



City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 28, 1994

Gregory J. Krenik, P.E.
Mark Goodwin & Assoc. PA
P.O. Box 90606
Albuquerque, N.M. 87199

RE: ENGINEER'S CERTIFICATION FOR RIO DEL NORTE SUBD. (F-13/D21).
RECEIVED JUNE 21, 1994 FOR FINANCIAL GUARANTY RELEASE
ENGINEER'S STAMP DATED 6/20/94

Dear Mr. Krenik:

Based on the information included in the submittal referenced above, City Hydrology accepts the Engineer's Certification of grading & drainage and releases the Financial Guaranty for this project.

If I can be of further assistance, you may contact me at 768-2727.

Sincerely,

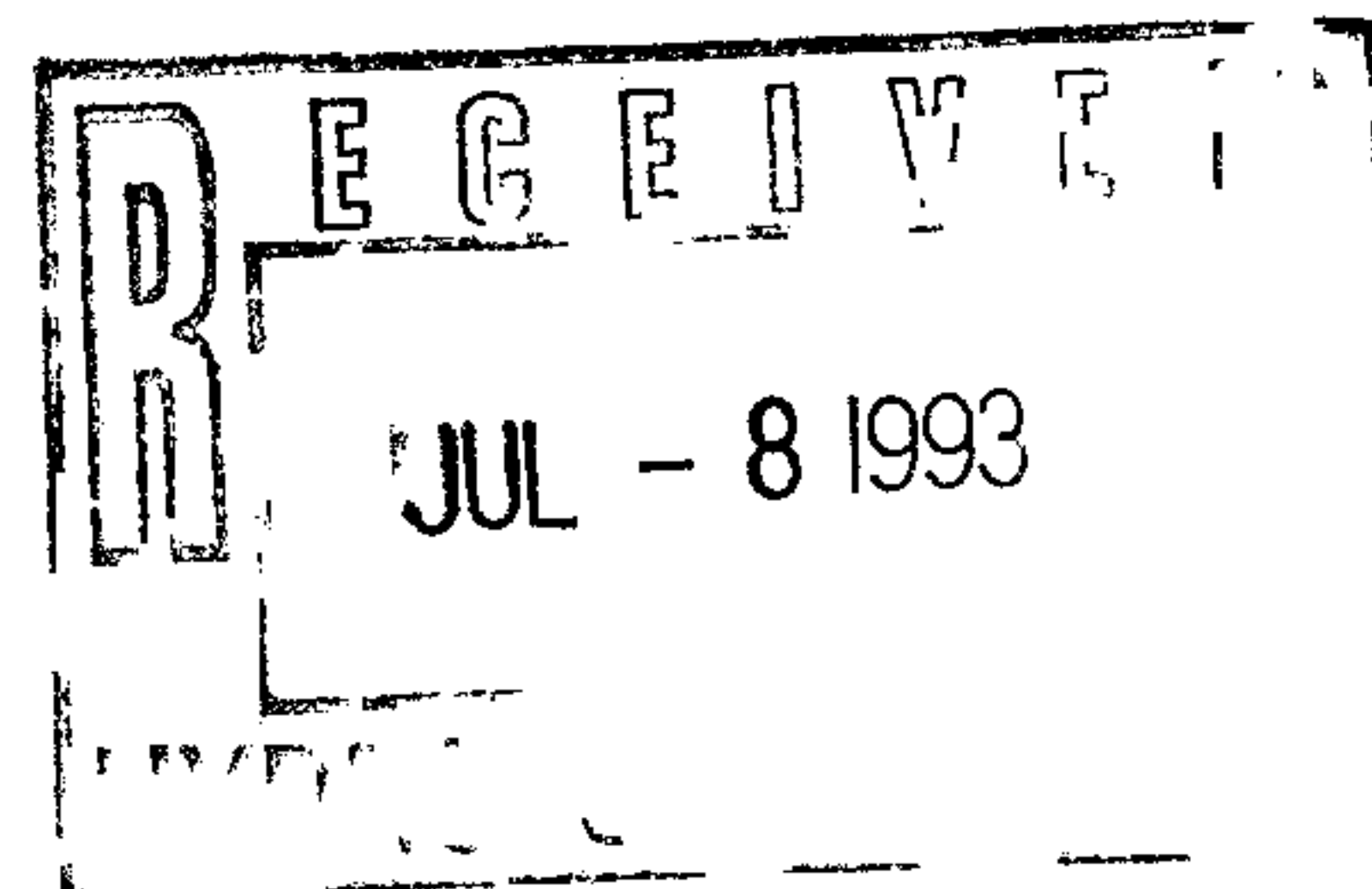
John P. Curtin, P.E.
Civil Engineer/Hydrology

c: Lynda Michelle DeVanti, Project #4683.90

WPHYD/7715/jpc

DRAINAGE REPORT
FOR
RIO DEL NORTE SUBDIVISION

July 93



Prepared for:

