HYDROLOGY E18/D10 6 PLANS

E18/D10

6 Plans

Bat R.

Bruno

Presley Company Of New Mexico

RECEIVED
MAR 23 1977
CITY ENGINEERS

March 21, 1977

265-5811

Mr. V. M. Kimmick
City Engineer
City of Albuquerque
P. O. Box 1293
Albuquerque, New Mexico 87103

Dear Mr. Kimmick:

We have arranged to place the Pino Arroyo on the south side of the land fill. The top width will not exceed 60 feet. A 20 foot bottom will require a water depth of 3.6 feet for the existing hundred year flow determined by Rice. If the bottom were 40 feet wide, the depth would be 2.5 feet. Using the Rice ten year developed flow, the depth and velocities for these channels is 1.6 feet at 8.7 feet per second and 1.0 feet at 7.5 feet per second. We have instructed Kent Nowlin to proceed.

Very truly yours,

THE PRESLEY COMPANY
OF NEW MEXICO

Kleston H. Laws

Kleston H. Laws
Vice President

KHL/rh

P.O. Box 11152 Albuquerque, New Mexico 87112 (505) 821-2727

RECEIVED
MAR 23 1977
CITY ENGINEER

March 21, 1977

Mr. Jim Pond
Kent Nowlin Construction Company
P. O. Box 14654
Albuquerque, New Mexico 87111

Dear Mr. Pond:

As I discussed on the phone, arrangements have been made to modify the Pino Arroyo improvements required for the development of Academy Acres #15. The garbage will be replaced and covered and a smaller channel will parallel the garbage just south of the land fill area. This small channel should not exceed 60 feet width at the top with side slopes not steeper than 3.1, a bottom with not less than 20 feet, be about 4 feet deep, and daylight below Glendora.

The work should begin as soon as possible.

It is our opinion this work can be accomplished for the remaining amount in our contract.

If you have any questions, please call.

Very truly yours,

THE PRESLEY COMPANY
OF NEW MEXICO

Klaston H. Laws
Vice President

KHL/rh

cc: V. M. Kimmick, City Engineer

TELEPHONE:
(303) 751-1237

STITES & BILLINGSLEY
CONSULTING ENGINEERS, INC.

8000 East Girard Avenue - Suite 306
Denver, Colorado 80231

Received 20 Jan 76

DRAINAGE STUDY

FOR

ACADEMY ACRES UNIT 15

ALBUQUERQUE, NEW MEXICO

Easement.
Recommendation 3 inlets on both subdivisions
Location Transition back to natural

Prepared For: Ralph K. Hicks & Associates, Inc.
4000 San Pedro Drive N.E.
Albuquerque, New Mexico 87110
Phone: (505) 881-0012

Prepared By: Stites & Billingsley, Inc.
8000 East Girard Avenue
Suite 306
Denver, Colorado 80231

729 Four Hills Rd S.E.
Albuquerque, New Mexico 87111

Project No. H4-1
January 19, 1976

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DESCRIPTION OF PROJECT

Location

The tract of land under consideration contains 31.48 acres, more or less, and is situated in Section 25, T 11 N, R 3 E, N.M.P.M. together with a portion of Section 30, T 11 N, R 4 E, N.M.P.M., County of Bernalillo, New Mexico at an average elevation of 5350 feet. The site is bordered by Arroyo del Pino on the North, Academy Acres Units 11 and 12 on the South and undeveloped land on the East and West. The site is situated approximately one mile East of Interstate 25. (See Site Plan, Figure 1.)

Topography

The ground slopes uniformly to the West at approximately 2.5 percent. The area is covered by sparse native vegetation. (See Figure 2 for existing contours.)

