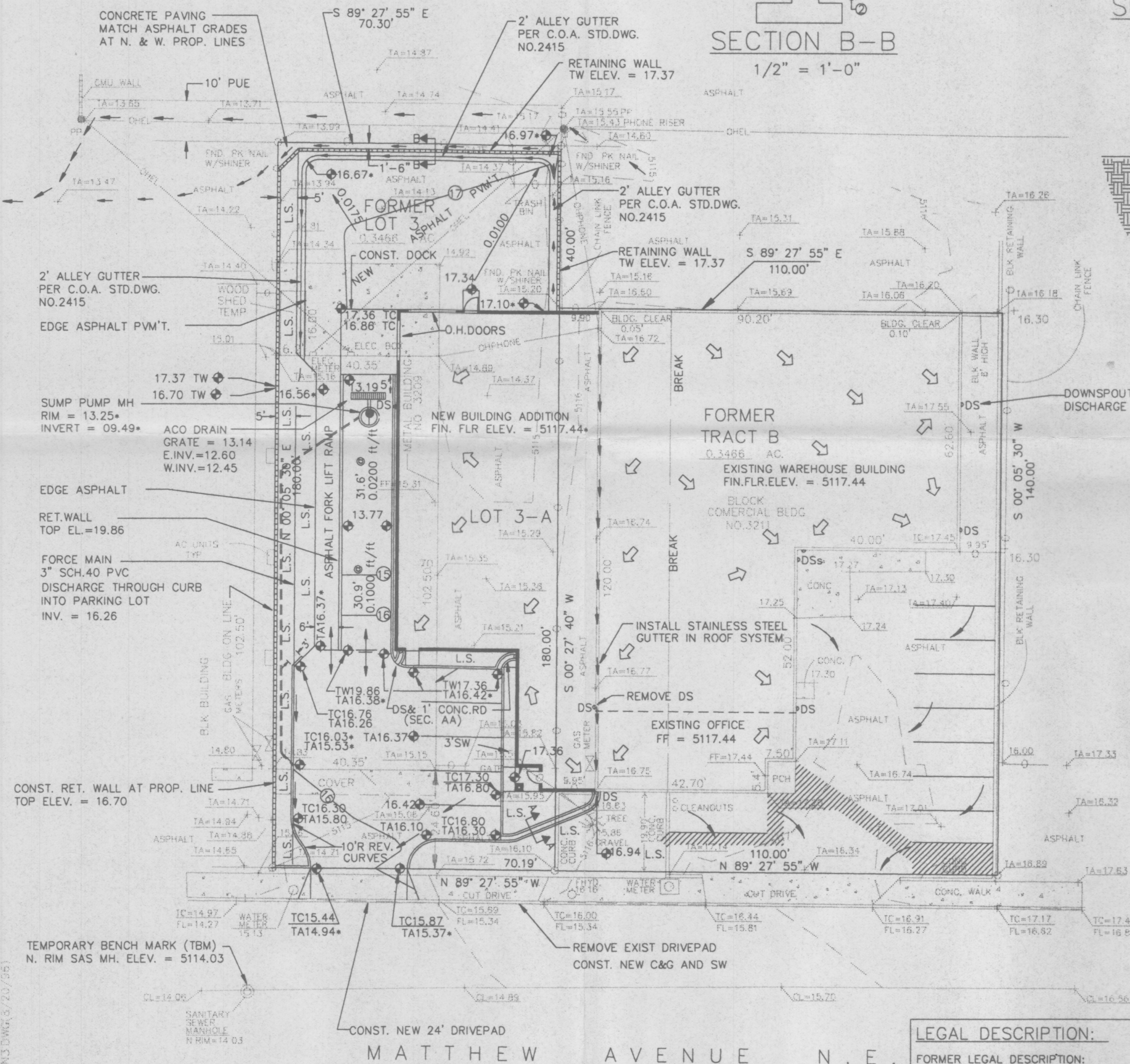


OFF-SITE FLOW ANALYSIS

Since the area north of the new addition is very flat, a flow test was conducted to determine if off-site flow actually enters the site. For purposes of this discussion, the 40' X 70' portion of the site north of the proposed addition will be referred to as the "panhandle". An area which is 63.5' X 111' (7048.5 sf or 0.1618 acre) lies east of the panhandle. This area is all paved and generates a peak 100-year discharge of $Q = 0.1618 \times 4.70 = 0.76$ cfs. A 5/8" garden hose was allowed to run in this area from a point near the NW corner of the existing building and the flow path of the water was noted. The water ran in a northwesterly direction around the NE corner of the panhandle and followed the approximate centerline of the existing 10' public utility easement to a point approximately 50' west of the NW corner of the panhandle. At that point, the flow turned south into Lot 2A and ran into a swale in the asphalt parking lot which is 20' south of, and parallel to, the north property line of Lot 2A (which lot is presently occupied by Safety Counseling). The flow continues west through the concrete paved area of Automatic Fueling, and discharges through a driveway into Richmond Drive.

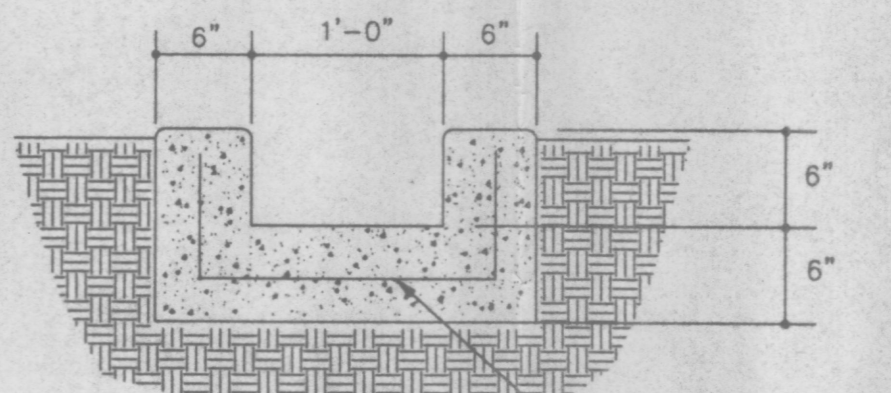
There were points north of the panhandle where pallets placed in the flowpath caused the water to puddle and the overflow from the puddles ran into the site. It is proposed to offset the northerly retaining wall 18" south of the property line and fill that space with a concrete section (see Section B-B) 18" wide and with a depth varying from 2" max. to 0" min. The concrete section is proposed to discharge into a widening concreted apron which will match the existing asphalt in Lot 2A. The space to construct the apron is made available by angling the westerly wall at a 45° angle.

