CITY OF ALBUQUERQUE

2005.015,3

THREE HUNDRED YEARS 1706 * 2006 ALBUQUERQUE Making History

March 1, 2006

Jeffrey Mortensen, P.E.
Jeff Mortensen & Associates, Inc.
6010-B Midway Park Blvd. NE
Albuquerque, NM 87109

Re: Health South Satellite Parking Lot, Ellison Street NE, Grading and Drainage Plan

Engineer's Stamp dated 1-13-06 (D17-D61C)

Dear Mr. Mortensen,

Based upon the information provided in your submittal received 2-01-06, the above referenced plan is approved for Building Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

A separate permit (SO#19) is required for construction within City Right of Way. A copy of this approval letter must be on hand when applying for the excavation permit. Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. If you have any questions regarding this permit please feel free to call the DMD Storm Drainage Design section at 768-3654 (Charles Caruso).

If you have any questions, you can contact me at 924-3981.

Sincerely,

Kristal D. Metro, P.E.
Senior Engineer, Planning Dept.
Development and Building Services

C: Edward Elwell, DMD Street / Storm Maintenance
Liz Sanchez, Excavation Permits
Charles Caruso, DMD Storm Drainage Design
File

RECEIVED
MAR 0 6 2006
LAND DEVELOPMENT SECTION

P.O. Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

CITY OF ALBUQUERQUE

January 11, 2006

Jeffery G. Mortensen, PE
Jeff Mortensen & Associates, Inc.
6010-B Midway Park Blvd. NE
Albuquerque, NM 87109

Re: Health South Satellite Parking Lot, Ellison Blvd NW
Grading and Drainage Plan
Engineer's Stamp dated 12-29-05 (D17/D61C)

Dear Mr. Mortensen,

Based upon the information provided in your submittal received 12-29-05, the above referenced plan is approved for Site Development Plan for Building Permit action by DRB and an SO-19. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Rudy E. Rael, Associate Engineer
Planning Department.
Building and Development Services

C: File

P.O. Box 1293
Albuquerque
New Mexico 87103
www.cabq.gov

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

September 8, 1992

PROJECT ACCEPTANCE LETTER

Mr. Gilbert Luna
Universal Constructors, Inc.
3825 Academy Parkway North N.E.
Albuquerque, NM 87109

RE: INTERSTATE INDUSTRIAL TRACT 5, PROJECT NO. 4334.90

Dear Mr. Luna:

The above referenced project has been completed according to the plans and specifications. The project consisted of the installation of 600 LF of 8" PVC sanitary sewer pipeline, 650 LF of PVC water line, 600 LF of storm drain pipeline and asphalt pavement. Portions of the storm drain system and asphalt pavement were part of the private infrastructure improvements of the work order and will not be accepted by the City for continuous maintenance.

The City of Albuquerque accepts the referenced project as a whole and the contractual correction period began August 18, 1992. The correction period on this project is for one (1) year.

Sincerely,

Philip Fischer

for Russell B. Givler, P.E.
City Engineer
Public Works Department

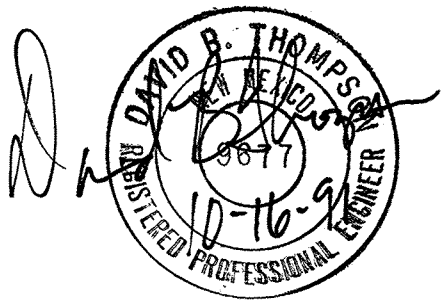
RBG:kj

DRAINAGE REPORT

FOR

TRACT 4B-1 AND 4B-2
INTERSTATE INDUSTRIAL TRACT, UNIT 5

ALBUQUERQUE, NEW MEXICO



Prepared By:
Wilson & Company, Engineers & Architects
6611 Gulton Ct., N.E.
Albuquerque, New Mexico 87109

16 OCTOBER 1991

WILSON
& COMPANY

DRAINAGE REPORT
FOR
TRACT 4B-1 AND 4B-2
INTERSTATE INDUSTRIAL TRACT, UNIT 5
ALBUQUERQUE, NEW MEXICO

SITE LOCATION:

The site is located on Ellison Street just east of Jefferson Street. The site is undeveloped at the present time. The proposed development will include the entire Tract 4B-1, Tract 4B-2 will remain undeveloped, (see Drainage Plan).

