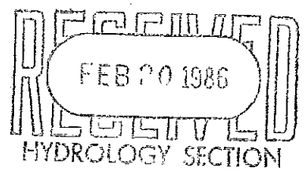
DRAINAGE PLAN
for
KELEHER EXECUTIVE CENTRE

October, 1985

Revised February, 1986



Prepared By:

SCANLON AND ASSOCIATES
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Albuquerque, NM 87110

Scanlon Job No. 85131

DRAINAGE MANAGEMENT PLAN
Keleher Executive Centre
2nd & Lomas NE
Formerly Lots 12, 13, 14, 15, 16, & North 10' of
Lot 17; Block 12, Francisco Armijo Y Otero Addn.
Filed May 4, 1892

1. Purpose and Scope

This report is in accordance with the Albuquerque Development Process Manual requirements for a drainage report and plan for all new development.

2. Site Location

This tract of land is located in the downtown area of Albuquerque at the north east corner of 2nd Street and Lomas Boulevard. The site is zoned M-1. This tract is currently developed and consists of single story buildings and impervious parking areas. All surrounding areas are developed. The alleyway to the rear (side) of this property is not paved.

3. Existing Drainage Conditions

The existing site drains to the south and west at an average rate of 0.86% slope. Site soils types are of the Glendale Loam Series. These soils are predominately clayey loams of low permeability. These soils do not affect site drainage conditions due to the lack of pervious areas:

The Keleher tract is 19,170 square feet in area (0.4401 acres) and all drainage flows from this site travel from the general NE to the south and to the west and end in a pair of inlets (one single and one double) at each end of the curb returns for Lomas and 2nd Street at the northwest corner of the intersection.

Some off-site flows cross this tract from the residential lot to the immediate north. Flows from area A1 (see plan sheet G1) flow south and east through the easternmost line of the Keleher tract. Flows from Area A2 (see plan sheet G1) flow across the north east corner of the Keleher tract to the alley at the rear (east) of the tract. Both areas are extremely small in size. Area A1 consists of 525 square feet of area and

area A2 consists of 92Ø square feet of area. The flows generated from these areas are very low, and positive drainage measures are adequate to handle these areas.

4. Hydrologic Considerations

The proposed Keleher Building will not exceed the existing drainage conditions, since the existing site is fully covered by buildings and parking lots. This tract is an infill tract within the fully developed area of downtown Albuquerque.

This immediate area of Albuquerque's Downtown (as well as many other areas surrounding the Downtown Area) is subject to flooding during high intensity storms (1Ø-year recurrence and above), due entirely to the inadequacy of the adjacent storm sewer facilities. This potential flooding of this site is not due in any way to the development of this site, but to evolution in the ways Albuquerque has tried to deal with this problem.

Therefore, the only considerations of redevelopment consist of (1) the proper handling of drainage and (2) protection from potential flooding.

We will first deal with Item 2, the potential flooding in and around this site. The Federal Emergency Management Agency's "FIRM Flood Insurance Rate Map" of Albuquerque (see Exhibit II) shows the street network surrounding this site to be subject to "Zone AØ-1ft Depth", which means the site must be flood proofed to above this 1 foot depth. The entire building site is designed to meet this criteria, in that (1) the lower level parking area down ramp has an elevation of 2 feet above the street gutter grade at this point (2) the entire lower level is surrounded by reinforced concrete walls with exterior water proofing (3) no occupied public space is in the lower area except for elevators and stairwells. The remainder of areas are storage.

Second, we will deal with the proper handling of drainage. Areas of this tract are exposed to storm drainage at three separate levels, due to the exposed nature of the two-level parking structure.

The lower level parking ramp is exposed to storm drainage since it extends beyond the roof area above. This area is shown as Area B on sheet G1 of the Grading

and Drainage Plan, and consists of 1220 square feet of drainage area. This area drains to a trench drain which is set at about elevation 50.01 (or approximately 5 feet below street level). Thence from this trench drain the water drains to a wet well area and two 1 1/2 HP sump pumps (rated at 100 gpm @ 25' TDH) each which discharges this water into the roof drainage collector pipes, and thence exits the building into the double inlet at the SE corner of the curb return at the SW corner of the site. No subsurface waters are designed to be part of this system, and site foundation & geological borings show the underground water level to be 33 feet below the surface. (See borings supplied with building plans for permit.)