There is no need to offset the retaining wall from the east property line because water will flow along the base of the wall to the corner of the wall where it will enter the concrete section and flow to the west.



SUMP DETAIL

1/2" = 1'-0"



SECTION A-A

1" = 1'-0"

LEGEND:

- EXIST. SPOT ELEV. INDICATES AS-BUILT SPOT ELEV.
- NEW SPOT ELEV.
- EXIST. CONTOUR
- NEW CONTOUR
- ROOF FLOW
- SHEET FLOW
- CONCENTRATED FLOW
- TC TOP OF CURB/CONCRETE
- TA TOP OF ASPHALT
- TW TOP OF WALL
- L.S. LANDSCAPING
- HANDICAPPED STRIPING

LEGAL DESCRIPTION:

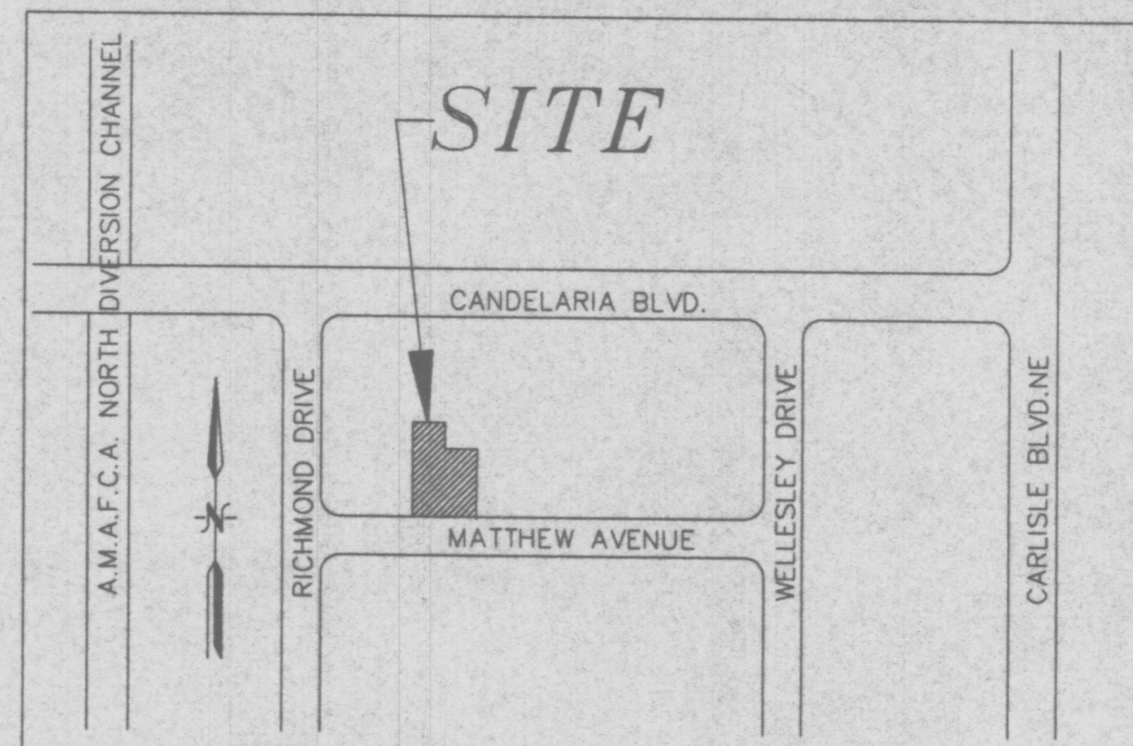
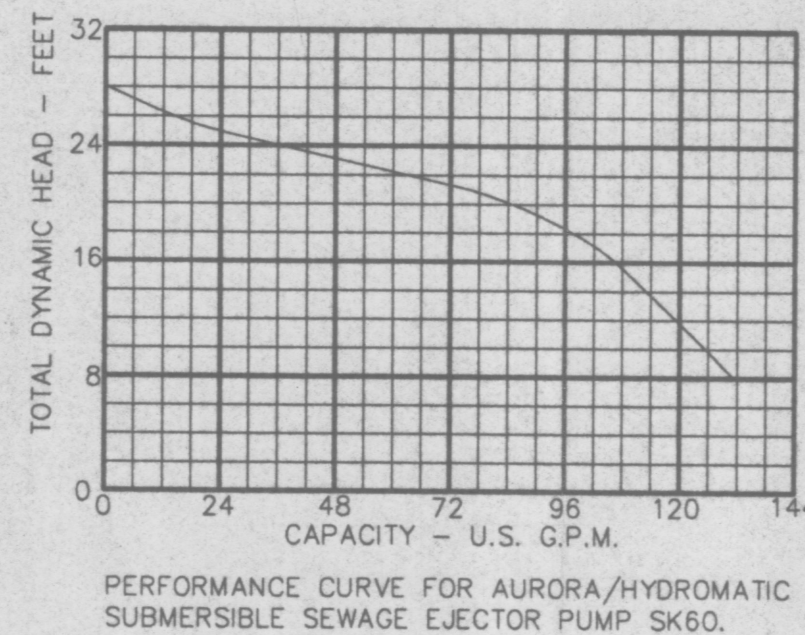
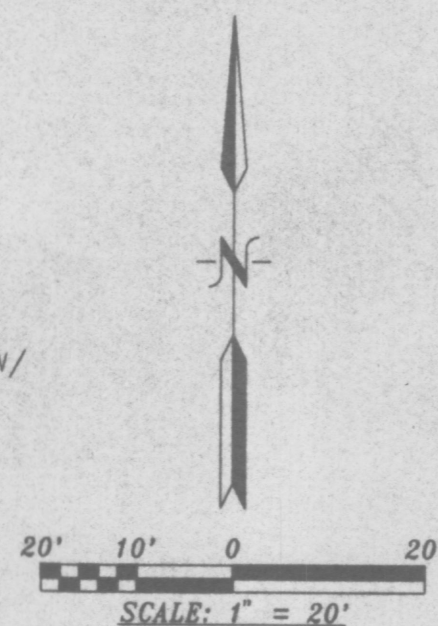
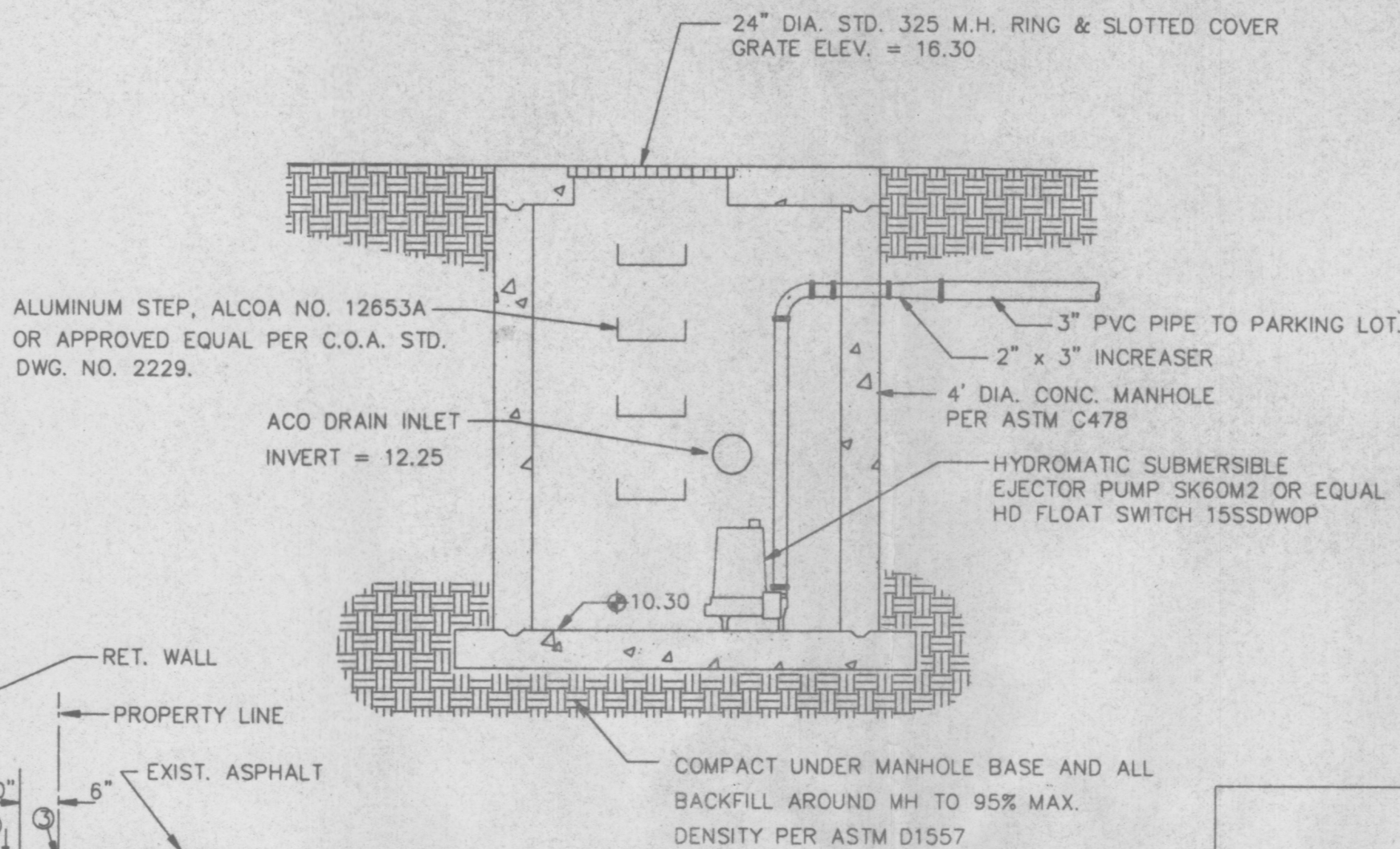
FORMER LEGAL DESCRIPTION:
ALL OF LOT NUMBERED THREE (3) OF THE PLAT OF LOTS 1, 2, AND 3, BUILDING CORPORATION OF AMERICA COMPLEX, FILED IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, ALBUQUERQUE, NEW MEXICO ON APRIL 03, 1974, IN VOLUME A5, FOLIO 48,
TOGETHER WITH
ALL OF TRACT LETTERED "B" OF THE SUMMARY PLAT OF LAND IN BLOCKS C & B OF DUKE CITY INDUSTRIAL AREA SUBDIVISION, FILED IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, ALBUQUERQUE, NEW MEXICO ON JANUARY 25, 1984 IN VOLUME B20, FOLIO 118.
PRESENT LEGAL DESCRIPTION:
LOT 3-A, BUILDING CORPORATION OF AMERICA COMPLEX, FILED IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, ALBUQUERQUE, NEW MEXICO ON DECEMBER 8, 1995, IN VOLUME 95C, FOLIO 439.