METHODOLOGY:

For this site the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque was followed to calculate the peak runoff. The method designated Part A in the revised Section 22.2 was used to determine the runoff for each basin. The charts and formulas in Part A were followed using the 100 year frequency 6 hour rainfall volume as the design storm. The site is located in Zone 2 as determined from Figure A. The peak discharge was determined using Table 9.

The developed storm drainage runoff is designated to drain into the existing Pino Arroyo which is a concrete lined channel. This design and calculations are in compliance with the approved Massey Vaughn Auto Park Grading and Industrial Drainage Plan dated December 1986 prepared by Easterling and Associates.

The drainage plan was prepared to show the following:

A. The proposed improvement to handle and contain the runoff from the design storm in accordance with the requirements for drainage management by the City of Albuquerque.

B. The relationship of on-site improvements with off-site developments to insure an orderly transition between proposed and existing developments.

ANALYSIS:

On-Site: The runoff for each basin was calculated using the methodology described above. The site was divided into three drainage basins. Basin A is the entire Tract 4B-1 while Tract 4B-2 is broken into Basins B and C (see Drainage Plan). Tract 4B-2 is drained to the Pino Arroyo via two existing concrete rundowns. Tract 4B-1 will be detained in an interim desilting baasin and discharged into a "beehive" inlet installed over a 6-foot diameter manhole to be constructed at the upstream side of the existing 42" RCP at the southwest corner of the site. The excess precipitation during a 100-year 6-hour storm is 0.48 inches in Zone 2, Treatment A. This yields a total volume of 7,850 cubic feet. The desilting bassin provides a minimum volume of 8,500 cubic feet. A minimum one foot high berm is located along the west boundary to control erosion.

A summary of the discharge calculations follows:

BASIN	AREA	ZONE	SOIL TYPE	PEAK DISCHARGE CFS/ACRE	Q CFS
A	4.41	2	D	4.7	20.73
B	1.30	2	D	4.7	6.11
C	1.38	2	D	4.7	6.49
				TOTAL	33.33

Q = Area x Peak Discharge Factor

Off-Site: Off-site flows come from two sources. The first is a concrete and asphalt rundown draining Tract 4C. The runoff (12.3 cfs) from Tract 4C is conveyed through Tract 4B-1 via the rundown to the open channel that passes through Tract 4B-1 to the Pino Arroyo. This runoff will be intercepted by a newly constructed Double D inlet within the Auto Park and conveyed through a 24 inch diameter RCP. The 24 inch diameter RCP will be connected to a proposed 6 ft. diameter manhole that will be installed at the upstream end of an existing 42 inch RCP which discharges to the Pino Arroyo, (see Drainage Plan).

The second source is the storm drain system constructed and maintained by the New Mexico State Highway and Transportation Department (NMSHTD). This system was constructed to drain the interchange at San Antonio and I-25.

An analysis of the runoff and flows can be found attached hereto. This system drains through Tract 4B-1 from Ellison Street in a 42 inch RCP for 50 feet then discharges to an open channel for approximately 440 ft. before entering the existing 42 RCP which discharges to the Pino Arroyo. The 42 inch pipe will be removed and plugged and the earthen channel will be filled. This portion of the storm drain system will be relocated to a proposed 20 foot public drainage easement to be located parallel to the east property line. The system will be a 42 inch RCP which will connect to the proposed 6 ft. diameter manhole described in the paragraph above, (see Drainage Plan for location of 42 inch RCP). The following is a summary of the flows and capacities of the new system.

PIPE	FLOW (MAX.)	*CAPACITY
42 inch (New)	55.18 CFS	90 CFS
24 inch (New)	12.3 CFS	37.2 CFS
42 inch (Existing)	67.48 CFS	131.2 CFS

* Capacity was calculated using Manning Equation (N = .013)

Refer to "Off-Site Drainage Analysis" for more information.

4334.90

CONCLUSIONS AND RECOMMENDATIONS:

Development of Tracts 4B-1 and 4B-2 will not have any drainage impacts to the adjacent properties. All flow from the developed and undeveloped areas of the tracts will discharge to the Pino Arroyo. Therefore, we recommend the approval of this drainage plan.

OFFSITE
DRAINAGE ANALYSIS
ELLISON STREET
ALBUQUERQUE, NEW MEXICO

SITE LOCATION:

The site located on Ellison Street between San Pedro Ave. and Hawkins Street. Various business sites drain to Ellison Street in this section as well as the ramps to Interstate 25. The site generally slopes from east to west at varying slopes between 0.5% and 4%. A storm sewer system was built by the NMSHTD to carry the runoff from the interchange.