The upper level parking area is also exposed to storm drainage since it also extends beyond the roof area above and consists of 4235 square feet of drainage area. This area (see sheet G2 of the Grading and Drainage Plan) drains down the up ramp and along the gutter to the aforementioned double inlet. This upper level parking area varies from elevation 60.06 to 55.00± before it exits the building (or from 5 foot above ground level down to approximately 2 foot above the adjacent street level). Also draining to the same street area is the building front patio area (Area E) which consists of 1290 square feet of Impervious Areas and 725 square feet of Pervious Areas that do not drain directly (Planter Areas). D.A. #C

The third level at which storm drainage is collected on this site, is the roof area atop the sixth floor. This area consists of 11,700 square feet of area. This roof area drains by means of four roof area drains, and is drained from the building roof to the roof drainage collector pipes, and thence exits the building into the double inlet at the aforementioned SE corner of the 2nd and Lomas curb returns. D.A. #D

During all stages, Architect and Contractor shall act to control erosion at all times in accordance with the proceedures of Section 22.5 of the City of Albuquerque DPM.

During the Foundation Excavation Stage, the contractor shall provide staked straw bales around the perimeter of the excavation to prevent silt and other eroded soils from passing into the storm drainage system. All earthmoving activities shall be limited to this area.

During later stages, the contractor shall initiate his own plan which meets the guidelines of EPA publication EPA-R2-72-OIS and the satisfaction of the City Hydrology Department.

6. Conclusions

The results of computations show that the developed versus existing peak runoff for the 1ØØ-year recurrence, 6-hour duration rainfall for this site is essentially the same. (Q 1ØØ developed is 1.98 cfs.) Therefore we conclude that free discharge of site drainage is warranted.