GENERAL NOTES:

- 1: ADD 5100 TO SPOT ELEVATIONS TO SHOW TRUE ELEVATION.
- 2: CONTOUR INTERVAL IS ONE (1) FOOT.
- 3: ELEVATIONS SHOWN ARE BASED ON ACS STATION "2-C16", WITH AN ELEVATION OF 5112.36.

NOTE:

UTILITIES SHOWN HEREON ARE IN THEIR APPROXIMATE LOCATION BASED ONLY ON ABOVE GROUND EVIDENCE FOUND IN THE FIELD AND AS-BUILT INFORMATION PROVIDED BY THE CLIENT. UTILITIES SHOWN HEREON, WHETHER INDICATED AS ABANDONED OR NOT, SHALL BE VERIFIED BY OTHERS FOR EXACT LOCATION AND/OR DEPTH PRIOR TO EXCAVATION OR DESIGN CONSIDERATIONS.



VICINITY MAP

ZONE ATLAS NO. H-16

DRAINAGE

CALCULATIONS

EXISTING CONDITIONS:

The site is located on the north side of Matthew Avenue, N.E., between Wellesley Drive and Richmond Drive, N.E. The site is presently developed and has two buildings, the westernmost one of which is now being removed. Nearly all of the existing non-building area is paved with the exception of a small landscaped area. The northerly 40' x 70' portion of the site is paved and drains to the west into an existing paved parking lot where it drains directly west over asphalt to Richmond Avenue. The property to the east of this portion is also paved and it has been graded so that the runoff flows north of the N.E. corner of this portion, and then west along the existing 10' utility easement. This flow pattern was confirmed by running a garden hose in this area and observing the flow pattern. The flow continues to the vicinity of the existing power pole 50' west of the NW corner of the site, where it crosses the fence into the paved parking lot and flows west to Richmond Ave. There is an existing retaining wall along the east property line. The area between the wall and the existing building is paved with asphalt and drains south to the existing parking lot and into Matthew Ave.

