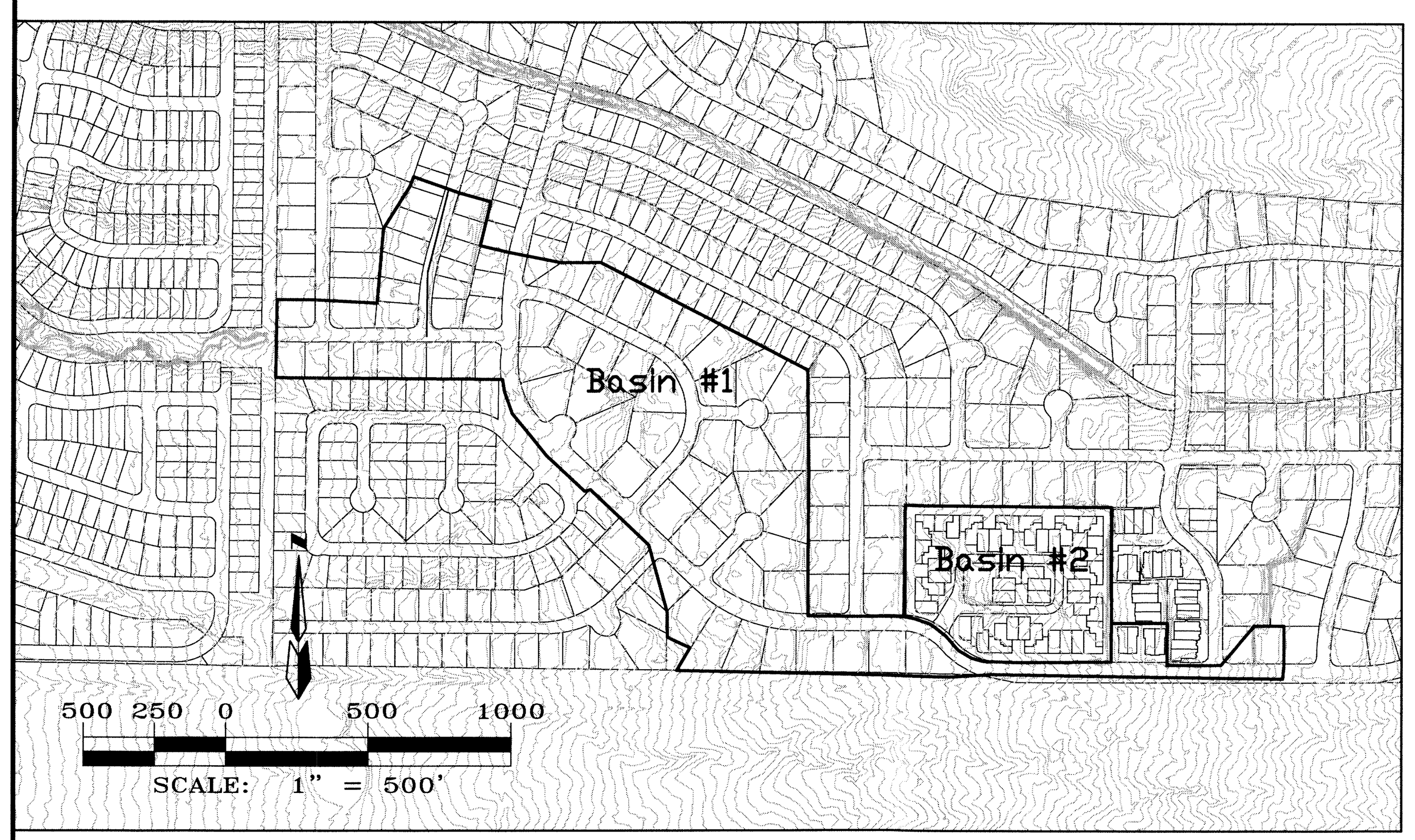
STATEMENT OF PROBLEM

The existing cattle guard inlet designed to protect Juan Tabo Hills Unit 1 and Unit 2 from offsite flows from Four Hills is failing. The stormwater is overflowing the inlet and eroding the downstream conditions. In the current condition, the inlet is "on grade." After applying the grate inlet interception efficiency and 15% clogging factor, the inlet is only able to capture 110.5 cfs. Analysis of the offsite flows into this grate was calculated using AHYMO. The resulting flows for the 100 year storm was determined to be 140cfs (see Basin Hydrology). Therefore, 29.5 cfs is overflowing the inlet and eroding the emergency access road and the HOA open space area.

