HYDROLOGY K14/D8 4 PLANS

K14/D8

4 PLANS

INFORMATION SHEET

PROJECT TITLE Barelas Elderly Housing TYPE OF SUBMITTAL Engineer's Certification

ZONE ATLAS PAGE NO. K-14-Z CITY ADDRESS 701 Fifth Street S.W.

LEGAL DESCRIPTION Tract A, Original Townsite of Albuquerque

ENGINEERING FIRM Chavez-Grieves Cons.Eng.,Inc. CONTACT Victor J. Chavez

ADDRESS 6121 Indian School Rd.,N.E.,#220 PHONE 881-7376

OWNER Albuquerque Housing Authority CONTACT Rob Strehl

ADDRESS P.O.Box 25064,City 87125 PHONE 766-7810

ARCHITECT Westwork Architects CONTACT Glade Sperry

ADDRESS 2403 San Mateo N.E.,S-2 PHONE 884-5252

SURVEYOR Gordon J. Douglass CONTACT Gordon J. Douglass

ADDRESS 205 La Vida Nueva Del Oeste S.W. PHONE 831-0166

CONTRACTOR Bradburry and Stamm CONTACT Bill Bennett

ADDRESS 701 Sixth Street S.W. PHONE 765-1200

DATE SUBMITTED January 24, 1983

BY Victor J. Chavez, P.E.

CHAVEZ GRIEVES / CONSULTING ENGINEERS, INC.

6121 INDIAN SCHOOL RD., N.E. SUITE 220
ALBUQUERQUE, N.M. 87110
PH. (505) 881-7376

January 24, 1983

Fred Aguirre
City Engineers Office
Hydrology Department
City of Albuquerque
P.O. Box 1293
Albuquerque, New Mexico 87103

RECEIVED
JAN 24 1983

RE: Barelas Elderly Housing
Engineers Certification

Dear Mr. Aguirre,

The Barelas Elderly Housing project has been reviewed for compliance with the criteria outlined in the approved drainage report. Based on as-built information supplied by Mr. Gordon Douglass, a licensed surveyor, it is my opinion that the project has been constructed in general compliance with the original drainage plan. Attached are two copies of the original grading plan with the as-built data required by the Engineer's Certification checklist.

Also shown on the attached plan are the individual drainage basins. With the elimination of on-site ponding the basins indicate only those seperate areas draining from the site through different outlets.

It should be noted that between buildings "A" and "B" there is a low spot which will pond water approximately three inches deep. Mr. Chris Jaschke is in the process of revising the grading to eliminate this condition. In a number of other areas, some ponding will result from inaccurate placement of the pipe drains. However, the location and volume of ponding is negligable and will have very little effect on the site.

Please call if you have questions or require any additional information.

Sincerely,

Gordon Walkhoff for V. Chavez

Victor J. Chavez, P.E.

Encl.

VJC/dlk

CHAVEZ GRIEVES / CONSULTING ENGINEERS, INC.
6121 INDIAN SCHOOL RD., N.E. SUITE 120
ALBUQUERQUE, N.M. 87110
PH. (505) 881-7376

December 21, 1981

Mr. Fred J. Aguirre
Civil Engineer/Hydrology
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: North Barelas Elderly Housing
File #K14-08

Dear Fred:

The following information shall be supplemental to the Drainage Report for North Barelas Elderly Housing prepared by this firm and submitted to the City on March 17, 1981. As you know, the original report defined development parameters required to maintain runoff conditions which existed in the developed site prior to its acquisition by the City. Subsequent to the submittal of the report, criteria for the drainage study was revised to reflect a request from HUD to eliminate on-site ponding. The revised criteria is reflected in the attached letter to Mr. Rob Strell, Director of Development for the Albuquerque Housing Authority. In addition, the original report was submitted prior to the issuance of the Hydrology Checklists and Procedures in June of 1981 and, as a result, does not address some of the finer points now required in drainage reports. However, in response to your letter dated November 5, 1981, and the stated comments, we offer the following information and attached calculations, site survey and grading plan which we hope will provide the satisfactory information:

1. Construction in compliance with the revised site plan (see attached) will be certified by an Engineer engaged by the Contractor.

2. The concept of no ponding is acceptable as a result of the attached letter and information contained therein and the approval of the City of Albuquerque Assistant City Engineer.

3. The 100-year flows from each of the drainage basins are included in the original drainage study. Revisions in the outlets are reflected in the attached site plan along with the revised outlet hydraulic calculations.

4. The attached site plan indicates the construction details for each of the three types of outlets incorporated into the final site plan.

5. In our discussion on or about November 5, 1981 it was pointed out that the referenced project is being constructed for the City of Albuquerque and Mr. Charles Wall, Municipal Development Department, Deputy Director agreed that the City would perform any required inspection of the existing storm drain system impacted by development of the site.

6. The site plan legend has been modified to correctly reflect the finish grade spot elevations. Existing elevation are shown on the site survey plan which is attached. Construction will incorporate pitched roofs with an even distribution of roof runoff to front and back without the use canales or scuppers except for those over entryways.

7. The types of covers to be used are shown on the attached revised site plan.

Please call if you require any additional information.

Sincerely,

Victor J. Chavez

Victor J. Chavez, P. E.

VJC:mb

CHAVEZ GRIEVES / CONSULTING ENGINEERS, INC.

6121 INDIAN SCHOOL RD., N.E. SUITE 120
ALBUQUERQUE, N.M. 87110
PH. (505) 881-7376

November 5, 1981

Mr. Fred Aguirre
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Re: North Barelas Elderly Housing

Dear Mr. Aguirre:

Attached is a copy of the final grading plan for the North Barelas Elderly Housing project as submitted to and approved by the Department of Housing and Urban Development. A drainage report for the project was submitted in March, 1981 which addressed the development criteria of the City Hydrologist and the Interim Drainage Guidelines of the City of Albuquerque.

Subsequently, HUD requested that the proposed ponding areas, both in the front yards and the larger area ponds, be eliminated. At a meeting on July 1, 1981 with Mr. Chuck Easterling and Mr. Jim Fink it was decided that "on-site ponding could be eliminated." This is noted in the attached letter signed by Mr. Mead with Bohannan-Huston, Inc. It was my understanding at the time that the original drainage report was approved pending implementation of the on-site treatment of runoff. The change in treatment is reflected on the grading plan.

Please call if you require further information or additional detailing. Your timely assistance in this matter is appreciated.

Sincerely,

Victor J. Chavez

Victor J. Chavez, P. E.