PROPOSED CONDITIONS:

It is proposed to construct a building addition and a loading dock as shown on the plan. The east side of the lot will remain the same as it is with the exception of new striping for parking and handicapped spaces. The front parking lot on the west side will be graded to drain to the street. The loading dock truck ramp is too low to drain to the street and will, therefore, require a sump pump to pump the runoff from the loading dock, the area behind the building, and a portion of the new building into the front parking lot where it will drain by gravity into the street. The low point of the truck ramp will be drained by an ACO drain and 6" PVC pipe into the sump pump manhole. Roof runoff from the westerly side of the existing building will be carried to the front of the building by a stainless steel gutter built into the roof system.

DRAINAGE CRITERIA:

The calculations shown on this plan were prepared in accordance with Section 22.2, Hydrology, of the Development Process Manual, Volume 2, Design Criteria, for the City of Albuquerque, in cooperation with Bernalillo County, New Mexico and the Albuquerque Metropolitan Arroyo Flood Control Authority, January, 1993.

PREVIOUS DRAINAGE SUBMITTAL:

A drainage submittal was prepared in 1984 by Resource Technology, Inc. and is filed under Hydrology Number H16 / D56.

PRECIPITATION ZONE:

The site is east of the Rio Grande River but west of San Mateo Boulevard and is, therefore, in Precipitation Zone 2.

LAND TREATMENT AREAS, EXCESS PRECIPITATION AND UNIT PEAK DISCHARGE:

The peak discharge per acre and excess precipitation are shown for the four land treatments in Zone 2 in the table below, and the values shown are from the City of Albuquerque D.P.M. Also shown are the existing and proposed land treatment areas.

LAND TREATMENT	q(cfs/acre)	E (in)	Existing Site Areas	Developed Site Areas
	100-yr.	100-yr.	%	%
			Sq.Ft.	Sq.Ft.
			Acres	Acres
A	1.56	0.38	0.53	0.13
B	2.28	0.95	0.78	0.28
C	3.14	1.71	1.13	0.52
D	4.70	3.14	2.12	1.34
Totals			98.0	27,503
			22.5	6.314
			100.0	28,043
				0.6438

PEAK DISCHARGE:

EXISTING CONDITIONS:
 $Q_{100} = 0.0124 \times 2.28 + 0.6314 \times 4.70 = 3.00$ cfs
 $Q_{10} = 0.0124 \times 0.95 + 0.6314 \times 3.14 = 1.99$ cfs

DEVELOPED CONDITIONS:
 $Q_{100} = 0.0451 \times 2.28 + 0.0064 \times 3.14 + 0.5923 \times 4.70 = 2.91$ cfs
 $Q_{10} = 0.0451 \times 0.95 + 0.0064 \times 1.71 + 0.5923 \times 3.14 = 1.91$ cfs

VOLUME, 100-YEAR, 6-HOUR:

EXISTING CONDITIONS:
 $V_{100} = (540 \times 0.78 + 27,503 \times 2.12) / 12 = 4,894$ cf
 $V_{10} = (540 \times 0.28 + 27,503 \times 1.34) / 12 = 3,084$ cf

DEVELOPED CONDITIONS:
 $V_{100} = (1,964 \times 0.78 + 280 \times 1.13 + 25,799 \times 2.12) / 12 = 4,712$ cf
 $V_{10} = (1,964 \times 0.28 + 280 \times 0.52 + 25,799 \times 1.34) / 12 = 2,939$ cf

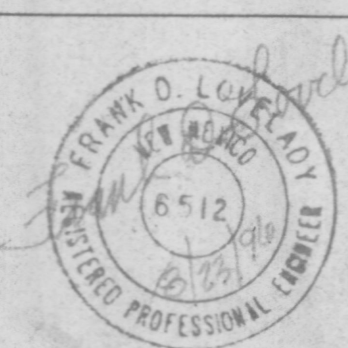
SUMMARY OF VOLUMES AND PEAK DISCHARGE RATES:

	V100(CFS)	V10(CFS)	Q100(CFS)	Q10(CFS)
EXISTING	4,894	3,084	3.00	1.99
DEVELOPED	4,712	2,939	2.91	1.91
DECREASE	182	145	0.09	0.08

ENGINEER'S CERTIFICATION:

HAVING INSPECTED THE AS-CONSTRUCTED FACILITY AND HAVING TAKEN SPOT ELEVATIONS AT KEY LOCATIONS, I HEREBY CERTIFY THAT THE AS-CONSTRUCTED FACILITY IS IN SUBSTANTIAL COMPLIANCE WITH THE APPROVED GRADING AND DRAINAGE PLAN WITH ENGINEER'S STAMP DATED 2/20/96 AND AND REVISION DATED 3/6/96.

FRANK D. LOVELADY, N.M.P.E. 6512
DATE: 8/23/96



FRANK D. LOVELADY, P.E.
300 ALAMOSA ROAD NW
ALBUQUERQUE, NEW MEXICO 87107
(505) 945-2267

AS-CONSTRUCTED G & D PLAN
OFFICE/WAREHOUSE ADDITION FOR
AUTO-CHLOR SYSTEM OF ALBUQUERQUE
3211 MATTHEW AVENUE N.E.
ALBUQUERQUE, NEW MEXICO

Designed: FDL Drawn: FDL Checked: FDL Scale: 1" = 20' Date: AUG. 1996 Job No. 511