C & G Development
P.O. Box 2164
Albuquerque, NM 87103

April 1993



4-26-93

7-7-93

PURPOSE

The purpose of this report is to present the drainage management plan for the Rio Del Norte Subdivision and the widening of Griegos Road to 22 feet between Pedroncelli Road and Rio Grande Boulevard NW to obtain final plat and work order approval. All applicable ordinances and the DPM were utilized to prepare this plan.

EXISTING CONDITIONS

The project comprises an area of 5.089 acres between the Durances Lateral and Pedroncelli Road, just south of Montano Road. (See attached Vicinity Map.)

The site is flat, but does not lie in a 100 Year Flood Zone plain. There are no facilities adjacent to this site capable of taking runoff, nor do off-site flows enter.

HYDROLOGIC ANALYSIS

Hydrologic aspects of this site were evaluated using AMAFCA's AHYMO program according to guidelines presented in the City of Albuquerque's DPM, Section 22.2 (August, 1991). All of the pertinent hydrologic parameters and calculations are located in the appendix of this report.

PROPOSED MANAGEMENT PLAN

1. Based upon discussions with Fred Aguirre, City of Albuquerque Hydrology Department, we can use the entire site as a ponding area.

As a developed site, this plan proposes to retain all runoff in front, side and rear yard ponds.

An impermeable barrier of filled CMU will be erected along the property line and a water stop will be installed at the intersection with Pedroncelli Road NW.

2. Based upon discussions with Fred Aguirre, City of Albuquerque Hydrology Department, we only need to retain the runoff from the additional pavement needed for the Griegos Road widening.

This will be accomplished by utilizing a French Drain system along the south side of the roadway.

Bar Ditch approve instead

INTERIM EROSION CONTROL

Due to the site being so flat, an Erosion Control Plan is part of this report and project.

The plan centers on the fact that storm waters will not be allowed free discharge during the construction process until all street paving and wall construction is accomplished.

CONCLUSIONS

The proposed Rio Del Norte Subdivision, comprising 21 lots on 5.089 acres, can be readily accommodated through the implementation of this plan. It has been adequately shown in this report that the internal conveyance of stormwater can be accomplished while meeting all current City requirements.



D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT Rio Del Norte
SUBJECT DRAINAGE CALCS
BY GSK DATE 6-30-93
CHECKED _____ DATE _____
SHEET 1 OF _____

SITE IS IN ZONE 2

$$\begin{aligned} P_{0.5} &= 2.01 \text{ in} & T_c &= 10 \text{ min} \\ P_{(6)} &= 2.35 \text{ in} & T_p &= 2/3(10) = 6.67 \text{ min USE } 8 \text{ min OR } 0.1333 \text{ HR} \\ P_{(24)} &= 2.75 \text{ in} \\ P_{(10d)} &= 3.95 \text{ in} & \text{STORM: } &100 \text{ YR } 10 \text{ day} \end{aligned}$$

$$\begin{aligned} \text{TOTAL AREA} &= 5.089 \text{ AC} \\ \text{PAVEMENT} &= 0.60985 \text{ AC} \\ \text{PAD/DRIVE AREA} &= 1.3512 \text{ AC} \\ \text{LANDSCAPE AREA} &= 3.12795 \text{ AC} \end{aligned}$$

- ALL RUNOFF WILL BE RETAINED ON SITE
- THE PONDING AREA IS SIZED SO THAT AREA ON EACH LOT IS SUFFICIENT TO RETAIN ITS PORTION OF RUNOFF INCLUDING THE ADJACENT ROWWAY.