BASIN BOUNDARIES



*** CONTOURS IN BASIN BOUNDARY MAP 2' INTERVALS*

BASIN HYDROLOGY

```
*S*********************************************************
*S
*S                  RATON AVE. RUNOFF
*S                  100 YEAR 6 HOUR STORM EVENT
*S
*S                  FILE: RATON AVE.DAT
*S                  LAST REVISED: 3-12-14
*S                  NOAA ATLAS 2, VOL IV ZONE=V 11
START               TIME=0.0 HR PUNCH CODE=0 PRINT LINES=-6
LOCATION            NEW MEXICO
RAINFALL            TYPE=1 RAIN QUARTER=0.0
                    RAIN ONE=1.89 IN RAIN SIX=2.47 IN
                    RAIN DAY=3.06 IN DT=0.01 HRS
*S*********************************************************
*S RATON AVE. DRAINAGE BASIN
*** *****************
*** *****************
*** BASIN 1
*** AREA 36.6 ACRES
*** *****************
COMPUTE LT TP       LCODE=1  NK=6  ISLOPE=-1
                    LENGTH=152 FT   SLOPE=0.010  K=0.7
                    LENGTH=1022 FT  SLOPE=0.055  K=3
                    LENGTH=407 FT   SLOPE=0.030  K=3
                    LENGTH=642 FT   SLOPE=0.040  K=3
                    LENGTH=981 FT   SLOPE=0.030  K=3
                    LENGTH=795 FT   SLOPE=0.038  K=3
COMPUTE NM HYD       ID=1  HYD NO=101 AREA= 0.0572 SQ MI
                    PER A=0  PER B=44  PER C=30  PER D=26
                    TP=0.0 HR  MASS RAIN=-1
PRINT HYD           ID=1 CODE=1
*** *****************
*** *****************
*** BASIN 2 (VILLA SERANA CONDOMINIUMS)
*** AREA 8.5 ACRES
*** *****************
COMPUTE LT TP       LCODE=1  NK=5  ISLOPE=-1
                    LENGTH=527 FT   SLOPE=0.008  K=2
                    LENGTH=625 FT   SLOPE=0.040  K=2
                    LENGTH=768 FT   SLOPE=0.040  K=3
                    LENGTH=1202 FT  SLOPE=0.033  K=3
                    LENGTH=795 FT   SLOPE=0.038  K=3
COMPUTE NM HYD       ID=2  HYD NO=102 AREA= 0.0133 SQ MI
                    PER A=0  PER B=30  PER C=0  PER D=70
                    TP=0.0 HR  MASS RAIN=-1
PRINT HYD           ID=2 CODE=1
*********************
ADD HYD              ID=3  HYD NO=103  IDS=1 AND 2
PRINT HYD           ID=3 CODE=1
FINISH
```

```
AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4)          - Ver. S4.01a, Rel: 01a     RUN DATE (MON/DAY/YR) =03/14/2014
INPUT FILE = RATON AVE.DAT                                                USER NO.= M-GoodwinNMSiteA90075759

                              FROM  TO                  PEAK       RUNOFF                TIME TO   CFS     PAGE =  1
                  HYDROGRAPH   ID   ID       AREA     DISCHARGE    VOLUME     RUNOFF     PEAK      PER
COMMAND         IDENTIFICATION NO.  NO.     (SQ MI)     (CFS)     (AC-FT)   (INCHES)   (HOURS)    ACRE     NOTATION

*S*********************************************************
*S
*S                  RATON AVE. RUNOFF
*S                  100 YEAR 6 HOUR STORM EVENT
*S
*S                  FILE: RATON AVE.DAT
*S                  LAST REVISED: 3-12-14
*S                  NOAA ATLAS 2, VOL IV ZONE=V 11
START                                                                                    TIME=     0.00
LOCATION                  NEW MEXICO
RAINFALL  TYPE= 1 NOAA 14                                                                RAIN6=    2.470
*S*********************************************************
*S RATON AVE. DRAINAGE BASIN
COMPUTE NM HYD     101.00  -   1    0.05720    109.51    3.975   1.30291   1.560   2.991 PER IMP=  26.00
COMPUTE NM HYD     102.00  -   2    0.01330     30.36    1.289   1.81748   1.570   3.566 PER IMP=  70.00
ADD HYD            103.00 1& 2 3    0.07050    139.73    5.264   1.39998   1.560   3.097
FINISH
```