VJC/mb
cc: Glade - Westwork

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

MAYOR
David Rusk

November 5, 1981

Vic Chavez
Chavez Grieves Consulting Engineers, Inc.
6121 Indian School Rd. NE
Albuquerque, New Mexico 87110

RE: NORTH BARELAS ELDERLY HOUSING (File # K14-D8)

Dear Vic:

Attached are my comments for the referenced drainage report. The building plans will be released contingent on the following items:

1. The submittal of a revised drainage report within thirty days from the date of this letter satisfying my comments and adhering to the new drainage concept of "No Ponding"

2. The certification (accompanied with as-built grading and drainage plans) by the developer's engineer indicating substantial compliance with revised report for the purpose of obtaining a Certificate of Occupancy.

If you have any question regarding the above please feel free to call me at 766-7644.

Sincerely yours,

Fred J. Aguirre, P.E.
Civil Engineer/Hydrology

FJA/csg

Attachments

cc: Charles D. Wall, Deputy Director, MDD
Drainage File
Drainage Report

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DRAINAGE REPORT REQUIREMENTS
CHECKLIST

PROJECT TITLE North Barelas Elderly Housing (File No. K-14-D8)

DATE 11-5-81 ZONE ATLAS PAGE NO. _____

REVIEWER F.J. Aguirre

LEGAL ADDRESS _____

ENGINEERING FIRM _____ CONTACT _____

ADDRESS _____ PHONE _____

OWNER _____ CONTACT _____

ADDRESS _____ PHONE _____

ARCHITECT/SURVEYOR _____ CONTACT _____

ADDRESS _____ PHONE _____

Approval of the submitted drainage will be granted when the following items have been satisfied. Please be advised that approval of the drainage report does not constitute approval of the construction plans (See Construction Plan Requirements Checklist). The pertinent sections of the City of Albuquerque Subdivision Ordinance and/or the AMAFCA Resolution 80-15 (labelled A and B respectively) are identified in parenthesis after each requirement.

GENERAL:

YES	NO	NA	SEE COMMENTS	
✓			1	1. ENGINEER CERTIFIES
				2. PLANNING HISTORY - Planning and zoning action history (A-21B; B-7).
				3. PROFESSIONAL CERTIFICATION - Professional's stamp with signature and date (B-4F and B-7B):
	✓		2	A. Engineer who prepared the Drainage Report.
	✓			B. Engineer or Surveyor who performed the survey.
				C. Engineer, Architect, or Surveyor who prepared the grading plan.
		✓		4. FLOOD HAZARD - Delineation of site on pertinent Flood Hazard Boundary Map (A-21B; B-7B).
		✓		5. WATERSHED SOILS - Delineation of site and contributing off-site watersheds on SCS Bernalillo County Soil Survey Maps (A-21B; B-7B).
		✓		6. SOILS - Soils investigation report for ponding within 15 ft. from planned or existing structure or closer than 15 ft. from the property line minus the required setback on adjacent property. For ponds 18" deep or less, water may be impounded adjacent to street ROW but not closer than 10' from pavement. For ponds deeper than 18", water shall not pond closer than 15' to the pavement (A-21D;B-7B).

OFF-SITE CONDITIONS:

YES	NO	NA	SEE COMMENTS	
✓				7. WATERSHED AREA - Delineation of off-site contributing watersheds on City of Albuquerque Ortho-Topo Area Maps at scale 1" = 200' or 1" = 500' (A-6B15; B-7B).
				8. STORM FLOWS - Quantification of off-site rates of flow caused by contributing watersheds for the:
		✓		A. 10 year frequency storm (A-6B15)
		✓		B. 100 year frequency storm (A-6B15 B-2E).
				9. FLOW DEPTH AND VELOCITY
		✓		A. Off-site flow velocities determined (A-6B15).
		✓		B. Off-site flow depths determined (A-6B15).
		✓		C. Locations indicated for A and B above (A-6B15).
		✓		10. OTHER CONDITIONS - Discussion of any off-site conditions or drainage facilities that affect site drainage (A-21A5f; B-7B).
				11. PROPOSED TREATMENT - Adequate treatment of off-site flows including:
		✓		A. Definition of required drainage facilities (A-21B; B-4A).
		✓		B. Location and configuration of facilities defined in A above (A-21B; B-4A).
		✓		C. Quantification that off-site flow draining through site shall do so at a rate of flow velocity, quantity, and location which does not exceed the capacity on such site and downstream drainage facilities OR does so in a manner similar to that which existed before such alteration (B-4A).
		✓		12. ROW-EASEMENTS - Delineation of R.O.W. and/or Easement configuration necessary to accommodate #11 above (A-21B;B-7B).

ON-SITE CONDITIONS:

YES	NO	NA	SEE COMMENTS	
	✓		3	13. FLOW VOLUMES AND RATES - Calculations showing on-site undeveloped and developed flow volumes and rates (B-4F).
				14. FLOW DEPTH AND VELOCITY:
		✓		A. On-site flow velocities determined (A-6B15).
		✓		B. On-site flow velocities determined (A-6B15).
		✓		C. Locations indicated for A and B above (A-6B15).
				15. PROPOSED TREATMENT - Adequate treatment of [illegible] flows including:
	✓	✓	4	A. Definition of required drainage facilities (A-21B; B-4F).
		✓		B. Location and configuration of facilities defined in A above (A-21B; B-4F).
		✓		1. Pond volume calculations (B-4B).
		✓		2. Positive discharge of ponds with required rate and outlet calculations (B-4B).
		✓		3. Pond emergency spillway calculations (B-7B)

YES	NO	NA	SEE COMMENTS	
		✓		4. Pond fencing required for depths greater than 18" (B-7B).
		✓		5. Pond landscaping provisions and commitments (A-21B).
		✓		6. Pond maintenance provisions and commitments. SEE ATTACHED STANDARD COVENANT (A-21B).
		✓		7. Channel characteristics including flow depths and velocities (A-21B).
	✓		C	8. Storm sewer characteristics including capacity and hydraulic grade line calculations (A-21B).
	✓			9. Hydraulic characteristics of other storm drainage facilities listed in 80-15; Sec. 2c(A-21B).
		✓		C. Quantification that on-site flow shall discharge at a rate of flow, velocity, quantity, and location which does not exceed the capacity of downstream drainage facilities OR does so in a manner similar to that which existed before such alteration (B-4B).
		✓		16. ROW-EASEMENTS - Delineation of R.O.W. and/or Easement configuration necessary to accommodate #13 above (A-21B).