Offsite Drainage

Offsite drainage will consist of street drainage from Louisiana Boulevard N.E., Glendora Drive N.E. and Truchas Drive N.E. The offsite flows resulting from a 100-year storm in these streets are as follows:

1. Glendora Drive N.E. - 65 cfs.
2. Louisiana Boulevard N.E. - 70 cfs.
3. Truchas Drive N.E. - 65 cfs.

The drainage to the West of the proposed development will be diverted into the Arroyo del Pino by Truchas Drive N.E.

Developed Runoff and Detention Ponding

The runoff from a 100-year storm was calculated using the Rational Method. Backyard ponding was utilized to limit runoff from the developed area to equal runoff from the undeveloped area.

The historical runoff from the site was calculated to be 111 cubic feet per second. The developed runoff from the site was calculated to be 110 cubic feet per second. The development will therefore not increase downstream flooding. Developed runoff for the 100-year storm is shown in Figure 3.

The coefficient of runoff from the undeveloped area was taken from "Data Book for Civil Engineer Design" Volume I, by Elwyn E. Seelye, Section 5-01. The coefficient of runoff was assumed to be 0.35 corresponding to a soil consisting of gravel ranging from clean to gravel sand mixtures and from no-silt and clay to high clay or silt content with a light vegetation cover. Seelye "C" value ranges from 0.15 to 0.50 for runoff from this combination of soil and vegetation cover. The required volume for detention ponding for each lot can be calculated using the equation developed on pages A-8 and A-9. The equation is:

$V = 0.118A$ where V = required ponding volume (cubic feet).

0.118 = constant based upon a 3-inch rainfall adjusted for infiltration, detention and depressions.

A = area lot (square feet).

The required volume for detention ponding for the typical 65 x 115 lot = 0.118 x 65 x 115 = 882 ft^3.

Flood Routing

Proposed street widths provide adequate channel area to allow the runoff from a 100-year storm to pass through the development with depth of flow and velocity of flow within acceptable engineering standards. Street capacity charts were constructed with maximum depth of flow not greater than one inch above top of curb. A comparison of runoff with street capacity requires that the following minimum street slopes be maintained. Minimum street slopes required by the City of Albuquerque must also be maintained:

1. Vivian Drive N.E. from Truchas Drive N.E. to Louisiana Blvd N.E: Maintain a minimum slope of 0.40 percent. Construction of the intersection of Vivian Drive N.E. with Truchas Drive N.E. and Louisiana Blvd N.E. requires a reverse slope on the West side

of the intersection to insure the runoff will be diverted North into the respective streets. (See Appendix A, pg A-17.)

Maximum crown equals 4 inches.

2. Forest Hills Drive N.E.: Maintain a minimum slope of 0.40 percent. Construction of the intersection of Forest Hills Drive N.E. with Truchas Drive N.E., Louisiana Blvd N.E. and Glendora Drive N.E. requires a reverse slope on the West side of the intersection to insure the runoff will be diverted North into the Arroyo del Pino.

   Construct crown to typcial standards.

3. Glendora Drive N.E., Louisiana Blvd N.E., Truchas Drive N.E.: From existing streets at the South side of the development, maintain a minimum slope of 0.40 percent. From Vivian Drive N.E. to intersection with Forest Hills Drive N.E., maintain a minimum slope of 0.70 percent.

   Maximum crown equals 4 inches.

Depths and flow velocity in the streets were calculated in Appendix A, pages A-18, A-19, A-20 and A-21. Depths for the 100-year storm are below top of curb in all instances and velocities average approximately 5.3 feet per second.

Minor Storms

To prevent minor storm runoff and nuisance waters from flowing across Forest Hills Drive N.E., install a single "C" storm inlet, with an 18-inch diameter RCP daylighted into the Arroyo del Pino, at the Southwest corner of the intersections of Forest Hills Drive N.E. with Glendora Drive N.E. and Louisiana Blvd N.E.. (See Figure 3.)

If the depth available under Forest Hills Drive N.E. does not allow the installation of the 18-inch RCP, install an 18" x 18" open box culvert with grate to carry the nuisance water.

