City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

August 30, 2002

Ronald Bohannan, P.E.
Tierra West, LLC
8509 Jefferson NE
Albuquerque, New Mexico 87113

RE: STORY ROCK SUBDIVISION UNIT 1 & 2 (F-11/D9)
Engineers Certification For Release of Financial Guaranty
Engineers Stamp dated 8/30/2000
Engineers Certification dated 8/21/2002

Dear Mr. Bohannan:

Based upon the information provided in your Engineers Certification submittal dated 8/22/2002, the above referenced plan is adequate to satisfy the Grading and Drainage Certification for Release of Financial Guaranty.

At first glance on your certification it appeared that the difference in grades was greater than 18"; However upon a site inspection the grades appeared to allow the water to drain to the street. In the future, please certify street asbuilt elevations as well as pad elevations to avoid any confusion, and allow for a prompt acceptance of the certification and release of financial guaranty.

If you have any questions, please call me at 924-3981.

Sincerely,

Teresa A. Martin
Teresa A. Martin
Hydrology Plan Checker
Development & Bldg. Ser. Division
BLD

c: Arlene Portillo, PWD – #650081 & #650082
File

TIERRA WEST, LLC

8509 Jefferson NE
Albuquerque, NM 87113

(505) 858-3100
fax (505) 858-1118

twllc@tierrawestllc.com
1-800-245-3102

August 21, 2002

Mrs. Teresa Martin, PE
City of Albuquerque
Hydrology Department
P.O. Box 1293
Albuquerque, NM 87103

Re: Final Certification of Drainage for Release of Financial Guarantees, Story Rock Subdivision, Phases One and Two (F11/D9)

Dear Mrs. Martin:

Enclosed please find one copy of the as-built Grading and Drainage Plan and information sheet for Phases One and Two of the Story Rock Subdivision. Paving, curb and gutter and utilities for the site are in place. Drainage outfall to the San Antonio Arroyo and the existing storm sewer in Northern Trails are complete. Site retaining walls are in place. All work is in substantial compliance with the approved Grading and Drainage Plan. As-built information was provided by Precision Surveys. We are, therefore, requesting Final Certification of Drainage for Release of Financial Guarantees.

If you have any questions or need additional information, please contact me.

Sincerely,

RONALD RAY BOHANNAN NEW MEXICO 7868 REGISTERED PROFESSIONAL ENGINEER

Ronald R. Bohannan, PE

Enclosure/s

cc: RP Bohannan, PE

JN: 990050
RRB/rw

990050Phase I and II H2o

RECEIVED
AUG 22 2002
HYDROLOGY SECTION

Albuquerque
Metropolitan
Arroyo
Flood
Control
Authority

2600 PROSPECT N.E. - ALBUQUERQUE, NM 87107
PHONE: (505) 884-2215
FAX: (505) 884-0214

FAXED 9/6/00

September 6, 2000

David Soule, PE
Tierra West, LLC
8509 Jefferson NE
Albuquerque, NM 87113

Re: Story Rock Subdivision, Revised Drainage Report and G&D Plan, ZAP F-11, dated 8-30-00

Grading and Drainage Plan is approved. Engineer needs to address the following during final design.

1. Manhole at AMAFCA R/W will be required on SD from Star Kachina to Channel.
2. Velocity in 24" pipe (20 '/s) will require an energy dissipator or use larger diameter pipe to reduce velocity.
3. Extend concrete overflow section down to bottom of channel in place of wire tied riprap. This will also serve as a rundown for the pipe penetration.
4. Gate design for AMAFCA access easements will have to be approved by AMAFCA.
5. Provide AMAFCA signoff block on appropriate sheets.
6. License will be required in AMAFCA R/W and easements.
7. No work will be allowed within San Antonio Channel from May 15 to October 15. **Include this note on plans.**
8. Preliminary plat needs to be re-submitted for review.

If you have any questions please contact me at 884-2215. Thank you.

Donald .S. Dixon. PE
AMAFCA Drainage Engineer

Cc: Susan Calongne, COA

***

Post-it® Fax Note 7671	Date 9/6	# of pages ▶ 1
To Susan Calongne	From Dixon	
Co./Dept. COA	Co. AMAFCA	
Phone #	Phone #	
Fax #	Fax #	

REVISED
DRAINAGE REPORT

for

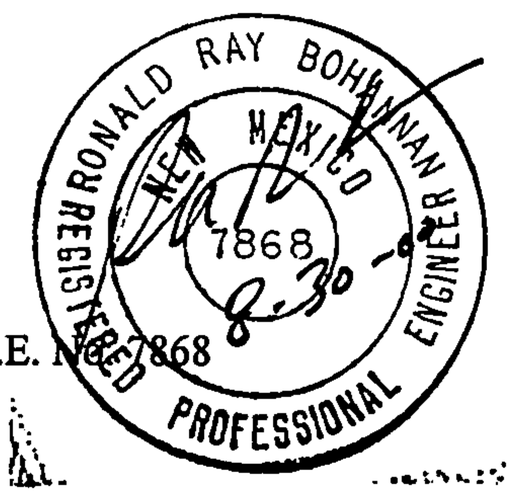
Story Rock Subdivision
Albuquerque, New Mexico

Prepared by

Tierra West, LLC
48509 Jefferson Blvd NE
Albuquerque, New Mexico 87113

Prepared for
DR Horton
4400 Alameda NE
Suite B
Albuquerque NM 87113

August 2000



Ronald R. Bohannan P.E. No. 7868

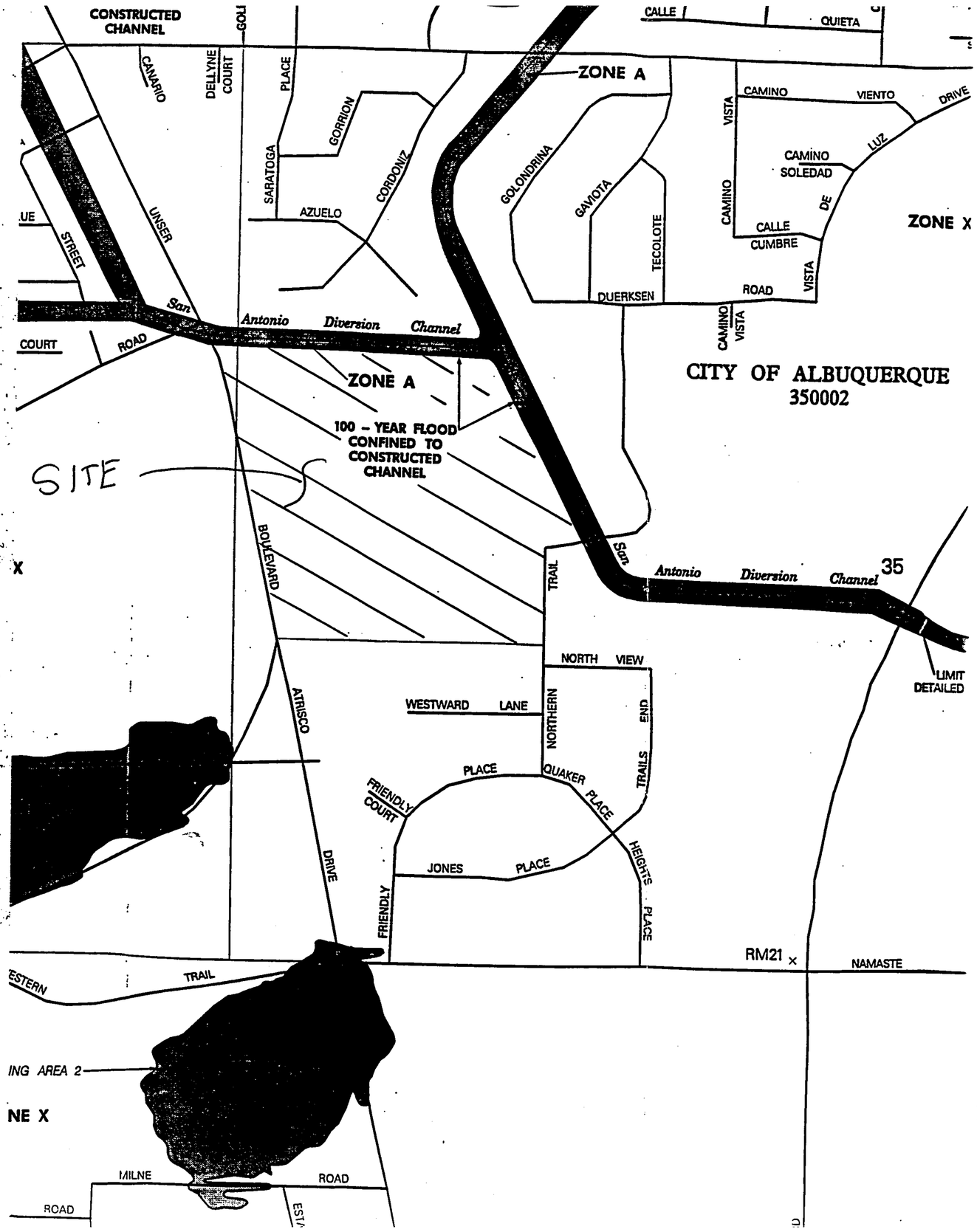
PURPOSE

The purpose of this report is to prove the development of the subject 33.28 acre property, for the use as a residential subdivision, is in accordance with the DPM Chapter 2. This report will determine the existing parameters and analyze the effect of the proposed improvements. This report will demonstrate that the proposed improvements do not adversely effect the surrounding properties nor the upstream or downstream facilities.

INTRODUCTION

The subject of this report as shown on the Exhibit A vicinity map is a 33.28 acre parcel of land located on the east side of Unser Boulevard between Western Trails and the San Antonio Arroyo. The site is located on Zone Atlas page F-10. This site is currently undeveloped and is bound by Unser Boulevard to the west, the San Antonio Arroyo to the north and developed residential properties to the east and south. The legal description of the property is the Unplatted Lands of Clarke-Anne Simm Clarke. As shown on FIRM map 35001C0114D (exhibit B), the site lies within flood zone X.

This site is immediately adjacent to the San Antonio Arroyo. An existing 54" storm drain runs adjacent to the east edge of the site within the Northern Trails Right of Way. The site has been analyzed in conjunction with the Unser Boulevard Improvements - Phase 2. This site was assumed fully developed within the Unser Boulevard Master Drainage Study, excerpts from this study can be found in map pocket A. Within the Unser Master Drainage Study a portion of this site was predicted to drain north directly to the San Antonio Arroyo. The underground storm drain within Northern Trails would capture the remaining flows. Using the Unser Boulevard Master Drainage Basin Map, this site comprises approximately 80% of Basin S, therefore the site shall ultimately contribute 42.4 CFS to the Northern Trails storm drain. No offsite flows impact the site. The developed site will consist of 155 lots, which will all be graded to drain to the streets.



NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

BERNALILLO COUNTY, NEW MEXICO AND INCORPORATED AREAS

PANEL 114 OF 825

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
ALBUQUERQUE, CITY OF	350002	0114	D
BERNALILLO COUNTY, UNINCORPORATED AREAS	350001	0114	D

MAP NUMBER
35001C0114 D

EFFECTIVE DATE:
SEPTEMBER 20, 1996

Federal Emergency Management Agency

Exhibit B – FIRM Map

The flow will be carried within the street from west to east. The streets are designed to carry the entire flow in mountable curb where possible and standard curb, once the flows require it. As shown on the drainage basin map located in Map pocket B, the site consists 9 drainage basins. Inlets located at the eastern portion of the site on Star Katchina will capture the 42.0 CFS of the 42.18 CFS from basins A, B, and H. The remaining .18 CFS will pass over these inlets. Once the flows are captured within this storm drain they will be conveyed to an existing outlet structure within the San Antonio Arroyo approximately 200 feet east of the project. The remaining basins will drain to a pair of double A Inlets located along the northeast boundary on Star Katchina. The remaining basin will generate a predicted 100-year peak flow rate of 63.44 CFS. This set of inlets discharge directly to the San Antonio Arroyo. A 30' wide channel located at these inlets will serve as an emergency overflow. This channel has the capacity to convey the entire peak flow rate of 105.62 CFS generated on site. This rundown shall be earthen onsite and concrete as it enters the AMAFCA right of way.

overflow only

EXISTING CONDITIONS

The site slopes from west to east with general grades between 2-5 %. The site appears to be in its natural undeveloped state. The site is covered with native grasses and small plants. Multiple manmade trails cris-cross the site. The site is bound on the west by the recently constructed Unser Boulevard, on the north by the San Antonio Arroyo, on the south by exiting residential lots and to the east by the unpaved Northern Trials. No offsite flows enter the site due to the development of the surrounding property. The site currently discharges 35.91 CFS directly into the San Antonio and onto Northern Trails.