PLAN DRAWINGS:

YES	NO	NA	SEE COMMENTS	
				17. DRAFTING STANDARDS:
✓		✓		A. North Arrow indicated (A-21A2).
				B. Standard engineering scales used - 1" = 10' for sites less than one acre; 1" = 20' for sites less than five acres; 1" = 50' for sites greater than five acres (A-21A2).
	✓		C	C. Legend.
				18. SITE DESCRIPTION:
	✓			A. Copy of zone atlas page with property outlined (A-21A6).
	✓			B. Legal description (A-21A6).
				19. BENCH MARKS:
	✓			A. Reference Albuquerque Control Survey Vertical Datum Location (A-21A5e; B-7A).
✓				B. Site ground elevation based on mean sea level datum as established by the U.S. Coast and Geodetic Survey, North American datum 1929 (A-21A5e; B-7A).
	✓			C. Temporary bench mark description (A-21A5e; B-7A).
				20. EXISTING SITE CONDITIONS:
✓				A. Existing contours per Subdivision Ordinance A-21A5el and AMAFCA 80-15 B-7A.
✓				B. Spot elevations adequately showing conditions on-site (A-21A5el; B-7A).

YES	NO	NA	SEE COMMENTS	
		✓		C. Contours and spot elevations extending a minimum of 15' beyond property line (A-21A5el; B-7A).
		✓		D. Identification of all existing structures located on-site or on adjacent property (15' minimum) with particular attention to retaining and garden walls (A-21B; B-7B).
	✓	✓		E. Identification of all existing drainage facilities located on-site or on adjacent property (A-21B; B-7B).
		✓		F. Pertinent elevation(s) of structures and facilities defined in D and E above with Mean Sea Level designation (A-21B; B-7A).
	✓			G. Indication of all existing easements and right-of-ways on, or adjacent to the site with dimensions and purpose shown (A-21A5b & c).
	✓			H. Existing City top of curb and flow line elevations with Mean Sea Level designation (A-21B; B-7B).

21. PROPOSED SITE CONDITIONS:

✓				A. Proposed contours (per Subdivision Ordinance A-21A5el and AMAFCA 80-15 Sec. 7A) superimposed over existing contours, adequately supporting the drainage plan (A-21A11; B-7A).
		✓		B. Indication of all proposed easements and right-of-ways on or adjacent to the site with dimensions and purpose shown (A-21A5G & C).
		✓		C. Proposed street and alley grades when site abuts a dedicated unpaved street or alley. These grades are available, at no charge, from the City Engineer's Office. An advance request will expedite your project. NOTE: At present there is a 3 month wait to have the City Engineer supply grades. However, to expedite the plans, the City Engineer will review grades provided by an engineer (A-21A7).
	✓		6.5	D. Internal contributory drainage areas, including roof areas, outlined on plan (A-21B; B-7B).
		✓		E. Proposed (City approved) top of curb elevations with Mean Sea Level designation (A-21B; B-7B).
✓		✓		F. Flow lines defined by arrows and spot elevations with Mean Sea Level designation (A-21B; B-7B).
		✓		G. 100 year pond depth determined and outlined on the plan (A-21B;B-7B).
	✓			H. Notes defining property line, asphalt sidewalks, planting areas, ponding areas, and all other areas whose definition would increase clarity (A-21A5d & g; B-7A).
✓				I. Finish building floor elevation(s) with Mean Sea Level designation (A-21A11; B-7A).
		✓		J. Slopes (cut or fill) with height of less than 18", not steeper than 2:1. Slopes with height greater than 18", not steeper than 3:1 (A-21B; B-5).

✓				K. Elevation of property line at least 1 ft. above flowline (A-21B).
		✓		L. Retaining wall required when a vertical grade change greater than 18" is indicated (A-21B; B-7A).
	✓			M. Details of ponds, swales, rundowns, curb cuts, water blocks, and all other significant drainage structures with contours, cross-sections, and spot elevations when appropriate. NOTE: All proposed construction within the public right-of-way must follow the City Engineer's Special Order No. 19 (A-21B; B-7B).

OTHER:

YES	NO	NA	SEE COMMENTS	
	✓		7	22. Erosion Control Plan (A-21B; B-7B).
		✓		23. Owners commitment to construct, operate, and maintain drainage facilities in substantial compliance with drainage report and grading plan (A21B).

COMMENTS:

1) RECOMMEND ENGINEER CERTIFIES PROJECT TO MINIMIZE THE AMOUNT OF CONSTRUCTION DETAIL NORMALLY REQUIRED ON A PROJECT OF THIS SIZE.

2) REVISED REPORT TO REFLECT THE ACCEPTABLE DRAINAGE CONCEPT OF NO PONDING.

3) SHOW A BALANCE BETWEEN THE Q GENERATED FROM EACH DRAINAGE BASIN AND THEIR RESPECTIVE OUTFALL.

4) MORE DETAIL NEEDED OF THE PROPOSED FACILITY (OUTFALL) TO HANDLE THE Q'S GENERATED FROM THEIR RESPECTIVE DRAINAGE BASIN.

5) COMPLY WITH C.J. MEAD'S LETTER TO MR ROB STRELL RECOMMENDING THAT STORM DRAINS BE EXAMINED TO INSURE THEY ARE IN GOOD REPAIR AND THAT THEY WILL EXCEPT THE DESIGN FLOWS.

6) UP DATE LEGEND TO REFLECT TOP of CURB ELEVATIONS

7) INDICATE TYPE OF COVER PROPOSED AT EACH STORM DRAIN INLET UNLESS INLET IS SHOWN IN A PAVED AREA.

6.5) INCLUDE LOCATION OF CANALES, SCUPPERS AND DRAIN PIPES

BOHANNAN-HUSTON INC.
4125 CARLISLE BLVD., N.E. ALBUQUERQUE, NEW MEXICO 87107 505 881-2000

ENGINEERS PLANNERS PHOTOGRAMMETRISTS

FILE:
BARRAS
ELDERLY
HOUSING
K-14 D.

June 2, 1981

RECEIVED
JUL 07 1981
CITY ENGINEER

Mr. Rob Strell
Director of Development
Albuquerque Housing Authority
P. O. Box 25064
Albuquerque, NM 87125

Re: Barelas Elderly Housing

Dear Mr. Strell:

Albuquerque Master Drainage Plan indicates that this project is located at the upper end of a 106.6 acre drainage basin referred to as Cell 130. There are 2 cfs entering this basin during the 100-year storm from the drainage basin directly to the east, referred to as Cell 131. This flow is located at the intersection of 4th Street and Barelas Street and does not effect the proposed site.

The existing storm drains are the only method by which flows may leave the drainage basin. These storm drains all discharge into the Barelas pump station.

