



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

DESIGN HYDROLOGY SECTION  
123 Central NW, Albuquerque, NM 87102  
(505) 766-7644

January 17, 1986

Kent Whitman  
Community Sciences Corporation  
Post Office Box 1328  
Corrales, New Mexico 87048

RE: CONCEPTUAL DRAINAGE ANALYSIS FOR OFF-SITE FLOWS AFFECTING  
SHENANDOAH UNIT II (D-11/D10) RECEIVED DECEMBER 23, 1985

Dear Mr. Whitman:

I have reviewed the referenced submittal and hereby approve the concept.

The main concerns of this section will be with regard to the diverted flows.

The appropriate legal documentation of commitment by the developer to maintain the off-site diversion facilities until permanent facilities are constructed will be required; or, the plans for permanent improvements to be built by the Developer and approved and accepted by the City will be required. Also, acquirement of any and all easements required to facilitate the diversions will be the responsibility of the developer.

It was identified in this submittal that the Developer would obtain an easement for a pipe to carry diverted flows from the top of the escarpment down to the basin to the south. This issue should be pursued at the earliest possible time.

MUNICIPAL DEVELOPMENT DEPARTMENT

C. Dwayne Sheppard, P.E., City Engineer

ENGINEERING DIVISION

Telephone (505) 766-7467

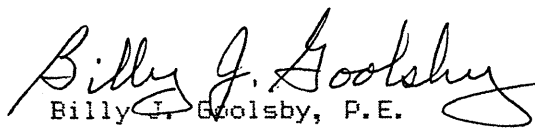
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Kent Whitman  
January 17, 1986  
Page Two of Two

The other main concern is what happens at the end of the currently improved Calle Nortena. The recent field trip to the site provided visual information that there exists a major erosion problem at the end of the pavement and for a long distance downstream. The City will need a recorded legal commitment by the developer to correct this problem and maintain the area until the road is extended to an appropriate discharge location or other permanent facilities can be provided.

Should you have any questions or comments concerning this issue, please call.

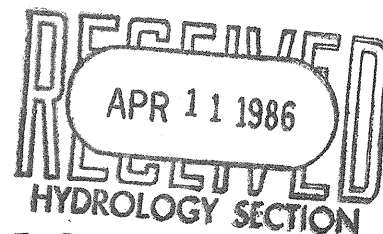
Cordially,

  
Billy J. Goolsby, P.E.  
C.E./Design Hydrology

BJG/bsj

# SHENANDOAH UNIT II & III TRAINER DIKES INTO CHANNEL CALCULATIONS

MANNING @ ENTRANCE



## MAIN FLOW

$$Q = 36 \quad n = 0.03 \quad S = \frac{4}{210} = 0.019 \quad SS_1 = 50$$

$$SS_2 = 50 \quad W = 0 \quad D_1 = ? \quad D_2 = 0$$

$$D_1 = 0.51' \quad V = 2.77' \quad F = 0.97$$

NATURAL CONDITION IS SUBCRITICAL

## SIDE FLOW

$$Q = 22 \quad n = 0.03 \quad S = 0.005 \quad SS_1 = 33$$

$$SS_2 = 16 \quad W = 0 \quad D_1 = ? \quad D_2 = 0$$

$$D_1 = 0.71' \quad V = 1.76 \text{ fps} \quad F = 0.52'$$

NATURAL CONDITION IS SUBCRITICAL

## POOL DEPTH

ASSUME SIDE FLOW WITH TOTAL  
MOMENTUM LOST (CONSERVATIVE)

$$V_{TOTAL} Q_T = V_{MAIN} Q_{MAIN} + V_{SIDE} Q_{SIDE}$$

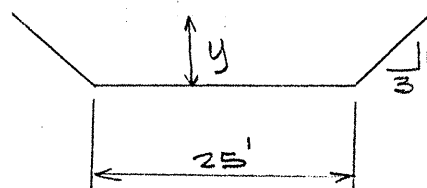
$$V_T = \frac{V_M Q_M}{Q_T} = \frac{2.77(36)}{58} = 1.72 \text{ fps}$$

$$Q = VA \quad Q = 58 \quad V = 1.72 \text{ fps}$$

$$A = \frac{58 \text{ ft}^3/\text{s}}{1.72 \text{ fps}} = 33.72 \text{ ft}^2$$

$$A = by + y^2 z \quad (\text{TRAPEZOID})$$

$$b = 25' \quad z = 3 \quad A = 33.72 \text{ ft}^2$$



$$y = 1.0 \rightarrow A = 28 \text{ ft}^2$$

$$y = 1.2 \rightarrow A = 34.3 \text{ ft}^2$$

$$y = 1.18 \rightarrow A = 33.7 \text{ ft}^2$$

$$\text{POOL DEPTH} = 1.18'$$

# WING WALL FORMULA

$$Y = C + Kx^2 \quad @ x=0 \quad Y=15 \rightarrow C=15$$

$$Y = 15 + Kx^2$$

$$Y = 25' \text{ ENTRANCE WIDTH}$$

$$X = 50' \text{ LENGTH OF DIKES}$$

$$25 = 15 + K(50)^2$$

$$K = \frac{25 - 15}{(50)^2} = 0.004$$

$$Y = 15 + 0.004x^2$$

| SECTION | X  | Y    |
|---------|----|------|
| 5       | 0  | 15   |
| 4       | 10 | 15.4 |
| 3       | 20 | 16.6 |
| 2       | 30 | 18.6 |
| 1       | 40 | 21.4 |
| 0       | 50 | 25.0 |