PROPOSED CONDITIONS

The proposed improvements consist of a 155-lot unit residential subdivision. The site will

have an overall developed density of 4.7 dwelling units per acre. As shown in Map Pocket B, the site will be graded so 9 onsite basins will be created. Appendix A includes the calculated peak 100-year 6-hour storm discharge for each of the basins. Each lot will be graded so the entire storm discharge will drain to the street. Once the flow enters the Right of Way it will be conveyed within the roadway by mountable, when possible, and then by standard curb and gutter. The street flow rates are shown on the Basin Map, which is located in Map Pocket A. The streets have been designed to conveyed the entire 100 year 6 hour peak flow within the street. Appendix B contains the street capacity calculations.

The southern portion of the site consisting of basins A, B, and H will drain west to east where the developed flows are captured by a pair of double A inlets located on Star Katchina. During the predicted 100-year 6-hour storm these basins will generate a peak discharge rate of 42.18 CFS. As shown in Appendix C these inlets have a capacity of 42 CFS. Therefore these inlets will capture 42 CFS and allow .18 CFS to pass over them. Once the flows have been captured by these inlets, they will be conveyed by underground 24" conduit to an existing 54" storm drain line located adjacent to the site within the Northern Trails Right of Way. As shown in Appendix D the underground conduits have been sized to convey the entire peak flow rate of 42.00 CFS. The existing Storm drain within Northern trails was designed and built with the Unser boulevard Phase-2 improvements. As shown on the Unser Boulevard Master Drainage plan located in map pocket A, this line conveys the routed discharge for Pond 16B, basin R and Basin S. The allowable flow rate from our site discharging into the existing Storm drain system is 42.4 CFS.

The northern portion of the site consists of basins C, D, E, F1, F2, and G. These basins will flow west to east where the will be captured by a pair of double A inlets. The contributing peak flow for this inlet during the 100 year- 6-hour storm will be 63.44 CFS. As shown in Appendix C, at the design flow rate, in a sump condition the water surface elevation will be .346' above the

inlet. Once the flows have been captured by these inlets, they will be conveyed by a 24" underground conduit directly to the San Antonio Arroyo. An emergency overflow is located directly begin these sump inlets. The design capacities of this conduit are located in appendix D. The overflow consists of a 30' wide earthen channel within the subdivision and a Concrete channel and rundown within the AMAFCA right of way. As shown in appendix C the emergency overflow channel is sized to accommodate the entire peak flow rate of 105.62 CFS generated by the entire site. This rundown will serve as the emergency overflow to both sets of upstream inlets. Since the proposed improvements are to take place within public right of way a copy of the proposed infrastructure list can be found in Appendix E. The improvements within the AMAFCA right of way will require approval of construction drawings and an executed license agreement from AMAFCA.

This project will be constructed in two phases. The phase line is shown on the preliminary plat. The entire site will be graded during phase 1. All the storm drain improvements will be constructed at that time. Temporary desiltation ponds will be created at the ends of each roadway to catch the nuisance flows. Desiltation basins and erosion protection devises will also be created around the inlets during the interim. The final plat for phase 1 will show phase 2 as a single tract with storm drain easement located within the future right of ways.

SUMMARY AND RECOMMENDATIONS

This site currently exists as an undeveloped parcel, surrounded on all sides by developed parcels. The site, in its existing condition, has a maximum predicted discharge of 35.91 CFS during a 100-year storm event. The proposed improvement consists of a 155 unit single-family residential development. The proposed improvements will generate a peak 100-year discharge of 106.52 for the entire site. The site will be graded so the entire storm runoff will be conveyed within the roadways. The southern portion of the site will drain to a pair of double A storm inlets

located at the east side of the site, while the remaining site will drain directly to the San Antonio Arroyo via a pair of double A inlets located at the northeast portion of the site. A 30' wide channel located at the northeastern pair of inlet serves as an emergency overflow. The new inlets have the capacity to collect the entire contributing peak discharge, and an overflow has been provided in the event of clogging.

The development of this site is consistent with the Albuquerque Master Drainage Plan and the DPM, Chapter 22, Hydrology section. Since this site encompassed more than 5 acres, both a NPDES permit and Topsoil Disturbance Permit will be required prior to any construction activity. A copy of the Notice of Intent is located within Appendix F. It is recommended this development be approved for Rough grading, Site Plan for Subdivision, Site Plan for Building Permit, Preliminary and Final Plat approval.

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APPENDIX A

BASIN FLOW CALCULATIONS

TIERRA WEST LLC
4421 McLeod Road NE, Suite D, Albuquerque, NM 87109 Phone (505) 883-7592 - Fax (505) 883-7034

RUNOFF CALCULATIONS

Date: August 26, 2000 Project: Story Rock Zone Atlas: F11

This procedure is in accordance with the City of Albuquerque Development Process Manual, Volume 2, Section 22.2, "Hydrology", peak discharge rate for small watersheds less than forty acres in size.

Precipitation Zone from Figure A-1: 1
Land treatment descriptions are in Table A-4.

1. RUNOFF RATE COMPUTATION

Use Equation A-10: $Q_P = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$
Values of Q_{pi} are from Table A-9, and are in CFS/acre. Area values are in acres.

EXISTING RATE OF RUNOFF (CFS)

BASIN	Q_{PA}	A_A	Q_{PB}	A_B	Q_{PC}	A_C	Q_{PD}	A_D	
Basin 1	1.29	25.76	2.03	1.52	2.87	1.52	4.37	1.52	35.91
Total									35.91

DEVELOPED RATE OF RUNOFF (CFS)

BASIN	Q_{PA}	A_A	Q_{PB}	A_B	Q_{PC}	A_C	Q_{PD}	A_D	Q
Basin A	1.29	0.00	2.03	1.45	2.87	1.45	4.37	2.89	19.73
Basin B	1.29	0.00	2.03	1.02	2.87	1.02	4.37	2.04	13.91
Basin C	1.29	0.00	2.03	0.78	2.87	0.78	4.37	1.56	10.64
Basin D	1.29	0.00	2.03	1.24	2.87	1.24	4.37	2.47	16.94
Basin E	1.29	0.00	2.03	0.91	2.87	1.61	4.37	1.81	14.36
Basin F1	1.29	0.00	2.03	.75	2.87	.75	4.37	1.44	10.18
Basin F2	1.29	0.00	2.03	0.34	2.87	0.34	4.37	0.68	4.64
Basin G	1.29	0.00	2.03	0.49	2.87	0.49	4.37	0.98	6.68
Basin H	1.29	0.00	2.03	0.63	2.87	0.63	4.37	1.25	8.54
Total									105.62

Street Capacity Calculations

Storyteller East of Storyrock

28' F-F Street Section with 8" curb

Slope= 0.011

Q=34.26

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703122	0.0046973	0.0002057	0.0004114	0.2571357	0.0025714	0.4531421	0.0031282
0.02	0.0032	0.3406244	0.0093945	0.0013062	0.0026123	0.4081775	0.0081635	0.5086349	0.0075205
0.04	0.0128	0.6812488	0.018789	0.0082936	0.0165873	0.6479414	0.0259177	0.5709233	0.0179875
0.06	0.0288	1.0218732	0.0281835	0.0244524	0.0489049	0.8490434	0.0509426	0.6108384	0.0298873
0.08	0.0512	1.3624976	0.037578	0.0526614	0.1053228	1.0285428	0.0822834	0.6408398	0.0428049
0.1	0.08	1.703122	0.0469726	0.0954815	0.1909629	1.1935182	0.1193518	0.6651217	0.0565258
0.12	0.1152	2.0437463	0.0563671	0.1552634	0.3105268	1.3477724	0.1617327	0.6856429	0.0709162
0.125	0.125	2.1289024	0.0587157	0.1731194	0.3462388	1.3849552	0.1731194	0.6903237	0.074607

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.3839524	0.0568908	0.1839222	0.3678443	1.3561082	0.1762941	0.6628187	0.0731098
0.16	0.225625	3.9142524	0.0576419	0.3086591	0.6173181	1.368018	0.2188829	0.6027038	0.0781091
0.2	0.415625	5.9546524	0.0697984	0.6459487	1.2918975	1.5541624	0.3108325	0.6124258	0.1000131
0.24	0.685625	7.9950523	0.0857562	1.2223524	2.4447048	1.7828294	0.4278791	0.6413221	0.128558
0.3045	1.2895063	11.285197	0.1142653	2.7837648	5.5675297	2.1587835	0.6573496	0.6894258	0.1813986
0.32	1.465625	12.075852	0.1213682	3.293764	6.587528	2.2473443	0.7191502	0.7001107	0.1949419
0.36	1.975625	14.116252	0.1399539	4.8823339	9.7646679	2.4712858	0.8896629	0.7258448	0.2310471
0.365	2.045	14.371302	0.1422975	5.1100404	10.220081	2.4987973	0.912061	0.728881	0.2356656

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.376302	0.1471171	5.4036273	10.807255	2.5549065	0.9453154	0.7401951	0.2442283
0.41	2.675	14.416302	0.1855538	7.9781701	15.95634	2.9824935	1.2228223	0.8208421	0.3132185
0.45	3.235	14.456302	0.2237778	10.931638	21.863275	3.379177	1.5206297	0.8877215	0.3830995
0.49	3.795	14.496302	0.2617909	14.237958	28.475916	3.7517676	1.8383661	0.9445174	0.4538689
0.54	**4.495**	**14.546302**	**0.3090132**	**18.835652**	**37.671304**	**4.1903564**	**2.2627924**	**1.0049076**	**0.5435344**
0.59	5.195	14.596302	0.3559121	23.919215	47.83843	4.6042762	2.716523	1.056349	0.63446
0.63	5.755	14.636302	0.3932004	28.317454	56.634907	4.9204959	3.0999124	1.0924729	0.7080459
0.667	6.273	14.673302	0.4275111	32.636717	65.273434	5.2027287	3.4702201	1.1226395	0.7767373

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.323632	0.4142598	34.451203	68.902406	5.0946549	3.5662585	1.0730941	0.7684813
0.72	7.085225	17.323832	0.4089872	35.789832	71.579665	5.0513332	3.6369599	1.0490878	0.7672474
0.74	7.428225	18.324032	0.4053816	37.301585	74.60317	5.0216014	3.715985	1.028723	0.7683841

Street Capacity Calculations

Sipapu from 175' west of Story Rock

28' F-F Street Section with 4" curb

Slope= 0.005

Q=8.85

For water depths less than 0.0625 feet

Y= Water depth

Area = 16*Y^2

P= SQRT(1025*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.3301562	0.0048462	0.0002832	0.0005664	0.1770062	0.0017701	0.3119325	0.0016679
0.02	0.0064	0.6603124	0.0096924	0.0017983	0.0035965	0.2809799	0.0056196	0.3501324	0.0040739
0.025	0.01	0.8253905	0.0121155	0.0032605	0.006521	0.3260483	0.0081512	0.3633992	0.0054255
0.035	0.0196	1.1555467	0.0169617	0.0079975	0.0159951	0.408038	0.0142813	0.3843604	0.0083495
0.045	0.0324	1.485703	0.0218079	0.0156318	0.0312636	0.4824625	0.0217108	0.4008015	0.0115125
0.055	0.0484	1.8158592	0.026654	0.0266937	0.0533874	0.5515231	0.0303338	0.4144331	0.0148718
0.06	0.0576	1.9809373	0.0290771	0.033665	0.06733	0.5844617	0.0350677	0.4204869	0.0166157
0.0625	0.0625	2.0634763	0.0302887	0.0375366	0.0750733	0.6005861	0.0375366	0.4233575	0.0175025