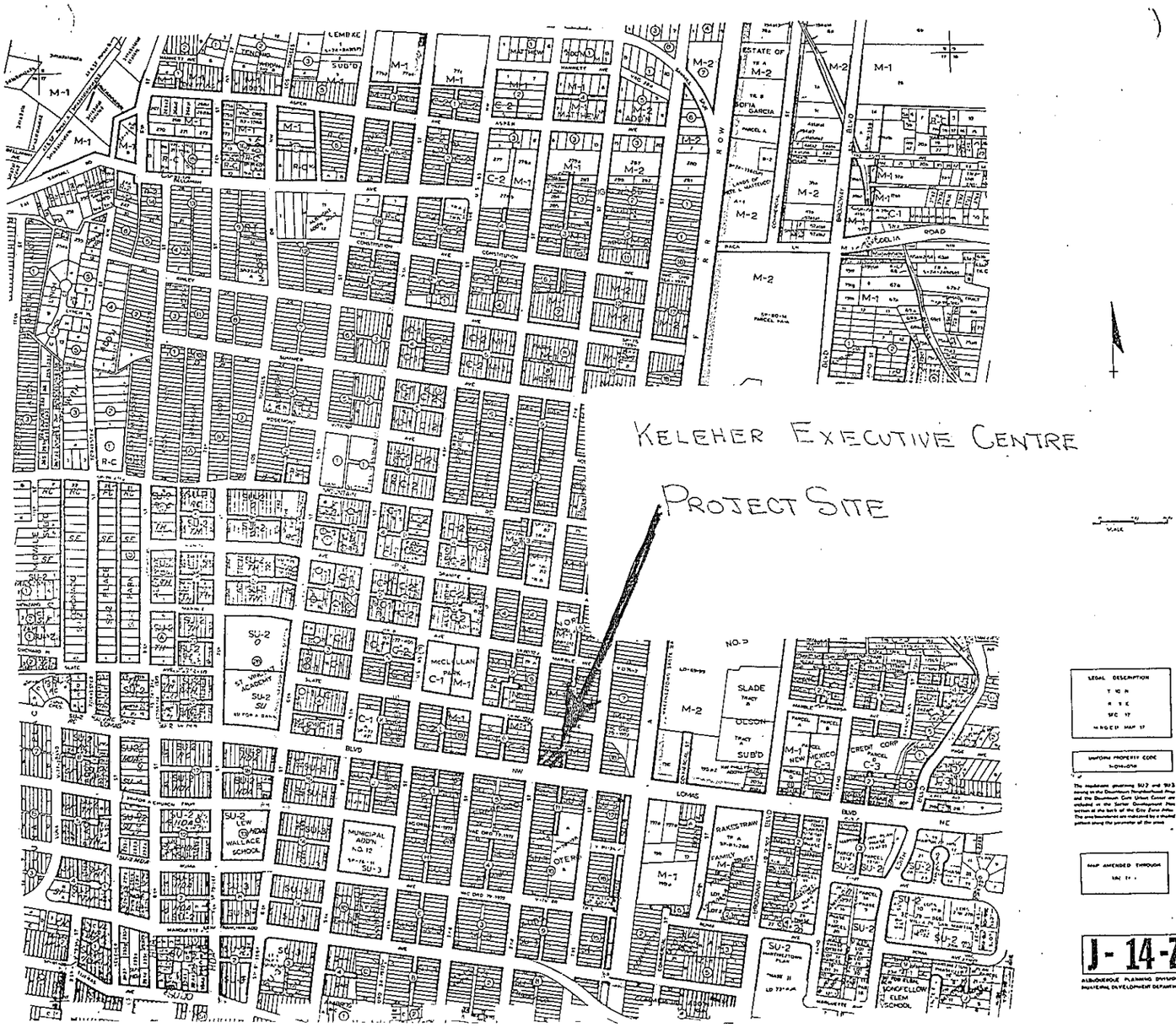
The site has been suitably protected from flooding shown on the FIRM Flood Map.

The physical seperation of this site from the adjacent alleyway (by reinforced concrete wall), and the existing positive drainage of this alleyway, both assure that improvements to the alleyway are not required at this time. However, alley grades have been provided for future construction.

APPENDIX A

Exhibits and Drainage Computations

EXHIBIT I


KELEHER EXECUTIVE CENTRE
PROJECT SITE
LEGAL DESCRIPTION
UNIFORM PROPERTY CODE
MAP AMENDED THROUGH
J-14-Z
ALBUQUERQUE PLANNING DIVISION
INDUSTRIAL DEVELOPMENT DEPARTMENT