METHODOLOGY:

For this site the Development Process Manual, Volume 2, Design Criteria for the City of Albuquerque was followed to calculate the peak runoff. The method designated Part A was used to determine the runoff for each basin. The charts and formulas from Part A were followed using the 100-year 6-hour as the design storm. The site is located in Zone 2 as determined from Figure A. The peak discharge was determined using Table 9.

The peak discharge for each basin has been calculated to determine how much of the runoff gets into the storm sewer system versus how much is carried in the road.

ANALYSIS

The runoff for each basin was calculated using the methodology mentioned above. The drainage basins were determined using the City of Albuquerque Topographic Orthophoto Maps and Field Observations (see attached map). Basin A_1 includes San Antonio Street, including the shoulder area from San Pedro to just west of the I-25 Bridge. Also included is the area of the La Quinta Hotel parking lot which drains to the street and the eastern I-25 on/off ramps. Basins A_2, A_3, A_4, and A_5 are the median areas between the on/off ramps and the interstate. A_5 is the area which drains to Ellison Street between I-25 and Hawkins Street, including the developed areas which drain to the street and the western I-25 on/off ramps. Basin A_7 is the portion of the La Quinta Hotel lot which drains to a drop inlet located at the northwest corner of the property. A summary of the runoff calculations follows:

BASINS	AREA	ZONE	TREATMENT	PEAK DISCHARGE CFS/ACRE	Q_{100}
A_1	13.5 AC	2	80% D / 20% C	4.7 / 3.02	59.1
A_2	1.15 AC	2	C	3.02	3.5
A_3	.30 AC	2	C	3.02	.91
A_4	2.6 AC	2	C	3.02	7.85
A_5	1.15 AC	2	C	3.02	3.5
A_6	8.85 AC	2	95% D / 5% C	4.7 / 3.02	40.84
A_7	3.44 AC	2	D	4.7	16.17
				TOTAL	**131.87**

Three analysis points were used. The first is located under the bridge at I-25, the second is just east of the western on/off ramp, and the third is at Hawkins Street. At Analysis Point 1, flow has entered the pipe from 5 different sources. All flows from the median areas, A_2 and A_3 as well as a portion of the La Quinta Hotel Lot (Basin $A_{7)}$ enter the pipe system through the inlets located in each area. There is one inlet located on each ramp of the interstate. The areas of A_1 draining to these inlets produce approximately 4.6 CFS.

The amount of flow accepted by the inlets were calculated by determining the depth of flow in the street using Plates 22.3 D-2 to D-4, then determining amount of flow entering the inlets using Plate 22.3 D-5 (assuming 30% clogging) then calculating the amount of flow through the curb opening using the weir equation and multiplying by an assumed percentage of flow entering the curb opening based on velocity in the street. At Analysis Point 1, the flow in the pipe is 40.68 CFS leaving 39.00 CFS of flow on the road.

The inflow to the pipe at Analysis Point 2 is attributed to the median areas, A_4 and A_5 as well as the partial flow of A_1 entering the inlets. All flows from Basins A_4 and A_5 enter the pipe (11.35 CFS). Also, 10..8 CFS is accepted at each inlet in San Antonio and the total flow in the pipe at Analysis Point 2 is 65.28 CFS leaving 25.8 CFS of flow on the road.

At Analysis Point 3, Basin A_6 introduces its flows to the street adding 40.84 CFS. Using the criteria state above the single inlet located at Analysis Point 3 will intercept 8.1 CFS leaving 50.1 CFS to continue flowing in the road past Hawkins Street. The following table summarizes the runoff which accumulates at each analysis point.

ANALYSIS POINT	CONTRIBUTING BASINS	PEAK RUNOFF-PIPE CFS		PEAK RUNOFF-ROAD CFS TOTAL	TOTAL CFS
		INFLOW	TOTAL		
1	*A_1, A_2, A_3, A_7	40.68	40.68	39.0	79.68
2	A_4, A_5, *A_1	32.95	73.63	17.4	91.03
3	*A_1, *A_6	8.1	81.73	50.1	131.87

*Discharge from basin is only partially intercepted at drop inlets.

The capacity of the pipe using mannings equation at the analysis points is as follows:

AP-1 = 53.47 CFS
AP-2 = 71.14 CFS
AP-3 = 90.00 CFS

From the storm drain master plan completed by Gordon Herkenhoff, Ellison Street can carry up to 164 CFS.