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.063	0.0635063	2.0889813	0.0304006	0.0382348	0.0764697	0.6020642	0.03793	0.422712	0.0175984
0.1	0.1726563	3.9763513	0.0434208	0.1318365	0.2636729	0.7635777	0.0763578	0.4255252	0.0282396
0.13	0.3114063	5.5066513	0.0565509	0.2835799	0.5671597	0.9106428	0.1183836	0.4450906	0.0395035
0.16	0.4951563	7.0369512	0.0703652	0.5216377	1.0432754	1.053481	0.168557	0.4641291	0.05202
0.2	0.8101563	9.0773512	0.0892503	1.0000693	2.0001387	1.2344154	0.2468831	0.4864278	0.0700852
0.24	1.2051563	11.117751	0.1083993	1.6934895	3.3869791	1.4052033	0.3372488	0.5054819	0.089368
0.28	1.6801563	13.158151	0.1276894	2.633345	5.26669	1.5673215	0.43885	0.5219767	0.1096431
0.3025	1.9825	14.305876	0.1385794	3.281461	6.562922	1.6552136	0.5007021	0.530351	0.1214273

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.303	1.9895	14.306376	0.1390639	3.3007176	6.6014352	1.6590689	0.5026979	0.5311475	0.121912
0.308	2.0595	14.311376	0.1439065	3.4957225	6.9914451	1.6973647	0.5227883	0.538979	0.1267698
0.312	2.1155	14.315376	0.1477782	3.6548938	7.3097876	1.7276738	0.5390342	0.5450753	0.1306691
0.316	2.1715	14.319376	0.1516477	3.8168511	7.6337022	1.7577025	0.555434	0.5510283	0.1345799
0.32	2.2275	14.323376	0.155515	3.9815681	7.9631362	1.7874604	0.5719873	0.556844	0.1385019
0.324	2.2835	14.327376	0.1593802	4.1490195	8.298039	1.8169562	0.5886938	0.5625278	0.1424351
0.331	**2.3815**	**14.334376**	**0.1661391**	**4.4485656**	**8.8971313**	**1.8679679**	**0.6182974**	**0.5721732**	**0.1493442**
0.333	2.4095	14.336376	0.168069	4.5356568	9.0713136	1.8824058	0.6268411	0.5748615	0.1513243

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.335	2.4376	14.436396	0.168851	4.6027752	9.2055504	1.8882406	0.6325606	0.5749194	0.1522565
0.36	2.805725	15.686646	0.1788607	5.5052451	11.01049	1.9621471	0.706373	0.576305	0.16422

Street Capacity Calculations

Star Katchina From Legend to Inlet

28' F-F Street Section with 8" curb

Slope= 0.005

Q=42.18 cfs

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703122	0.0046973	0.0001387	0.0002774	0.1733609	0.0017336	0.3055084	0.0016081
0.02	0.0032	0.3406244	0.0093945	0.0008806	0.0017612	0.2751932	0.0055039	0.3429216	0.0039311
0.04	0.0128	0.6812488	0.018789	0.0055916	0.0111832	0.436842	0.0174737	0.3849164	0.0095654
0.06	0.0288	1.0218732	0.0281835	0.0164858	0.0329717	0.5724249	0.0343455	0.4118272	0.0160557
0.08	0.0512	1.3624976	0.037578	0.0355043	0.0710086	0.6934434	0.0554755	0.4320541	0.0231616
0.1	0.08	1.703122	0.0469726	0.0643736	0.1287472	0.8046698	0.080467	0.448425	0.030757
0.12	0.1152	2.0437463	0.0563671	0.1046785	0.2093571	0.908668	0.1090402	0.4622604	0.0387629
0.125	0.125	2.1289024	0.0587157	0.1167171	0.2334342	0.9337366	0.1167171	0.4654162	0.0408217

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.3839524	0.0568908	0.1240003	0.2480006	0.914288	0.1188574	0.4468723	0.0397601
0.16	0.225625	3.9142524	0.0576419	0.2080979	0.4161958	0.9223176	0.1475708	0.4063428	0.0418764
0.2	0.415625	5.9546524	0.0697984	0.4354986	0.8709971	1.0478161	0.2095632	0.4128974	0.0537489
0.24	0.685625	7.9950523	0.0857562	0.8241098	1.6482196	1.2019833	0.288476	0.4323793	0.0695702
0.3045	1.2895063	11.285197	0.1142653	1.8768139	3.7536278	1.4554516	0.443185	0.4648108	0.0992342
0.32	1.465625	12.075852	0.1213682	2.2206552	4.4413105	1.5151592	0.484851	0.4720145	0.1068876
0.36	1.975625	14.116252	0.1399539	3.2916689	6.5833377	1.6661405	0.5998106	0.4893645	0.1273639
0.365	2.045	14.371302	0.1422975	3.4451886	6.8903771	1.6846888	0.6149114	0.4914115	0.12999

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.376302	0.1471171	3.6431248	7.2862496	1.7225176	0.6373315	0.4990394	0.1350191
0.41	2.675	14.416302	0.1855538	5.3788812	10.757762	2.0107967	0.8244266	0.5534117	0.175777
0.45	3.235	14.456302	0.2237778	7.3701086	14.740217	2.2782407	1.0252083	0.5985017	0.2173774
0.49	3.795	14.496302	0.2617909	9.5992293	19.198459	2.5294412	1.2394262	0.6367935	0.2597266
0.54	4.495	14.546302	0.3090132	12.698994	25.397988	2.8251377	1.5255743	0.6775086	0.3136088
0.59	5.195	14.596302	0.3559121	16.126331	32.252663	3.1042024	1.8314794	0.7121904	0.3684366
0.63	5.755	14.636302	0.3932004	19.091623	38.183247	3.3173976	2.0899605	0.7365451	0.4129151
0.667	**6.273**	**14.673302**	**0.4275111**	**22.00367**	**44.007341**	**3.507679**	**2.3396219**	**0.7568834**	**0.4545048**

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.323632	0.4142598	23.226996	46.453993	3.4348157	2.404371	0.7234799	0.4471541
0.72	7.085225	17.323832	0.4089872	24.1295	48.259	3.4056081	2.4520379	0.7072948	0.4451558

Street Capacity Calculations

Sipapu form Storyrock to 175' west

28' F-F Street Section with 8" curb

Slope= 0.005

Q=13.92 cfs

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703122	0.0046973	0.0001387	0.0002774	0.1733609	0.0017336	0.3055084	0.0016081
0.02	0.0032	0.3406244	0.0093945	0.0008806	0.0017612	0.2751932	0.0055039	0.3429216	0.0039311
0.04	0.0128	0.6812488	0.018789	0.0055916	0.0111832	0.436842	0.0174737	0.3849164	0.0095654
0.06	0.0288	1.0218732	0.0281835	0.0164858	0.0329717	0.5724249	0.0343455	0.4118272	0.0160557
0.08	0.0512	1.3624976	0.037578	0.0355043	0.0710086	0.6934434	0.0554755	0.4320541	0.0231616
0.1	0.08	1.703122	0.0469726	0.0643736	0.1287472	0.8046698	0.080467	0.448425	0.030757
0.12	0.1152	2.0437463	0.0563671	0.1046785	0.2093571	0.908668	0.1090402	0.4622604	0.0387629
0.125	0.125	2.1289024	0.0587157	0.1167171	0.2334342	0.9337366	0.1167171	0.4654162	0.0408217

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.3839524	0.0568908	0.1240003	0.2480006	0.914288	0.1188574	0.4468723	0.0397601
0.16	0.225625	3.9142524	0.0576419	0.2080979	0.4161958	0.9223176	0.1475708	0.4063428	0.0418764
0.2	0.415625	5.9546524	0.0697984	0.4354986	0.8709971	1.0478161	0.2095632	0.4128974	0.0537489
0.24	0.685625	7.9950523	0.0857562	0.8241098	1.6482196	1.2019833	0.288476	0.4323793	0.0695702
0.3045	1.2895063	11.285197	0.1142653	1.8768139	3.7536278	1.4554516	0.443185	0.4648108	0.0992342
0.32	1.465625	12.075852	0.1213682	2.2206552	4.4413105	1.5151592	0.484851	0.4720145	0.1068876
0.36	1.975625	14.116252	0.1399539	3.2916689	6.5833377	1.6661405	0.5998106	0.4893645	0.1273639
0.365	2.045	14.371302	0.1422975	3.4451886	6.8903771	1.6846888	0.6149114	0.4914115	0.12999

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.376302	0.1471171	3.6431248	7.2862496	1.7225176	0.6373315	0.4990394	0.1350191
0.41	2.675	14.416302	0.1855538	5.3788812	10.757762	2.0107967	0.8244266	0.5534117	0.175777
0.45	**3.235**	**14.456302**	**0.2237778**	**7.3701086**	**14.740217**	**2.2782407**	**1.0252083**	**0.5985017**	**0.2173774**
0.49	3.795	14.496302	0.2617909	9.5992293	19.198459	2.5294412	1.2394262	0.6367935	0.2597266
0.54	4.495	14.546302	0.3090132	12.698994	25.397988	2.8251377	1.5255743	0.6775086	0.3136088
0.59	5.195	14.596302	0.3559121	16.126331	32.252663	3.1042024	1.8314794	0.7121904	0.3684366
0.63	5.755	14.636302	0.3932004	19.091623	38.183247	3.3173976	2.0899605	0.7365451	0.4129151
0.667	6.273	14.673302	0.4275111	22.00367	44.007341	3.507679	2.3396219	0.7568834	0.4545048

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.323632	0.4142598	23.226996	46.453993	3.4348157	2.404371	0.7234799	0.4471541
0.72	7.085225	17.323832	0.4089872	24.1295	48.259	3.4056081	2.4520379	0.7072948	0.4451558
0.74	7.428225	18.324032	0.4053816	25.148723	50.297447	3.385563	2.5053166	0.6935649	0.4446941

Street Capacity Calculations

Storyteller west of Storyrock

28' F-F Street Section with 4" curb

Slope= 0.015

Q=10.64cfs

For water depths less than 0.0625 feet

Y= Water depth

Area = 16*Y^2

P= SQRT(1025*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.3301562	0.0048462	0.0004905	0.0009811	0.3065838	0.0030658	0.5402829	0.0041313
0.02	0.0064	0.6603124	0.0096924	0.0031147	0.0062294	0.4866714	0.0097334	0.6064471	0.009855
0.025	0.01	0.8253905	0.0121155	0.0056473	0.0112946	0.5647322	0.0141183	0.6294259	0.0130239
0.035	0.0196	1.1555467	0.0169617	0.0138522	0.0277043	0.7067425	0.024736	0.6657317	0.0198107
0.045	0.0324	1.485703	0.0218079	0.027075	0.0541501	0.8356496	0.0376042	0.6942086	0.0270787
0.055	0.0484	1.8158592	0.026654	0.0462349	0.0924697	0.955266	0.0525396	0.7178191	0.0347382
0.06	0.0576	1.9809373	0.0290771	0.0583095	0.116619	1.0123174	0.060739	0.7283047	0.0386956
0.0625	0.0625	2.0634763	0.0302887	0.0650153	0.1300307	1.0402456	0.0650153	0.7332768	0.0407035

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.063	0.0635063	2.0889813	0.0304006	0.0662247	0.1324494	1.0428058	0.0656968	0.7321587	0.0409394
0.1	0.1726563	3.9763513	0.0434208	0.2283475	0.4566949	1.3225555	0.1322555	0.7370313	0.0656041
0.13	0.3114063	5.5066513	0.0565509	0.4911747	0.9823494	1.5772796	0.2050463	0.7709196	0.090926
0.16	0.4951563	7.0369512	0.0703652	0.903503	1.807006	1.8246826	0.2919492	0.8038951	0.1187155
0.2	0.8101563	9.0773512	0.0892503	1.7321709	3.4643418	2.1380701	0.427614	0.8425177	0.1584316
0.24	1.2051563	11.117751	0.1083993	2.9332099	5.8664199	2.4338835	0.584132	0.8755203	0.2004761
0.28	1.6801563	13.158151	0.1276894	4.5610874	9.1221747	2.7146805	0.7601105	0.9040902	0.2444022
0.3025	1.9825	14.305876	0.1385794	5.6836571	11.367314	2.8669141	0.8672415	0.9185949	0.2698267