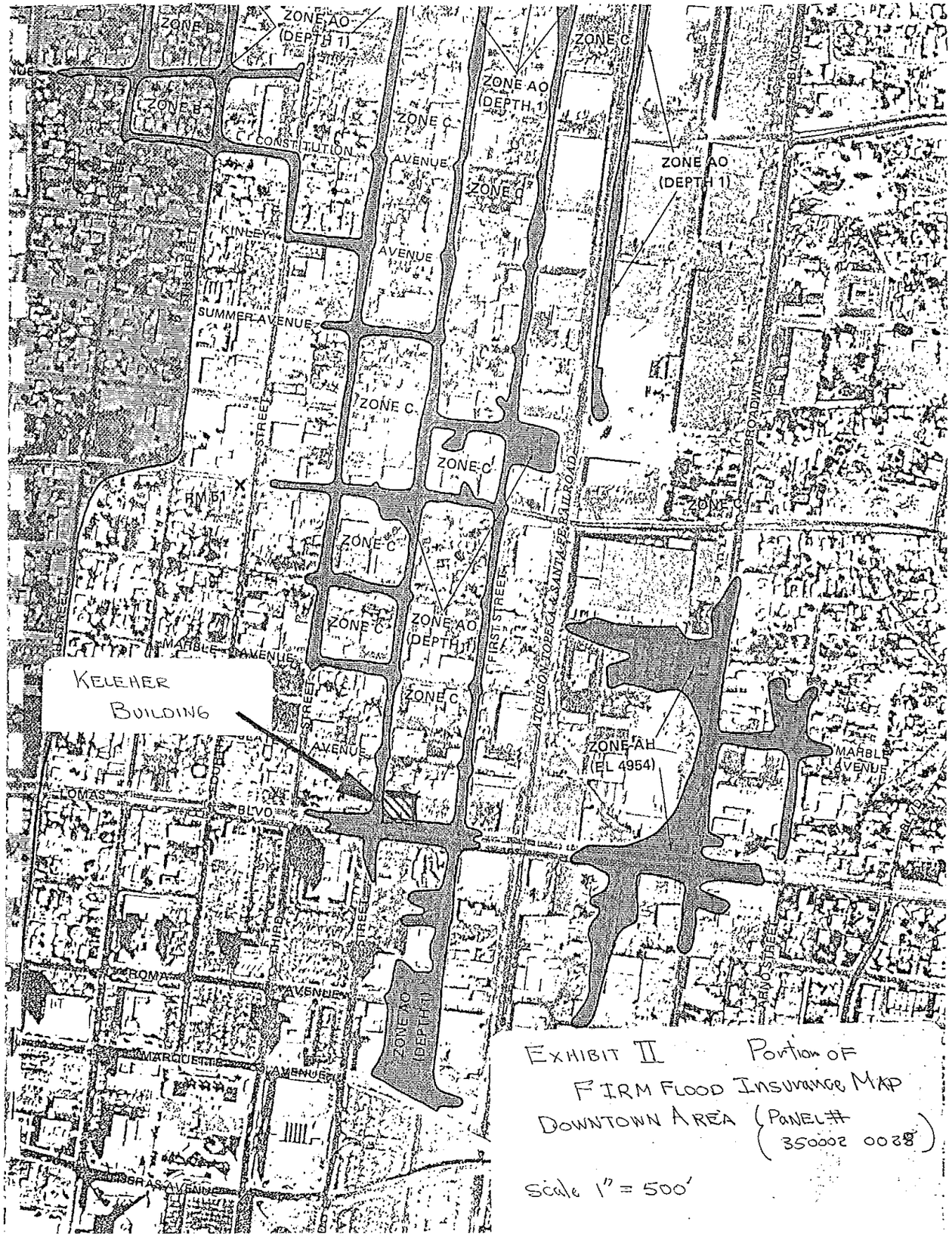


EXHIBIT II Portion of
FIRM FLOOD INSURANCE MAP
DOWNTOWN AREA (PANEL # 350002 0028)

Scale 1" = 500'

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Project Kelsher Building
Location 2nd & Lomas (Albuquerque)
Job No. 85131 Date Oct 9, 85
By DDB Sheet 1 of 5

Hydrologic and Hydraulic Computations

Using City of Albuquerque DPM Criteria
Section 22.2

I Hydrologic

A. Existing Conditions

Lot Acreage = 19,170 SQFT (0.4401 Acres)

Soil is Glendale Loam — (0 to 1% Slope)

Hydrologic Soil Group B

This Site Contains < 1% Slopes and almost 100% Impervious Areas

CN (From Plate 22.2 C-1)

= 98

B C-factors

Modifications to Natl
Produce C-factors

Calculate % Impervious

$$\frac{19,170 - 725}{19,170} = 96.22\ \%\ \text{Impervious}$$

Now - Using Hydrologic Group B, 96.22% Impervious and Plate 22.2 C-1

The "C" factor for use in the

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Job No. 85131 Date Oct 9, 85
By DDB. Sheet 2 of 5

C Time Of Concentration

As Per DPM Procedure

Use Kirpich relationship for Upper Level Garage $L = 245'$, $\Delta H = 8'$

$$T_c = 0.0078 \frac{L^{0.77}}{S = \left(\frac{\Delta H}{L}\right)^{0.385}} = 0.0078 \frac{(245)^{0.77}}{(0.0327)^{0.365}}$$

$$= 2.01 \text{ minutes}$$

but we utilize a minimum of $T_c = 10$ minutes
(See 22.2 Sheet 4)