ENTRANCE → FLOW ENTERS AT CRITICAL DEPTH

$$Q = 58 \quad SS_1 = 3$$

$$SS_2 = 3 \quad W = 25' \quad D_1 = ? \quad D_2 = 0$$

$$\rightarrow D_c = 0.54' \quad V_c = 4.06 \text{ fps}$$

SECTION #

⑥

①

②

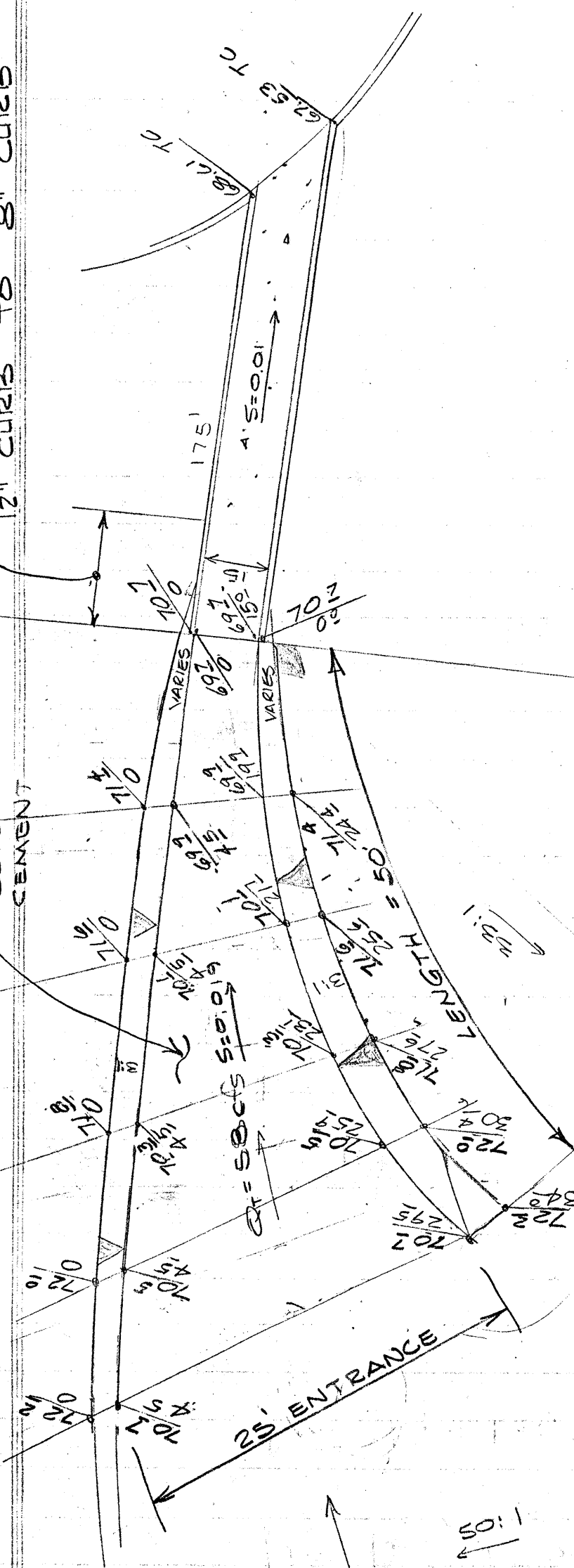
③

④

⑤

IN 60' TRANSITION FROM  
12" CURBS TO 8" CURBS

SOIL  
CEMENT



25' ENTRANCE

Q=360fs

50:1

Q=220fs

16:1

50' LENGTH

Q=530fs

50:1

VARIES

VARIES

175'

4'S=0.01

10

67.53

0.17

10%

10%

67.53

67.53

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### CONCRETE CHANNEL

$$Q = 58 \quad n = 0.013 \quad S = 0.014 \quad SS_1 = 0 \\ SS_2 = 0 \quad W = 15 \quad D_1 = ? \quad D_2 = 0$$

$$\rightarrow D_n = 0.48' \quad V = 8.00 \text{ fps} \quad F = 2.03$$

$$\rightarrow D_c = 0.77 \quad V_c = 5.00 \text{ fps}$$

FLOW IS SUPERCRITICAL

WITH 4" INVERTED CROWN  $D_n = 0.64$  TO INVERT  
 $V = 8.06 \text{ fps} \quad F = 2.05$

### STREET @ CHANNEL EXIT

$$Q = 40 \text{ cfs} \quad n = 0.017 \quad S = 0.045 \quad SS_1 = 0 \\ SS_2 = 0 \quad W = 32' \quad D_1 = ? \quad D_2 = -0.32'$$

$$\rightarrow D_n = 0.36' \quad V = 6.28 \text{ fps} \quad F = 2.48$$

STREET IS SUPERCRITICAL

SINCE CHANNEL EXIT IS TANGENTIAL WITH STREET AND BOTH FLOWS ARE SUPERCRITICAL WITH COMPARATIVE VELOCITIES, NO HYDRAULIC JUMP WILL OCCUR OR POOLING

### CHANNEL AND STREET FLOW: MERGED

$$Q = 58 + 40 = 98 \text{ cfs} \quad n = 0.017 \quad S = 0.045 \quad SS_1 = 0 \\ SS_2 = 0 \quad W = 32' \quad D_1 = ? \quad D_2 = -0.32'$$

$$\text{NORMAL DEPTH} = 0.58' < 0.87' \quad \text{OK}$$

$$V = 8.91 \text{ fps} \quad F = 2.68$$

$$V \times D = 5.2 < 6.5 \quad \text{OK}$$

## CONCLUSION 8

FLOW POOLS UP BEFORE ENTERING  
TRAINER DIKES TO A DEPTH OF 1.18'

FLOW THEN ENTERS TRAINER DIKES  
AT CRITICAL DEPTH OF 0.54' and 4.06 fps

FLOW IS ACCELERATED THRU TRAINER  
DIKES THRU SUPERCRITICAL AT ENTERS  
CONCRETE CHANNEL AT A DEPTH  
OF 0.68' AND 5.83 fps

FLOW CONTINUES THROUGH CONCRETE  
CHANNEL AT SUPERCRITICAL AND  
REACHES A NORMAL DEPTH OF 0.64'  
AND 8.0 fps. with a 4" INVERTED CROWN

SINCE CHANNEL EXIT IS TANGENTIAL  
WITH STREET AND BOTH FLOWS ARE  
SUPERCRITICAL NO HYDRAULIC JUMP  
OR POOLING WILL OCCUR,

AFTER CHANNEL AND STREET FLOW  
MERGE, STREET REACHES A NORMAL  
DEPTH OF 0.58' AND 8.9 fps



# City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

**DESIGN HYDROLOGY SECTION**  
123 Central NW, Albuquerque, NM 87102  
(505) 766-7644

June 5, 1986

Mr. Michael Yost  
Community Sciences Corp.  
P.O. Box 1328  
Corrales, NM 87048

REF: DRAINAGE REPORT FOR SHENANDOAH UNITS II & III (D11/D10) RECEIVED  
MAY 12 and 23, 1986

Dear Mr. Yost:

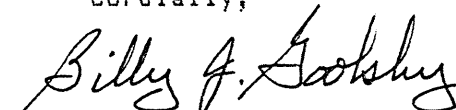
I have reviewed the above referenced submittal and hereby grant approval for Site Development Plan sign-off, Preliminary and Final Plats and for submission to DRC for Work Order.