ARROYO DEL PINO

A portion of the proposed development is situated within the flood plains of the Arroyo del Pino. This portion, as shown in "Northeast Heights Drainage Management Plan," Volume 2, Sheets 3 and 4, "Arroyo del Pino," published by the Albuquerque Metropolitan Flood Control Authority, appears in Appendix B, Figure B-1 of this report.

The 100-year flow in the Arroyo del Pino with existing conditions is approximately 1350 cfs, based on "Northeast Heights Drainage Management Plan," Volume I. The 100-year flow would be reduced to approximately 600 cfs after implementation of a proposed Drainage Management Plan. A 100-foot wide bottom channel with 3 to 1 side slopes will provide adequate capacity for the existing flow of 1350 cfs. Velocity of flow in the 100-foot channel was calculated to be 10.5 fps with the flow rate of 1350 cfs. This is in excess of the 8 fps maximum velocity recommended by "Northeast Heights Drainage Management Plan," Volume I. The 100-foot wide channel is approximately equal in capacity to the existing channel in the Arroyo del Pino (Figures B-2,-3, and -4, Appendix B). Therefore, velocities of flow with the improved channel should approximately equal velocity of flow for existing conditions. The velocity of flow after implementation of the Drainage Management Plan will be less than 8 fps.

A 200-foot wide easement, 125 feet North of and parallel and adjacent to proposed Forest Hills Drive N.E., will be obtained from the Albuquerque National Bank, Trustees of the Academy for Boys Trust, for construction and maintenance of the improved 100-foot wide channel. The channel will be aligned to coincide with existing main channel in the Arroyo del Pino where feasible. The location of the channel is shown on Figure B-1.

CONCLUSIONS

The proposed development of Academy Acres Unit 15 meets the requirements of Sections 3A and 3B of Drainage Resolution 1972-2, Albuquerque Metropolitan Arroyo Flood Control Authority. The flow in the Arroyo del Pino will have approximately the same velocity as existed prior to channel improvements, as the shape

of channel, channel roughness and slope will not be substantially altered. The discharge from the development has not been increased in quantity, the velocity is approximately the same or lower and the point of discharge into the Arroyo del Pino has not been substantially altered.

RECOMMENDATIONS

(1) Set street slopes to minimum slope as recommended on pages 2 and 3 and Figure 3 of this report.

(2) Pond the back half of all lots with a detention volume based on lot area. Use equation shown on page 3 for calculating required volume.

(3) Install an 18-inch diameter RCP at the Southwest corner of the intersections of Forest Hills Drive N.E. with Glendora Drive N.E., Louisiana Blvd N.E. and Truchas Drive N.E. Daylight the RCP into the Arroyo del Pino. If sufficient depth is not available, use an 18-inch x 18-inch open culvert with grate across Forest Hills Drive with 0.40% slope. Extend the culvert to the natural slope.

If Forest Hills Drive N.E. at the East end of the proposed development is relocated to the North, construct a drainage channel from the North end of Truchas Drive N.E. to the Arroyo del Pino in accordance with item 4 of these "Recommendations."

(4) At such time when the 125-foot wide strip North of and adjacent to Forest Hills Drive N.E. is completed, construct a permanent drainage channel from Forest Hills Drive N.E. to the Arroyo del Pino. Use a 10-foot wide bottom cement-lined channel with 1 to 1 side slopes or a 20-foot wide earth channel with 3 to 1 side slopes. Construct a concrete head wall at the intersection of these channels and the Arroyo del Pino. (See Figure B-1, page B-4 for location.)

(5) Improve the existing Arroyo del Pino with a 100-foot wide bottom channel with 3 to 1 side slopes. (See Figure B-1, page B-4 for location of the channel.)

REGISTERED ENGINEER STATE OF 5900 NEW MEXICO WILBUR D. STITES

Wilbur D. Stites
New Mexico P.E. No. 5900