HYDRAULICS

The solution is to create a "sump" condition for the inlet by providing a waterblock in the downstream location. The height of the waterblock was determined by the largest of the following three conditions:

1. *Cattle Guard acting a a weir*
2. *Cattle Gurad acting as a sag inlet*
3. *Inlet controlled culvert*

CATTLE GUARD ACTING AS WEIR:

$Q = CwPd^{1.5}$

$140cfs = 3.33\,(32')d^{1.5}$

d = 1.2'

Grate Inlet Elevation = 89.19

HWEL = 89.19' + 1.2' = 90.39'

CATTLE GUARD ACTING AS A SUMP INLET (ORIFICE INTO GRATE):

$Q = CoAg\sqrt{(2gd)}$

Ag = clear opening = 66.72sf. After applying a 50% clogging factor, Ag = 33.64sf

$140cfs = 0.67(33.64)\sqrt{(2(32.16)d)}$

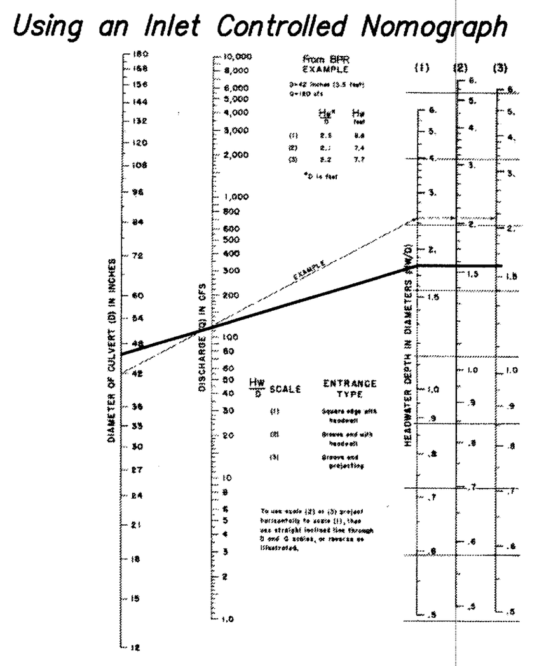
d = 0.6'

Grate Inlet Elevation = 89.19

HWEL = 89.19' + 0.6' = 89.69'

INLET CONTROLLED CULVERT

Using an Inlet Controlled Nomograph



Hw/D = 1.95 for square edge

Storm Drain Inlet Elevation = 81.09

HWEL = (1.95) (4' dia) + 81.09' = 88.9'