As we discussed today, I was premature in signing the plans for rough grading because the site development plan has not been signed and preliminary plat has not been granted. I must therefore, rescind my approval on Unit III until these items have been cleared up.

Unit II may proceed as scheduled. However, before commencing any construction work, please provide this office with copies of the proposed phasing and erosion control plans.

Should you have any questions or comments, please call.

Cordially,

  
Billy J. Goolsby  
CE/Hydrology

BJG:mrk

cc: Bellamah Community Dev., P.O. Box 3300, 87190. Attn: Doug Reynolds

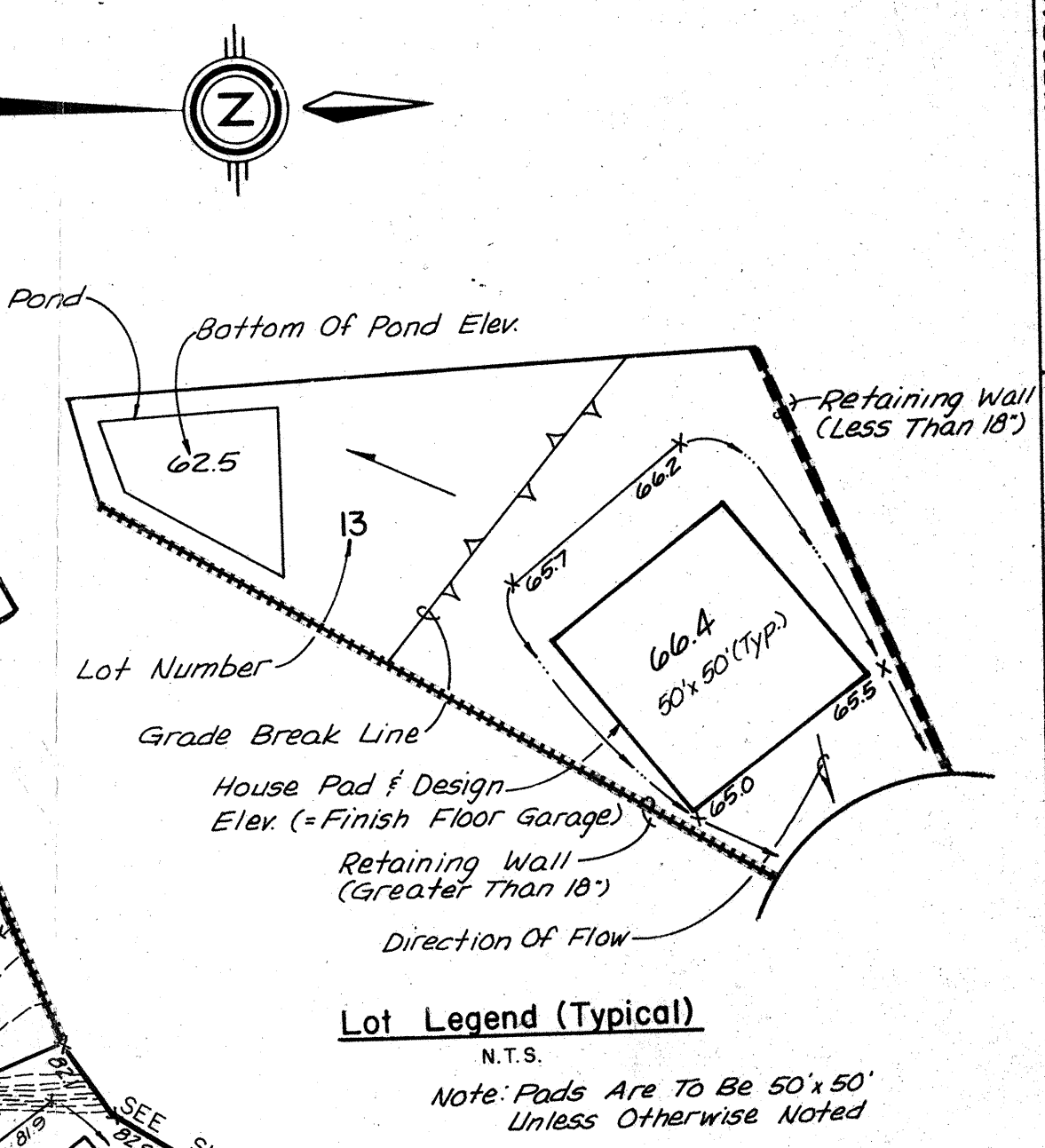
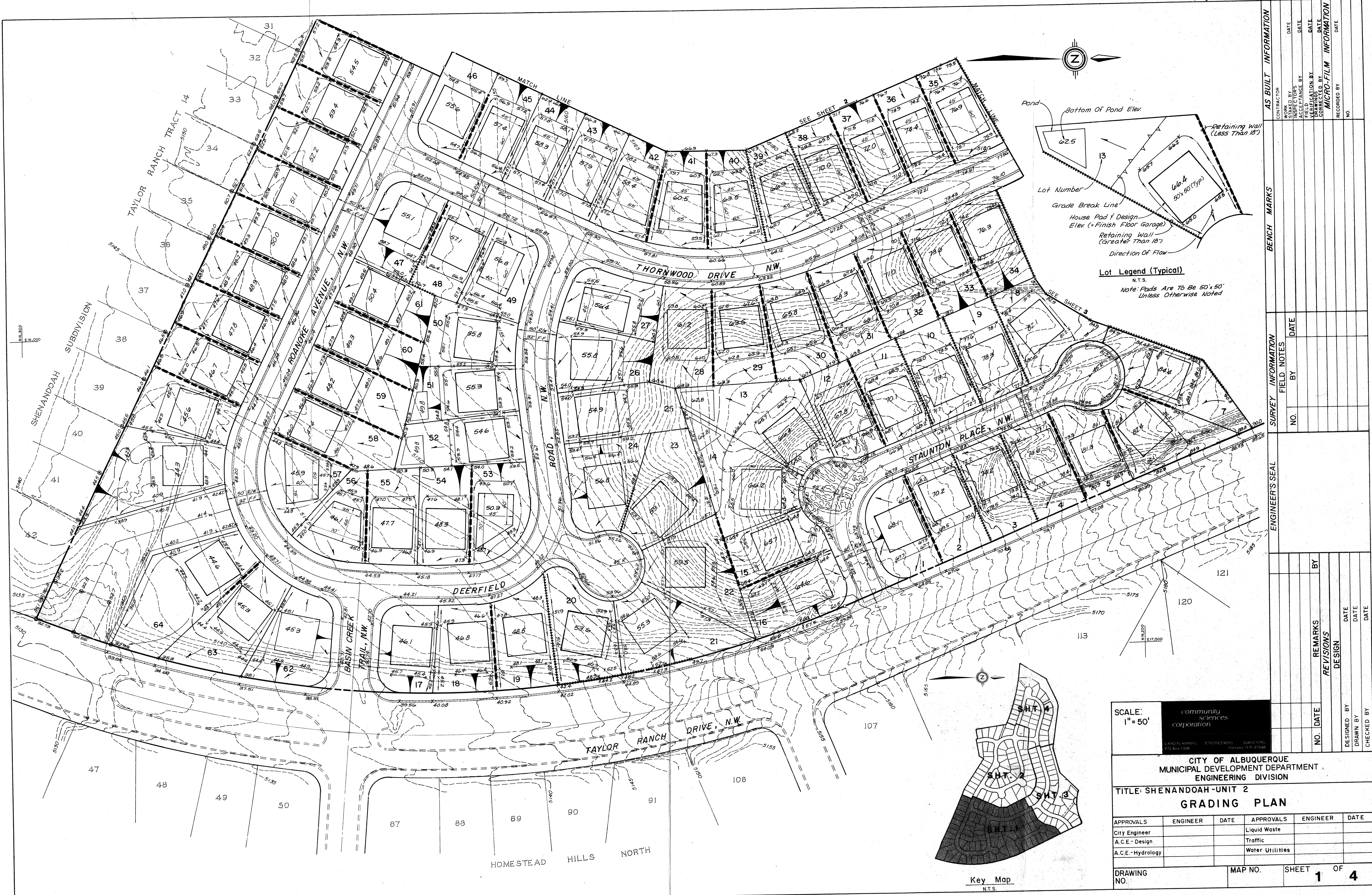
**MUNICIPAL DEVELOPMENT DEPARTMENT**