The storm drains in the area of the proposed project consist of a 15-inch line and a 24-inch line. The 15-inch line starts 197 feet north of Hazeldine on Barelas Street, then goes south on Barelas Street to Lewis Street, then west on Lewis Street across the Riverside Drain, then south to the Barelas Pump Station. The manhole at the start of the line, referred to as Node 775 in Albuquerque Master Drainage Plan, has two feet of freeboard during the 100-year storm at a water surface elevation of 4942.75. The 24-inch line starts 162 feet south of Stover Street and 5th Street, then goes north on 5th Street to a 72-inch storm drain in 5th Street and Iron Ave., which continues to the Barelas Pump Station. There is 3.60 feet of freeboard during the 100-year storm at the manhole in 5th Street and Iron, referred to as Node 713 in Albuquerque Master Drainage Plan, at a water surface elevation of 4945.88.

Additional runoff volume created by development of this site is .20 acre feet for the 100-year storm. The total runoff volume for the entire Cell 130 is 9.8 acre feet for the 100-year storm. The additional 2% of runoff volume will increase the maximum modeled water depth in the cell to .07 feet which is below the .10 foot criteria for improvements stated in the Albuquerque Master Drainage Plan, Volume I, Appendix F, Modeling Explanation for RADS, page R-6, Improvements.

During the meeting on July 1, 1981, with Mr. Chuck Easterling, Mr. Victor Chavez and Mr. Jim Fink, it was concluded that on-site ponding could be eliminated with the flows going to the existing storm drains in Bareias and in 5th Street. These existing systems should be examined to insure that they are in good repair and that they will except the design flows.

Runoff from the site will not be allowed to flow across the sidewalk. They must reach the street through driveways, curb cuts or directly into the storm drains.

All nuisance runoff caused by landscape watering or small storms that, prior to development, did not produce runoff must be prevented from reaching the streets.

If you should have any questions regarding this matter, please feel free to contact this office.

Sincerely,

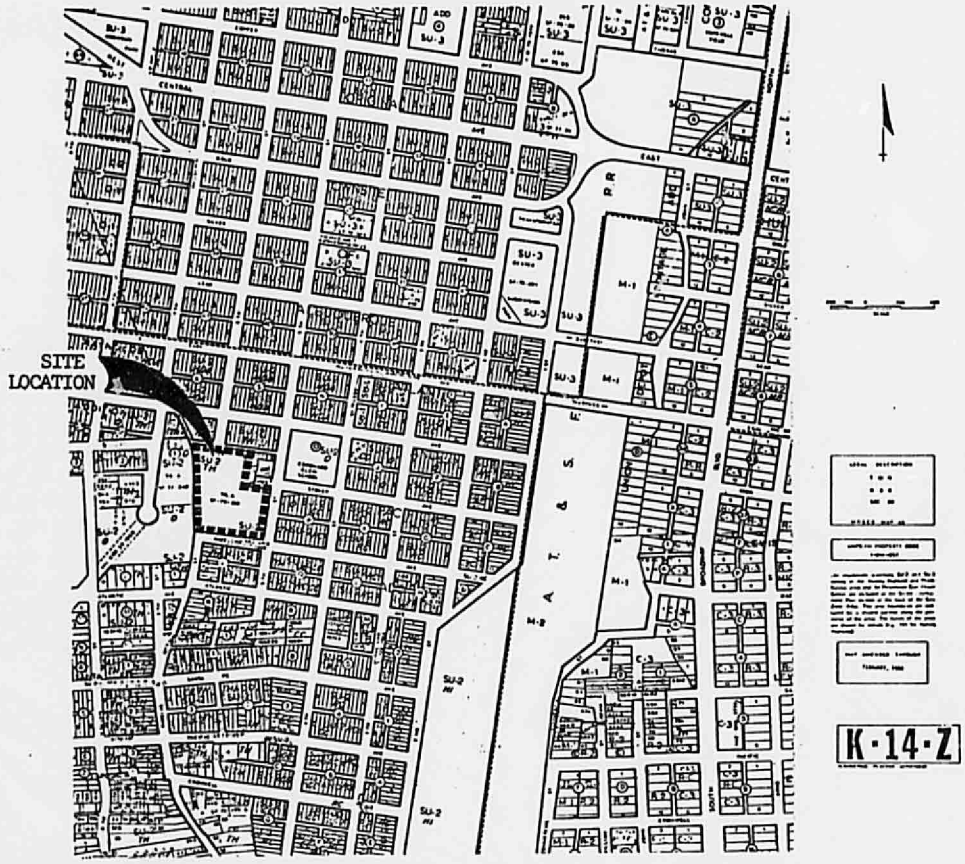
C. J. Mead, P.E.
Vice President

cc: Mr. Chuck Easterling
Mr. Victor Chavez

JF/dlh
Job No. 1 100 0

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



NOTICE TO CONTRACTOR

1. An excavation/construction permit will be required before beginning any work within City right-of-way. An approved copy of these plans must be submitted at the time of application for this permit.

2. All work detailed on these plans to be performed, except as otherwise stated or provided hereon, shall be constructed in accordance with "Contract Documents for City-Wide Utilities and Cash Paving No. 31".

3. Two working days prior to any excavation, contractor must contact Line Locating Service, 765-1234, for location of existing utilities.

4. Prior to construction, the contractor shall excavate and verify the horizontal and vertical locations of all obstructions. Should a conflict exist, the contractor shall notify the engineer so that the conflict can be resolved with a minimum amount of delay.