TREATMENT B

$$3.12795 \text{ AC} \times 60\% = 1.87677 \text{ AC} = 36,879\%$$

TREATMENT C

$$3.12795 \text{ AC} \times 40\% = 1.25118 \text{ AC} = 24,586\%$$

TREATMENT D

$$0.60985 + 1.3512 = 1.96105 \text{ AC} = 38,535\%$$

TOTAL

$$5.089 \text{ AC} = 0.00795 \text{ SQ. MI.}$$

- FROM THE HYMO RUN (SHEETS 2 & 3)

$$Q_p = 17.39 \text{ CFS} \quad \text{VOL} = 0.581 \text{ AC-FT}$$

$$\begin{aligned} \text{VOL}_{(10)} &= 0.581 + 1.96105 (3.95 - 2.35) / 12 = 0.84247 \text{ AC-FT} \\ &= 36,698.1384 \text{ CU. FT.} \end{aligned}$$

VOLUME REQUIRED PER LOT

$$36,698.1384 / 16 = 2294 \text{ CU. FT}$$


```

TART                TIME=0.0
***** Hydrograph For TIERRA ENCANTADA SUBDIVISION *****
DEVELOPED HOME AREA *
AINFALL             TYPE=1 RAIN QUARTER=0.0 IN
                    RAIN ONE=2.01 IN RAIN SIX=2.35 IN
                    RAIN DAY=2.75 IN DT=0.03333 HR
COMPUTE NM HYD      ID=1 HYD NO=101.1 AREA=0.00795
                    PER A=0.0 PER B=36.879 PER C=24.586 PER D=38.535
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=1 CODE=1
FINISH

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***** Hydrograph For TIERRA ENCANTADA SUBDIVISION *****

-DEVELOPED HOME AREA *

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                    RAIN ONE=2.01 IN RAIN SIX=2.35 IN

                    RAIN DAY=2.75 IN DT=0.03333 HR

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COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2
- PEAK AT 1.40 HR.

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.0120	.0139	.0158	.0178	.0199	.0219	.0241
.0263	.0286	.0309	.0333	.0358	.0384	.0411
.0439	.0467	.0497	.0529	.0561	.0596	.0631
.0669	.0709	.0751	.0807	.0866	.0930	.1066
.1371	.1840	.2514	.3434	.4644	.6186	.8106
1.0449	1.2624	1.3533	1.4300	1.4982	1.5602	1.6174
1.6704	1.7200	1.7664	1.8102	1.8514	1.8904	1.9273
1.9622	1.9953	2.0268	2.0566	2.0850	2.0915	2.0976
2.1033	2.1088	2.1140	2.1191	2.1239	2.1285	2.1329
2.1373	2.1414	2.1454	2.1494	2.1531	2.1568	2.1604
2.1639	2.1673	2.1706	2.1739	2.1771	2.1802	2.1832
2.1862	2.1891	2.1919	2.1947	2.1975	2.2002	2.2028
2.2054	2.2080	2.2105	2.2130	2.2154	2.2178	2.2202
