DRAINAGE REPORT

for

ST JOSEPH'S MEDICAL OFFICES

in

GATEWAY NORTH

NM STATE ROAD 528

Rio Rancho, New Mexico

October 18, 1995

Prepared by

Larry D. Read, PE

DRAINAGE REPORT

for

ST. JOSEPH'S MEDICAL OFFICES

Tract C-7A, Gateway North

RIO RANCHO, NEW MEXICO

October 17, 1995

GRADING & DRAINAGE PLAN
APPROVED
10/20/95
City Engineer City of Rio Rancho
cc: Dolores Wood
Rio Rancho Development Dept

GRADING AND DRAINAGE PLAN

ST. JOSEPH'S MEDICAL OFFICES
GATEWAY NORTH
RIO RANCHO, NEW MEXICO

PREPARED BY: LARRY D. READ, P.E.
P.O. BOX 90233
ALBUQUERQUE, NEW MEXICO 87199
(505) 858-3165

GRADE 3:1

October 18, 1995

Mr. Jerome P. Fossenier, PE
City Engineer
City of Rio Rancho
3900 Southern Boulevard
Rio Rancho, New Mexico 87124

RE: Drainage Report
St Joseph's Medical Office Building
Nm State Road 528

Dear Mr. Fossenier:

Attached for your review and approval is the drainage report and grading plan for the referenced project. The grading plan is in conformance with The City's current requirements for drainage and conforms to the Master Drainage Plan for the Gateway North Development.

If you have any questions or comments, please call me at 858-3165.

Thank you for you help on this project

Sincerely,

Larry D. Read, PE

DRAINAGE REPORT

for

ST. JOSEPH'S MEDICAL OFFICES

Tract C-7A, Gateway North

RIO RANCHO, NEW MEXICO

October 17, 1995

LOCATION & DESCRIPTION

The proposed site is a 2.60 acre tract located in the master planned Gateway North Development within City of Rio Rancho, Sandoval County, New Mexico. It is at the northwest corner of N. M. State Road No. 528 and the central "right in - right out" (Road B) access to Gateway North. The legal description of the property is Tract C-7A , Gateway North, Rio Rancho, New Mexico.

The site has been recently graded and absent of any vegetation. The graded terrain slopes about 1.5% to the southwest toward the existing detention ponds at the southern end of the development. The detention ponds have been designed to limit runoff from the development to the 528 Drainage Channel (7-Bar Channel) to less than the 0.5 cfs/acre discharge currently allowed in this drainage basin. The current drainage is by shallow overland flow to Drive B which conveys the runoff to the existing detention ponds.

PROPOSED CONDITIONS

St Joseph's Hospitals, the owner and developer of this site, proposes to construct a Medical Office Building enclosing approximately 18,000 square feet with an additional 54,000 square feet of paved parking and driveways and 14,000 square feet of joint use internal access drives to this and adjacent properties. The proposed building will front on NM 528 but access to the site will be via the internal roadway system that exists within the development.

In compliance with the City of Rio Rancho Drainage Ordinances and the Drainage Master Plan for Gateway North, this development has been designed to freely discharge all runoff to Drive

B which is an inverted crown section designed to convey the drainage to the existing detention ponds.

Since this site is adjacent to and could discharge to the 528 Channel if on-site facilities were included to reduce the runoff to 0.5 cfs/acre. This option was not used in order to maximize the use and visual appeal of the completed project.

Since Drive B is a major storm water conveyance channel, the site has been designed with a waterblocks at all property lines keep the runoff in Drive B from entering the site. Due to the master planned nature of this site, there is no off-site drainage entering the site from any of the adjacent property. Since this parcel discharges all runoff to Drive B and the existing developed detention ponds, there is no impact to adjacent parcels or to parcels downstream of this site.

EROSION CONTROL

The proposed erosion control consists of an earthen berm at the property lines to restrict the movement of sediment off the project site. These berms are to be installed prior to the start of grading and shall remain until the site is permanently stabilized either by pavement, landscaping or revegetation.