DRAINAGE CERTIFICATION

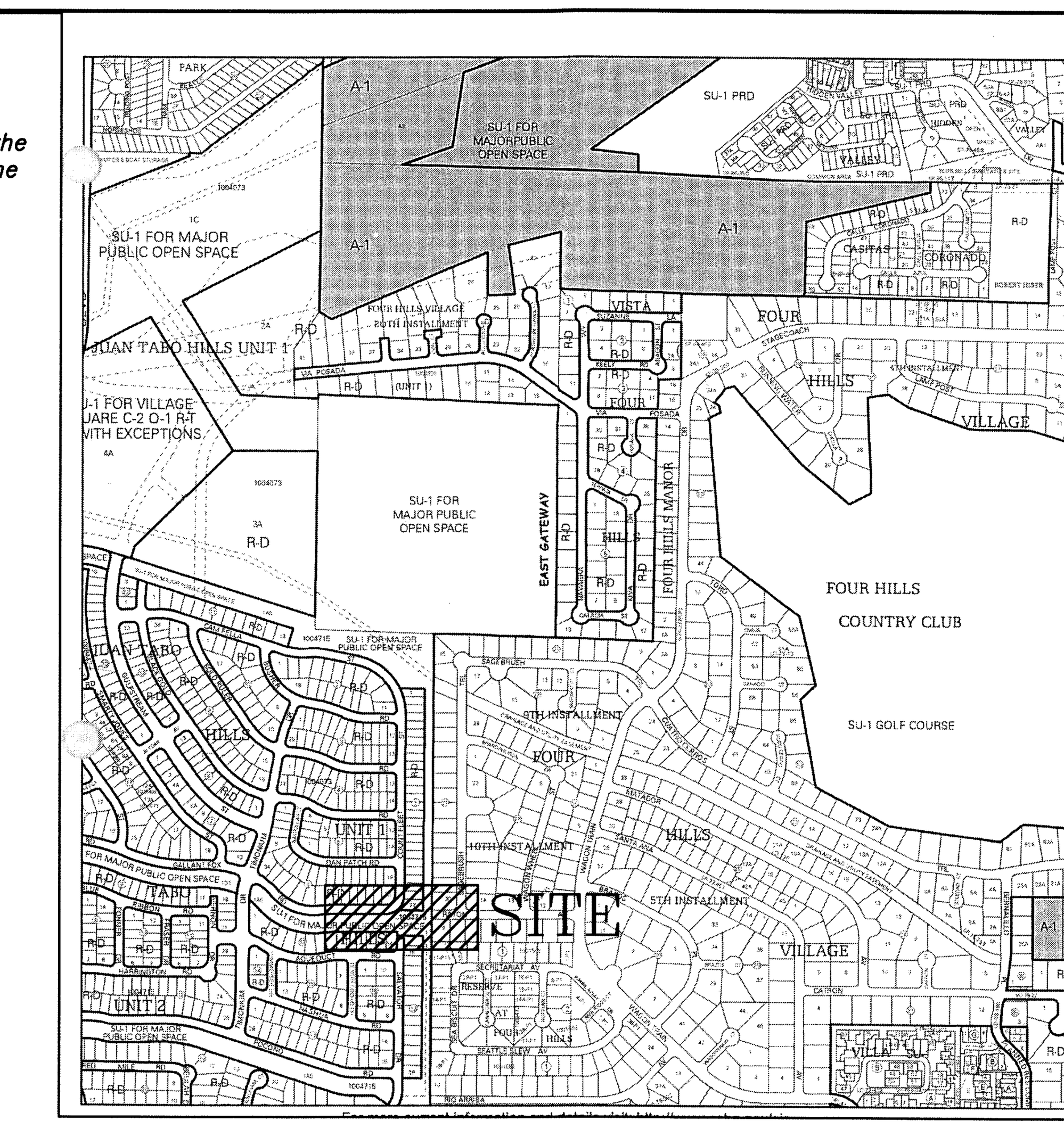
I, MARK GOODWIN, PE, NMPE 8948, OF THE FIRM MARK GOODWIN & ASSOCIATES, PA, HEREBY CERTIFY THAT THIS PROJECT HAS BEEN GRADED AND WILL DRAIN IN SUBSTANTIAL COMPLIANCE WITH AND IN ACCORDANCE WITH THE DESIGN INTENT OF THE APPROVED PLAN DATED MAY 20, 2014. THE RECORD INFORMATION EDITED ONTO THE ORIGINAL DESIGN DOCUMENT HAS BEEN OBTAINED BY TIM ALDRICH, NMPS 7719 , OF THE FIRM ALS, INC. I FURTHER CERTIFY THAT I HAVE PERSONALLY VISITED THE PROJECT SITE ON 7/16/14, AND HAVE DETERMINED BY VISUAL INSPECTION THAT THE SURVEY DATA PROVIDED IS REPRESENTATIVE OF ACTUAL SITE CONDITIONS AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. THIS CERTIFICATION IS SUBMITTED IN SUPPORT OF A REQUEST FOR GRADING CERTIFICATION APPROVAL.

THE RECORD INFORMATION PRESENTED HEREON IS NOT NECESSARILY COMPLETE AND INTENDED ONLY TO VERIFY SUBSTANTIAL COMPLIANCE OF THE GRADING AND DRAINAGE ASPECTS OF THIS PROJECT. THOSE RELYING ON THIS RECORD DOCUMENT ARE ADVISED TO OBTAIN INDEPENDENT VERIFICATION OF ITS ACCURACY BEFORE USING IT FOR ANY OTHER PURPOSE.