**C. Dwayne Sheppard, P.E., City Engineer**

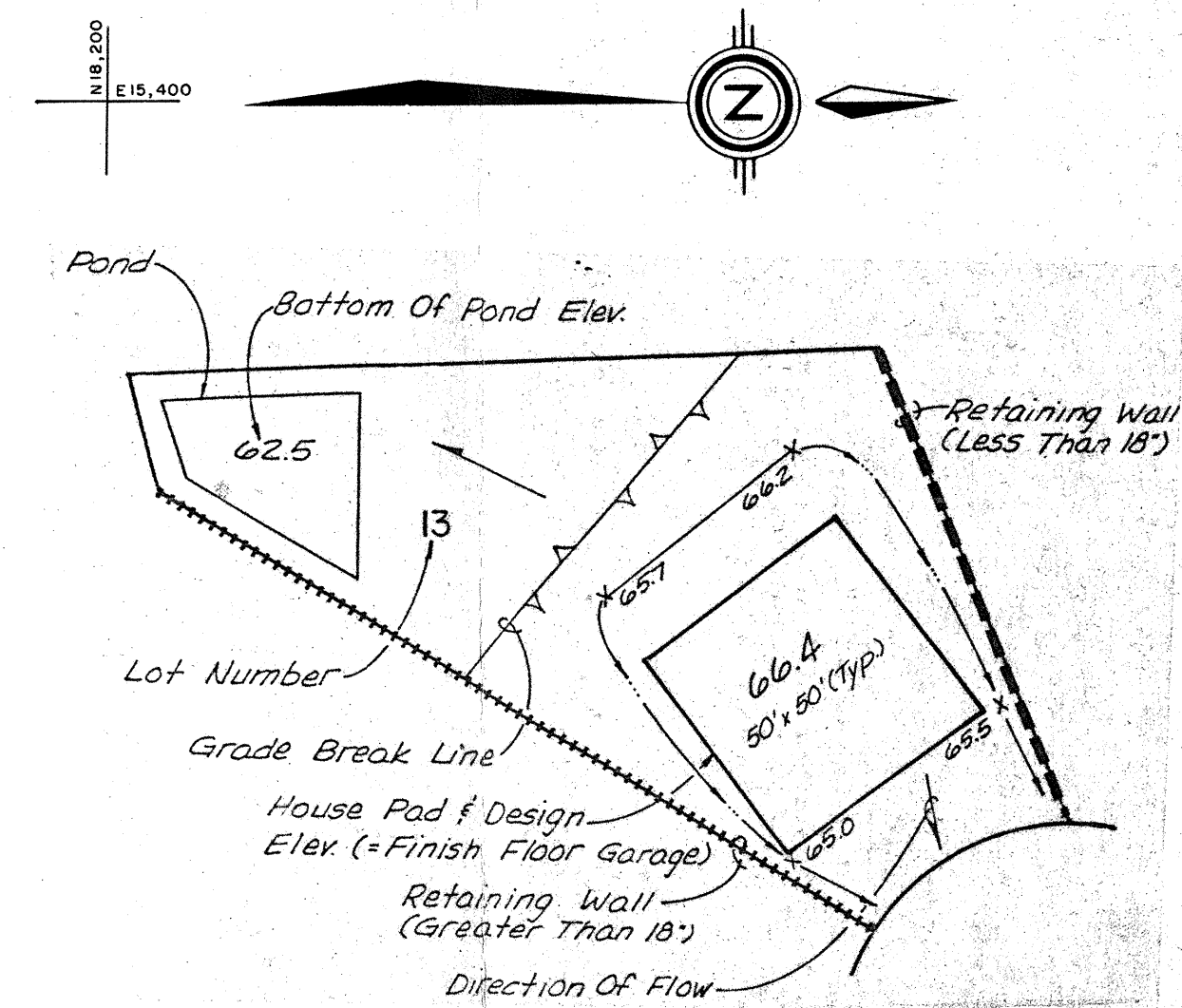
**ENGINEERING DIVISION**

Telephone (505) 766-7467

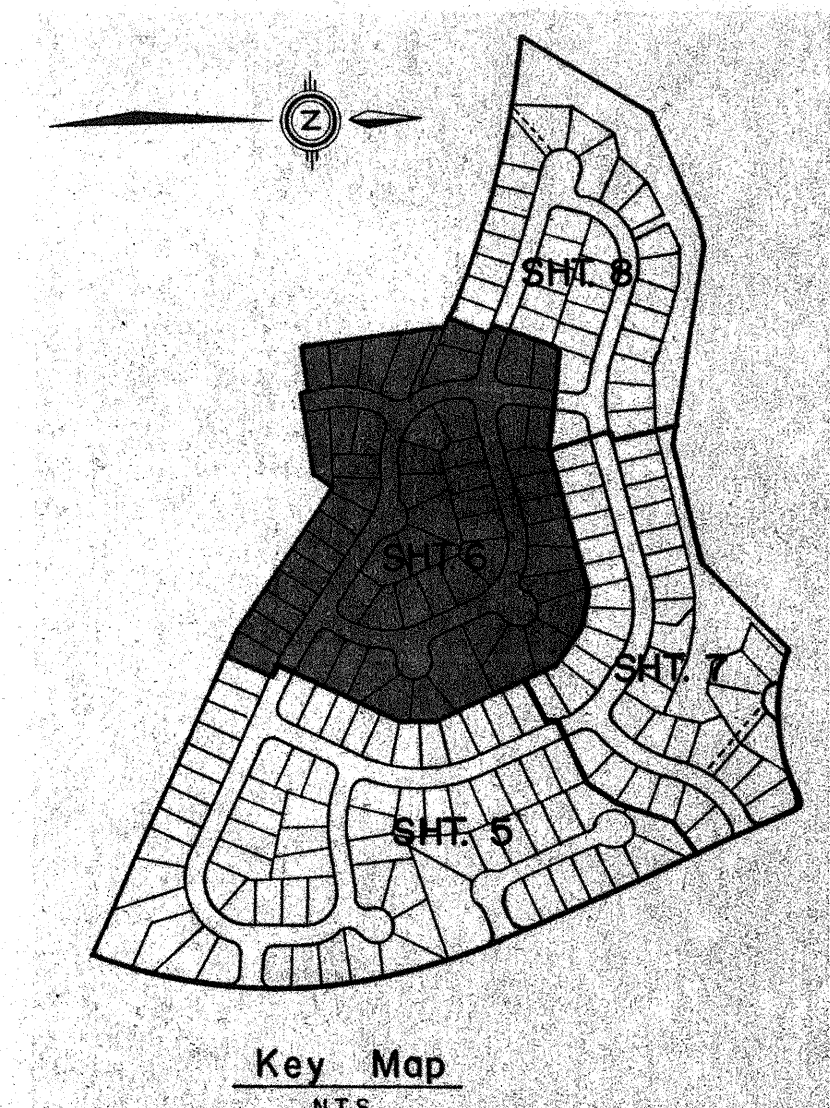
AN EQUAL OPPORTUNITY EMPLOYER



|                      |  |  |                                  |  |  |
|----------------------|--|--|----------------------------------|--|--|
| SCALE: 1" = 50'      |  |  | community sciences corporation   |  |  |
| CITY OF ALBUQUERQUE  |  |  | MUNICIPAL DEVELOPMENT DEPARTMENT |  |  |
| ENGINEERING DIVISION |  |  | TITLE: SHENANDOAH-UNIT 2         |  |  |
| GRADING PLAN         |  |  | APPROVALS                        |  |  |
| ENGINEER             |  |  | DATE                             |  |  |
| City Engineer        |  |  | Liquid Waste                     |  |  |
| A.C.E. - Design      |  |  | Traffic                          |  |  |
| A.C.E. - Hydrology   |  |  | Water Utilities                  |  |  |
| DRAWING NO.          |  |  | MAP NO.                          |  |  |
| SHEET 1 OF 4         |  |  | NO.                              |  |  |



Lot Legend (Typical)  
N.T.S.  
*Note: Pads Are To Be 50'x50'  
Unless Otherwise Noted.*



Key Map  
N.T.S.

SCALE:  
1" = 50'