PEAK RUNOFF QUANTITIES

The AHYMO printouts, summary sheets, and miscellaneous calculations to support these analyses are included in Appendix A of this report for reference. The values by Drainage Basin are summarized as follows:

Basin A	Total Area	= 0.00029 sq mi
	Developed Peak Runoff Q_{100}	=0.38 cfs
	Developed Volume V_{100}	=0.0103 ac-ft
Basin B	Total Area	=0.00148 sq mi
	Developed Peak Runoff Q_{100}	=3.82 cfs
	Developed Volume V_{100}	=0.1417 ac-ft
Basin C	Total Area	=0.00179 sq mi
	Developed Peak Runoff Q_{100}	=4.44 cfs
	Developed Volume V_{100}	=0.1621 ac-ft

Basin D	Total Area	=0.000508 sq mi
	Developed Peak Runoff Q_{100}	=1.40 cfs
	Developed Volume V_{100}	=0.0533 ac-ft

Discharge to Drive B is 9.67 cfs from a 100 year 24 hour storm.

METHODOLOGY

The hydrology for this project was analyzed using the January 1994 release of the AHYMO computer modeling program as developed by AMAFCA. All procedures are in accordance with those shown in the January 1993 release of the City of Albuquerque Development Process Manual, Section 22.2.

The specific values used for this analysis are as follows:

-Precipitation Zone 1

-Design Storm 100-year, 24-hour duration
i = 2.66 inches (t_c = 0.2 hours)

APPENDIX A

BASIN D

A	0	0	
B	0	0	
C	0	0	
D	14171	100%	
	14171 sf	100%	0.000508

SITE TOTALS

A	0 sf	0%	
B	16,859 sf	14.9%	
C	8789 sf	7.8%	
D	87,613 sf	77.3%	
	113,256 sf (2.6ac)	100%	0.009062

Drainage Basin Analysis

Basin A

Treatment Type	Area SF	% of Total	
A	0	0	
B	8063	100%	
C	0	0	
D	0	0	
Total	8063 sf	100%	0.000289 sq mi

Basin B

A	0	0	
B	3087	7.5%	
C	3086	7.4%	
D	35,088	85.1%	
Total	41261 sf	100%	0.001480 sq mi

Basin C

A	0		
B	5704	11.5	
C	5703	11.5	
D	38,354	77.0	
Total	49,761 sf	100%	0.001785 sq mi

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model - January, 1994 RUN DATE (MON/DAY/YR) =10/19/1995
INPUT FILE = STJOES.DAT USER NO.= CINFRNNM.I01