The Hydraulic Grade Line (HGL) for the 42" storm sewer was calculated. At the downstream end at the Pino Arroyo, the 10-year flow depth was used as a starting elevation. The 10-year flow and depth according to the Western Report is 770 CFS and a depth of 2.21 feet. The beginning HGL is 0.94 feet above the invert of the outlet into the channel. The HGL remains in the pipe except at the first manhole where the pipe is slightly under pressure during 100-year flows.

COMP. | LOC. | FILE

CK. | PROJ. | SHEET

DATE | SUBJ. | OF

WILSON & COMPANY

DETERMINE DEPTH OF FLOW IN SAN ANTONIO

FROM DPM SECTION 22.3 STREET FLOW CHARTS

BASIN	REACH	STREET SECTION	Slope	AREA	TREATMENT	Q_{100}
A_1	SA EAST OF I-25	WB - 36', 2% Crown EB - 24'	5.0%	12.5AC	80% D 20% C	54.5CFS
A_1	SA THROUGH I-25	WB - 36', 2% Crown EB - 24'	0.5%			
A_6	SA WEST OF I-25 AT HAWKINS	60' W/2% CROWN	2.4%			
	EAST FRONT ROAD					
A_1	SOUTH OF SA	36' WIDE	4.0%	0.55AC	D	2.6CFS
A_1	NORTH OF SA	36' WIDE	4.5%	0.42 AC	D	2.0CFS
	WEST FRONT ROAD					
A_6	SOUTH OF SA	36' WIDE	3.5%	0.46 AC	D	2.2CFS
A_6	NORTH OF SA	36' WIDE	3.7%	0.40 AC	D	1.9 CFS

ASSUME 30% CLOGGED

REACH	SLOPE	STREET Q_{100} (PLATE 223 D-2)	DEPTH	VEL	# OF INLETS	D-5 GRATE	FLOW THRU EACH CURB OPENING	TOT
SAN ANTONIO(SA) EAST OF I-25.	5.0%	54.5CFS	0.48FT	6.8FPS	2 TYPE A	6.7	1.8 CFS	8.5CFS
SA THROUGH I-25	0.5%	39.0CFS	0.62FT	2.6FPS	2 TYPE A	5.6	5.2 CFS	10.8CFS
EAST FRONT ROAD								
SOUTH OF SA	4.0%	2.6CFS	0.20 FT	3.0FPS	1 TYPE C	1.2CFS	0.5CFS	1.7CFS
NORTH OF SA	4.5%	2.0CFS	0.18FT	3.0FPS	1 TYPE C	1.0CFS	0.4CFS	1.4CFS
WEST FRONT ROAD								
SOUTH OF SA	3.5%	2.2CFS	0.19FT	2.8FPS	1 TYPE C	1.0CFS	0.5 CFS	1.5CFS
NORTH OF SA	3.7%	1.9CFS	0.19FT	2.8FPS	1 TYPE C	1.0CFS	0.5 CFS	1.5CFS
SA WEST OF I-25	2.4%	66.6CFS	0.55FT	5.1FPS	1 TYPE C	7.0CFS	1.1 CFS	8.1CFS

FLOWS IN ELLISON WEST OF HAWKINS = 58.5 CFS

COMP. | LOC. | FILE

CK. | PROJ. | SHEET

DATE | SUBJ. | OF

WILSON & COMPANY

DETERMINE FLOW THROUG CURB OPENING FOR TYPE A INLET

OPENING IS 7' X 6" TYPE A INLET
OPENING IS 3.5' X 6" TYPE C INLET
CHECK WEIR
$Q = C_L H^{3/2}$

REACH	DEPTH	VEL	Qsump	Q ACT	
SA EAST OF I-25	0.48 FT	6.8 FPS	7 CFS	1.8 CFS	ASSUME 25% GETS INTO OPENING
SA THRU I-25	0.62 FT	2.6 FPS	10.3 CFS	5.2 CFS	ASSUME 50%
EAST FRONT ROAD					
SOUTH OF SA	0.20 FT	3 FPS	0.9 CFS	0.5 CFS	ASSUME 50%
NORTH OF SA	0.18 FT	3 FPS	0.8 CFS	0.4	ASSUME 50%
WEST FRONT ROAD					
SOUTH OF SA	0.19 FT	2.8 FPS	0.9 CFS	0.5 CFS	ASSUME 50%
NORTH OF SA	0.19 FT	2.8 FPS	0.9 CFS	0.5 CFS	ASSUME 50%
SA WEST OF I-25	0.55 FT	5.1 FPS	4.3 CFS	1.1 CFS	ASSUME 25%

COMP

CK.