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.303	**1.9895**	**14.306376**	**0.1390639**	**5.7170106**	**11.434021**	**2.8735917**	**0.8706983**	**0.9199745**	**0.2708244**
0.308	2.0595	14.311376	0.1439065	6.054769	12.109538	2.9399218	0.9054959	0.9335391	0.2808138
0.312	2.1155	14.315376	0.1477782	6.3304618	12.660924	2.9924187	0.9336346	0.9440981	0.2888208
0.316	2.1715	14.319376	0.1516477	6.61098	13.22196	3.0444301	0.9620399	0.954409	0.2968417
0.32	2.2275	14.323376	0.155515	6.8962782	13.792556	3.0959723	0.9907111	0.964482	0.3048765
0.324	2.2835	14.327376	0.1593802	7.1863126	14.372625	3.1470605	1.0196476	0.9743268	0.3129254
0.331	2.3815	14.334376	0.1661391	7.7051417	15.410283	3.2354154	1.0709225	0.991033	0.3270445
0.333	2.4095	14.336376	0.168069	7.855988	15.711976	3.2604225	1.0857207	0.9956893	0.3310865

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For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.335	2.4376	14.436396	0.168851	7.9722405	15.944481	3.2705286	1.0956271	0.9957897	0.3331198
0.36	2.805725	15.686646	0.1788607	9.5353643	19.070729	3.3985384	1.2234738	0.9981895	0.3591311

Street Capacity Calculations

Stoney Bluff 150 west of Storyrock and above

28' F-F Street Section with 4" curb

Slope= 0.006

Q=8.90cfs

For water depths less than 0.0625 feet

Y= Water depth

Area = 16*Y^2

P= SQRT(1025*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.3301562	0.0048462	0.0003102	0.0006205	0.1939006	0.001939	0.3417049	0.0019536
0.02	0.0064	0.6603124	0.0096924	0.0019699	0.0039398	0.307798	0.006156	0.3835508	0.0047543
0.025	0.01	0.8253905	0.0121155	0.0035717	0.0071434	0.357168	0.0089292	0.3980839	0.0063239
0.035	0.0196	1.1555467	0.0169617	0.0087609	0.0175217	0.4469832	0.0156444	0.4210457	0.0097137
0.045	0.0324	1.485703	0.0218079	0.0171238	0.0342475	0.5285112	0.023783	0.4390561	0.0133744
0.055	0.0484	1.8158592	0.026654	0.0292415	0.058483	0.6041633	0.033229	0.4539887	0.017257
0.06	0.0576	1.9809373	0.0290771	0.0368782	0.0737563	0.6402457	0.0384147	0.4606204	0.019271
0.0625	0.0625	2.0634763	0.0302887	0.0411193	0.0822386	0.6579091	0.0411193	0.4637649	0.0202947

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.063	0.0635063	2.0889813	0.0304006	0.0418842	0.0837683	0.6595283	0.0415503	0.4630578	0.020407
0.1	0.1726563	3.9763513	0.0434208	0.1444196	0.2888392	0.8364575	0.0836458	0.4661395	0.0327389
0.13	0.3114063	5.5066513	0.0565509	0.3106462	0.6212923	0.9975592	0.1296827	0.4875724	0.0457256
0.16	0.4951563	7.0369512	0.0703652	0.5714255	1.1428509	1.1540306	0.1846449	0.5084279	0.0601255
0.2	0.8101563	9.0773512	0.0892503	1.0955211	2.1910421	1.3522343	0.2704469	0.532855	0.0808722
0.24	1.2051563	11.117751	0.1083993	1.8551249	3.7102497	1.5393231	0.3694375	0.5537277	0.1029842
0.28	1.6801563	13.158151	0.1276894	2.8846849	5.7693699	1.7169147	0.4807361	0.5717969	0.1262067
0.3025	1.9825	14.305876	0.1385794	3.5946604	7.1893208	1.8131957	0.5484917	0.5809705	0.1396936

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.303	1.9895	14.306376	0.1390639	3.615755	7.23151	1.8174189	0.5506779	0.581843	0.1402439
0.308	2.0595	14.311376	0.1439065	3.8293722	7.6587444	1.8593698	0.5726859	0.5904219	0.1457579
0.312	2.1155	14.315376	0.1477782	4.0037356	8.0074712	1.8925718	0.5904824	0.5971001	0.1501827
0.316	2.1715	14.319376	0.1516477	4.1811509	8.3623017	1.9254667	0.6084475	0.6036213	0.1546192
0.32	2.2275	14.323376	0.155515	4.3615893	8.7231786	1.9580648	0.6265807	0.609992	0.1590675
0.324	**2.2835**	**14.327376**	**0.1593802**	**4.5450231**	**9.0900463**	**1.9903758**	**0.6448818**	**0.6162184**	**0.1635273**
0.331	2.3815	14.334376	0.1661391	4.8731595	9.746319	2.0462564	0.6773109	0.6267843	0.1713593
0.333	2.4095	14.336376	0.168069	4.9685631	9.9371261	2.0620722	0.6866701	0.6297292	0.1736033

For water depths greater than 0.333 ft but less than 0.513 ft

Y3= Y - 0.333

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.335	2.4376	14.436396	0.168851	5.0420876	10.084175	2.0684639	0.6929354	0.6297927	0.1746722
0.36	2.805725	15.686646	0.1788607	6.0306939	12.061388	2.1494244	0.7737928	0.6313105	0.1883815

Street Capacity Calculations

Stoney bluff 150' west of Storyrock and below
28' F-F Street Section with 8" curb
Slope= 0.006
Q=11.13 cfs

For water depths less than 0.125 feet

Y= Water depth
Area = 8*Y^2
P= SQRT(257*Y^2) + Y
n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703122	0.0046973	0.0001519	0.0003039	0.1899073	0.0018991	0.3346677	0.0018848
0.02	0.0032	0.3406244	0.0093945	0.0009647	0.0019293	0.3014591	0.0060292	0.3756517	0.0045908
0.04	0.0128	0.6812488	0.018789	0.0061253	0.0122505	0.4785364	0.0191415	0.4216548	0.0111278
0.06	0.0288	1.0218732	0.0281835	0.0180593	0.0361187	0.6270601	0.0376236	0.4511341	0.0186349
0.08	0.0512	1.3624976	0.037578	0.038893	0.077786	0.7596292	0.0607703	0.4732915	0.0268376
0.1	0.08	1.703122	0.0469726	0.0705177	0.1410355	0.8814716	0.0881472	0.4912249	0.0355923
0.12	0.1152	2.0437463	0.0563671	0.1146696	0.2293392	0.9953959	0.1194475	0.5063809	0.0448091
0.125	0.125	2.1289024	0.0587157	0.1278572	0.2557143	1.0228572	0.1278572	0.5098378	0.0471777

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125
A2= A1 + 2*Y1 + 25*Y1^2
P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.3839524	0.0568908	0.1358355	0.2716711	1.0015523	0.1302018	0.489524	0.0460163
0.16	0.225625	3.9142524	0.0576419	0.2279598	0.4559197	1.0103483	0.1616557	0.4451262	0.0486259
0.2	0.415625	5.9546524	0.0697984	0.4770648	0.9541295	1.147825	0.229565	0.4523064	0.0623776
0.24	0.685625	7.9950523	0.0857562	0.9027671	1.8055342	1.3167068	0.3160096	0.4736478	0.0806096
0.3045	1.2895063	11.285197	0.1142653	2.0559466	4.1118932	1.5943673	0.4854848	0.5091747	0.1146904
0.32	1.465625	12.075852	0.1213682	2.4326059	4.8652118	1.6597738	0.5311276	0.517066	0.1234692
0.36	1.975625	14.116252	0.1399539	3.6058426	7.2116852	1.8251655	0.6570596	0.5360719	0.1469359
0.365	2.045	14.371302	0.1422975	3.774015	7.54803	1.8454841	0.6736017	0.5383143	0.1499436

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365
A3= A2 + Y2*14
P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.376302	0.1471171	3.9908433	7.9816865	1.8869235	0.6981617	0.5466703	0.1556607
0.41	**2.675**	**14.416302**	**0.1855538**	**5.8922691**	**11.784538**	**2.2027174**	**0.9031141**	**0.6062321**	**0.2019205**
0.45	3.235	14.456302	0.2237778	8.0735494	16.147099	2.4956876	1.1230594	0.6556258	0.2490383
0.49	3.795	14.496302	0.2617909	10.515429	21.030858	2.770864	1.3577234	0.6975723	0.2969352
0.54	4.495	14.546302	0.3090132	13.911051	27.822102	3.0947833	1.671183	0.7421735	0.357805
0.59	5.195	14.596302	0.3559121	17.665511	35.331022	3.4004833	2.0062852	0.7801654	0.4196837
0.63	5.755	14.636302	0.3932004	20.913826	41.827651	3.634027	2.289437	0.8068447	0.4698487
0.667	6.273	14.673302	0.4275111	24.103813	48.207626	3.8424698	2.5629274	0.8291242	0.5167338

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667
A4= A3 + 14 * Y3 + 25 * Y3^2
P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.323632	0.4142598	25.4439	50.887799	3.762652	2.6338564	0.7925325	0.5090958
0.72	7.085225	17.323832	0.4089872	26.432543	52.865086	3.7306568	2.6860729	0.7748027	0.5071856

Street Capacity Calculations

Storyrock From Stoney Bluff to Legends

28' F-F Street Section with 8" curb

Slope= 0.006

Q=13.91cfs

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703122	0.0046973	0.0001519	0.0003039	0.1899073	0.0018991	0.3346677	0.0018848
0.02	0.0032	0.3406244	0.0093945	0.0009647	0.0019293	0.3014591	0.0060292	0.3756517	0.0045908
0.04	0.0128	0.6812488	0.018789	0.0061253	0.0122505	0.4785364	0.0191415	0.4216548	0.0111278
0.06	0.0288	1.0218732	0.0281835	0.0180593	0.0361187	0.6270601	0.0376236	0.4511341	0.0186349
0.08	0.0512	1.3624976	0.037578	0.038893	0.077786	0.7596292	0.0607703	0.4732915	0.0268376
0.1	0.08	1.703122	0.0469726	0.0705177	0.1410355	0.8814716	0.0881472	0.4912249	0.0355923
0.12	0.1152	2.0437463	0.0563671	0.1146696	0.2293392	0.9953959	0.1194475	0.5063809	0.0448091
0.125	0.125	2.1289024	0.0587157	0.1278572	0.2557143	1.0228572	0.1278572	0.5098378	0.0471777

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.3839524	0.0568908	0.1358355	0.2716711	1.0015523	0.1302018	0.489524	0.0460163
0.16	0.225625	3.9142524	0.0576419	0.2279598	0.4559197	1.0103483	0.1616557	0.4451262	0.0486259
0.2	0.415625	5.9546524	0.0697984	0.4770648	0.9541295	1.147825	0.229565	0.4523064	0.0623776
0.24	0.685625	7.9950523	0.0857562	0.9027671	1.8055342	1.3167068	0.3160096	0.4736478	0.0806096
0.3045	1.2895063	11.285197	0.1142653	2.0559466	4.1118932	1.5943673	0.4854848	0.5091747	0.1146904
0.32	1.465625	12.075852	0.1213682	2.4326059	4.8652118	1.6597738	0.5311276	0.517066	0.1234692
0.36	1.975625	14.116252	0.1399539	3.6058426	7.2116852	1.8251655	0.6570596	0.5360719	0.1469359
0.365	2.045	14.371302	0.1422975	3.774015	7.54803	1.8454841	0.6736017	0.5383143	0.1499436

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.376302	0.1471171	3.9908433	7.9816865	1.8869235	0.6981617	0.5466703	0.1556607
0.41	2.675	14.416302	0.1855538	5.8922691	11.784538	2.2027174	0.9031141	0.6062321	0.2019205
0.45	**3.235**	**14.456302**	**0.2237778**	**8.0735494**	**16.147099**	**2.4956876**	**1.1230594**	**0.6556258**	**0.2490383**
0.49	3.795	14.496302	0.2617909	10.515429	21.030858	2.770864	1.3577234	0.6975723	0.2969352
0.54	4.495	14.546302	0.3090132	13.911051	27.822102	3.0947833	1.671183	0.7421735	0.357805
0.59	5.195	14.596302	0.3559121	17.665511	35.331022	3.4004833	2.0062852	0.7801654	0.4196837
0.63	5.755	14.636302	0.3932004	20.913826	41.827651	3.634027	2.289437	0.8068447	0.4698487
0.667	6.273	14.673302	0.4275111	24.103813	48.207626	3.8424698	2.5629274	0.8291242	0.5167338