2.2225	2.2248	2.2270	2.2293	2.2315	2.2336	2.2358
2.2379	2.2399	2.2420	2.2440	2.2460	2.2480	2.2500
2.2519	2.2538	2.2557	2.2576	2.2594	2.2612	2.2631
2.2648	2.2666	2.2684	2.2701	2.2718	2.2735	2.2752
2.2769	2.2785	2.2802	2.2818	2.2834	2.2850	2.2866
2.2881	2.2897	2.2912	2.2928	2.2943	2.2958	2.2973
2.2987	2.3002	2.3017	2.3031	2.3045	2.3060	2.3074
2.3088	2.3102	2.3115	2.3129	2.3143	2.3156	2.3169
2.3183	2.3196	2.3209	2.3222	2.3235	2.3248	2.3261
2.3273	2.3286	2.3298	2.3311	2.3323	2.3335	2.3348
2.3360	2.3372	2.3384	2.3396	2.3408	2.3419	2.3431
2.3443	2.3454	2.3466	2.3477	2.3488	2.3500	

COMPUTE NM HYD

ID=1 HYD NO=101.1 AREA=0.00795

PER A=0.0 PER B=36.879 PER C=24.586 PER D=38.535

TP=0.1333 HR MASS RAINFALL=-1

K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE
CONSTANT, N = 7.106420

UNIT PEAK = 12.095 CFS UNIT VOLUME = .9984 B = 526.28
P60 = 2.0100

AREA = .003064 SQ MI IA = .10000 INCHES INF = .04000 I
NCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT
.033330

K = .122231HR TP = .133300HR K/TP RATIO = .916961 SHAPE
CONSTANT, N = 3.860804

UNIT PEAK = 12.675 CFS UNIT VOLUME = .9994 B = 345.78
P60 = 2.0100

AREA = .004886 SQ MI IA = .44000 INCHES INF = 1.08200 I
NCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT
.033330

PRINT HYD

ID=1 CODE=1

PARTIAL HYDROGRAPH 101.10

RUNOFF VOLUME = 1.37020 INCHES = .5810 ACRE-FEET

PEAK DISCHARGE RATE = 17.39 CFS AT 1.500 HOURS BASIN AREA =
.0080 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

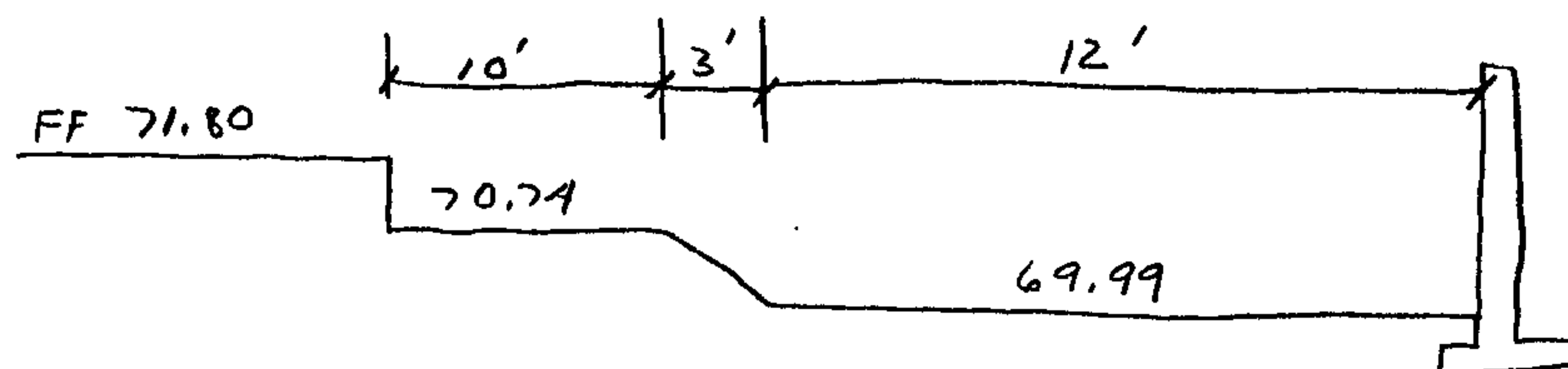
END TIME (HR:MIN:SEC) = 10:47:42



PROJECT RIO DEL NORTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 6-30-93
CHECKED _____ DATE _____
SHEET 4 OF _____

DETERMINE RETENTION AREA / VOLUME

TYPICAL AREA OF EACH LOT FOR RETENTION

$$= 4148 \text{ S.F.}$$


sec. A

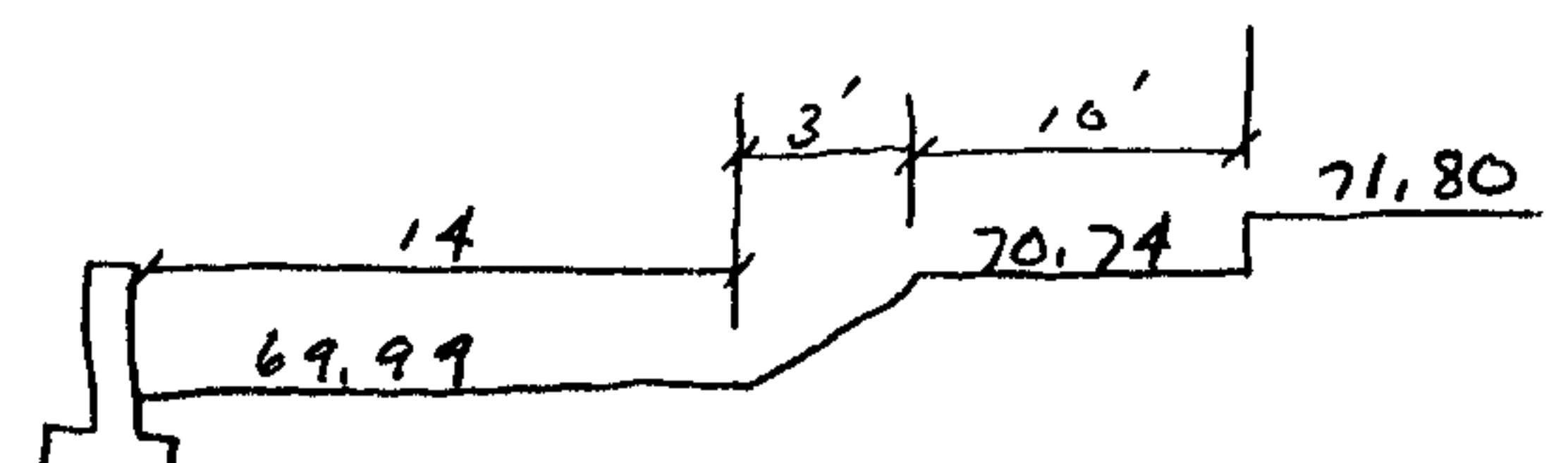
$$\text{VOLUME} = 80 \left[.75(12) + .75(3)/2 \right] = 810 \text{ CF}$$

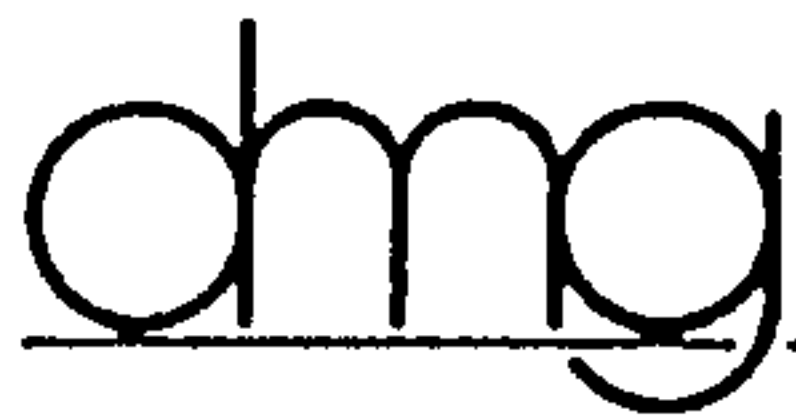
SEC. B

$$\begin{aligned} \text{VOLUME} &= 2(85) \left[.75(14) + .75(3)/2 \right] = \\ &= 1,976.25 \text{ CF} \end{aligned}$$

TOTAL VOLUME = 2,786.25 CF > 2294

OK





D. Mark Goodwin & Associates, P.A.