DATE

WILSON & COMPANY

LOC.

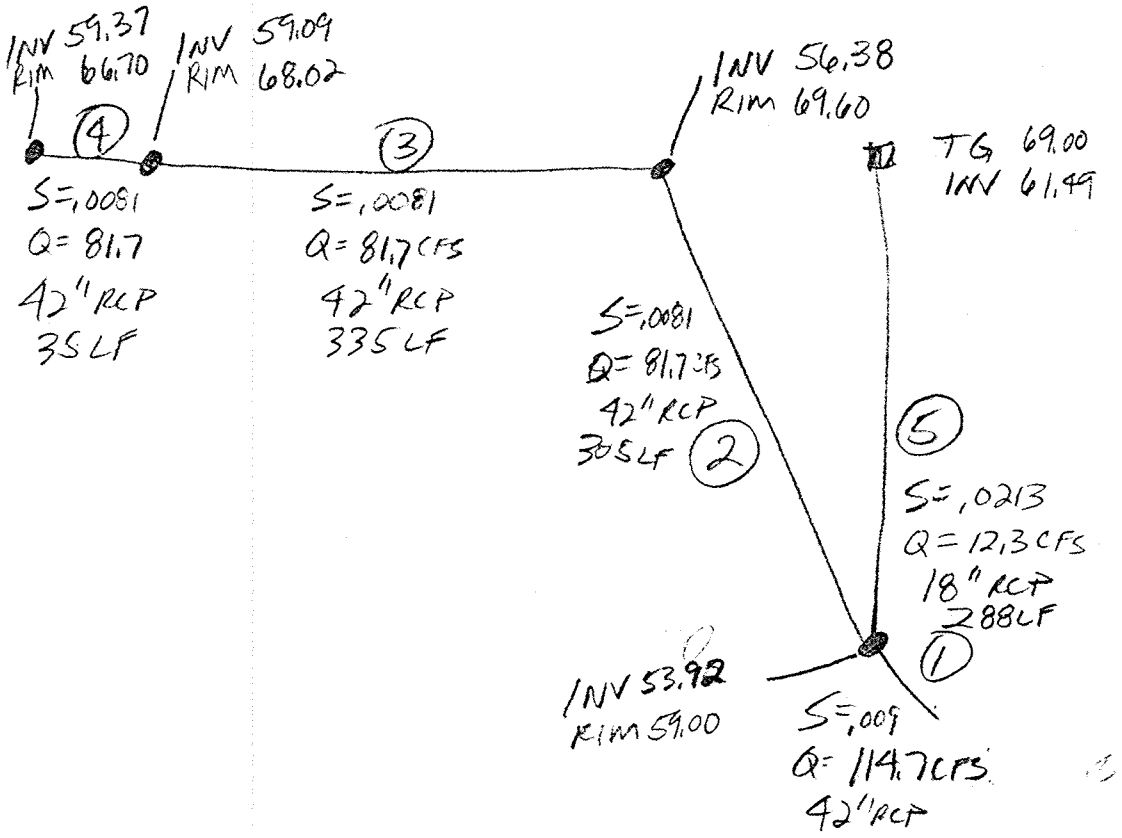
PROJ.

SUBJ.

FILE

SHEET

OF



CHANEL INVERT 52.18

10YR DEPTH 2.21 FT

10YR WATER SURFACE 54.39

Run date: 10-11-1991
File: health.ST3

Return Period = 100 Yrs
Rainfall file: NOT SPECIFIED

LINE 1 / Q = 114.7 / HT = 42 / WID = 42 / N = .013 / L = 50 / JLC = .1

OUTFALL

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	56.70	38.99	53.45	12.31	59.05	21.65	2.32	9.32
UPSTRM	57.41	41.92	53.92	11.92	59.62	3.63	1.58	9.62

Drainage area (ac)	= 0	Slope of invert (%)	= 0.940
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.134
Time of conc (min)	= 4	Critical depth (in)	= 39
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 68.3
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 26.1
Cumulative C*A	= 0.0	Natural ground elev (ft)	= 59
Runoff contr (cfs)	= 114.7	Minimum cover (ft)	= 4
Default Q (cfs)	= 114.7	Depth at inlet opening (in)	= 8
Line capac. (cfs)	= 97.5		