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.323632	0.4142598	25.4439	50.887799	3.762652	2.6338564	0.7925325	0.5090958
0.72	7.085225	17.323832	0.4089872	26.432543	52.865086	3.7306568	2.6860729	0.7748027	0.5071856

Street Capacity Calculations

Legends east of Story Rock

28' F-F Street Section with 8" curb

Slope= 0.005

Q=33.64cfs

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703122	0.0046973	0.0001387	0.0002774	0.1733609	0.0017336	0.3055084	0.0016081
0.02	0.0032	0.3406244	0.0093945	0.0008806	0.0017612	0.2751932	0.0055039	0.3429216	0.0039311
0.04	0.0128	0.6812488	0.018789	0.0055916	0.0111832	0.436842	0.0174737	0.3849164	0.0095654
0.06	0.0288	1.0218732	0.0281835	0.0164858	0.0329717	0.5724249	0.0343455	0.4118272	0.0160557
0.08	0.0512	1.3624976	0.037578	0.0355043	0.0710086	0.6934434	0.0554755	0.4320541	0.0231616
0.1	0.08	1.703122	0.0469726	0.0643736	0.1287472	0.8046698	0.080467	0.448425	0.030757
0.12	0.1152	2.0437463	0.0563671	0.1046785	0.2093571	0.908668	0.1090402	0.4622604	0.0387629
0.125	0.125	2.1289024	0.0587157	0.1167171	0.2334342	0.9337366	0.1167171	0.4654162	0.0408217

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.3839524	0.0568908	0.1240003	0.2480006	0.914288	0.1188574	0.4468723	0.0397601
0.16	0.225625	3.9142524	0.0576419	0.2080979	0.4161958	0.9223176	0.1475708	0.4063428	0.0418764
0.2	0.415625	5.9546524	0.0697984	0.4354986	0.8709971	1.0478161	0.2095632	0.4128974	0.0537489
0.24	0.685625	7.9950523	0.0857562	0.8241098	1.6482196	1.2019833	0.288476	0.4323793	0.0695702
0.3045	1.2895063	11.285197	0.1142653	1.8768139	3.7536278	1.4554516	0.443185	0.4648108	0.0992342
0.32	1.465625	12.075852	0.1213682	2.2206552	4.4413105	1.5151592	0.484851	0.4720145	0.1068876
0.36	1.975625	14.116252	0.1399539	3.2916689	6.5833377	1.6661405	0.5998106	0.4893645	0.1273639
0.365	2.045	14.371302	0.1422975	3.4451886	6.8903771	1.6846888	0.6149114	0.4914115	0.12999

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.376302	0.1471171	3.6431248	7.2862496	1.7225176	0.6373315	0.4990394	0.1350191
0.41	2.675	14.416302	0.1855538	5.3788812	10.757762	2.0107967	0.8244266	0.5534117	0.175777
0.45	3.235	14.456302	0.2237778	7.3701086	14.740217	2.2782407	1.0252083	0.5985017	0.2173774
0.49	3.795	14.496302	0.2617909	9.5992293	19.198459	2.5294412	1.2394262	0.6367935	0.2597266
0.54	4.495	14.546302	0.3090132	12.698994	25.397988	2.8251377	1.5255743	0.6775086	0.3136088
0.59	5.195	14.596302	0.3559121	16.126331	32.252663	3.1042024	1.8314794	0.7121904	0.3684366
0.63	**5.755**	**14.636302**	**0.3932004**	**19.091623**	**38.183247**	**3.3173976**	**2.0899605**	**0.7365451**	**0.4129151**
0.667	6.273	14.673302	0.4275111	22.00367	44.007341	3.507679	2.3396219	0.7568834	0.4545048

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.323632	0.4142598	23.226996	46.453993	3.4348157	2.404371	0.7234799	0.4471541
0.72	7.085225	17.323832	0.4089872	24.1295	48.259	3.4056081	2.4520379	0.7072948	0.4451558

Street Capacity Calculations

Arrow point

~~Sipapu~~ form Storyrock to 175' west

28' F-F Street Section with 8" curb

Slope= 0.005

Q=13.20 cfs

For water depths less than 0.125 feet

Y= Water depth

Area = 8*Y^2

P= SQRT(257*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0008	0.1703122	0.0046973	0.0001387	0.0002774	0.1733609	0.0017336	0.3055084	0.0016081
0.02	0.0032	0.3406244	0.0093945	0.0008806	0.0017612	0.2751932	0.0055039	0.3429216	0.0039311
0.04	0.0128	0.6812488	0.018789	0.0055916	0.0111832	0.436842	0.0174737	0.3849164	0.0095654
0.06	0.0288	1.0218732	0.0281835	0.0164858	0.0329717	0.5724249	0.0343455	0.4118272	0.0160557
0.08	0.0512	1.3624976	0.037578	0.0355043	0.0710086	0.6934434	0.0554755	0.4320541	0.0231616
0.1	0.08	1.703122	0.0469726	0.0643736	0.1287472	0.8046698	0.080467	0.448425	0.030757
0.12	0.1152	2.0437463	0.0563671	0.1046785	0.2093571	0.908668	0.1090402	0.4622604	0.0387629
0.125	0.125	2.1289024	0.0587157	0.1167171	0.2334342	0.9337366	0.1167171	0.4654162	0.0408217

For water depths greater than 0.125 ft but less than 0.365 ft

Y1= Y-0.125

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.13	0.135625	2.3839524	0.0568908	0.1240003	0.2480006	0.914288	0.1188574	0.4468723	0.0397601
0.16	0.225625	3.9142524	0.0576419	0.2080979	0.4161958	0.9223176	0.1475708	0.4063428	0.0418764
0.2	0.415625	5.9546524	0.0697984	0.4354986	0.8709971	1.0478161	0.2095632	0.4128974	0.0537489
0.24	0.685625	7.9950523	0.0857562	0.8241098	1.6482196	1.2019833	0.288476	0.4323793	0.0695702
0.3045	1.2895063	11.285197	0.1142653	1.8768139	3.7536278	1.4554516	0.443185	0.4648108	0.0992342
0.32	1.465625	12.075852	0.1213682	2.2206552	4.4413105	1.5151592	0.484851	0.4720145	0.1068876
0.36	1.975625	14.116252	0.1399539	3.2916689	6.5833377	1.6661405	0.5998106	0.4893645	0.1273639
0.365	2.045	14.371302	0.1422975	3.4451886	6.8903771	1.6846888	0.6149114	0.4914115	0.12999

For water depths greater than 0.365 ft but less than 0.667 ft

Y2= Y - 0.365

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.37	2.115	14.376302	0.1471171	3.6431248	7.2862496	1.7225176	0.6373315	0.4990394	0.1350191
0.41	2.675	14.416302	0.1855538	5.3788812	10.757762	2.0107967	0.8244266	0.5534117	0.175777
0.45	**3.235**	**14.456302**	**0.2237778**	**7.3701086**	**14.740217**	**2.2782407**	**1.0252083**	**0.5985017**	**0.2173774**
0.49	3.795	14.496302	0.2617909	9.5992293	19.198459	2.5294412	1.2394262	0.6367935	0.2597266
0.54	4.495	14.546302	0.3090132	12.698994	25.397988	2.8251377	1.5255743	0.6775086	0.3136088
0.59	5.195	14.596302	0.3559121	16.126331	32.252663	3.1042024	1.8314794	0.7121904	0.3684366
0.63	5.755	14.636302	0.3932004	19.091623	38.183247	3.3173976	2.0899605	0.7365451	0.4129151
0.667	6.273	14.673302	0.4275111	22.00367	44.007341	3.507679	2.3396219	0.7568834	0.4545048

For water depths greater than 0.667 ft but less than 0.847 ft

Y3= Y - 0.667

A4= A3 + 14 * Y3 + 25 * Y3^2

P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.7	6.762225	16.323632	0.4142598	23.226996	46.453993	3.4348157	2.404371	0.7234799	0.4471541
0.72	7.085225	17.323832	0.4089872	24.1295	48.259	3.4056081	2.4520379	0.7072948	0.4451558
0.74	7.428225	18.324032	0.4053816	25.148723	50.297447	3.385563	2.5053166	0.6935649	0.4446941

Street Capacity Calculations

Arrowpoint 175' west of Storyrock and Above

28' F-F Street Section with 4" curb

Slope= 0.005

Q=8.96cfs

For water depths less than 0.0625 feet

Y= Water depth

Area = 16*Y^2

P= SQRT(1025*Y^2) + Y

n= 0.017

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.01	0.0016	0.3301562	0.0048462	0.0002832	0.0005664	0.1770062	0.0017701	0.3119325	0.0016679
0.02	0.0064	0.6603124	0.0096924	0.0017983	0.0035965	0.2809799	0.0056196	0.3501324	0.0040739
0.025	0.01	0.8253905	0.0121155	0.0032605	0.006521	0.3260483	0.0081512	0.3633992	0.0054255
0.035	0.0196	1.1555467	0.0169617	0.0079975	0.0159951	0.408038	0.0142813	0.3843604	0.0083495
0.045	0.0324	1.485703	0.0218079	0.0156318	0.0312636	0.4824625	0.0217108	0.4008015	0.0115125
0.055	0.0484	1.8158592	0.026654	0.0266937	0.0533874	0.5515231	0.0303338	0.4144331	0.0148718
0.06	0.0576	1.9809373	0.0290771	0.033665	0.06733	0.5844617	0.0350677	0.4204869	0.0166157
0.0625	0.0625	2.0634763	0.0302887	0.0375366	0.0750733	0.6005861	0.0375366	0.4233575	0.0175025

For water depths greater than 0.0625 ft but less than 0.3025 ft

Y1= Y-0.0625

A2= A1 + 2*Y1 + 25*Y1^2

P2= P1 + SQRT(2501*Y1^2)+Y1

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.063	0.0635063	2.0889813	0.0304006	0.0382348	0.0764697	0.6020642	0.03793	0.422712	0.0175984
0.1	0.1726563	3.9763513	0.0434208	0.1318365	0.2636729	0.7635777	0.0763578	0.4255252	0.0282396
0.13	0.3114063	5.5066513	0.0565509	0.2835799	0.5671597	0.9106428	0.1183836	0.4450906	0.0395035
0.16	0.4951563	7.0369512	0.0703652	0.5216377	1.0432754	1.053481	0.168557	0.4641291	0.05202
0.2	0.8101563	9.0773512	0.0892503	1.0000693	2.0001387	1.2344154	0.2468831	0.4864278	0.0700852
0.24	1.2051563	11.117751	0.1083993	1.6934895	3.3869791	1.4052033	0.3372488	0.5054819	0.089368
0.28	1.6801563	13.158151	0.1276894	2.633345	5.26669	1.5673215	0.43885	0.5219767	0.1096431
0.3025	1.9825	14.305876	0.1385794	3.281461	6.562922	1.6552136	0.5007021	0.530351	0.1214273

For water depths greater than 0.3025 ft but less than 0.333 ft

Y2= Y - 0.3025

A3= A2 + Y2*14

P3= P2 + Y2

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.303	1.9895	14.306376	0.1390639	3.3007176	6.6014352	1.6590689	0.5026979	0.5311475	0.121912
0.308	2.0595	14.311376	0.1439065	3.4957225	6.9914451	1.6973647	0.5227883	0.538979	0.1267698
0.312	2.1155	14.315376	0.1477782	3.6548938	7.3097876	1.7276738	0.5390342	0.5450753	0.1306691
0.316	2.1715	14.319376	0.1516477	3.8168511	7.6337022	1.7577025	0.555434	0.5510283	0.1345799
0.32	2.2275	14.323376	0.155515	3.9815681	7.9631362	1.7874604	0.5719873	0.556844	0.1385019
0.324	2.2835	14.327376	0.1593802	4.1490195	8.298039	1.8169562	0.5886938	0.5625278	0.1424351
0.331	2.3815	14.334376	0.1661391	4.4485656	8.8971313	1.8679679	0.6182974	0.5721732	0.1493442
0.333	**2.4095**	**14.336376**	**0.168069**	**4.5356568**	**9.0713136**	**1.8824058**	**0.6268411**	**0.5748615**	**0.1513243**