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	PAGE = 1 NOTATION
*S ST JOSEPH'S MEDICAL OFFICES - RIO RANCHO										
*S Compute 100 Year Flows, OCTOBER 18, 1995										
*S Use 6 Hour Storm										
START										TIME= .00
RAINFALL TYPE= 1										RAIN6= 2.200
*S AREA BASIN A DRAINS TO 528 CHANNEL----------										
COMPUTE NM HYD	101.10	-	1	.00029	.38	.010	.66636	1.500	2.056	PER IMP= .00
*S AREA BASIN B DRAINS TO INTERSECTION A AND B STREET----------										
COMPUTE NM HYD	102.10	-	2	.00148	3.82	.142	1.79577	1.500	4.037	PER IMP= 85.10
*S AREA BASIN C DRAINS TO INTERSECTION A AND B STREET----------										
COMPUTE NM HYD	103.10	-	3	.00179	4.44	.162	1.70260	1.500	3.885	PER IMP= 77.00
*S ROAD BASIN D INCLUDES DRIVES A AND B WITHIN THE PROPERTY BOUNDARIES--------										
COMPUTE NM HYD	104.10	-	4	.00051	1.40	.053	1.96760	1.500	4.321	PER IMP= 100.00
ADD HYD	110.00	2& 3	5	.00327	8.26	.304	1.74465	1.500	3.954	
ADD HYD	-111.00	5& 4	6	.00377	9.67	.357	1.77460	1.500	4.003	
*S----------										
*S----------										
*S----------										
*S----------										
*S----------										
*S----------										
*S----------										
FINISH										

```
*S ST JOSEPH'S MEDICAL OFFICES - RIO RANCHO
*  Compute 100 Year Flows, OCTOBER 18, 1995
*  Use 6 Hour Storm
*
START                   TIME=0.0   CODE 0     LINES -6
*
RAINFALL                TYPE=-1  RAIN QUARTER=0.0  RAIN ONE=1.87
                        RAIN SIX=2.2  RAIN DAY=2.66 DT=0.05
*S AREA BASIN A DRAINS TO 528 CHANNEL-------------------------------------
*
COMPUTE NM HYD          ID=1  HYD NO=101.1 DA=0.000289 SQ MI
                        PER A=0 PER B=100 PER C=0.0 PER D=0 TP=-.133
                        MASS RAINFALL=-1
PRINT HYD               ID=1    CODE=10
*
*S AREA BASIN B DRAINS TO INTERSECTION A AND B STREET----------------------
*
COMPUTE NM HYD          ID=2  HYD NO=102.1 DA=O.001480 SQ MI
                        PER A=0 PER B=7.5 PER C=7.4 PER D=85.1 TP=-.133
                        RAIN=-1
PRINT HYD               ID=2    CODE=10
*
*
*S AREA BASIN C DRAINS TO INTERSECTION A AND B STREET----------------------
*
COMPUTE NM HYD          ID=3 HYD NO=103.1 DA=0.001785 SQ MI
                        PER A=0 PER B=11.5 PER C=11.5 PER D=77.0  TP=-0.133
                        RAIN=-1
PRINT HYD               ID=3  CODE=10
*
*S ROAD BASIN D INCLUDES DRIVES A AND B WITHIN THE PROPERTY BOUNDARIES--------
*
COMPUTE NM HYD          ID=4 HYD NO=104.1 DA=0.000508 SQ MI
                        PER A=0 PER B=0 PER C=0 PER D=100 TP=-.133
                        RAIN=-1
PRINT HYD               ID=4    CODE=10
*
ADD HYD                 ID=5 HYD=110 ID I=2 ID II=3
ADD HYD                 ID=6 HYD-111 ID I=5 ID II=4
*
*S-------------------------------------------------
*S-------------------------------------------------
* TOTAL DISCHARGE TO DRIVE B AND THE ON-SITE PONDS
*S-------------------------------------------------
*S-------------------------------------------------
*
PRINT HYD               ID=6 CODE=10
*
*
*S-------------------------------------------------
*S-------------------------------------------------
* TOTAL DIRECT DISCHARGE TO 528 CHANNEL
*S-------------------------------------------------
*S-------------------------------------------------
*
PRINT HYD               ID=1 CODE=10
FINISH
```

```
    AHYMO PROGRAM (AHYMO194) - AMAFCA Hydrologic Model - January, 1994
         RUN DATE (MON/DAY/YR) = 10/19/1995
         START TIME (HR:MIN:SEC) = 12:25:03     USER NO.= CINFRNNM.I01
         INPUT FILE = STJOES.DAT

*S ST JOSEPH'S MEDICAL OFFICES - RIO RANCHO
*S Compute 100 Year Flows, OCTOBER 18, 1995
*S Use 6 Hour Storm
*
START                   TIME=0.0   CODE 0     LINES -6
*
RAINFALL                TYPE=-1  RAIN QUARTER=0.0  RAIN ONE=1.87
                        RAIN SIX=2.2  RAIN DAY=2.66 DT=0.05

               COMPUTED 6-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.
               DT =    .050000 HOURS       END TIME =     6.000000 HOURS
*S AREA BASIN A DRAINS TO 528 CHANNEL-------------------------------------
*
COMPUTE NM HYD          ID=1  HYD NO=101.1 DA=0.000289 SQ MI
                        PER A=0 PER B=100 PER C=0.0 PER D=0 TP=-.133
                        MASS RAINFALL=-1

    K =   .130697HR    TP =   .133000HR    K/TP RATIO =   .982685     SHAPE CONSTANT, N =  3.593454
    UNIT PEAK =   .71074    CFS   UNIT VOLUME =    .9827       B =   327.09      P60 = 1.8700
    AREA =      .000289 SQ MI    IA =    .50000 INCHES    INF =   1.25000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD               ID=1    CODE=10

                                PARTIAL HYDROGRAPH   101.10

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     .000       .0          1.000       .0          2.000       .0