D Intensity

(1) 10 Year Frequency
100 Year Frequency

From 22.2 Plates D-1 & D-2 rainfall Values (6 hr rainfall

$I_{100} = 2.22$ inches

$I_{10} = 0.657(2.22) = 1.46$ inches

for $t_c = 10$ minutes (from plate 22.2 D-2

$i_{10} = 1.46 (2.16) = 3.15$ in/hour

$i_{100} = 2.22 (2.16) = 4.80$ in/hour

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Project Kelehan Building
Location 2nd & Lomas (NW Albuquerque)
Job No. 85131 Date Revised 2/17/86
By DDB Sheet 3 of 5

PEAK FLOWS $Q = C_1 C_2 I A$ Onsite

EXISTING CONDITIONS (For Comparison)

$Q_{10} = 0.98(3.15)(0.44) = 1.36$ cfs

$Q_{100} = 0.98(4.80)(0.44) = 2.07$ cfs

PROPOSED IMPROVEMENTS

1. Roof Area — Drains to Inlet — A = 11,700 sq ft (0.269 Acres)
   $Q_{10} = 0.94(3.15)(.269) = 0.80$ cfs
   $Q_{100} = 0.94(4.80)(.269) = \boxed{1.21 \text{ cfs}}$

2. Lower Level Parking — Drains to Pump/Inlet — A = 1,220 Sq Ft (0.028 Acres)
   $Q_{10} = (\text{"} \quad \text{"})0.028 = 0.08$ cfs
   $Q_{100} = (\text{"} \quad \text{"})0.028 = \boxed{0.12 \text{ cfs}}$

3. Upper Level Parking And Sidewalk Areas — Drains to Street — A = 6250 Sq Ft (0.143 Acres)
   $Q_{10} = (\text{"} \quad \text{"})0.143 = 0.42$ cfs
   $Q_{100} = (\text{"} \quad \text{"})0.143 = \boxed{0.65 \text{ cfs}}$

Summary of Q_{100} Developed is 1.98 cfs $\leq$ 2.07 Existing

VOLUMES OF RUNOFF (100 Yr) Onsite

1. Roof Area "D"
   $\forall_{100} = \frac{11,700 \times 0.94 \times 2.22}{12} = \boxed{2035 \text{ cubic feet}}$

2. Lower Level Parking Area "B"
   (To Simp Pump — * See Computations for Simp Pump in Appendix B)
   $\forall_{100} = \frac{1,220 \times 0.94 \times 2.22}{12} = \boxed{212 \text{ cubic feet}}$

3. Upper Level Parking "C" "E" and Sidewalk Areas
   $\forall_{100} = \frac{6,250 \times 0.94 \times 2.22}{12} = \boxed{1087 \text{ cu ft}}$

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Project Kelehan Building
Location 2nd & Lomas (Alvarado Revenue)
Job No. 85131 Date Revised 2/17/86
By DDB Sheet 4 of 5

Offsite Flow Analysis

A. Flow to West of Tract (Area A1.)

Area A_1 = 525 Sq.ft. = 0.0121 Acres

T_c = 10 minutes { i_{10} = 3.15 in/hr, i_{100} = 4.80 in/hr

c-factor = 0.70

rainfall = 2.22 inches (100 Yr)
= 1.46 inches (10 Yr)

1. Peak flows $Q = ciA$

$Q_{10} = 0.7(3.15)0.0121 = 0.0267$ cfs

$Q_{100} = 0.7(4.80)0.0121 = 0.0405$ cfs

2. Runoff Volume

(100 Yr) $\forall_{100} = \frac{525 \times 0.70 \times 2.22}{12} =$ 68 cubic feet

