO. 6	SHEET NO.
NEW MEXICO PROJECT NO.	60



SCALES:
1M =500 HOR
1M =50 VER



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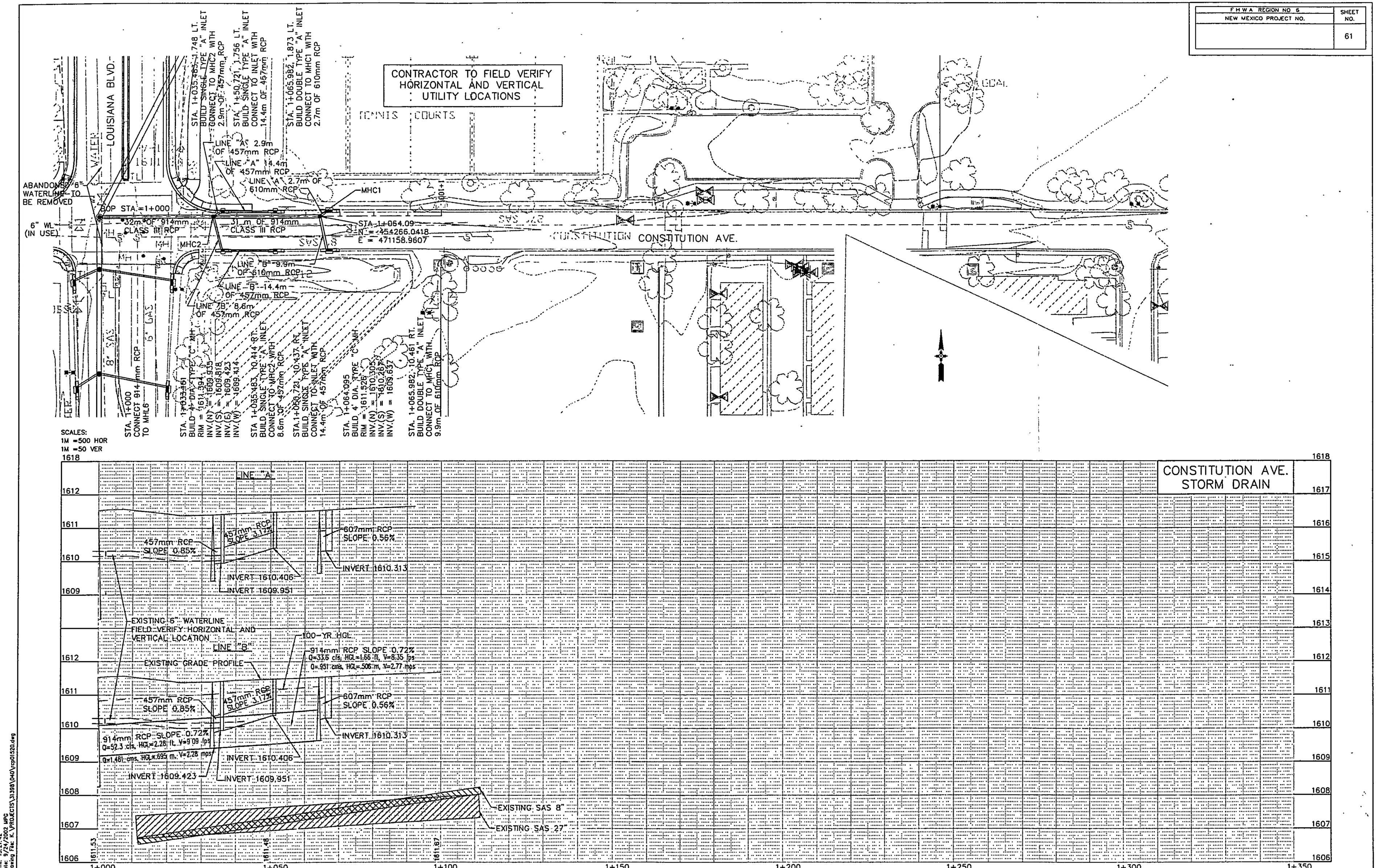
ENGR. FILE:

Gannett Fleming West, Inc.
ENGINEERS AND PLANNERS

N.M. PROJECT NO. IM-NH-TPU-040-3(90)163, CN 2833 SHEET 60 OF 61

F.H.W.A. REGION NO. 6	SHEET NO.
NEW MEXICO PROJECT NO.	61



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ENGR. FILE: _____

Gannett Fleming West, Inc.
ENGINEERS AND PLANNERS

N.M. PROJECT NO. IM-NH-TPU-040-3(90)163, CN 2633 SHEET 61 OF 61

City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

February 3, 2003

Gilbert Aldaz
Applied Engineering & Surveying Inc.
1605 Blair Rive NE
Albuquerque, New Mexico 87112

RE: Drainage Plan for Winrock Villas (J19-D78) Dated December 30, 2002

Dear Mr. Aldaz:

I have reviewed the reference plan and forward the following comments.

1. You are reconstructing the emergency gated access (general note No. 4). This work will be done outside of the property line. Has Winrock given permission for this proposed work?
2. How will this proposed construction on general note no. 4 fit with the existing inlet?
3. Has Winrock been given plans on the proposed improvements?

If you have any questions please call me at 924-3982.

Sincerely,

Carlos A. Montoya
City Floodplain Administrator

THE CITY OF ALBUQUERQUE IS AN EQUAL OPPORTUNITY/REASONABLE ACCOMMODATION EMPLOYER

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/11/2002)

J-19/D78

PROJECT TITLE: Winrock Villas
ZONE MAP/DRG. FILE #: J-19
DRB #:
EPC#:
WORK ORDER#:

LEGAL DESCRIPTION: PARCEL "K", WINROCK CENTER ADDITION
CITY ADDRESS: Pennsylvania Street & Winrock Mall Loop Road

ENGINEERING FIRM: Applied Engineering & Surveying Inc.
CONTACT: Gilbert Aldaz
ADDRESS: 1605 Blair Drive NE
PHONE: 237-1456
CITY, STATE: Albuq. NM
ZIP CODE: 87112

OWNER:
ADDRESS:
CITY, STATE:
CONTACT:
PHONE:
ZIP CODE:

ARCHITECT:
ADDRESS:
CITY, STATE:
CONTACT:
PHONE:
ZIP CODE:

SURVEYOR:
ADDRESS
CITY, STATE:
CONTACT:
PHONE:
ZIP CODE:

CONTRACTOR:
ADDRESS:
CITY, STATE:
CONTACT:
PHONE:
ZIP CODE:

CHECK TYPE OF SUBMITTAL:

- ___ DRAINAGE REPORT
- X DRAINAGE PLAN
- ___ CONCEPTUAL GRADING & DRAINAGE PLAN
- X GRADING PLAN
- ___ EROSION CONTROL PLAN
- ___ ENGINEERS CERTIFICATION (HYDROLOGY)
- ___ CLOMR/LOMR
- ___ TRAFFIC CIRCULATION LAYOUT (TCL)
- ___ ENGINEERS CERTIFICATION (TCL)
- ___ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ___ OTHER

CHECK TYPE OF APPROVAL SOUGHT:

- ___ SIA / FINANCIAL GUARANTEE RELEASE
- ___ PRELIMINARY PLAT APPROVAL
- ___ S. DEV. PLAN FOR SUBD. APPROVAL
- ___ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ___ SECTOR PLAN APPROVAL
- ___ FINAL PLAT APPROVAL
- ___ FOUNDATION PERMIT APPROVAL
- ___ BUILDING PERMIT APPROVAL
- ___ CERTIFICATE OF OCCUPANCY (PERM.)
- ___ CERTIFICATE OF OCCUPANCY (TEMP.)
- ___ GRADING PERMIT APPROVAL
- X PAVING PERMIT APPROVAL
- ___ WORK ORDER APPROVAL
- ___ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- X YES w/ Carlos Montoya On Site
- ___ NO
- ___ COPY PROVIDED

RECEIVED
DEC 30 2002
HYDROLOGY SECTION

DATE SUBMITTED: 12-30-02
BY: [signature]

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submitta
The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. Conceptual Grading and Drainage Plan: Required for approval of Site Development Plans greater than five
2. Drainage Plans: Required for building permits, grading permits, paving permits and site plans less than five (5
3. Drainage Report: Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or