5. Backfill compaction shall be according to Residential street use.

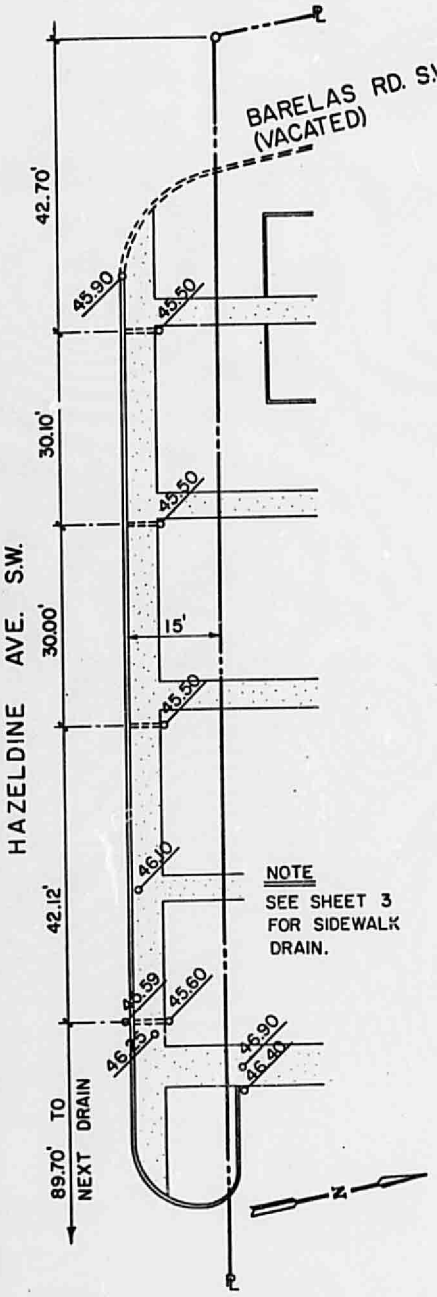
VICTOR J CHAVEZ STATE OF NEW MEXICO REGISTERED PROFESSIONAL ENGINEER

B-1-4

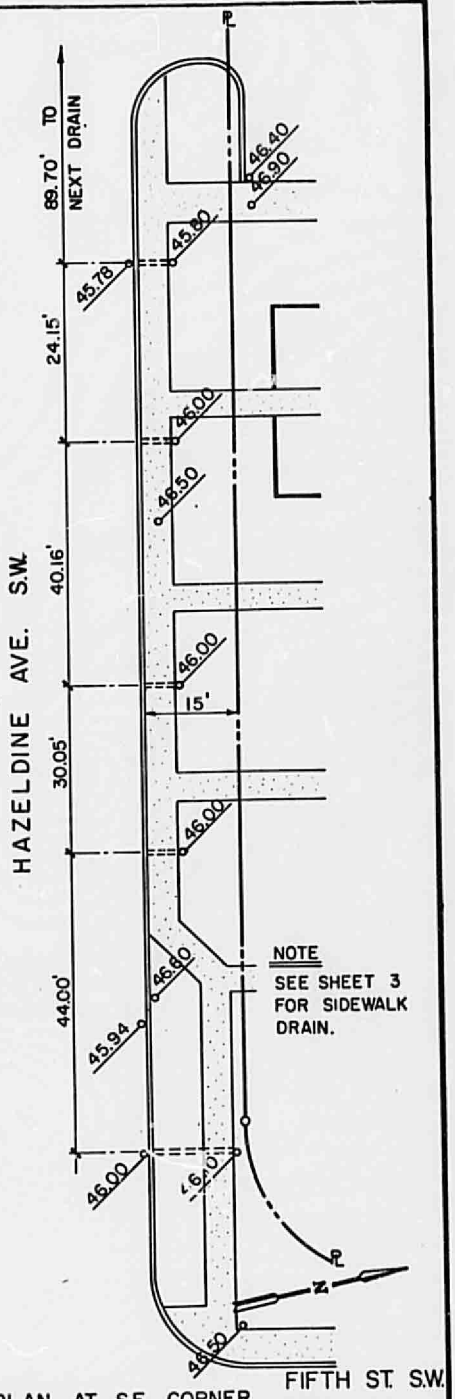
APPROVALS	NAME	DATE	TITLE: BARELAS HOUSING FOR THE ELDERLY 701 FIFTH ST. S. W.	
A.C.E./DESIGN	A Kellich	22 Nov 82		
INSPECTOR	Gerry G	Jan 25 83	PERMIT NO.	MAP
A.C.E./FIELD	M Barney	1-25-83	SHEET 1 OF 3	NO. K-14-Z

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



PLAN AT S.W. CORNER
(AT HAZELDINE AVE.) N.T.S.



PLAN AT S.E. CORNER
(AT HAZELDINE AVE.) N.T.S. B64

APPROVALS	NAME	DATE
A.C.E./DESIGN	[illegible]	22 Nov 82
INSPECTOR	[illegible]	Jan 25, 83
A.C.E./FIELD	[illegible]	1-25-83

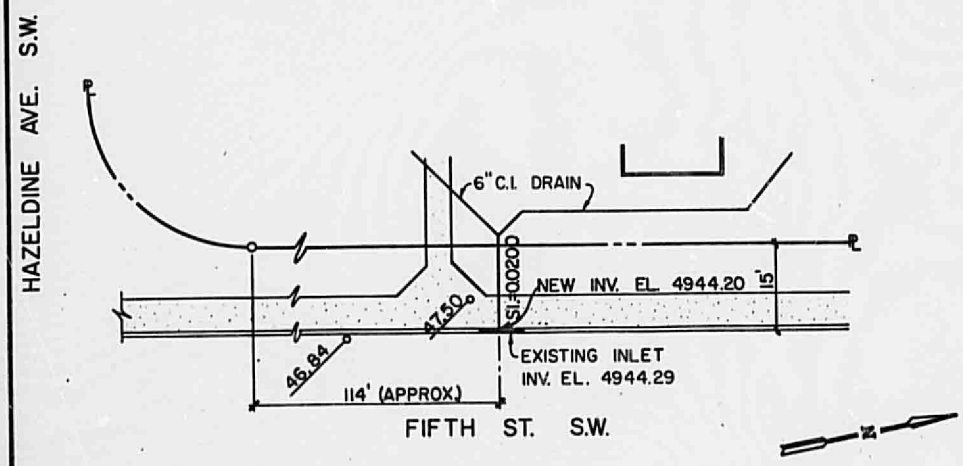
TITLE: BARELAS HOUSING FOR THE ELDERLY
701 FIFTH - ST. S. W.

PERMIT NO.
SHEET 2 OF 3

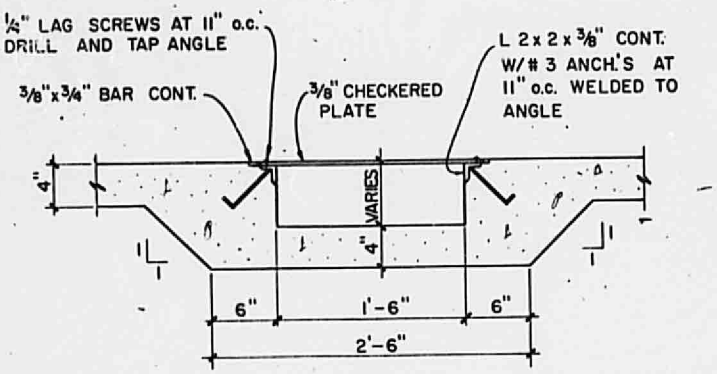
MAP NO. K-14-Z

CITY OF ALBUQUERQUE

DRAINAGE FACILITIES WITHIN CITY RIGHT-OF-WAY



PLAN AT EAST SIDE (AT FIFTH ST.)
(SEE CITY STANDARD DRAWING K-17-1) N.T.S.