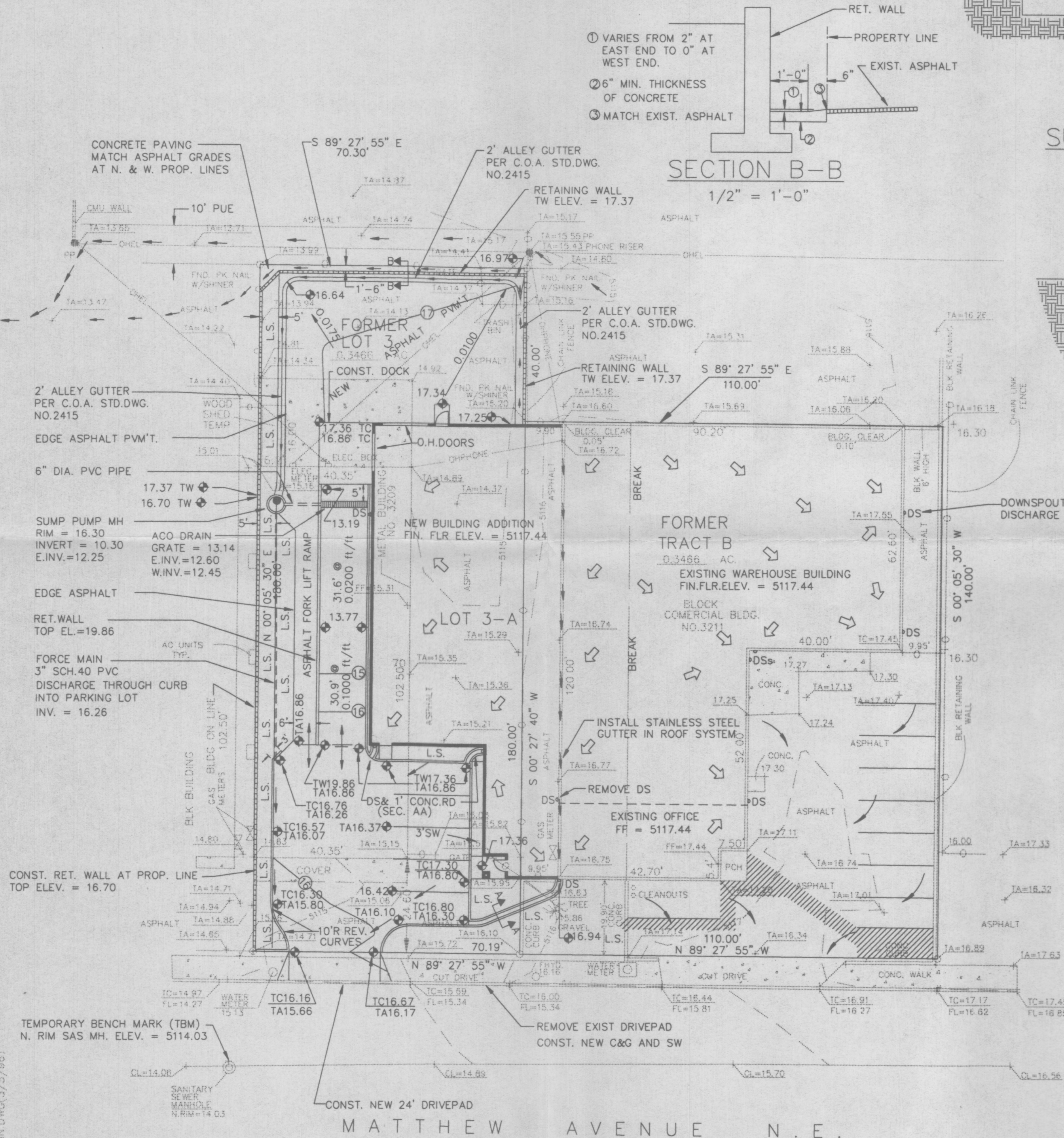
SHEET
OF
1
1

OFF-SITE FLOW ANALYSIS:

Since the area north of the new addition is very flat, a flow test was conducted to determine if off-site flow actually enters the site. For purposes of this discussion, the 40' X 70' portion of the site north of the proposed addition will be referred to as the "panhandle". An area which is 63.5' X 111' (7048.5 sf or 0.1618 acre) lies east of the panhandle. This area is all paved and generates a peak 100-year discharge of $Q = 0.1618 \times 4.70 = 0.76$ cfs. A 5/8" garden hose was allowed to run in this area from a point near the NW corner of the existing building and the flow path of the water was noted. The water ran in a northerly direction around the NE corner of the panhandle and followed the approximate centerline of the existing 10" public utility easement to a point approximately 50' west of the NW corner of the panhandle. At that point, the flow turned south into Lot 2A and ran into a swale in the asphalt parking lot which is 20' south of, and parallel to, the north property line of Lot 2A (which lot is presently occupied by Safety Counseling). The flow continues west through the concrete paved area of Automatic Fueling, and discharges through a driveway into Richmond Drive.

There were points north of the panhandle where pallets placed in the flowpath caused the water to puddle and the overflow from the puddles ran into the site. It is proposed to offset the northerly retaining wall 18" south of the property line and fill that space with a concrete section (see Section B-B) 18" wide and with a depth varying from 2" max. to 0" min. The concrete section is proposed to discharge into a widening concrete apron which will match the existing asphalt in Lot 2A. The space to construct the apron is made available by angling the westerly wall at a 45° angle.

There is no need to offset the retaining wall from the east property line because water will flow along the base of the wall to the corner of the wall where it will enter the concrete section and flow to the west.



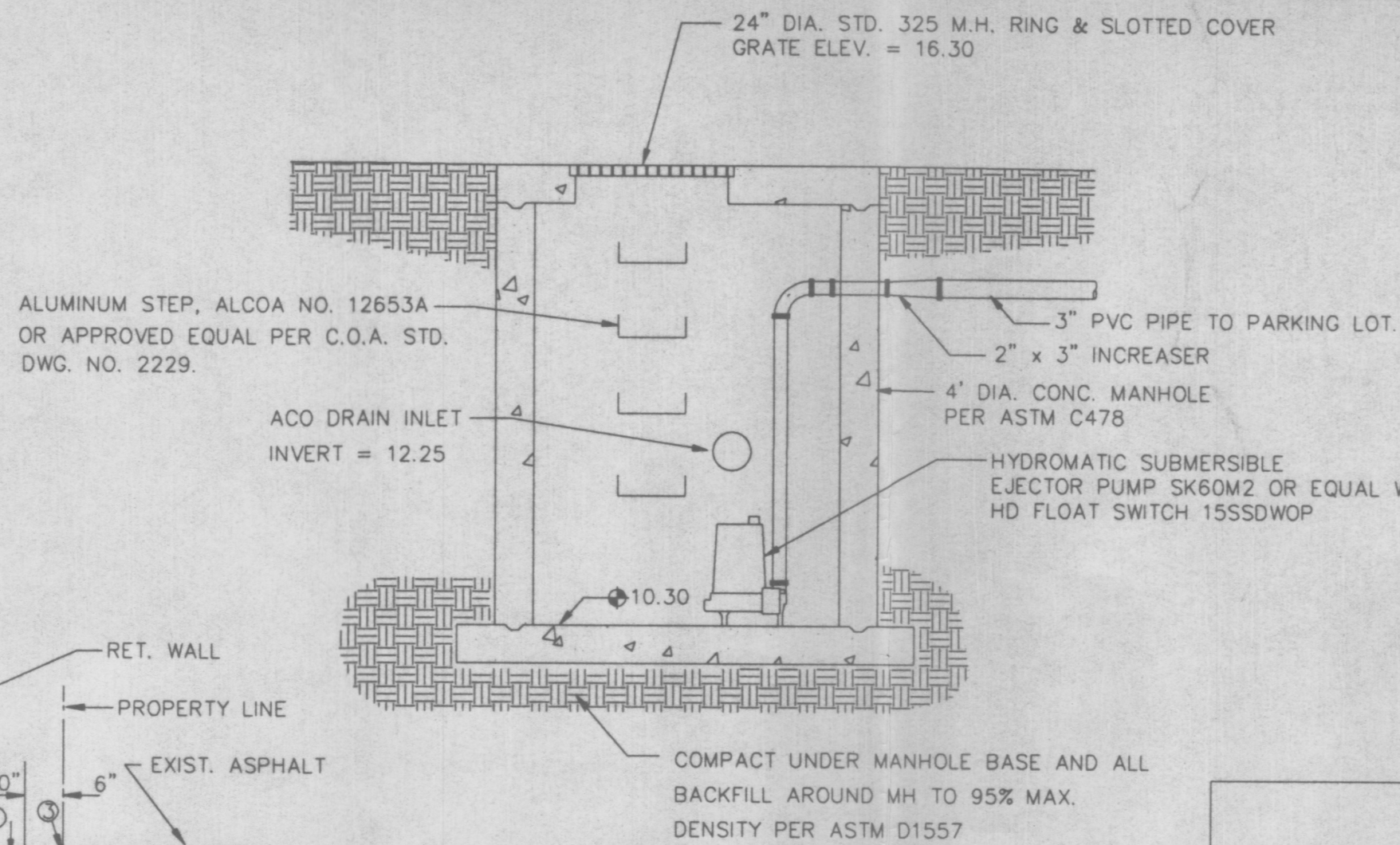
COLVIN DWG(3/5/96)