LINE 2 / Q = 81.7 / HT = 42 / WID = 42 / N = .013 / L = 305 / JLC = .2

DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	57.63	42.00	53.92	8.49	58.75	0.00	1.58	9.62
UPSTRM	59.34	35.53	56.38	9.41	60.72	30.32	9.72	8.68

Drainage area (ac)	= 0	Slope of invert (%)	= 0.807
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.643
Time of conc (min)	= 2	Critical depth (in)	= 35
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 48.6
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 18.6
Cumulative C*A	= 0.0	Natural ground elev (ft)	= 69.6
Runoff contr (cfs)	= 81.7	Minimum cover (ft)	= 4

WARNING! JLC of Line 1 too small.
Line capac. (cfs) = 90.4

LINE 3 / Q = 81.7 / HT = 42 / WID = 42 / N = .013 / L = 335 / JLC = .4

DNLN = 2

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	59.62	38.83	56.38	8.77	60.81	21.65	9.72	9.32
UPSTRM	62.01	35.07	59.09	9.52	63.42	31.18	5.41	8.58

Drainage area (ac)	= 0	Slope of invert (%)	= 0.809
Runoff coefficient	= 0	Slope energy grade line (%)	= 0.779
Time of conc (min)	= 0	Critical depth (in)	= 35
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 48.6
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 18.6
Cumulative C*A	= 0.0	Natural ground elev (ft)	= 68
Runoff contr (cfs)	= 81.7	Minimum cover (ft)	= 4
Default Q (cfs)	= 81.7	Depth at inlet opening (in)	= 8
Line capac. (cfs)	= 90.5		

LINE 4 / Q = 81.7 / HT = 42 / WID = 42 / N = .013 / L = 35 / JLC = .2

DNLN = 3

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	62.58	41.82	59.09	8.49	63.70	3.84	5.41	9.62
UPSTRM	62.99	40.75	59.37	8.57	64.13	14.27	3.83	9.54

Drainage area (ac)	= 0	Slope of invert (%)	= 0.800
Runoff coefficient	= 0	Slope energy grade line (%)	= 1.250
Time of conc (min)	= 0	Critical depth (in)	= 35
Inlet time (min)	= 0	Req'd length curb inlet (ft)	= 48.6
Intensity (in/hr)	= 0.00	Req'd grate area (sf)	= 18.6
Cumulative C*A	= 0.0	Natural ground elev (ft)	= 66.7
Runoff contr (cfs)	= 81.7	Minimum cover (ft)	= 4
Default Q (cfs)	= 81.7	Depth at inlet opening (in)	= 8
Line capac. (cfs)	= 90.0		

LINE 5 / Q = 12.3 / HT = 18 / WID = 18 / N = .013 / L = 288 / JLC = .2

DNLN = 1

	HGL	DEPTH	INVERT	VEL	EGL	T WID	COVER	AREA
DNSTRM	57.63	18.00	53.92	6.96	58.39	0.00	3.58	1.77
UPSTRM	63.01	16.24	61.49	7.33	63.84	10.70	6.01	1.68

Drainage area (ac) = 0
Runoff coefficient = 0
Time of conc (min) = 0
Inlet time (min) = 0
Intensity (in/hr) = 0.00
Cumulative C*A = 0.0
Runoff contr (cfs) = 12.3
WARNING! JLC of Line 1 too small.
Line capac. (cfs) = 17.0

Slope of invert (%) = 2.628
Slope energy grade line (%) = 1.895
Critical depth (in) = 16
Req'd length curb inlet (ft) = 7.3
Req'd grate area (sf) = 2.8
Natural ground elev (ft) = 69
Minimum cover (ft) = 4

COMP.

CK.

DATE 10-23-91

WILSON & COMPANY

LOC. ABQ FILE 91-512B

PROJ. INTERSTATE INDUS. SHEET 1

SUBJ. INLET CAPACITY OF 1

CALCULATE CAPACITY OF DOUBLE D INLET AT PC BETWEEN 4B+4C

AREA OF GRATE = $\frac{2.5 \times 4.0}{1.74} = 6.9\ FT^2$

Assume 80% opening = $6.9 \times .80 = 5.5\ ft^2$

2 GRATES = $2 \times 5.5\ ft^2 = 11.0\ ft^2$

Assume 30% Clogged = $11.0 \times .70 = 7.7\ ft^2$

ORIFICE EQUATION

$Q = CA\sqrt{2gh}$ head = 1.0 ft

$Q = .6(7.7)\sqrt{2(32.2)(1.0)} = 37.1$ CFS > 12.3 CFS getting to inlet

THEREFORE OK