     .500       .0          1.500       .4          2.500       .0

    RUNOFF VOLUME =      .66636 INCHES     =        .0103 ACRE-FEET
    PEAK DISCHARGE RATE =        .38 CFS  AT   1.500 HOURS   BASIN AREA =   .0003 SQ. MI.


*
*S AREA BASIN B DRAINS TO INTERSECTION A AND B STREET-----------------------
*
COMPUTE NM HYD          ID=2  HYD NO=102.1 DA=0.001480 SQ MI
                        PER A=0 PER B=7.5 PER C=7.4 PER D=85.1 TP=-.133
                        RAIN=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   4.9837    CFS   UNIT VOLUME =    .9971       B =   526.28      P60 = 1.8700
    AREA =      .001259 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000


    K =   .118247HR    TP =   .133000HR    K/TP RATIO =   .889075     SHAPE CONSTANT, N =  3.989439
    UNIT PEAK =   .58772    CFS   UNIT VOLUME =    .9810       B =   354.46      P60 = 1.8700
    AREA =      .000221 SQ MI    IA =    .42550 INCHES    INF =   1.04141 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD               ID=2    CODE=10

                                PARTIAL HYDROGRAPH   102.10

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     .000       .0          1.500       3.8         3.000       .0          4.500       .0          6.000       .0
     .500       .0          2.000       .9          3.500       .0          5.000       .0          6.500       .0
    1.000       .0          2.500       .1          4.000       .0          5.500       .0

    RUNOFF VOLUME =     1.79577 INCHES     =        .1417 ACRE-FEET
    PEAK DISCHARGE RATE =       3.82 CFS  AT   1.500 HOURS   BASIN AREA =   .0015 SQ. MI.
```

```
*
*
*S AREA BASIN C DRAINS TO INTERSECTION A AND B STREET-----------------------
*
COMPUTE NM HYD          ID=3 HYD NO=103.1 DA=0.001785 SQ MI
                        PER A=0 PER B=11.5 PER C=11.5 PER D=77.0  TP=-0.133
                        RAIN=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   5.4386    CFS   UNIT VOLUME =    .9971       B =   526.28      P60 = 1.8700
    AREA =      .001374 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000


    K =   .118163HR    TP =   .133000HR    K/TP RATIO =   .888442     SHAPE CONSTANT, N =  3.992480
    UNIT PEAK =   1.0948    CFS   UNIT VOLUME =    .9898       B =   354.67      P60 = 1.8700
    AREA =      .000411 SQ MI    IA =    .42500 INCHES    INF =   1.04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD               ID=3  CODE=10

                                PARTIAL HYDROGRAPH   103.10

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     .000       .0          1.500       4.4         3.000       .0          4.500       .0          6.000       .0
     .500       .0          2.000       1.0         3.500       .0          5.000       .0          6.500       .0
    1.000       .0          2.500        .1         4.000       .0          5.500       .0

    RUNOFF VOLUME =     1.70260 INCHES     =        .1621 ACRE-FEET
    PEAK DISCHARGE RATE =       4.44 CFS  AT   1.500 HOURS   BASIN AREA =   .0018 SQ. MI.


*
*S ROAD BASIN D INCLUDES DRIVES A AND B WITHIN THE PROPERTY BOUNDARIES--------
*
COMPUTE NM HYD          ID=4 HYD NO=104.1 DA=0.000508 SQ MI
                        PER A=0 PER B=0 PER C=0 PER D=100 TP=-.133
                        RAIN=-1

    K =   .072485HR    TP =   .133000HR    K/TP RATIO =   .545000     SHAPE CONSTANT, N =  7.106420
    UNIT PEAK =   2.0101    CFS   UNIT VOLUME =    .9941       B =   526.28      P60 = 1.8700
    AREA =      .000508 SQ MI    IA =    .10000 INCHES    INF =    .04000 INCHES PER HOUR
    RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =   .050000

PRINT HYD               ID=4    CODE=10

                                PARTIAL HYDROGRAPH   104.10

     TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW          TIME      FLOW
      HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS           HRS       CFS
     .000       .0          1.500       1.4         3.000       .0          4.500       .0          6.000       .0
     .500       .0          2.000        .3         3.500       .0          5.000       .0
    1.000       .0          2.500        .0         4.000       .0          5.500       .0

    RUNOFF VOLUME =     1.96760 INCHES     =        .0533 ACRE-FEET
    PEAK DISCHARGE RATE =       1.40 CFS  AT   1.500 HOURS   BASIN AREA =   .0005 SQ. MI.


*
ADD HYD                 ID=5 HYD=110 ID I=2 ID II=3
ADD HYD                 ID=6 HYD-111 ID I=5 ID II=4
*
*S-------------------------------------------------
*S-------------------------------------------------
* TOTAL DISCHARGE TO DRIVE B AND THE ON-SITE PONDS
*S-------------------------------------------------
*S-------------------------------------------------
```

```
*
PRINT HYD              ID=6 CODE=10
```