For water depths greater than 0.333 ft but less than 0.513 ft

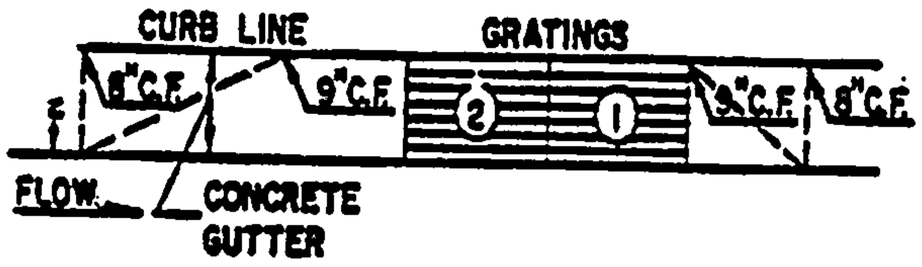
Y3= Y - 0.333

A4= A3 + 14 * Y3 + 25 * Y3^2

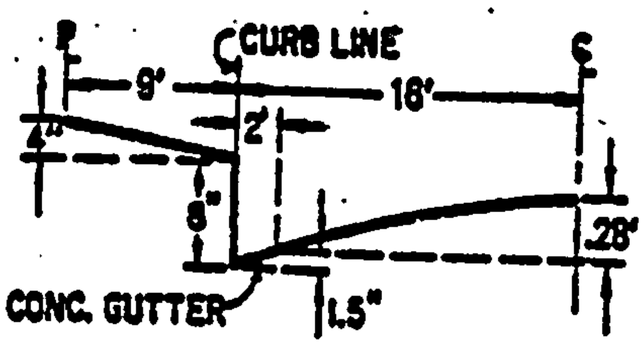
P4= P3 + SQRT(2501 * Y3^2)

Depth (ft)	Area (ft^2)	P (ft)	R (A/P)	Q (cfs)	2Q (cfs)	Vel (ft/s)	D*V	Fr	D2 (ft)
0.335	2.4376	14.436396	0.168851	4.6027752	9.2055504	1.8882406	0.6325606	0.5749194	0.1522565
0.36	2.805725	15.686646	0.1788607	5.5052451	11.01049	1.9621471	0.706373	0.576305	0.16422

GRATING CAPACITIES FOR TYPE DOUBLE "C," AND "D"



GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

PLATE 22.3 D-6

DROP INLET CALCULATIONS

STREET	TYPE OF INLET	AREA (SF)	Q* (CFS)	H (FT)	H ALLOW (FT)
STAR KATCHINA	DOUBLE 'A'	11.24	31.81	0.3455	0.847

ORIFICE EQUATION

Q = CA sqrt(2gH)

C = 0.6

g = 32.2

*INCLUDES 1/2 OF TOTAL FLOW SINCE TWO INLETS TO BE USED.
NO CLOGGING FACTOR IS USED DUE TO PROVIDED OVERFLOW

EMERGENCY OVERFLOW CALCULATIONS

Weir Equation:

$$Q = CLH^{3/2}$$

$Q_{required}$ = 105.6 CFS
C= 2.75
H=1.5 foot
L=30 feet

$$Q = 2.75(30)(1.5)^{1.5}$$

$$Q = 151.56 > Q_{required}$$

Channel Capacity

	Top Width	Bottom Width	Depth	Area	WP	R	Slope	Q Provided	Q Required	Velocity
	(ft)	(ft)	(ft)	(ft^2)	(ft)		(%)	(cfs)	(cfs)	(ft/s)
Emergency overflow	30	30	1.5	45.00	33.00	1.363636	1.1	508.68	105.62	2.35

Manning's Equation:

Q = 1.49/n * A * R^(2/3) * S^(1/2)

A = Area

R = D/4

S = Slope

n = 0.017

Pipe Capacity

Manning's Equation:

Q = 1.49/n * A * R^(2/3) * S^(1/2)

A = Area

R = D/4

S = Slope

n = 0.013

STORM SEWER STORYROCK SUBDIVISION

Pipe	D	Slope	Area	R	Q Provided	Q Required	Velocity
	(in)	(%)	(ft^2)		(cfs)	(cfs)	(ft/s)
IN#1 TO IN#3	18	16	1.77	0.375	42.13	10.50	23.84
IN#2 TO IN#4	18	16	1.77	0.375	42.13	10.50	23.84
IN#3 TO IN#4	24	7.1	3.14	0.5	60.44	21.00	19.24
IN#4 TO MH#1	24	30	3.14	0.5	124.24	42.00	39.55
MH#2 TO MH#1	24	4	3.14	0.5	45.37	42.00	14.44
S.IN TON.IN	24	5	3.14	0.5	50.72	31.81	16.15
N. IN TO OUTLET	24	8.1	3.14	0.5	64.56	63.62	20.55

THIS FORM REPLACES PREVICUS FORM 3510-6 (8-98)
See Reverse for Instructions

Form Approved. OMB No. 2040-0

NPDES FORM

EPA

United States Environmental Protection Agency
Washington, DC 20460

Notice of Intent (NOI) for Storm Water Discharges Associated with CONSTRUCTION ACTIVITY Under a NPDES General Permit

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a NPDES permit iss for storm water discharges associated with construction activity in the State/Indian Country Land identified in Section II of this form. Submission of this No of Intent also constitutes notice that the party identified in Section I of this form meets the eligibility requirements in Part I.B. of the general permit (inclu those related to protection of endangered species determined through the procedures in Addendum A of the general permit), understands that contir authorization to discharge is contingent on maintaining permit eligibility, and that implementation of the Storm Water Pollution Prevention Plan required u Part IV of the general permit will begin at the time the permittee commences work on the construction project identified in Section II below. IN ORDEF OBTAIN AUTHORIZATION, ALL INFORMATION REQUESTED MUST BE INCLUDED ON THIS FORM. SEE INSTRUCTIONS ON BACK OF FO

I. Owner/Operator (Applicant) Information

Name: DIRIHIOIRITIOINI Phone: 5|0|5|7|9|7|4|2|4

Address: 4|4|0|0| |A|L|A|M|E|D|A| | | | |N|E| Status of Owner/Operator: ☐

City: A|L|B|U|Q|U|E|R|Q|U|E| State: N|M| Zip Code: 8|7|1|1|3|-| |

II. Project/Site Information

Is the facility located on Indi Country Lands?
Yes ☐ No ☒

Project Name: SITIORIYIRIOICIK ISIUIBIDIIVIISIIOIN

Project Address/Location: TIMITIOIF IAITIRIISICIO IRID IANIDI IUINISIEIRI IBILIVID

City: A|L|B|U|Q|U|E|R|Q|U|E| State: N|M| Zip Code: 8|7|1|2|0|1|-| |

Latitude: 3|5|0|8|1|3|3| Longitude: 1|0|6|4|2|5|0| County: BIEIRINIAILIILILIOI

Has the Storm Water Pollution Prevention Plan (SWPPP) been prepared? Yes ☒ No ☐

Optional: Address of location of SWPPP for viewing ☒ Address in Section I above ☐ Address in Section II above ☐ Other address (if known) be

SWPPP Address: Phone:

City: State: Zip Code:

Name of Receiving Water: RIIIOI IGIRIAINIDIE

0|1|0|1|2|0|1|0|1|0| 1|2|0|1|2|0|1|2|
Month Day Year — Estimated Construction Start Date

Month Day Year — Estimated Completion Date

Estimate of area to be disturbed (to nearest acre): 5|3|.|2|8|

Estimate of Likelihood of Discharge (choose only one):

1. ☒ Unlikely
2. ☐ Once per month
3. ☐ Once per week
4. ☐ Once per day
5. ☐ Continual

Based on instruction provided in Addendum A of the permit, there any listed endangered or threatened species, or desig critical habitat in the project area?

Yes ☐ No ☒

I have satisfied permit eligibility with regard to protection of endangered species through the indicated section of Part I.B. of the permit (check one or more boxes):

(a) ☒ (b) ☐ (c) ☐ (d) ☐

***

III. Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a s designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persor manage this system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowled belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fi imprisonment for knowing violations..

Print Name: DIAIVIIDI ISIOIUILIEI IPIE Date: 0|8|2|9|0|6|

Signature: DM

EPA Form 3510-9 replaced 3510-6 (8-98)

CITY OF
Albuquerque

Albuquerque Geographic Information System
PLANNING DEPARTMENT

N
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GRAPHIC SCALE IN FEET

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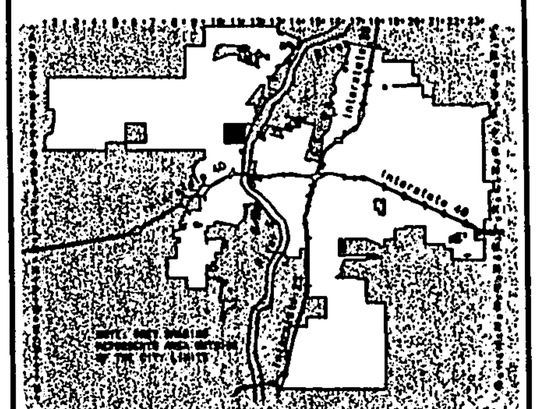


Zone Atlas Page
F-11-Z

Map Amended through
June 26, 1998

Exhibit A – Vicinity Map

650081

F11/D009

Parcels: M-3-13, 3-8-E, 3-11-E, San Antonio

ZAP F-11

ENCROACHMENT LICENSE AGREEMENT
STORM DRAIN OUTFALL
WITHIN SAN ANTONIO ARROYO CHANNEL RIGHT OF WAY

WHEREAS, the ALBUQUERQUE METROPOLITAN ARROYO FLOOD CONTROL AUTHORITY, a political subdivision of the State of New Mexico (AMAFCA) owns fee simple and easement rights-of-way for the San Antonio Arroyo Channel in the vicinity of Northern Trail Road (CHANNEL); and

WHEREAS, LAWSON STIFF, NORTH FORK LAND LIMITED COMPANY, LLC, a New Mexico Limited Liability Company (NORTH FORK) owns certain real property in the Story Rock Subdivision adjacent to said CHANNEL, including a Tract of land that is subject to a thirty foot (30') Public Drainage Easement in favor of the City of Albuquerque, a New Mexico Municipal Corporation (CITY); and

WHEREAS, as part of the Subdivision Improvements required with the development of Story Rock, NORTH FORK is constructing a storm drain outfall , CITY Project # 6500.81, which includes a thirty six inch (36") RCP Conduit, a thirty foot (30') wide emergency rundown and a wire enclosed rip-rap pad into the CHANNEL (the PROJECT); and

WHEREAS, NORTH FORK and the CITY have entered into a CITY approved Development Plan, assuring that NORTH FORK will construct the PROJECT in accordance with standards set forth by the CITY and, among other responsibilities, maintain the PROJECT until it is accepted by CITY; and

WHEREAS, upon completion of construction and acceptance by CITY, CITY shall thereafter maintain the PROJECT.

NOW, THEREFORE, for good and valuable consideration, the receipt of which is hereby acknowledged:

AMAFCA hereby grants to NORTH FORK and CITY, and their successors and assigns, a license to construct, operate, maintain, and repair the PROJECT in Bernalillo County, New Mexico, as graphically shown on Exhibit "A" attached hereto and incorporated by reference and being more specifically described in the approved construction drawings for the PROJECT, CITY Project # 6500.81, together with full and free ingress and egress thereto subject to the following terms and conditions:

1. NORTH FORK and/or CITY, as appropriate, shall obtain AMAFCA's written approval for the following:

   a. All changes to the plans or specifications which affect the PROJECT or the CHANNEL.
   b. Future repair, modification, removal or other activities affecting the completed PROJECT or CHANNEL.
   c. Future terrain disturbance in the vicinity of the CHANNEL.

2. Workmanship and materials shall conform to the CITY Standard Specifications for Public Works Construction, as currently modified.