community  
sciences  
corporation

CITY OF ALBUQUERQUE  
MUNICIPAL DEVELOPMENT DEPARTMENT  
ENGINEERING DIVISION

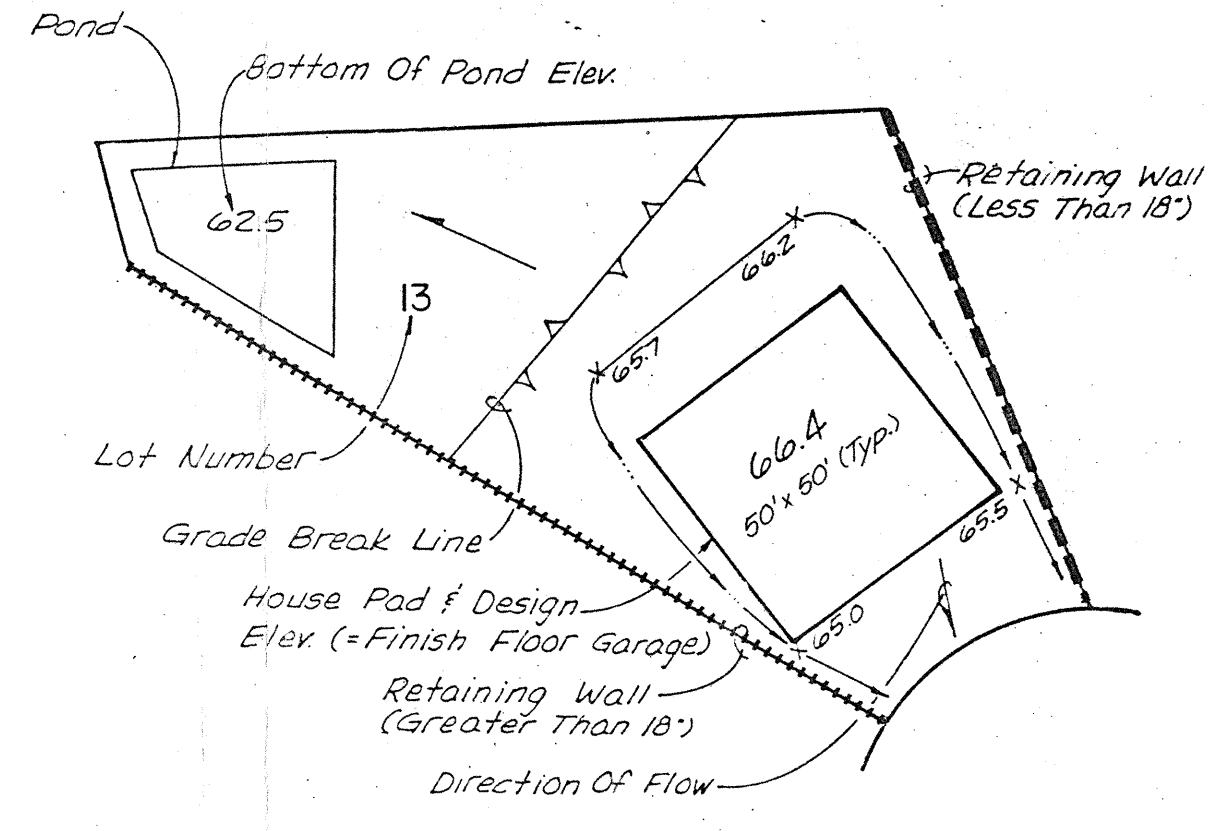
TITLE: SHENANDOAH - UNIT 2

## GRADING PLAN

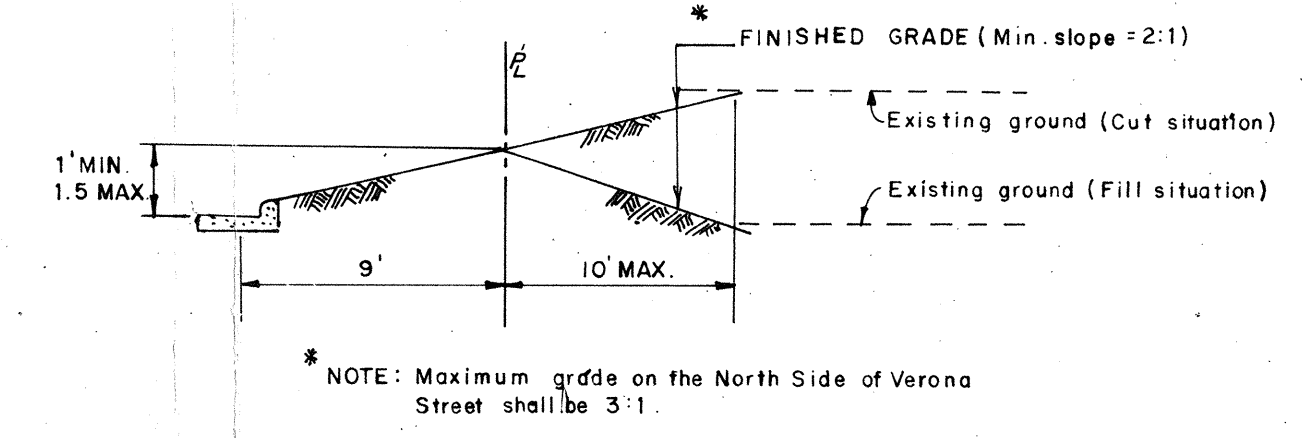
| APPROVALS          | ENGINEER | DATE | APPROVALS       | ENGINEER | DATE |
|--------------------|----------|------|-----------------|----------|------|
| City Engineer      |          |      |                 |          |      |