Consulting Engineers and Surveyors

PROJECT RIO DEL NORTE
SUBJECT DRAINAGE CALCS
BY GJK DATE 7-1-93
CHECKED _____ DATE _____
SHEET 5 OF _____

GRIEGOS ROAD DRAINAGE

PER FRED AGUIRRE OF THE HYDROLOGY DEPT. WE ONLY
NEED TO RETAIN THE RUNOFF FROM THE ADDITIONAL
ASPHALT ON GRIEGOS ROAD.

FOR THIS WE WILL ASSUME A 6 FOOT WIDE
ADDITION ALONG THE SOUTH SIDE OF THE ROADWAY -
FOR A LENGTH OF 300 FEET.

USE THE 100yr 6 HR STORM

$$P_{(1)} = 1.90 \text{ in}$$

$$P_{(6)} = 2.20 \text{ in}$$

$$P_{(24)} = 2.63 \text{ in}$$

$$DT = 0.0333 \text{ HR}$$

$$TP = 0.1333 \text{ HR}$$

$$\text{Area} = 1800 \text{ SF} = 0.0413 \text{ AC} = 0.00006457 \text{ SM.}$$

FROM THE HYMO OUTPUT (SHEETS 6 & 7)

$$Q = 0.19 \text{ CFS}$$

$$\text{Vol} = 0.0068 \text{ AC-FT}$$

$$= 296.208 \text{ CF}$$

APPROXIMATELY 1 CF OF STORAGE IS NEEDED
PER LINEAR FOOT OF ROADWAY.

USE A ROCK FRENCH DRAIN (ASSUME 40% OPEN SPACE)

USE A 1 FOOT WIDE TRENCH W/ 3" + 4" ROCK

DETERMINE DEPTH OF TRENCH.

$$1 \text{ CF} = 1 \times 0.4 \times 1 \times \underline{D}$$

$$D = 2.5 \text{ FT.}$$


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PART                TIME=0.0
**** Hydrograph For GRIEGOS ROAD ****
*** ADDITIONAL PAVE ****
RAINFALL            TYPE=1 RAIN QUARTER=0.0 IN
                    RAIN ONE=1.90 IN RAIN SIX=2.20 IN
                    RAIN DAY=2.63 IN DT=0.03333 HR
COMPUTE NM HYD      ID=1 HYD NO=101.1 AREA=0.00006457 SQ MI
                    PER A=0.00 PER B=0.00 PER C=0.00 PER D=100.0
                    TP=0.1333 HR MASS RAINFALL=-1
PRINT HYD           ID=1 CODE=1
FINISH

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AHYMO PROGRAM (AHYMO392) - AMAFCA VERSION OF HYMO - MARCH, 1992
RUN DATE (MON/DAY/YR) = 07/07/1993
START TIME (HR:MIN:SEC) = 09:31:54      USER NO. = Z_GOODWN.892
INPUT FILE = rdn.dat

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START                TIME=0.0

**** Hydrograph For GRIEGOS ROAD ****
*** ADDITIONAL PAVE ****

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RAINFALL            TYPE=1 RAIN QUARTER=0.0 IN
                    RAIN ONE=1.90 IN RAIN SIX=2.20 IN
                    RAIN DAY=2.63 IN DT=0.03333 HR