OUTFLOW HYDROGRAPH REACH -111.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.500	9.7	3.000	.1	4.500	.1	6.000	.1
.500	.0	2.000	2.2	3.500	.1	5.000	.1	6.500	.0
1.000	.0	2.500	.3	4.000	.1	5.500	.1		

RUNOFF VOLUME = 1.77460 INCHES = .3571 ACRE-FEET
PEAK DISCHARGE RATE = 9.67 CFS AT 1.500 HOURS BASIN AREA = .0038 SQ. MI.

```
*
*
*S-------------------------------------------------
*S-------------------------------------------------
* TOTAL DIRECT DISCHARGE TO 528 CHANNEL
*S-------------------------------------------------
*S-------------------------------------------------
*
PRINT HYD              ID=1 CODE=10
```

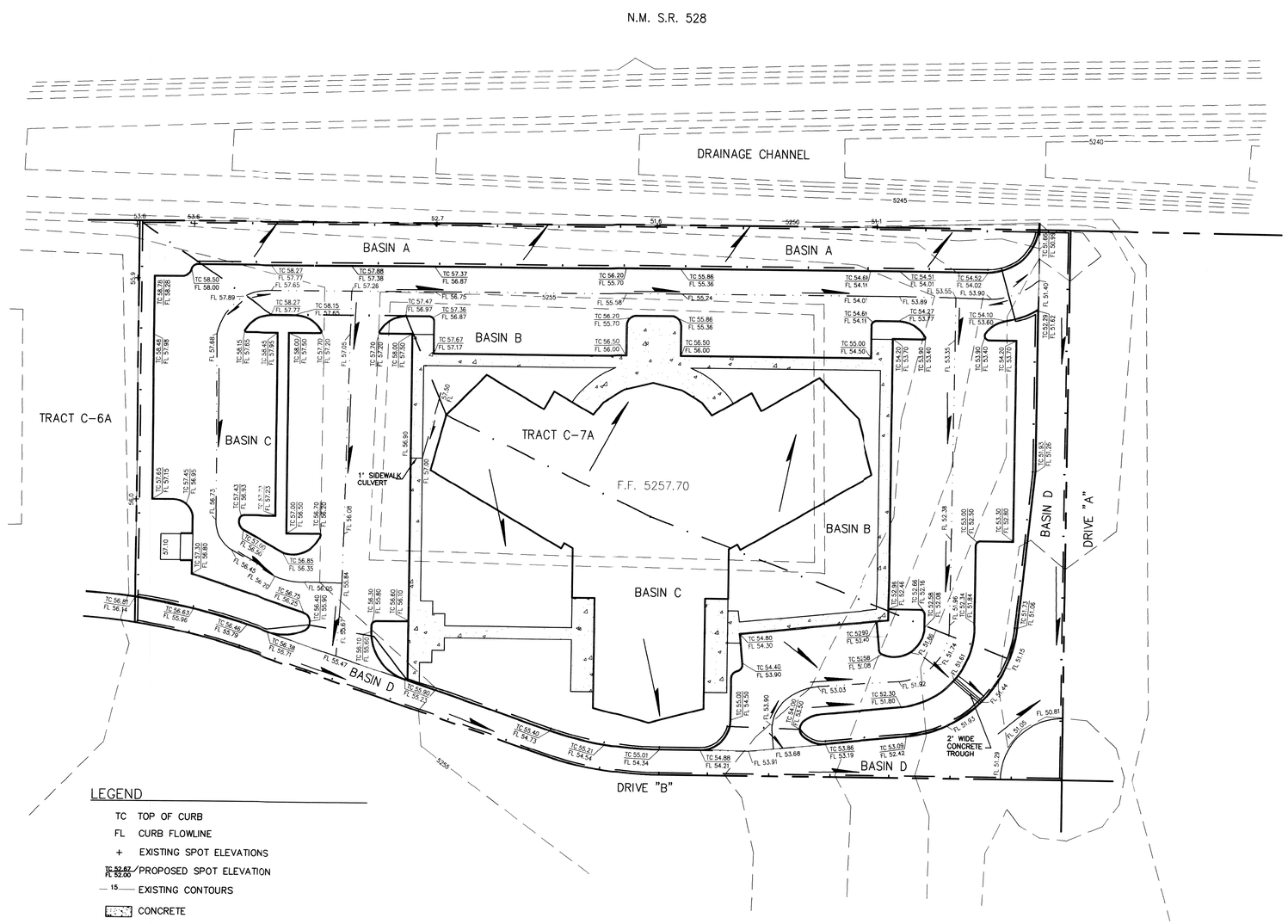
PARTIAL HYDROGRAPH 101.10

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
.000	.0	1.000	.0	2.000	.0				
.500	.0	1.500	.4	2.500	.0				