Mark Goodwin 7/18/14

MARK GOODWIN NMPE 8948 DATE

MARK GOODWIN NEW MEXICO 8948 LICENSED PROFESSIONAL ENGINEER



VICINITY MAP ZONE MAP: M-21/M-22

Juan Tabo Hills Subdivision
Unit 2 and Unit 1
West End of Raton Avenue

EARTHWORK

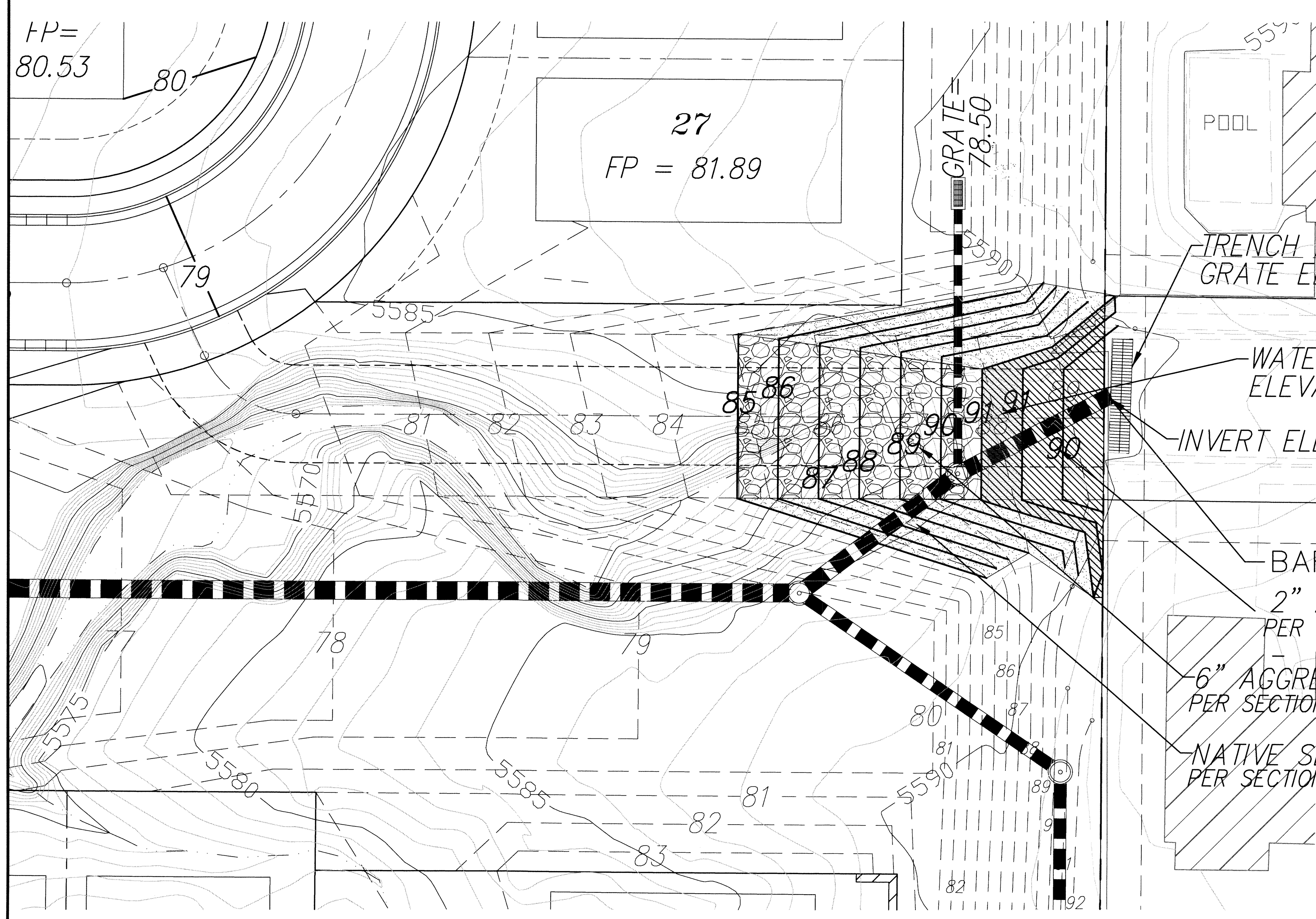
Area of Grading and Land Disturbance is 0.13 acres

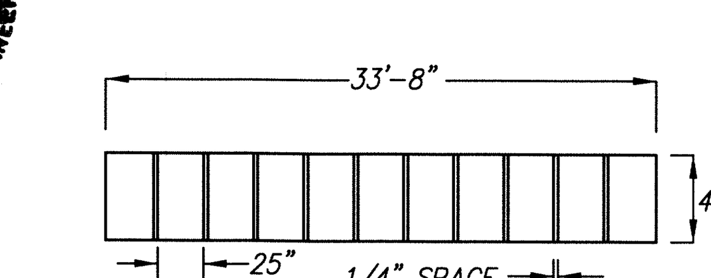
Total Volume of fill required is 313cy

CONCLUSIONS AND RECOMMENDATIONS

The offsite flows can be contained by changing the inlet to a sump condition by adding a waterblock downstream. Per the hydraulic calculations, the maximum HWEL is at 5290.39. By constructing a waterblock at Elevation 5291 per the plans, the offsite flows from Four Hills can be adequately contained until captured by the existing Cattle Guard inlet.