SIDEWALK DRAIN DETAIL
N.T.S.

B-64

APPROVALS	NAME	DATE	TITLE: BARELAS HOUSING FOR THE ELDERLY 701 FIFTH ST. S. W.	
A.C.E./DESIGN	[illegible]	22 Nov 82		
INSPECTOR	[illegible]	Jan 25 83	PERMIT NO.	MAP NO. K-14-Z
A.C.E./FIELD	[illegible]	1-25-83	SHEET 3 OF 3	

Job North Barelas Elderly Housing
Subject Revised drainage calculations
Client Westwork Architects

Sheet No. 1.a of
Job No.
By VJC Date 12/1

CHAVEZ-GRIEVES / CONSULTING ENGINEERS, Inc. Albuquerque, NM

Sub-Basin 6 $Q = 1.43$ cfs. Area = .2 ft²

$V = 1.43/.2 = 7.15$ f.p.s.

$Re = \frac{7.15(.5)}{1.22 \times 10^{-5}} = 2.93 \times 10^5$ ∴ f = .015

$h_f = \frac{(7.15)^2}{64.4}(.015)\left(\frac{35}{.5}\right) = 0.82$

head avail = 46.0 − 44.29 = 1.71

Sub-Basin 5 $Q = 1.94$ cfs

$V = 1.94/.2 = 9.7$

$Re = \frac{9.7(.5)}{1.22 \times 10^{-5}} = 3.98 \times 10^5$ f = .014

$h_f = \frac{(9.7)^2}{64.4}(.014)(60/.5) = 2.45' > 1.71'$ Avail

Det. Max. Flow w/ Avail head

Try $Q = 1.55$ cfs. $V = 1.55/.2 = 7.75$ f.p.s

$Re = 3.2 \times 10^5$ $f = .0143$

$h_f = \frac{(7.75)^2}{64.4}(.0143)(60/.5) = 1.6 < 1.71$ ∴ flow ≈ 1.6 cfs

$I = 1.6/.59(.145) = 6.02$

$t_c = \left(\frac{188}{602}\right) - 25 = 6.4$ min

∴ Runoff will exceed flow capacity for less than 7 min

Small Volume of ponding may exist for short period of time.

Job North Barelas Elderly Housing
Subject Revised Drainage Calculations
Client Westwork architects.

Sheet No. 2-a of
Job No.
By Date

CHAVEZ-GRIEVES / CONSULTING ENGINEERS, Inc. Albuquerque, NM

Ck. Cap. of Sidewalk Drains

a. 6" corrugated pipe

from Kings Handbook of Hydraulics $n = .027$
$S = .02$

$$Q = \frac{.463}{.027}(.5)^{2.66}(.02)^{1/2} = .4 \text{ cfs}$$

Average $C = 0.64$

Area gen. .4 cfs $= \frac{.4}{.64(2.61)} = .31$ Ac.

Max. Cont. Area N.E. of Comm. Bldg. = .08 Ac. ok.

b. Sidewalk Opening.

$n = .015$ min $D = .33$ $D/b = .22$

$\therefore k = 5.30$

$$Q = \frac{5.3}{.015}(.33)^{2.66}(.01)^{1/2} = 1.84 \text{ cfs}$$

$A = 1.84/.64(2.61) = 1.1$ Ac.

Max. Area to Opening = .2 Ac. $\therefore$ ok.

Address 701 5TH St., S.W. Engr/Arch ~ KH-D8

Plans Approved _____ Cond. _____

Comments: North Barelas Elderly Housing

Inspection Requested 1-10-83 Contractor _____

Appr. 1-24-83 Disappr. _____ 30 Day Temp. _____

Comments: Engineer will certify

Engineer certified on 1-24-83 see letter

Reinspection and/or comments:

CHAVEZ GRIEVES

CONSULTING ENGINEERS, INC.

DRAINAGE REPORT
FOR
NORTH BARELAS
ELDERLY HOUSING

MARCH, 1981

RECEIVED
MAR 1 9 1981
CITY ENGINEER

CHAVEZ / GRIEVES CONSULTING ENGINEERS, INC.
6121 INDIAN SCHOOL RD. N.E.
SUITE 132
ALBUQUERQUE, N.M. 87110
PH. (505) 881-7376

DRAINAGE REPORT
FOR
NORTH BARELAS
ELDERLY HOUSING

MARCH, 1981

CHAVEZ / GRIEVES CONSULTING ENGINEERS, INC.
6121 INDIAN SCHOOL RD. N.E. SUITE 132
ALBUQUERQUE, N.M. 87110
PH. (505) 881-7376

March 17, 1981

Westwork Architects
2403 San Mateo N.E.
Albuquerque, New Mexico

RE: North Barelas, Elderly Housing - Drainage Report

Dear Mr. Sperry:

Transmitted herewith are four (4) Drainage Reports for the proposed Elderly Housing project. Presented is development criteria for the project as required by the City Hydrologist and the Interim Drainage Guidelines of the City of Albuquerque.

Please feel free to call should you have any questions or if we can be of any further assistance in the matter.

Very Truly Yours,

Victor J. Chavez

Victor J. Chavez P.E.
#5713

Attachments

DRAINAGE REPORT
FOR
NORTH BARELAS

TABLE OF CONTENTS

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SCOPE.....1
DESIGN CRITERIA.....1
LOCATION AND DESCRIPTION.....2
EXISTING DRAINAGE CONDITIONS.....2
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CONCLUSIONS AND RECOMMENDATIONS.....4

CALCULATIONS.....APPENDIX - A

PLATES.....APPENDIX - B

DRAINAGE REPORT
FOR
NORTH BARELAS
ELDERLY HOUSING

PURPOSE

The purpose of this report is to transmit storm drainage data relative to the proposed North Barelas - Elderly Housing project and to provide development guidelines such that the proposed dwellings will not be susceptible to flooding and that the development will not increase the threat of flooding to downstream areas.

SCOPE

The scope of this report is limited to an investigation of the study site and those immediate areas which either influence conditions on the site or are effected by the proposed site development. It is assumed that compliance with the interim drainage guidelines will not require an investigation of downstream storm drain facilities and that the existing capacities are adequate to maintain existing site conditions. The conclusions of this report are intended to provide development guidelines only and to show the feasability of the proposed development. It is not the intent of this report to develop finalized construction documents.