10 Yr $\forall_{10} = \forall_{100} \times 0.652 =$ 44 cubic feet

This Area will produce in a 100 Year Storm a peak flow of approximately 18 gpm with a total runoff Volume of 68 cubic feet

in a 10-Year Storm the Values are about 12 gpm and 44 cubic feet of runoff

We believe this to be so minimal as to require only positive drainage. Thus we have provided a 1ft wide Valley Gutter to transport the water to the front of the building to assure drainage

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Project Kelehner Building
Location 2nd & Lomas (Albuquerque)
Job No. 85131 Date Revised 2/17/86
By DDS Sheet 5 of 5

Offsite Flow Analysis (Continued)

B. Flow to Existing Inlet (Alley) – Area A'_2

Area A_2 = 920 sq ft = 0.021 Acres

T_c = 10 minutes { i_{10} = 3.15 in/hr
i_{100} = 4.80 in/hr

c-factor = 0.70

rainfall = 1.46 inches (10 yr)
= 2.22 inches (100 yr)

1. Peak Flows $Q = CiA$

$Q_{10} = 0.7(3.15)\ 0.021 = 0.0463$ cfs

$Q_{100} = 0.7(4.80)\ 0.021 = \boxed{0.0706 \text{ cfs}}$

2. Runoff Volume

100 yr $V_{100} = \frac{920(0.70)\times 2.22}{12} = \boxed{119 \text{ cubic feet}}$

10 yr $V_{10} = V_{100}(.652) = 78$ cubic feet

Flows are again, so little as to require only positive measures to insure adequate Drainage

APPENDIX B

Submersible Sump Pump Details

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Project Kelehar Building
Location 2nd & Lomas (Albuquerque)
Job No. 85131 Date Feb 17, 1986
By DDB Sheet 1 of 1

Hydraulic Computations
Submersible Pumps for Underground
Parking Area - Kelehar Building

Hydrologic Flows From Appendix A, Sheet 3 of 5

A = 1220 sq ft (0.028 Acres)

Q_{10} = 0.08 cfs

Q_{100} = 0.12 cfs

Inflow/discharge Volume

$$\frac{1220 \text{ Sq ft} \times 0.94 \times 2.22 \text{ in/hr}}{12} = 212 \text{ cu ft}$$

Discharge Through Submersible Sump Pump
Two Pumps (one for Backup) Weil Model
#2-1601A-1½ or Equivalent
Discharge 100 gpm @ 25 ft of TDH
Max inflow = 0.12 cfs × 448.8 gpm/cfs
= 53.9 gallons per minute (gpm)

So the pumps each have double the capacity required by the computations
Actual factor of Safety = 200/53.9
F.S. = 3.71

Appendix B

Submersible Sump Pump Details

D. FD-2

Round cast iron, medium duty, shallow body drain with flashing collar, tractor type non-tilt slotted grate, bottom waste outlet, sediment bucket, flashing clamp.

2.06 SUMP PUMP

A. Round precast reinforced concrete basin with solid bottom, inlet openings as required, steel cover plate with inspection, vent pipe, discharge pipe, and control wire openings. Pumps shall be single or duplex,as noted, [above-pit] [submersible]. Pump[s] shall have wall mounted control panel. Controls shall include adjustable type mercury float switches mounted on wire cable support shaft and anchored to removable control wire service cover plate, high water alarm and buzzer in control panel at pump, remote alarm light and buzzer.

B. Mercury switches shall:

1. Start one pump on liquid rise.
2. Indicate Pump "On".
3. [Alternate pumps.] (Duplex)
4. Operate both pumps on demand (Duplex).
5. Indicate Pump "Off".
6. Operate alarm on continuous water rise above pump capacity.

C. Submersible pumps shall have 5 year warranty.

2.08 SAND TRAP

A. Round precast reinforced concrete basin with solid bottom, 24" diameter access opening in top, inlet and outlet holes in basin walls, outlet 2" lower than inlet, 36" diameter x 60" high inside. Provide precast manhole rings from basin access opening to near grade with 24" diameter heavy duty cast iron manhole cover and ring to grade.