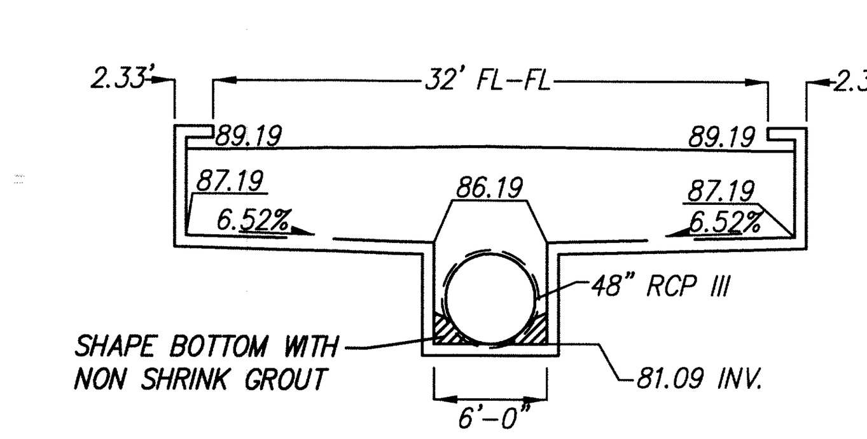
Because the site is less than 1 acre in size, this site is exempt from a NPDES permit.





CATTLE GUARD INLET GRATE PLAN

N.T.S.



CATTLE GUARD INLET (NORTH SIDE)

N.T.S. PER COA DWG 2271, 2272 & 2220

20 10' 0 40' 80'

SCALE: 1" = 20'

LEGEND

5210	EXISTING CONTOUR (MAJOR)
	EXISTING CONTOUR (MINOR)
75	NEW CONTOUR
	STORM GRATE
	2" ASPHALT As-Built
	6" AGGREGATE BASE COURSE - As Built
	NATIVE SEED AND MULCH

F:\A14JOBS\A14010 Raton Avenue\GRADE & DRAIN\GRADE-N-DRAIN-REV KMK.dwg

SURVEY INFORMATION			BENCH MARKS	AS BUILT INFORMATION	
NO.	FIELD NOTES BY	DATE	STATION "5-M22" IS LOCATED 8.7 MI. SE OF DOWNTOWN ALBUQUERQUE ON THE EAST SIDE OF THE MUNICIPAL LIMITS LINE IN THE FOUR HILLS SUBDIVISION AREA. STATION IS 600 FT. EAST OF MUNICIPAL LIMITS LINE, 77.9' SE OF POWER POLE #SE37 & 186.0' NW OF POWER POLE #60. STATION IS A STANDARD ACS BRASS DISK SET IN A CONCRETE MONUMENT IN THE GROUND. STATION IS STAMPED "5-M22, 1975ACS". X= 424,017.61, Y= 1,475,700.07, (NAD 1927), Z= 5594.518 (SLD 1929).	CONTRACTOR	
				WORK STAKED BY	DATE
				INSPECTOR'S ACCEPTANCE BY	DATE
				FIELD VERIFICATION BY	DATE
				DRAWINGS CORRECTED BY	DATE
				MICRO-FILM INFORMATION	
				RECORDED BY	DATE
				NO.	

ENGINEER'S SEAL

D. MARK GOODWIN NEW MEXICO 8948 LICENSED PROFESSIONAL ENGINEER 7/18/14

NO.	DATE	REMARKS REVISIONS	BY

DESIGN	DATE 05/07/14	
DESIGNED BY	GJK	DATE 05/07/14
DRAWN BY	KMK	DATE 05/07/14
CHECKED BY	DMG	

dmg MARK GOODWIN & ASSOCIATES, P.A.
CONSULTING ENGINEERS
P.O. BOX 90606
ALBUQUERQUE, NEW MEXICO 87199
(505) 828-2200, FAX (505) 797-9539

CITY OF ALBUQUERQUE
PUBLIC WORKS DEPARTMENT

TITLE: JUAN TABO HILLS SUBDIVISION UNIT 1
RATON AVENUE GRADING & DRAINAGE PLAN

DESIGN REVIEW COMMITTEE	CITY ENGINEER APPROVAL	LAST DESIGN UPDATE	MO./DAY/YR.	MO./DAY/YR.

CITY PROJECT NO.	ZONE MAP NO.	SHEET OF
XX	M-21/22	1 1