DESIGN CRITERIA

Ponding volumes have been determined such that the original developed runoff conditions have been maintained in the event of a 100-year frequency storm. Pond drains have been sized in accordance with the City of Albuquerque Interim Drainage Guidelines published November 13, 1979. Design storm is the 100-year frequency

storm with intensity and duration as shown on the curves of Chart I "1963 Master Plan of Drainage for the City of Albuquerque and Environs" as prepared by Gordon Herkenhoff and Associates, Inc. Consulting Engineers.

Analysis of storm runoff is based on the Rational Formula, Q=CIA, where:

Q = Runoff quantity in cubic feet per second

C = Runoff coefficient; non-dimensional

I = Intensity in inches per hour

A = Contributing area in acres.

LOCATION AND DESCRIPTION

The study site is located in the valley area of Albuquerque immediately south of the Downtown area. The parcel of land consists of the southerly two-thirds of the area bounded by ; Hazeldine Ave. on the south, Barelas St. on the west, Iron Ave. on the north and Fourth St. on the east, containing approximately 4.47 acres.

The site had been extensively developed with single-family units which have since been removed in anticipation of the proposed construction.

Existing soil conditions consist of varying amounts of rubble and manmade fill over a slightly silty,loose to medium-dense sand. The manmade fill will be removed and replaced with a controlled engineered fill to minimize the potential for differential settlement. The underlying soils, however, are sensitive to changes in moisture content. Ponding areas are required to be a minimum of fifteen feet from the new structures in accordance with the subsoil investigation prepared for the site by F.M. Fox & Associates, Inc.

EXISTING DRAINAGE CONDITIONS

Presently, the majority of the site slopes to the south where a natural ponding area exists.

The size and volume of the original ponding area has been significantly altered as a result of the clearing which has occurred on the site. A closed contour shown in the 1974 aerial survey prepared for the City of Albuquerque indicates the bottom of the pond elevation to be 4945.0. Existing top of curb elevations along Barelas Rd. are as low as4945.1 immediately west of the ponding area, indicating an outlet to an existing storm drain. The original ponding volume was significantly less than would be required to retain runoff from a 100-year storm. This observation is shared by the 1979 Flood Hazard Boundary Maps which indicates that the study site lies along the eastern boundary of a flood prone area located west of the proposed development.

The surrounding area is fully developed with single and multi-family dwellings, a public school and a community center. Development patterns are typical of most of the older valley communities. Streets in the area are paved and fully developed and like most streets in the valley area, they are relatively flat with poorly defined patterns of flow. Plate I shows the existing patterns of street flow and the limits of the upstream contributing areas.

As shown, the existing flow patterns limit the upstream contributing area to approximately 4.11 Ac. Of this, 3.66 Ac. flow to four existing inlets located at the intersection of Stover and Fifth St. Flow rates to the inlet are approximately 10.7 cubic feet per second. This is below the existing storm drain capacity. The remaining 0.45 Ac. flows to the existing inlets located in the extension of Sixth St., within the boundaries of the study site. Flow to the existing inlets is 1.31 cubic feet per second.

Street flow patterns north and east of the site divert upstream flows away from the study site.

PROPOSED DRAINAGE CONDITIONS

Development plans for the site involve the construction of sixty elderly housing units, a community building, parking areas and associated walkways and seating areas. The fully developed coefficient of runoff will be only slightly higher than the original coefficient of runoff. As noted earlier, existing subsoil conditions require positive drainage away from the new building foundations, severely restricting the areas available for ponding. It will be necessary, therefore, to restrict ponding to shallow front yard ponds and common detention areas located away from the proposed buildings. As a result,the ponds have been located in the landscaped areas as shown on plate II. The front yard ponds will range from relatively shallow ponds, two inches or less, to a maximum four inch deep pond where permitted by yard geometry. Water will be disposed of through evaporation or percolation. The larger common ponds will provide the additional volume required to maintain the original conditions. Water from the common pond will be drained to the existing storm drain system with a Q_1 rate, in conformance with existing City standards. Sizes and flow rates are shown in the attached calculations.

CONCLUSIONS and RECOMMENDATIONS

Proposed development plan should incorporate the following features:

1. Shallow front yard ponds with a total depth of two inches or less should be provided in those areas restricted by existing soil conditions.
2. Front yard ponding with water depths of three to four inches should be provided in those areas unrestricted by existing soil conditions or yard geometry.
3. Large common ponding areas located away from the proposed structures with outlets to existing storm drains. Flow

from the large ponding areas should be restricted to Q_1 flows.

4. Retain existing elevations in access roads to maintain existing condition of flows from upstream areas.

Provided that these items are incorporated into the construction documents, the proposed development will not be susceptible to flooding nor increase the threat of flooding to downstream areas.

Victor J. Chavez

Victor J. Chavez P.E.
#5713

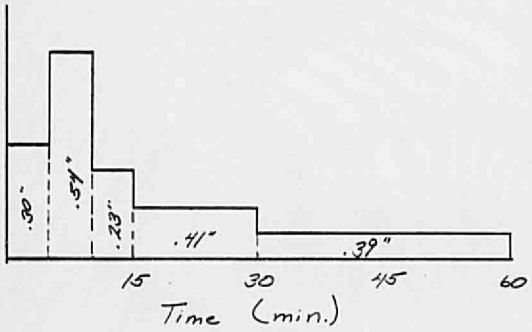
APPENDIX - A

North Barelas - Elderly Housing
Drainage Study

Design Criteria.

Location - Albuquerque Valley Area.
Total Rainfall - 2.2 in.

Design Storm. -



Determine Coefficients of Runoff

Original Coefficient in Developed State

Use	Area (Ac.)	Coeff	Prod.
Roof	0.98	0.9	0.88
Paved	0.24	0.95	0.23
Barren Soil	3.26	0.4	1.30
			2.41

$C = 2.41/4.47 = \underline{0.54}$

New Coefficient in Developed State

Use	Area (Ac.)	Coeff.	Prod.
Roof	1.25	0.9	1.13
Paved	0.36	0.95	0.34
Sidewalk	0.41	0.95	0.39
Landscaped	2.45	0.4	0.98
			2.84

$C = 2.84/4.47 = \underline{0.64}$

North Barelas - Elderly Housing. Sht. 2
Drainage Study

Determine Original Runoff Conditions for Study Site
Assume Coeff. of Runoff is similar for Basins "A", "B" & "C"

Sub-Basin "A"

Area = 1.07 Ac. $T_c < 10$ min. $\therefore I = 189/35 = 5.4$ in/hr.

$Q_A = 1.07(.54)(5.4) = 3.12$ c.f.s.

Vol. = $1.07(.54)43{,}560(2.2/12) = 4{,}614$ ft^3

Sub-Basin "B"

Area = 3.11 Ac.