| A.C.E. - Design    |          |      | Traffic         |          |      |
| A.C.E. - Hydrology |          |      | Water Utilities |          |      |

|             |      |         |      |       |   |    |    |
|-------------|------|---------|------|-------|---|----|----|
| DRAWING NO. | 2826 | MAP NO. | D-11 | SHEET | 6 | OF | 43 |
|-------------|------|---------|------|-------|---|----|----|

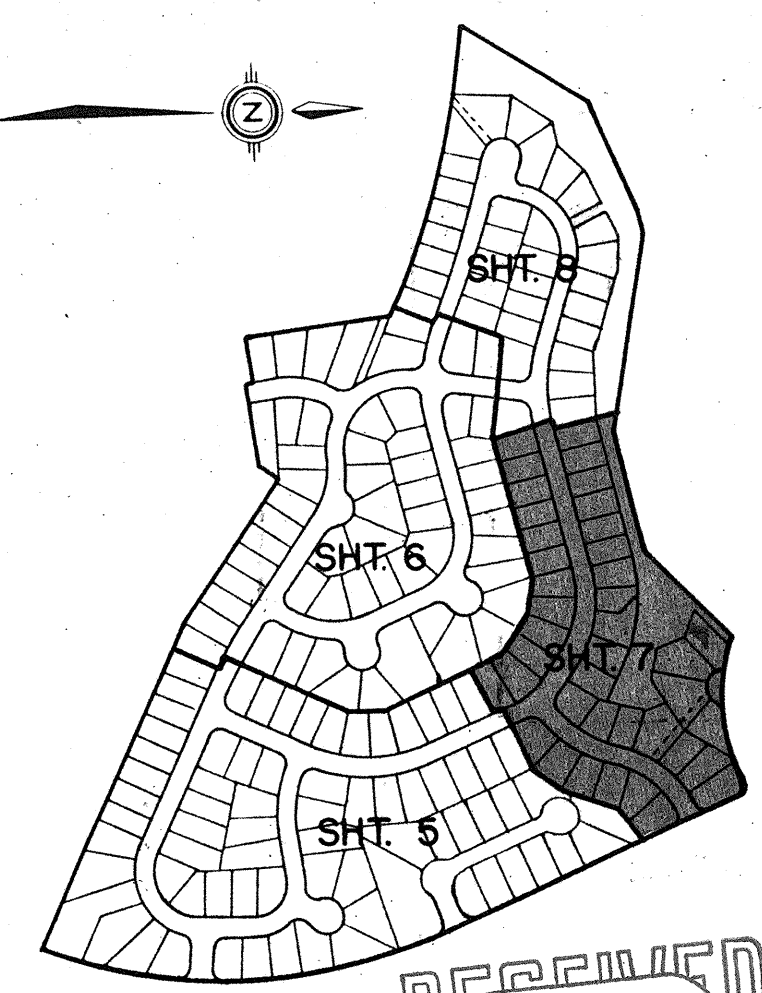
APPROVED FOR ROUGH GRADING  
± 1 ft. Billy J. Goolsby 6/2/86