3. The initial construction of PROJECT shall be accomplished at the sole expense of NORTH FORK.

4. Upon completion of construction and acceptance by CITY, CITY shall be responsible for all operation, maintenance, repair, relocation and removal of PROJECT, at the sole expense of CITY, in such manner as will not damage or interfere with the operation, maintenance or reconstruction of AMAFCA's flood control facilities.

5. As between the parties, each party acknowledges that it will be responsible for claims or damages arising from personal injury or damage to persons or property to the extent they result from the negligence or intentional misconduct of its employees. The liability of NORTH FORK, CITY and AMAFCA shall, in all cases, be subject to the immunities and limitations contained in the New Mexico Tort Claims Act, §§41-4-1, et seq., N.M.S.A. 1978, as amended.

6. NORTH FORK shall be responsible for all damages caused by the initial construction activities. To ensure repair of such damages, NORTH FORK shall require the contractor to purchase Standard Form Owner's Protective Liability insurance naming AMAFCA as additional named insured in the amounts specified in Section 5.2.4, "Bonds and Insurance", of the CITY Standard Specifications for Public Works Construction, 1986 Edition (revised 1992).

7. NORTH FORK shall notify the AMAFCA Field Engineer two days before beginning work in the AMAFCA right-of-way.

8. Construction in or on the CHANNEL, or any impairment to the flood-carrying ability of the CHANNEL, shall be restricted to the period between October 15 and May 15. At all other times, the CHANNEL shall be in original or final condition, and excavations and other land alterations shall be returned to their original contours, compacted condition and shall be re-vegetated in accordance

with CITY Standard Specifications for Public Works Construction, Section 1012 Native Grass Seeding, as currently updated.

9. Construction within the limits of the AMAFCA CHANNEL right-of-way shall be subject to inspection by AMAFCA's Executive Engineer or his designated representative. AMAFCA comments shall be directed to NORTH FORK's Project Manager. NORTH FORK shall be responsive to AMAFCA comments, especially as such comments pertain to endangering the CHANNEL or impairing the CHANNEL's flood-carrying ability.

10. All materials to be used in the construction within the AMAFCA CHANNEL right-of-way shall be subject to inspection by AMAFCA, in coordination with the Project Manager.

11. Upon completion of construction and acceptance by CITY, CITY shall maintain the PROJECT in good operating order.

12. Upon completion of construction and acceptance by CITY, CITY shall save and hold harmless AMAFCA from all claims and judgments from damages or injury to property or persons arising from the negligent construction, operation, maintenance, relocation, or removal of the PROJECT, and shall reimburse AMAFCA all costs and expenses incurred by AMAFCA arising from the negligent installation, operation, maintenance or removal of the PROJECT. Determination whether damage has occurred shall be by AMAFCA.

13. NORTH FORK shall provide AMAFCA with one set of "as built" plans within thirty (30) days of completion of work.

14. This License, and all rights and privileges herein granted, may be terminated by AMAFCA should CITY fail to comply with any provision of this License Agreement, fail to follow approved construction drawings, or fail to make use of the premises for the purposes stated herein for a continuous period of one year.

15. In addition to its common law rights and remedies under the law of contract, if any AMAFCA action defined in any portion of this License is deemed unreasonable, NORTH FORK, or CITY shall have the right to appeal to the AMAFCA Board of Directors.

15. For Work within AMAFCA easement right-of-way, NORTH FORK is responsible for obtaining any necessary permission from the underlying landowners.

16. This License Agreement shall be construed according to the laws of the State of New Mexico.

The provisions hereof shall inure to the benefit of and bind the heirs, executors, administrators, successors, and assigns of the parties hereto.

LICENSOR: Albuquerque Metropolitan Arroyo Flood Control Authority

by: John P Kelly 3-13-01
John P. Kelly, Executive Engineer Date

LICENSEE: LAWSON STIFF, NORTH FORK LAND LIMITED COMPANY, LLC, a New Mexico Limited Liability Company

by: Ann S Heine 2/2/01
Ann S. Heine, Managing Member Date

LICENSEE: City of Albuquerque:

by: 2-23-01
Fred Aguirre, City Engineer Date

by: 2-23-01
Larry A. Blair, Director
Public Works Department Date

KJL 2/21/01

ACKNOWLEDGMENTS

State of New Mexico)
)ss
County of Bernalillo)

This instrument was acknowledged before me this 13th day of March, 2001, by John P. Kelly as Executive Engineer of the Albuquerque Metropolitan Arroyo Flood Control Authority, a political subdivision of the State of New Mexico, on behalf of said political subdivision.

OFFICIAL SEAL
Christy Burch
NOTARY PUBLIC
STATE OF NEW MEXICO
My commission expires: July 6, 2004

My commission expires: Jr.

Martha Schmitz
Notary Public

***

State of New Mexico)
)ss
County of Bernalillo)

This instrument was acknowledged before me this 2 day of February, 2001, by Ann S. Heine, Managing Member of LAWSON STIFF, NORTH FORK LAND LIMITED COMPANY, LLC, a New Mexico Limited Liability Company, on behalf of said LLC.

My commission expires:
April 6, 2002

Bernice Stratton
Notary

State of New Mexico)
)ss
County of Bernalillo)

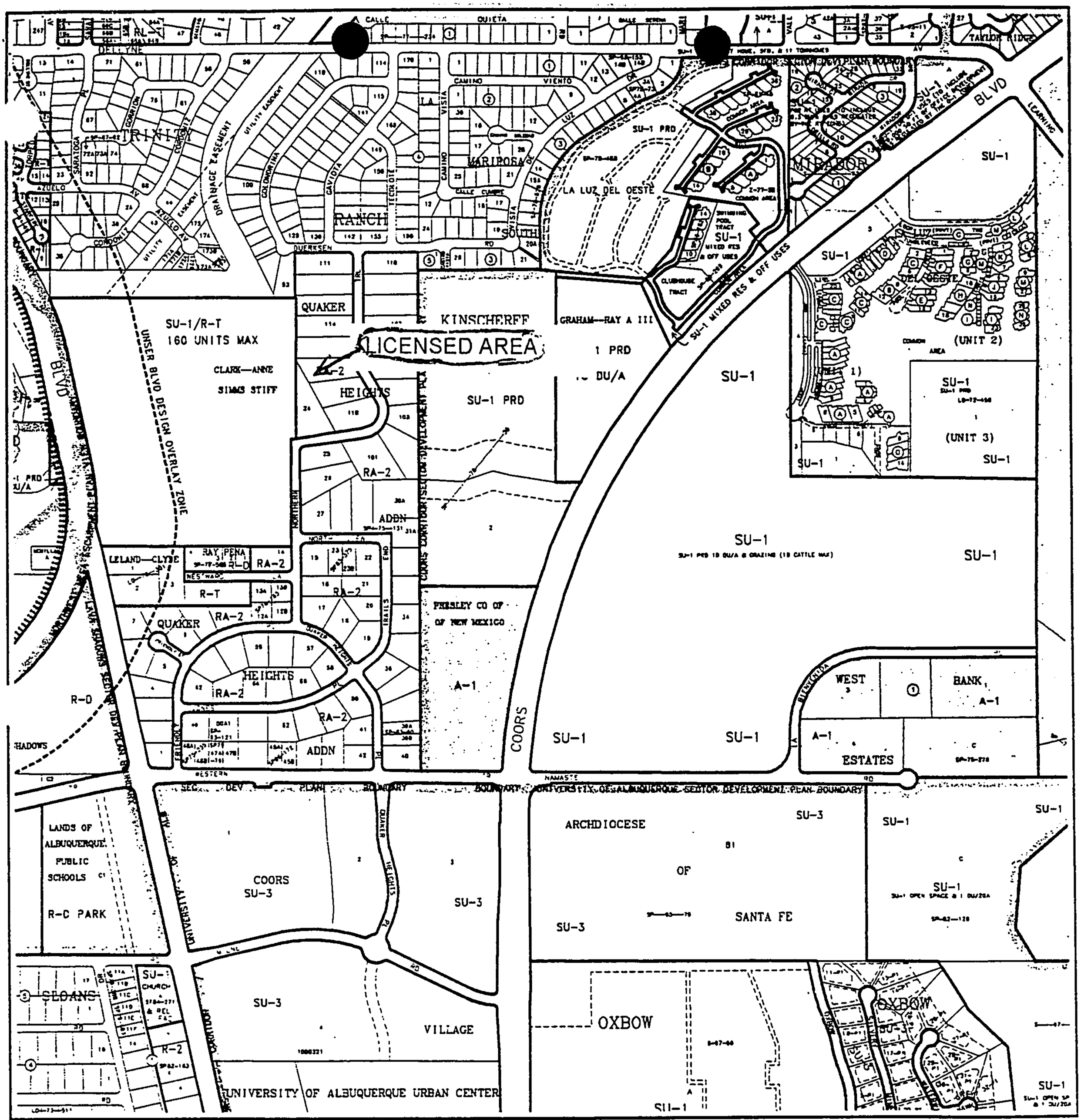
This instrument was acknowledged before me this 23rd day of February, 2001, by ~~Larry A. Blair~~ Fred J. Aguirre as Director of the Public Works Department of the City of Albuquerque, a New Mexico Municipal Corporation, on behalf of said Municipal Corporation.

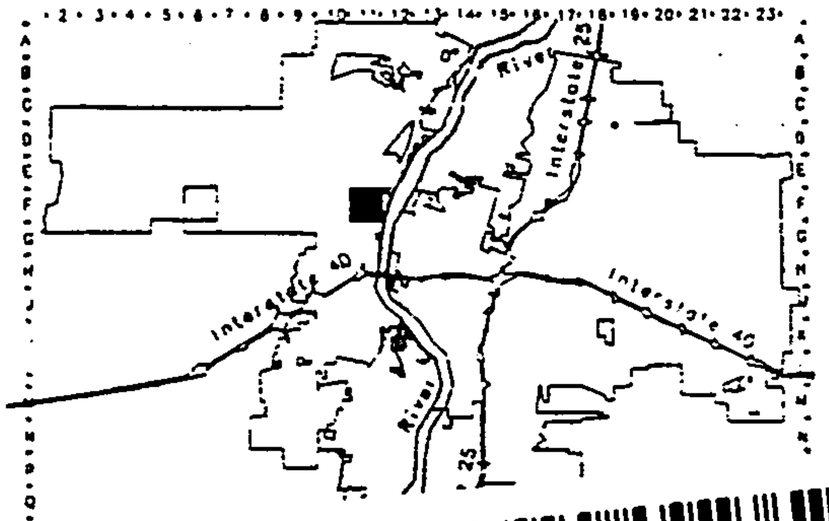
My commission expires:
11-15-2003

Gloria D. Saavedra
Notary

***

\Fe:fe_c.legal\LICENSE\STORMDRN\storyrock san antonio f11 wpd
February 1, 2001





GRAPHIC SCALE IN FEET

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Zone Atlas Page

F-11-Z

Map Amended through July 28, 2000

CITY OF ALBUQUERQUE NEW MEXICO

2001029838
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Page: 6 of 9
03/16/2001 11:15A
Bk-A16 Pg-8325