```

COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2
- PEAK AT 1.40 HR.

DT =	.033330 HOURS			END TIME =	5.999400 HOURS	
.0000	.0013	.0027	.0041	.0055	.0069	.0084
.0099	.0115	.0131	.0147	.0164	.0181	.0199
.0217	.0236	.0256	.0276	.0296	.0318	.0340
.0363	.0387	.0412	.0438	.0465	.0493	.0523
.0554	.0587	.0622	.0675	.0731	.0791	.0920
.1208	.1651	.2289	.3159	.4302	.5759	.7574
.9790	1.1846	1.2704	1.3429	1.4074	1.4661	1.5201
1.5702	1.6171	1.6610	1.7023	1.7413	1.7781	1.8130
1.8460	1.8774	1.9071	1.9353	1.9621	1.9861	1.9736
1.9789	1.9839	1.9887	1.9932	1.9976	2.0018	2.0059
2.0098	2.0136	2.0172	2.0208	2.0242	2.0275	2.0308
2.0339	2.0370	2.0400	2.0430	2.0458	2.0486	2.0514
2.0540	2.0567	2.0592	2.0617	2.0642	2.0666	2.0690
2.0714	2.0737	2.0759	2.0781	2.0803	2.0825	2.0846
2.0867	2.0887	2.0907	2.0927	2.0947	2.0966	2.0985
2.1004	2.1023	2.1041	2.1059	2.1077	2.1095	2.1112
2.1130	2.1147	2.1164	2.1180	2.1197	2.1213	2.1229
2.1245	2.1261	2.1277	2.1292	2.1307	2.1322	2.1337
2.1352	2.1367	2.1382	2.1396	2.1410	2.1425	2.1439
2.1452	2.1466	2.1480	2.1494	2.1507	2.1520	2.1533
2.1547	2.1560	2.1572	2.1585	2.1598	2.1611	2.1623
2.1635	2.1648	2.1660	2.1672	2.1684	2.1696	2.1708
2.1720	2.1731	2.1743	2.1754	2.1766	2.1777	2.1789
2.1800	2.1811	2.1822	2.1833	2.1844	2.1855	2.1866
2.1876	2.1887	2.1897	2.1908	2.1918	2.1929	2.1939
2.1949	2.1960	2.1970	2.1980	2.1990	2.2000	

COMPUTE NM HYD ID=1 HYD NO=101.1 AREA=0.00006457 SQ MI
 PER A=0.00 PER B=0.00 PER C=0.00 PER D=100.0
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K = .072649HR TP = .133300HR K/TP RATIO = .545000 SHAPE
 CONSTANT, N = 7.106420
 UNIT PEAK = .25493 CFS UNIT VOLUME = .9546 B = 526.28
 P60 = 1.9000
 AREA = .000065 SQ MI IA = .10000 INCHES INF = .04000 I
 CHES PER HOUR
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT
 - .033330

PRINT HYD ID=1 CODE=1

PARTIAL HYDROGRAPH 101.10

RUNOFF VOLUME = 1.96638 INCHES = .0068 ACRE-FEET
 PEAK DISCHARGE RATE = .19 CFS AT 1.500 HOURS BASIN AREA =
 .0001 SQ. MI.

FINISH

NORMAL PROGRAM FINISH

END TIME (HR:MIN:SEC) = 09:31:57