2.09 SANITARY SEWER MANHOLE

A. Manhole: Pre-cast concrete sections with heavy duty cast iron traffic cover and rim.

B. Manhole Base: Heavy density concrete poured at least 48 hours prior to setting the precast sections.

C. Form flow channels to provide smooth flow and maintain sewer grade in cement mortar on base, troweled smooth.

D. Set bottom manhole section in full mortar base (21" thick) while base is still moist. Join succeeding sections in similar manner, fill holes and imperfections with cement mortar.

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NOTES

1. SLEEVE
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2. LOCATI
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PUMP SCHEDULE

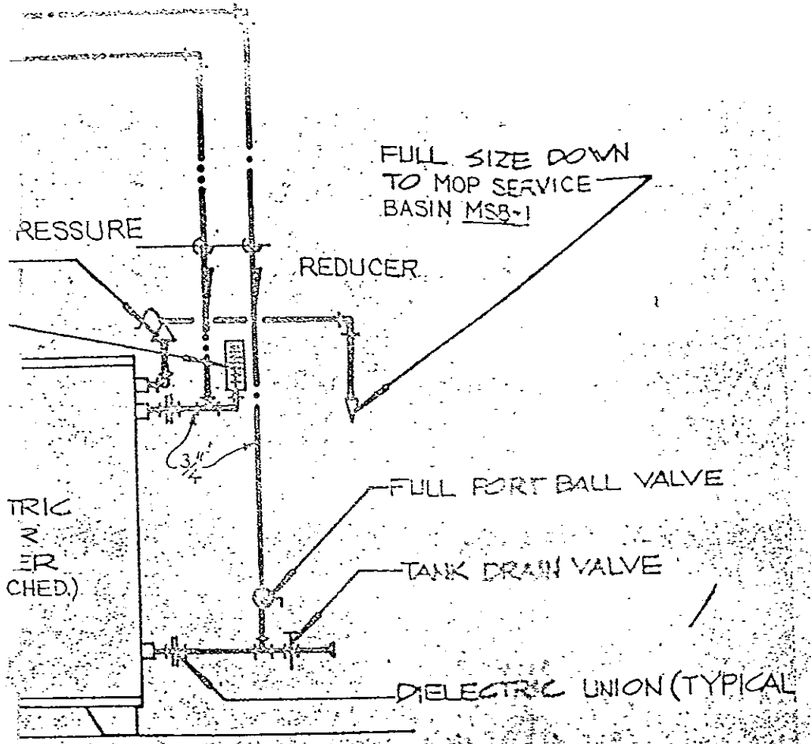
SYMBOL	SERVICE	REMARKS
SP-1	SEWAGE	
SP-2	CLEAR WATER	