Exhibit "A"
Page 1 of 4

Bern. Co. AGRE R 23.00

Mary Herrera

STA: 10+82.50
ELEV: 5109.62
BEGIN 2" ASPHALT RUNDOWN

STA: 10+57.16, CL
ELEV: 5109.06

STA: 10+32.15, ROW
ELEV: 5109.70

187.2 LF @ 0.07247
36" RCP
Q=66.44 CFS
V=13.64 FT/SEC

EXISTING GRADE
CL

STA:11+91.91
ELEV: 5108.79
CONTINUE 2" ASPHALT RUNDOW

STA:12+11.35
ELEV: 5102.78
BEGIN 8" CONCRETE RUNDOW

EXISTING
CHANNEL WALL

HGL

BUILD 51'x61' WIRE
ENCLOSED RIP-RAP
TYPE-V 2' THICK
INV:5087.00

STA: 12+42.05
INV ELEV: 5087.96

STA: 12+51.54
INV ELEV: 5084.96

STA: 10+73.69 INLET #6
DOUBLE "A" INLET
GRATE=5107.63
INV IN=5100.75
INV OUT=5100.22

STA: 10+66.90 INLET #5
DOUBLE "A" INLET
GRATE=5107.61
INV OUT=5102.22

STA: 10+84.18 SD-MH 1
4' DIA. TYPE "E" MH
RIM=5110.75
INV IN=5101.08
INV OUT=5100.08

5110
5100
5090
5080
10+00
11+00
12+00
13+00

TIERRA WEST, LLC
8509 JEFFERSON NE
ALBUQUERQUE, NEW MEXICO 87113
(505)858-3100

EXHIBIT A-1

Exhibit "A"
Page 1 of 4

01-18-2001

2 OF 3

990050

10+00 11+00 12+00 13+00

STA: 10+73.69, INLET #6
OFFSET 0.75 L
DOUBLE "A" INLET (N)
GRATE ELEV: 5107.63
INV IN=5100.75
INV OUT=5100.22

STA: 10+66.90, INLET #5
OFFSET 10.77 R
DOUBLE "A" INLET (S)
GRATE ELEV: 5107.61
INV OUT=5102.22

STA: 12+41.89
OFFSET 0.00 L
STORM DRAIN OUTLET
INV.=5088.00

STA: 12+11.35
OFFSET 0.00 R
BUILD CONCRETE
OVERFLOW STRUCTURE
PER DETAIL THIS SHEET

STA: 11+93.55
OFFSET 0.00 R
INSTALL REMOVABLE
MAINTENANCE GATE

BUILD 51'x61' WIRE
ENCLOSED RIP-RAP
TYPE-V 2' THICK
INV.=5087.00

STAR KACHINA STREET
SEE SHEET 24

NEW 30' DRAINAGE
EASEMENT

101

145

144

TRACT L

108

109

BUILD TEMPORARY
DESILTING POND
WITHIN PHASE 1, TO BE
REMOVED W/ PHASE 2

142

143

STAR KACHINA STREET
SEE SHEET 24

5100

5095

5090

PLAN VIEW
NORTH STORM DRAIN

2001029838 ***
5486621
Page: 8 of 9
03/16/2001 11:15A
Bk-A16 Pg-8325
Mary Herrera Bern. Co. AGRE R 23.00

TIERRA WEST, LLC
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(505)858-3100

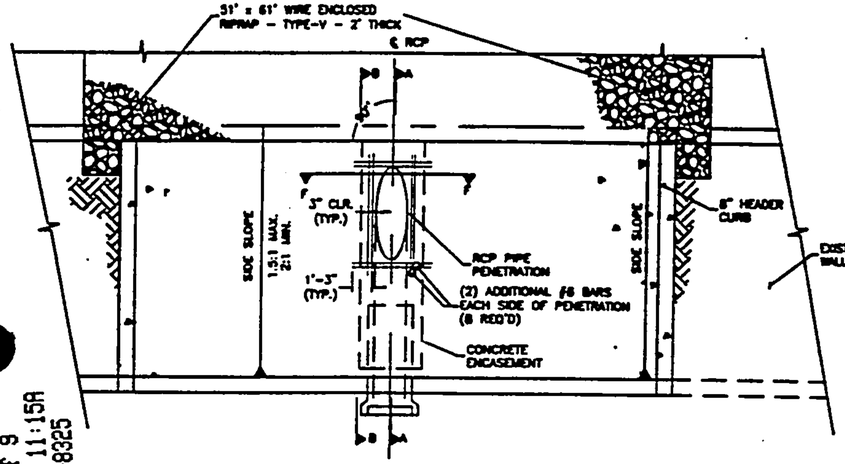
EXHIBIT A

Exhibit "A"
Page 3 of 4

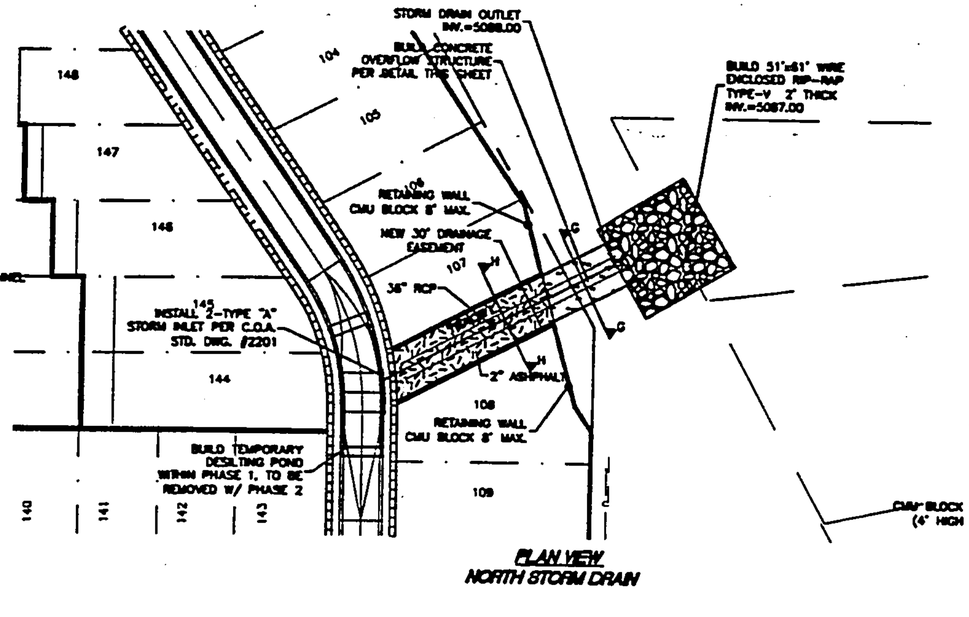
01-18-2001

1 OF 3

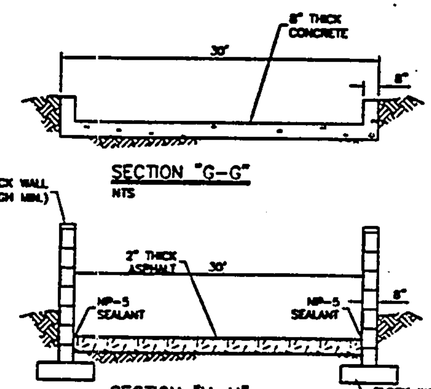
990050



PIPE PENETRATION (PLAN VIEW)
NTS



PLAN VIEW
NORTH STORM DRAIN



SECTION "G-G"
NTS

SECTION "H-H"
NTS

SECTION "A-A"
CONCRETE SLOPE PAVEMENT
NTS

SECTION "B-B"
NTS

NOTES:

1. AN EXECUTED DRAINAGE LICENSE(IN THIS CASE) TO COA (OR EC) IF O & M BY PUBLIC ENTITY.
2. CONCRETE TO BE 4,000 PSI AND STEEL TO BE GRADE 60.
3. ALL SUBGRADE AND BACKFILL PLACED AT 95% MODIFIED PROCTOR, MOISTURE AT OPTIMUM TO PLUS 3% OF OPTIMUM.
4. AMAFCA TO INSPECT STEEL PRIOR TO POURING PIPE COLLAR AND CHANNEL LINING. CALL AMAFCA, 884-2215.
5. AMAFCA FIELD ENGINEER SHALL BE NOTIFIED 48-HOURS PRIOR TO ANY WORK WITHIN THE AMAFCA R/W. TEL. 884-2215 JERRY LOVATO.
6. NO WORK WILL BE PERFORMED IN THE AMAFCA R/W BETWEEN APRIL 15 AND OCTOBER 15 WITHOUT WRITTEN PERMISSION FROM AMAFCA.
7. ALL SUBGRADE, BACKFILL AND EMBANKMENT SHALL BE COMPACTED TO 95% (MODIFIED PROCTOR) WITHIN THE AMAFCA R/W. TESTING REPORTS SHALL BE PROVIDED TO AMAFCA FIELD ENGINEER.
8. AMAFCA FIELD ENGINEER WILL BE NOTIFIED 48-HOURS PRIOR TO FINAL INSPECTION OF ANY FACILITIES WITHIN THE AMAFCA R/W.

AMAFCA DATE

DRAWING BY: MP
DATE: 01-18-2001
SHEET # 3 OF 3
JOB # 990050

Exhibit "A"
Page 4 of 4

EXHIBIT A-2

TIERRA WEST, LLC
8509 JEFFERSON NE
ALBUQUERQUE, NEW MEXICO 87113
(505)858-3100

CONTRACT CONTROL FORM

PRELIMINARY REVIEW

Project # 650081
CCN# 200100526
~~Number~~ Ext. # 3010860050

Contact Person Kathy Jaramillo
Phone No. 924-3996

Type of Agreement: Encroachment License agreement

Description/Project Name: Story Rock Unit 1
Public Works Dept./Div.: Design Review
Developer: AMAFCA
Contract Amount $ -0- SIA Contract Period: 2/23/01 - 12/31/2001
Contract Amount $_____ SIA Contract Period:_____ - _____
Contract Amount $_____ S/W Contract Period:_____ - _____

DRAFT CONTRACT:
Rec'd by Legal:_____ Rejected/Returned to Dept.: _____/_____
Returned to Legal: _____/_____ Appproved: _____ Initials:_____

FINANCIAL GUARANTY:
Letter of Credit No.: _____Date:_____ Attached: Yes___ No.___ Initial_____
Other: Type _____ Date:_____ Attached: Yes___ No.___ Initial_____

FINAL CONTRACT REVIEW

APPROVALS REQUIRED:

	Date Delivered	Returned to Dept.	Approved By	Approval Date
Utilitiy Div				
Hydrology Div	02/09/01 VJ	2/09/01	BLB	2/9/01
Transportation Div				
DRC Chairman	02/12/01 JG	2/12/01	JB	2/12/01
Legal Dept	2/12/01 dup	2/2/01	KK	2/21/01 c/f 2/24/01
City Engineer	2/22/01	2/24/01	EA	2/23/01
PWD Director				
Finance				
City Clerk				
CAO				

***

DISTRIBUTION:

	Date:	By:
User Department.	3-26-01	
Vendor		
City Clerk	3/27/01	
Treasury		
Other: _____		

ADDENDUM TO COVER PAGE

02/09/01
(Date)

TO: Kevin Curran, Assistant City Attorney, Legal Department

FROM: Project Administrator, Project Review Sec., PWD

SUBJECT: PROJECT TITLE: Storey Rock, Unit 1 PROJECT # 650081

The attached documents have been review, approved, initialed and/or signed by the DRC Chairman and are submitted for your action as noted.

2/12/01

ITEM	ACTION		
	Review & Approval	Reference	Comments
Procedure "A"	☐☐☐	☐☐	_____
Procedure "B"	☐☐☐	☐☐	_____
Procedure "B" Modified Non Work Order	☐☐☐	☐☐	_____
Procedure "C"	☐☐☐	☐☐	_____
Procedure "C" Modified	☐☐☐	☐☐	_____
Special Agreement	☐☐☐	☐☐	_____
Sidewalk Deferral Agreement	☐☐☐	☐☐	_____
Amendment	☐☐☐	☐☐	_____
Assignment	☐☐☐	☐☐	_____
Financial Guarantee	☐☐☐	☐☐	_____
Construction Paperwork:			
Contractors Proposal	☐☐☐	☐☐	_____
Performance/Warranty Bonds	☐☐☐	☐☐	_____
Labor/Material Bonds	☐☐☐	☐☐	_____
Certificate of Insurance	☐☐☐	☐☐	_____
Engineers Cost Estimate	☐☐☐	☐☐	_____
Extension	☐☐☐	☐☐	_____
Release/Agreement	☐☐☐	☐☐	_____
Release/Financial Guarantee	☐☐☐	☐☐	_____
Calling Notice	☐☐☐	☐☐	_____
Letter of Commitment	☐☐☐	☐☐	_____
Reduction Letter	☐☐☐	☐☐	_____
License Agreement	☐☐☐	☐☐	_____
Monitoring Well Permit	☐☐☐	☐☐	_____
Agreement & Covenant	☐☐☐	☐☐	_____
Drainage Covenant	☐☐☐	☐☐	_____
Revocable Permit	☐☐☐	☐☐	_____
Encroachment	☐☐☐	☐☐	_____
Permanent Easement	☐☐☐	☐☐	_____
Temporary Easement	☐☐☐	☐☐	_____

Other:

_____

_____

_____ ***

Please Call Kathy at 3996 if you have any questions regarding the above or when the documents are ready to be picked up.

No. of Attachments (1)