GENERAL NOTES:

- 1: ADD 5100 TO SPOT ELEVATIONS TO SHOW TRUE ELEVATION.
- 2: CONTOUR INTERVAL IS ONE (1) FOOT.
- 3: ELEVATIONS SHOWN ARE BASED ON ACS STATION "2-G16", WITH AN ELEVATION OF 5112.36.

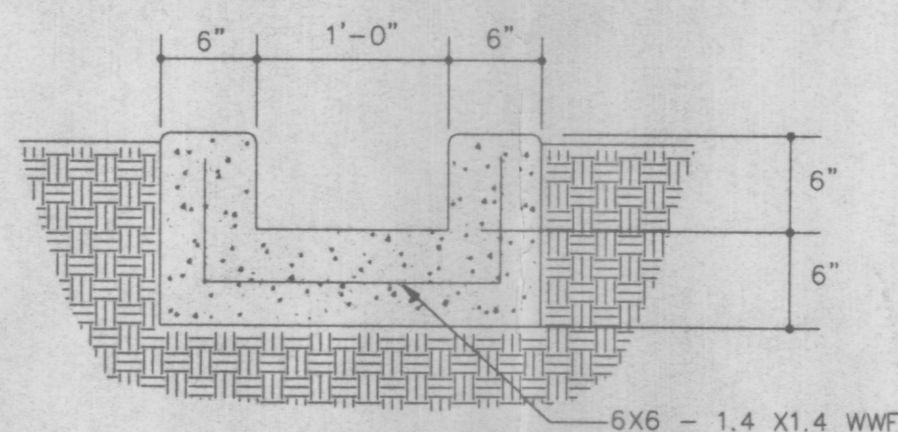
NOTE:

UTILITIES SHOWN HEREON ARE IN THEIR APPROXIMATE LOCATION BASED ONLY ON ABOVE GROUND EVIDENCE FOUND IN THE FIELD AND AS-BUILT INFORMATION PROVIDED BY THE CLIENT. UTILITIES SHOWN HEREON, WHETHER INDICATED AS ABANDONED OR NOT, SHALL BE VERIFIED BY OTHERS FOR EXACT LOCATION AND/ OR DEPTH PRIOR TO EXCAVATION OR DESIGN CONSIDERATIONS.



SUMP DETAIL

1/2" = 1'-0"



SECTION A-A

1" = 1'-0"

LEGEND:

- EXIST. SPOT ELEV.
- NEW SPOT ELEV.
- EXIST. CONTOUR
- NEW CONTOUR
- ROOF FLOW
- SHEET FLOW
- CONCENTRATED FLOW
- TC TOP OF CURB/CONCRETE
- TA TOP OF ASPHALT
- TW TOP OF WALL
- L.S. LANDSCAPING
- HANDICAPPED STRIPING

LEGAL DESCRIPTION:

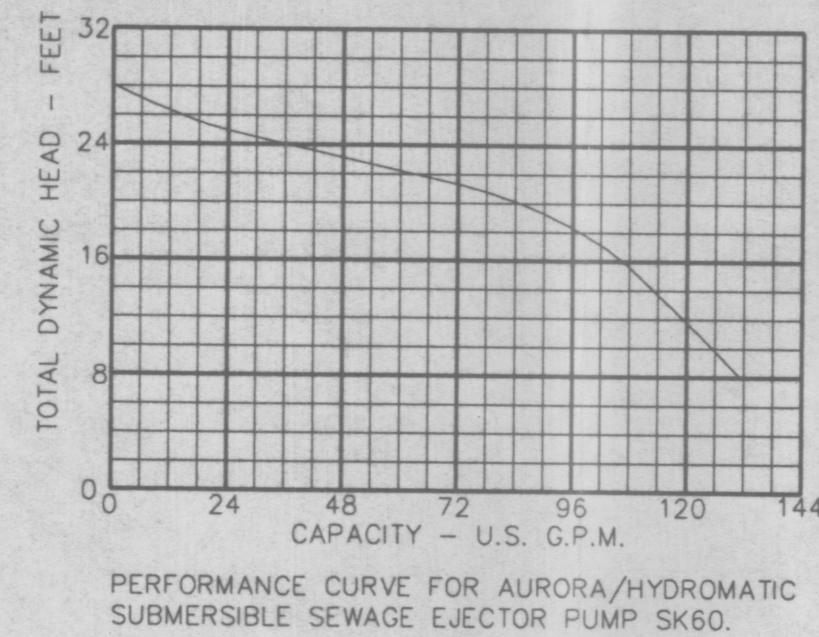
FORMER LEGAL DESCRIPTION:
ALL OF LOT NUMBERED THREE (3) OF THE PLAT OF LOTS 1, 2, AND 3, BUILDING CORPORATION OF AMERICA COMPLEX, FILED IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, ALBUQUERQUE, NEW MEXICO ON APRIL 03, 1974, IN VOLUME A5, FOLIO 48.

TOGETHER WITH

ALL OF TRACT LETTERED "B" OF THE SUMMARY PLAT OF LAND IN BLOCKS C & 8 OF DUKE CITY INDUSTRIAL AREA SUBDIVISION, FILED IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, ALBUQUERQUE, NEW MEXICO ON JANUARY 25, 1984 IN VOLUME B20, FOLIO 118.