Ponding Vol. = 8800 ft^3

Det. Time Req. to fill pond.

Vol = $8800 = 3.11(x/12)(.54)43{,}560$ $\therefore x = 1.44$ in.

From Graph on Page 1 Time req. for 1.44 in o frain ≈ 30 min.

$\therefore i_{30} = 189/30+25 = 3.43$

$Q_B = 3.11(.54)(3.43) = 5.76$ c.f.s.

Vol = $3.11(2.2-1.44)(1/12)(43{,}560)(.54) = 4{,}633$ ft^3

Sub-Basin "C"

Area = .29 Ac $T_c < 10$ min $I = 5.4$ in/hr.

$Q_C = .29(5.4)(.54) = .85$ c.f.s.

Vol. = $.29(2.2/12)(.54)(43{,}560) = 1{,}250$ ft^3

North Barclas - Elderly Housing
Drainage Study

Sht. 3

Original Conditions - Cont.

$Q_{10} = Q_A + Q_c = 3.12 + .85 = 3.97$ cfs. (Pond being filled)

Q_{50} (Pond Full) $= 4.47(.54)(3.43) = \underline{8.3 \text{ cfs.}}$ ← Des. Q.

Vol = 4,614 + 4,633 + 1250 = $\underline{10,497 \text{ ft}^3}$ (After Pond has filled)

∴ In the event of a 100-year storm, the original pond would have been filled within 30 minutes. The design parameters for the new development are based on conditions that would exist 30 min. into the storm.

Proposed Conditions.

Sub-Basin	C.	A.	(C)(A)	Q (I=5.4)	
1	0.9	0.14	.13	.68	
2	0.73	0.78	.57	3.07	*
3	0.7	0.09	.06	.34	
4	0.59	0.09	.05	.29	
5	0.59	0.45	.27	1.43	*
6	0.59	0.61	.36	1.94	*
7	0.59	0.30	.18	.96	
8	0.9	0.15	.14	.73	
9	0.59	0.21	.12	.67	
10	0.59	1.65	.96	5.26	*
		4.47	2.84	15.37	

* Provide Detention Ponds in Sub-Basins.

Pond Design Criteria

$I_1 = 1.62$ in/hr.

Outflow constant @ Q_1

Determine Reduction in Outflow due to Temp. Ponding

Outflow Q_1 for I = 1.62 in/hr.

Area	C	A	Q_1	Vol. (5 min.)	Q
2	.73	.78	.92	276 ft³	55 G.P.M
5	.59	.45	.43	129 "	26 "
6	.59	.61	.58	174 "	35 "
10	.59	1.65	1.58	474 "	95 "

North Barelas Elderly Housing. Sht. 4
Drainage Study

Ponding - Area 2

Time	Rainfall 100-Yr.	Vol. in. ft^3	Vol. out. $Q_1 \cdot ft^3$	Pond Vol. Required
5	.3	620	138	482
10	.84	1736	414	1322
15	1.07	2211	690	1521
20	1.21	2501	966	1535
25	1.34	2770	1242	1528
30	1.48	3059	1518	1541 ← Max. Vol.
35	1.55	3204	1794	1410

Ponding - Area 5

Time	Rainfall 100-Yr.	Vol. in. ft^3	Vol. out $Q_1 \cdot ft^3$	Pond. Vol. Required
5	.3	289	64	225
10	.84	809	194	615
15	1.07	1031	323	708
20	1.21	1166	452	714
25	1.34	1291	581	710
30	1.48	1426	710	716 ← Max Vol.
35	1.55	1493	839	654

Ponding - Area 6

Time	Rainfall 100-Yr.	Vol. in ft^3	Vol out $Q \cdot ft.^3$	Pond. Vol Required
5	.3	392	87	305
10	.84	1097	261	836
15	1.07	1398	435	963
20	1.21	1581	609	972
25	1.34	1751	783	968
30	1.48	1933	957	976 ← Max. Vol.
35	1.55	2025	1131	894

North Barelas Elderly Housing
Drainage Study

Sht-5

Pond Design Cont.

Ponding - Area 10

Time	Rainfall 100-yr.	Vol. In ft^3	Vol. Out Q - ft^3	Pond. Vol. Required.
5	.3	1060	237	823
10	.84	2968	711	2257
15	1.07	3781	1185	2596
20	1.21	4276	1659	2617
25	1.34	4735	2133	2602
30	1.48	5230	2607	2623 ← Max. Vol.
35	1.55	5477	3081	2396

Proposed Conditions w/ Ponding

Sub-Basin	Req. Ponding Vol.	Q (cfs)
1		.68
2	1541 ft^3	.92
3		.34
4		.29
5	1001 ft^3	.43
6	976 ft^3	.58
7		.96
8		.23
9		.67
10	2623 ft^3	1.58
		7.18 c.f.s. < 8.3 (See Sht 3)

Actual runoff rates will be reduced by the numerous small ponding areas associated with each unit.

North Barelas
Drainage Study

Sht 6

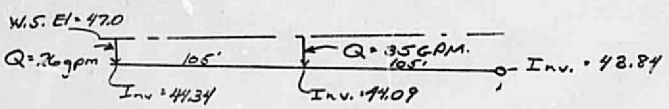
Design Orifice Control for outflow Control

Use Josam "flo-set" roof drains.
modified to be set in concrete catch basin.
Provide Standard Multi Weir Barrier with
linear flow-head characteristics.
Ref: A.P.W.A. - "Practices in Detention of Urban
Stormwater Runoff"

See Plate II for flow settings.

Ck. Pipe flow capacities.

From Ponding Areas 5 & 6



$Q = 26\,\frac{gal}{min}\,\frac{1\,min}{60\,sec}\,\frac{ft^3}{7.48\,gal} = .058\,c.f.s.$ $\quad Vel = \frac{.058}{.087} = .66\,f.p.s.$

$R_e = \frac{VD}{\nu} = \frac{.66(.33)}{1.22\times10^{-5}} = .18\times10^5 \qquad f = .028$

$h_f = \frac{V^2}{2g} f \frac{L}{D} = \frac{(.66)^2}{64.4}(.028)\frac{105}{.33} = .06'$

h_f Avail = .25 $\quad$ ∴ Weir Sizing Will Govern

$Q = 26+35 = 61$ gpm $\quad Vel. = .66\left(\frac{61}{26}\right) = 1.55$

$R_e = 1.55(.33)/1.22\times10^{-5} = 4.2\times10^4 \qquad f = .024$

$h_f = \frac{1.55^2}{64.4}(.024)\left(\frac{105}{.33}\right) = .18\ ft' < .25$ Avail. ∴ OK

APPENDIX - B