EQUIPMENT SCHED

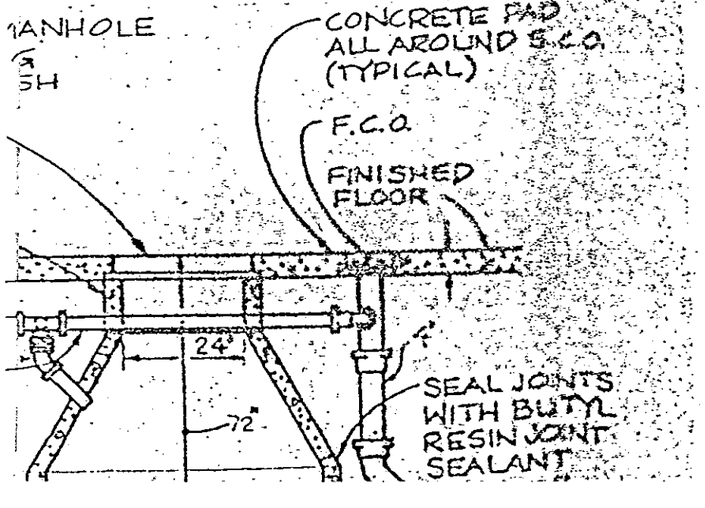
PLUMBING

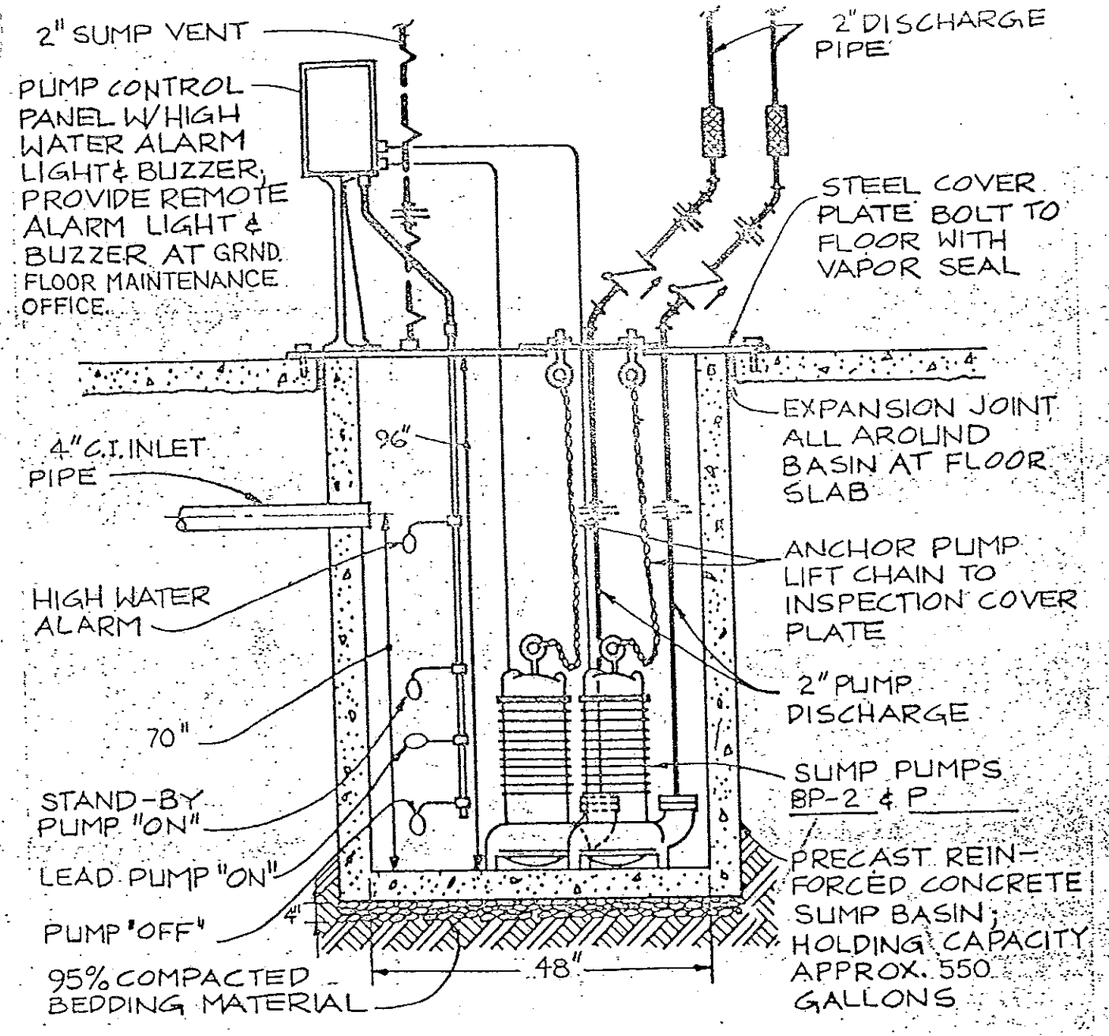
SYMBOL	FIXTU
WC	WATER
UR	T
L	
MSB	MOP
EWC	ELECTR

REMARKS: 1.



TER HEATER PIPING DETAIL





DUPLEX SUMP PUMP & BASIN DETAIL

NO SCALE

PUMP SCHEDULE