PRESENT LEGAL DESCRIPTION:

LOT 3-A, BUILDING CORPORATION OF AMERICA COMPLEX, FILED IN THE OFFICE OF THE COUNTY CLERK OF BERNALILLO COUNTY, ALBUQUERQUE, NEW MEXICO ON DECEMBER 8, 1995, IN VOLUME 95C, FOLIO 439.



DRAINAGE

CALCULATIONS

EXISTING CONDITIONS:

The site is located on the north side of Matthew Avenue, N.E., between Wellesley Drive and Richmond Drive, N.E. The site is presently developed and has two buildings, the westernmost one of which is now being removed. Nearly all of the existing non-building area is paved with the exception of a small landscaped area. The northerly 40' X 70' portion of the site is paved and drains to the west into an existing paved parking lot where it drains directly west over asphalt to Richmond Avenue. The property to the east of this portion is also paved and it has been graded so that the runoff flows north of the N.E. corner of this portion, and then west along the existing 10" utility easement. This flow pattern was confirmed by running a garden hose in this area and observing the flow pattern. The flow continues to the vicinity of the existing power pole 50' west of the NW corner of the site where it crosses the fence into the paved parking lot and flows west to Richmond Ave. There is an existing retaining wall along the east property line. The area between the wall and the existing building is paved with asphalt and drains south to the existing parking lot and into Matthew Ave.

PROPOSED CONDITIONS:

It is proposed to construct a building addition and a loading dock as shown on the plan. The east side of the lot will remain the same as it is with the exception of new striping for parking and handicapped spaces. The front parking lot on the west side will be graded to drain to the street. The loading dock truck ramp is too low to drain to the street and will, therefore, require a sump pump to pump the runoff from the loading dock, the area behind the building, and a portion of the new building into the front parking lot where it will drain by gravity into the street. The low point of the truck ramp will be drained by an ACO drain and 6" PVC pipe into the sump pump manhole. Roof runoff from the westerly side of the existing building will be carried to the front of the building by a stainless steel gutter built into the roof system.

DRAINAGE CRITERIA:

The calculations shown on this plan were prepared in accordance with Section 22.2, Hydrology, of the Development Process Manual, Volume 2, Design Criteria, for the City of Albuquerque, in cooperation with Bernalillo County, New Mexico and the Albuquerque Metropolitan Arroyo Flood Control Authority, January, 1993.

PREVIOUS DRAINAGE SUBMITTAL:

A drainage submittal was prepared in 1984 by Resource Technology, Inc. and is filed under Hydrology Number H16 / D56.

PRECIPITATION ZONE:

The site is east of the Rio Grande River but west of San Mateo Boulevard and is, therefore, in Precipitation Zone 2.

LAND TREATMENT AREAS, EXCESS PRECIPITATION AND UNIT PEAK DISCHARGE:

The peak discharge per acre and excess precipitation are shown for the four land treatments in Zone 2 in the table below, and the values shown are from the City of Albuquerque D.P.M. Also shown are the existing and proposed land treatment areas.

LAND TREATMENT	q(cfs/acre)		E (in)		Existing Site Areas		Developed Site Areas	
	100-yr	10-yr	100-yr	10-yr	%	Sq.Ft.	%	Sq.Ft.
A	1.56	0.38	0.53	0.13	0.0	0.0	0.0	0.000
B	2.28	0.95	0.78	0.28	0.0	540	0.0124	7.0
C	3.14	1.71	1.13	0.52	0.0	0.0	1.0	280
D	4.70	3.14	2.12	1.34	98.0	27,503	92.0	25,799
Totals					100.0	28,043	100.0	28,043

PEAK DISCHARGE:

EXISTING CONDITIONS:

$$Q_{100} = 0.0124 \times 2.28 + 0.6314 \times 4.70 = 3.00 \text{ cfs}$$
$$Q_{10} = 0.0124 \times 0.95 + 0.6314 \times 3.14 = 1.99 \text{ cfs}$$

DEVELOPED CONDITIONS:

$$Q_{100} = 0.0451 \times 2.28 + 0.0064 \times 3.14 + 0.5923 \times 4.70 = 2.91 \text{ cfs}$$
$$Q_{10} = 0.0451 \times 0.95 + 0.0064 \times 1.71 + 0.5923 \times 3.14 = 1.91 \text{ cfs}$$

VOLUME, 100-YEAR, 6-HOUR:

EXISTING CONDITIONS:

$$V_{100} = (540 \times 0.78 + 27,503 \times 2.12) / 12 = 4,894 \text{ cf}$$
$$V_{10} = (540 \times 0.28 + 27,503 \times 1.34) / 12 = 3,084 \text{ cf}$$

DEVELOPED CONDITIONS:

$$V_{100} = (1,964 \times 0.78 + 280 \times 1.13 + 25,799 \times 2.12) / 12 = 4,712 \text{ cf}$$
$$V_{10} = (1,964 \times 0.28 + 280 \times 0.52 + 25,799 \times 1.34) / 12 = 2,939 \text{ cf}$$

SUMMARY OF VOLUMES AND PEAK DISCHARGE RATES:

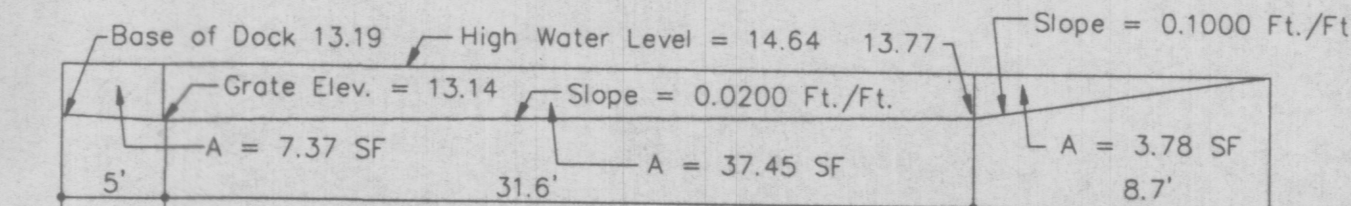
	V100(CF)	V10(CF)	Q100(CFS)	Q10(CFS)
EXISTING	4,894	3,084	3.00	1.99
DEVELOPED	4,712	2,939	2.91	1.91
DECREASE	182	145	0.09	0.08

AREAS DRAINING TO SUMP, VOLUMES AND DISCHARGE RATES:

LAND TREATMENT	AREA (Sq.Ft.)	AREA (Acres)	V100 (CF)	Q100 (CFS)
A	0	0.0000	0	0.00
B	1,272	0.0292	83	0.07
C	0	0.0000	0	0.00
D	5,968	0.1370	1,054	0.64
Totals	7,240	0.1662	1,137	0.71

CALCULATION OF REQUIRED MINIMUM DISCHARGE RATE:

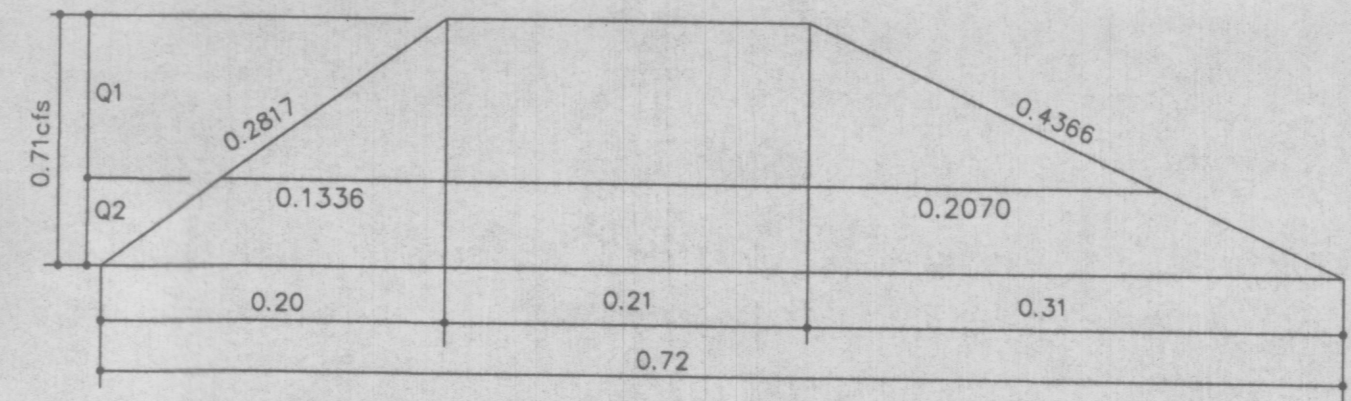
It is assumed that during the 100-year storm, ponding could be permitted in the dock basin to a depth of 1.5 feet. The volume is calculated as follows:



$A = 48.60 \text{ SF}$ Width = 12' Volume = $48.60 \times 12 = 583 \text{ cf}$
Vol. in Manhole = $12.56(14.64 - 10.30) = 54.50 \text{ cf}$ use 54 cf. For vol. of pumps- Assume 4 cf.
Total Volume = $583 + 54 = 633 \text{ cf}$.

$$E = (1,137(0.78) + 5,968(2.12)) / 7,240 = 1.88 \text{ in.}$$
$$t_B = (2,107 \times 1.88 \times 0.1662 / 0.71) - (0.25 \times 0.1370 / 0.1662) = 0.72 \text{ hr.}$$
$$t_P = (0.7 \times 0.2) + ((1.6 - (0.1370 / 0.1662)) / 12) = 0.20 \text{ hr.}$$

Continue the peak for $0.25 \times (0.1370 / 0.1662) = 0.21 \text{ hr.}$



$V_{100} = (1/2(0.71 \times 0.20) + 0.71 \times 0.21 + 1/2(0.71 \times 0.31) \times 3,600 = 1,189 \text{ cf}$
Because volumes from the above diagram are slightly larger than the calculated V100, a factor of $1189/1137 = 1.0457$ is used to convert volumes in the above diagram to actual volumes, and vice versa. Convert storage volume to diagram volume. $633 \times 1.0457 = 662 \text{ cf}$

Solve for Q1 using the quadratic equation.
 $V_{pond} = (1/2(Q1 \times 0.2817 Q1) + 0.21 Q1 + 1/2(Q1 \times 0.4366 Q1)) \times 3,600 = 662 \text{ cf}$
 $(0.1409 Q1^2 + 0.21 Q1 + 0.2183 Q1^2) \times 3,600 = 662$
 $0.3592 Q1^2 + 0.21 Q1 = 0.1839$ or $0.3592 Q1^2 + 0.21 Q1 - 0.1839 = 0$
Quadratic Equation Solution:
 $-0.21 \pm \sqrt{0.21^2 - 4 \times 0.3592 \times (-0.1839)} / (2 \times 0.3592) = 0.3453 / 0.7184 = 0.4807 \text{ cfs}$
CALCULATE BASE OF PONDING VOLUMES (UPPER PORTION OF DIAGRAM):
 $0.2817 Q1 = 0.2817 \times 0.4807 = 0.1354$ $0.4336 Q1 = 0.4336 \times 0.4807 = 0.2084$
 $V_{pond} = (1/2(0.4807 \times 0.1354) + 0.4807 \times 0.21 + 1/2(0.4807 \times 0.2084)) \times 3,600 = 661$ (Check)
Required minimum discharge = $0.71 \text{ cfs} - 0.48 \text{ cfs} = 0.23 \text{ cfs}$

PUMP SELECTION:

Static Head: $16.26 - 12.25 = 4.01 \text{ Ft.}$ Friction loss: Flow = 0.24 cfs $\times 448.83 \text{ gpm/cfs} = 103.23 \text{ gpm.}$ This is the peak pumping capacity required during the 100-year storm.
For 125 gpm w/ 3" PVC pipe, friction loss is 3.7 Ft./100 Ft. Length of pipe = 72 Ft.
2 ea. 90 deg. bends and one check valve. $2 \times 7.7 + 25.5 = 40.9 \text{ Ft.}$
Total length is $72 + 40.9 = 112.9 \text{ Ft.}$ Friction Loss = $112.9(3.7 / 100) = 4.17 \text{ Ft.}$
Total Dynamic Head (TDH) = $4.01 + 4.17 = 8.18 \text{ Ft.}$ Use Hydromatic SK 60 Submersible Sewage Ejector Pump.

FRANK D. LOVELADY, P.E.
2/20/96
REVISED 3/6/96

FRANK D. LOVELADY, P.E. 300 ALAMOSA ROAD NW ALBUQUERQUE, NEW MEXICO 87107 (505)345-2267				GRADING AND DRAINAGE PLAN OFFICE/WAREHOUSE ADDITION FOR AUTO-CHLOR SYSTEM OF ALBUQUERQUE 3211 MATTHEW AVENUE N.E. ALBUQUERQUE, NEW MEXICO				SHEET OF 1			
Designed	FDL	Drawn	FDL	Checked	FDL	Scale:	1" = 20'	Date:	MAR. 1996	Job No.	511