Lot Legend (Typical)  
N.T.S.  
Note: Pads Are To Be 50' x 50' Unless Otherwise Noted.



SECTION A  
N.T.S.



Key Map  
N.T.S.  
AUG 26 1986  
HYDROLOGY SECTION

SCALE: 1" = 50'

community sciences corporation

LAND PLANNING ENGINEERING SURVEYING  
P.O. Box 1328 Corrales, N.M. 87048

CITY OF ALBUQUERQUE  
MUNICIPAL DEVELOPMENT DEPARTMENT  
ENGINEERING DIVISION

TITLE: SHENANDOAH-UNIT 3  
GRADING PLAN

| APPROVALS        | ENGINEER | DATE | APPROVALS       | ENGINEER | DATE |
|------------------|----------|------|-----------------|----------|------|
| City Engineer    |          |      | Traffic         |          |      |
| A.C.E.-Design    |          |      | Water Utilities |          |      |
| A.C.E.-Hydrology |          |      |                 |          |      |

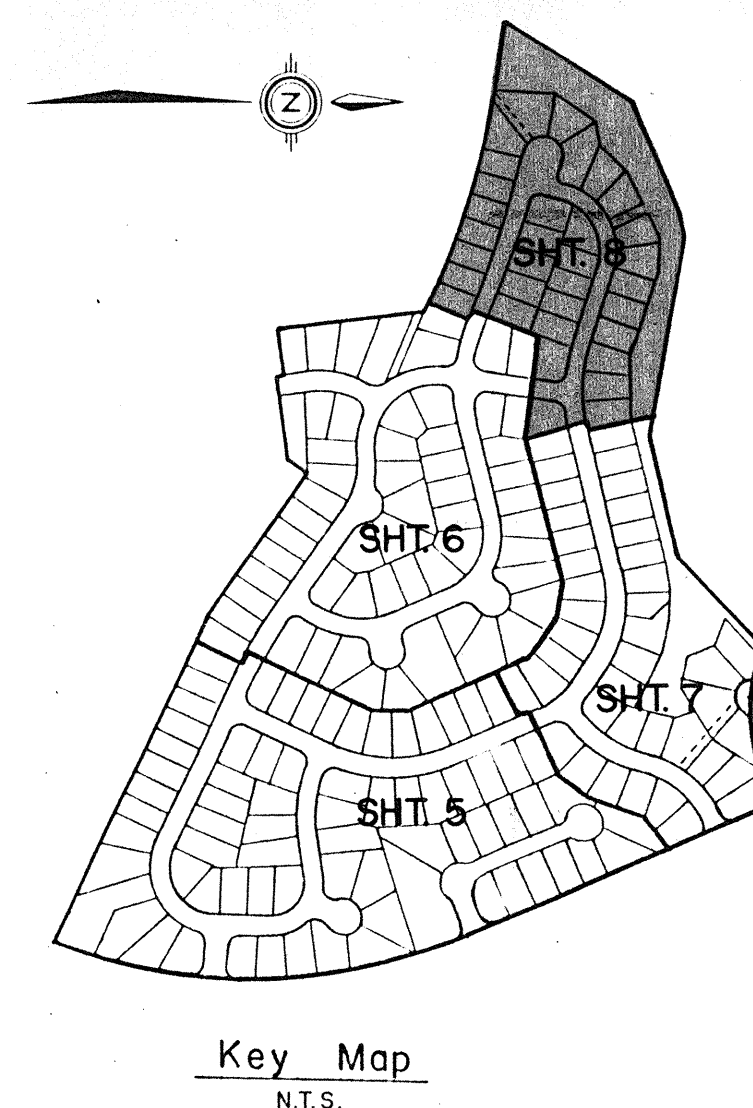
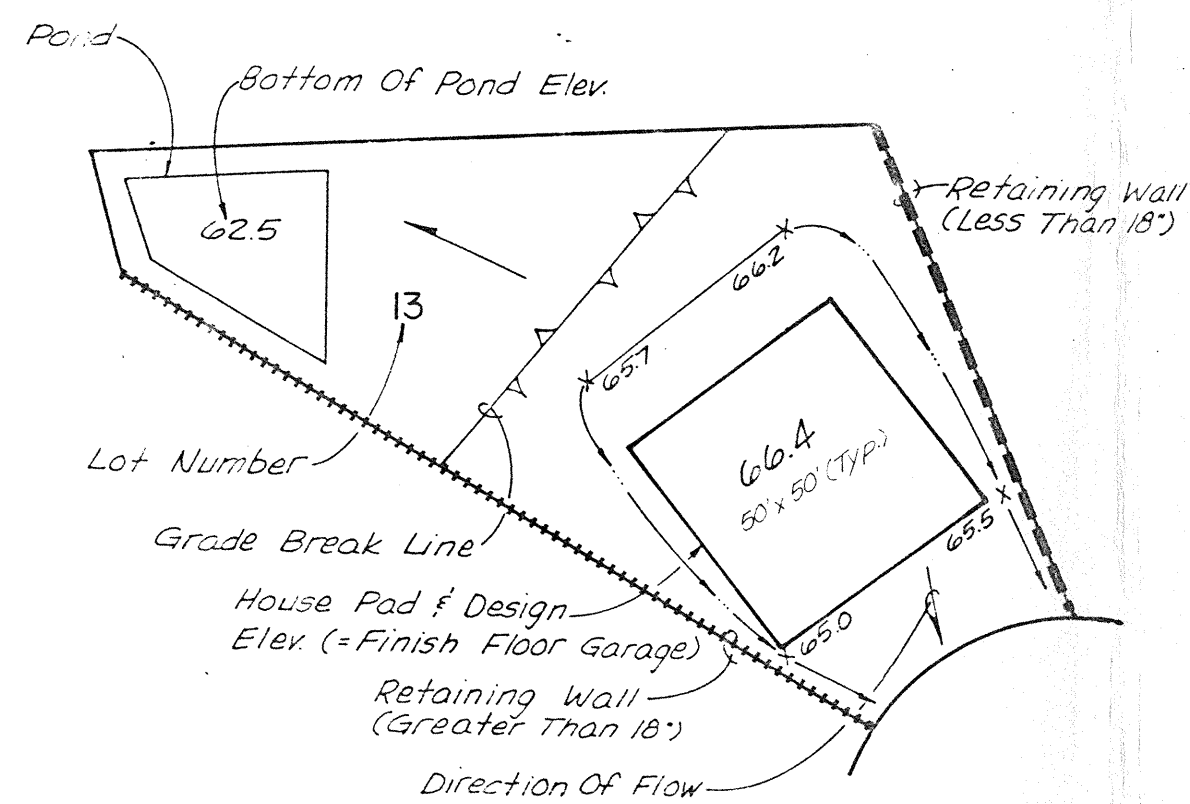
DRAWING NO. 2826 MAP NO. D-II SHEET 7 OF 43