RUNOFF VOLUME = .66636 INCHES = .0103 ACRE-FEET
PEAK DISCHARGE RATE = .38 CFS AT 1.500 HOURS BASIN AREA = .0003 SQ. MI.

```
FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 12:25:11
```

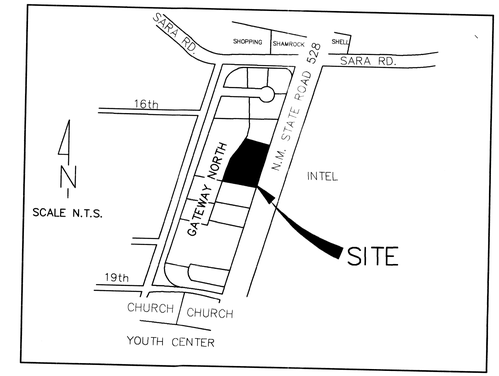


LEGEND

- TC TOP OF CURB
- FL CURB FLOWLINE
- \+ EXISTING SPOT ELEVATIONS
- TC 52.87 / FL 52.00 PROPOSED SPOT ELEVATION
- 15 EXISTING CONTOURS
- CONCRETE
- PROPOSED WATERCOURSE FLOWLINE

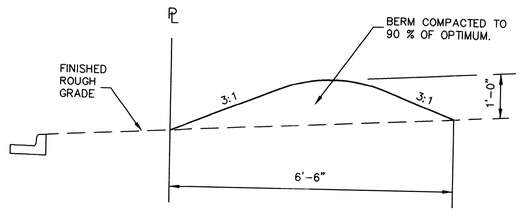
GRADING AND DRAINAGE PLAN

SCALE 1" = 30'



LEGAL DESCRIPTION: TRACT C-7A
GATEWAY NORTH
SANDOVAL COUNTY, NEW MEXICO

EROSION CONTROL



EROSION CONTROL BERM DETAIL
N.T.S.

EROSION CONTROL NOTES

1. THE CONTRACTOR SHALL CONFORM TO ALL CITY, COUNTY, STATE, AND FEDERAL DUST CONTROL MEASURES AND REQUIREMENTS AND WILL BE RESPONSIBLE FOR PREPARING AND OBTAINING ALL NECESSARY APPLICATIONS AND APPROVALS.
2. THE CONTRACTOR SHALL ENSURE THAT NO SOIL ERODES FROM THE CONSTRUCTION SITE ONTO ADJACENT PUBLIC OR PRIVATE LANDS OR ONTO A PUBLIC RIGHT-OF-WAY. THIS RESULT MAY BE ACHIEVED BY CONSTRUCTING TEMPORARY EROSION CONTROL BERMS PER THE DETAIL ON THIS SHEET AND BY WETTING THE SOIL TO PREVENT IT FROM BLOWING.
3. EROSION CONTROL BERMS PER THE DETAIL ON THIS SHEET ARE REQUIRED AROUND THE ENTIRE SITE. BERMS AND SEDIMENT POND MUST BE IN PLACE AND ENGINEER CERTIFIED PRIOR TO START OF SITE GRADING.
4. THE CONTRACTOR IS RESPONSIBLE FOR CLEANING UP ANY SEDIMENT THAT GETS INTO THE PUBLIC RIGHT-OF-WAY.
5. THE CONTRACTOR SHALL RESEED ALL DISTURBED SOILS OUTSIDE PROPERTY LINE AS SOON AS GRADING IS COMPLETED. RESEEDING TYPE SHALL MATCH EXISTING VEGITATION IN CONTENT AND DENSITY.

LARRY D. READ NEW MEXICO 10398 REGISTERED PROFESSIONAL ENGINEER

GRADING AND DRAINAGE PLAN

ST. JOSEPH'S MEDICAL OFFICES
GATEWAY NORTH
RIO RANCHO, NEW MEXICO

PREPARED BY: LARRY D. READ, P.E.
P.O. BOX 90233
ALBUQUERQUE, NEW MEXICO 87199
(505) 858-3165