APPROVED FOR ROUGH GRADING  
(± 1 FT.)  
B. J. G. 8/27/86  
CITY ENGINEER

| AS BUILT INFORMATION |               |      | BENCH MARKS                                      |      |    | SURVEY INFORMATION |    |     | ENGINEER'S SEAL |  |  |
|----------------------|---------------|------|--------------------------------------------------|------|----|--------------------|----|-----|-----------------|--|--|
| CONTRACTOR           | WORKED BY     | DATE | BENCHMARK USED FOR THIS PLAT IS A.C.S. "13-D11", | DATE | BY | NO.                | BY | NO. |                 |  |  |
| INSPECTOR'S          | ACCEPTANCE BY | DATE | A "13" CHISELED ON TOP OF THE CURB AT THE S.S.E. | DATE | BY | NO.                | BY | NO. |                 |  |  |
| VERIFICATION BY      | DATE          |      | CURB RETURN LOCATED AT THE SOUTHEAST QUADRANT OF | DATE | BY | NO.                | BY | NO. |                 |  |  |
| DRAWINGS BY          | DATE          |      | THE INTERSECTION OF TAYLOR RANCH DRIVE, N.W. AND | DATE | BY | NO.                | BY | NO. |                 |  |  |
| COMPILED BY          | DATE          |      | CALLE NORTENA, N.W. ELEV. = 5198.95              | DATE | BY | NO.                | BY | NO. |                 |  |  |
| RECORDED BY          | DATE          |      |                                                  | DATE | BY | NO.                | BY | NO. |                 |  |  |
| NO                   |               |      |                                                  |      | BY | NO.                | BY | NO. |                 |  |  |
|                      |               |      |                                                  |      | BY | NO.                | BY | NO. |                 |  |  |

DESIGNED BY C.S.C.  
DRAWN BY C.S.C.  
CHECKED BY

DATE MAY, 1986  
DATE MAY, 1986  
DATE



SCALE: 1" = 50'

community sciences corporation  
LAND PLANNING ENGINEERING SURVEYING  
P.O. Box 1328 Corrales, N.M. 87048

|                                                                                 |          |         |                   |
|---------------------------------------------------------------------------------|----------|---------|-------------------|
| CITY OF ALBUQUERQUE<br>MUNICIPAL DEVELOPMENT DEPARTMENT<br>ENGINEERING DIVISION |          |         |                   |
| TITLE: SHENANDOAH- UNIT 3<br>GRADING PLAN                                       |          |         |                   |
| AUG 26 1986                                                                     |          |         |                   |
| APPROVALS                                                                       | ENGINEER | DATE    | APPROVALS         |
| CITY Engineer                                                                   |          |         | HYDROLOGY SECTION |
| A.C.E.-Design                                                                   |          |         | Traffic           |
| A.C.E.-Hydrology                                                                |          |         | Water Utilities   |
| DRAWING NO.                                                                     | 2826     | MAP NO. | D-11              |
|                                                                                 |          | SHEET   | 8 OF 43           |

APPROVED FOR ROUGH GRADING  
(± 1 FT.)  
Billy J. Sookley 8/27/86  
CITY ENGINEER

| SURVEY INFORMATION |    | BENCH MARKS |                                                                                                                                                                                                                                         | AS BUILT INFORMATION |     |
|--------------------|----|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----|
| NO.                | BY | DATE        | BENCHMARK USED FOR THIS PLAT IS A.C.S. "3-DIT", A "1/2" CHISELED ON TOP OF THE CURB AT THE S.S.E. CURB RETURN LOCATED AT THE SOUTHEAST QUADRANT OF THE INTERSECTION OF TAYLOR RANCH DRIVE, N.W. AND CALLE NORTENA, N.W. ELEV. = 5198.95 | CONTRACTOR           | NO. |
|                    |    |             |                                                                                                                                                                                                                                         | WORK BY              |     |
|                    |    |             |                                                                                                                                                                                                                                         | INSPECTED BY         |     |
|                    |    |             |                                                                                                                                                                                                                                         | DATE                 |     |
|                    |    |             |                                                                                                                                                                                                                                         | FIELD CORRECTION BY  |     |
|                    |    |             |                                                                                                                                                                                                                                         | DATE                 |     |
|                    |    |             |                                                                                                                                                                                                                                         | DRAWINGS BY          |     |
|                    |    |             |                                                                                                                                                                                                                                         | DATE                 |     |
|                    |    |             |                                                                                                                                                                                                                                         | CORRECTED BY         |     |
|                    |    |             |                                                                                                                                                                                                                                         | DATE                 |     |
|                    |    |             |                                                                                                                                                                                                                                         | RECORDED BY          |     |
|                    |    |             |                                                                                                                                                                                                                                         | DATE                 |     |