

T1 Ranch-Fort Apache Storm Drain Project
 T2 Main Storm Drain - Mannings's N = 0.013
 T3 By FKR, 4/23/2013 Checked By JSD, 4/28/2013

SO	800.0002588.104	1				2591.784		
R	911.1702590.528	1	.015				.000	
R	1012.1902592.730	1	.015				.000	
TS	1018.9402592.860	12	.015				.000	
JX	1018.9502592.870	12 10	.015	6.000		2593.870	80.0	.000
TS	1062.1602593.770	3	.015				.000	
JX	1465.0002602.180	3 6	.015	5.000		2603.170	80.0	.000
R	1850.0002610.200	3	.015				.000	
R	2059.3632613.390	3	.015				.000	.000 0
R	2216.3622615.790	3	.015				89.954	.000 0
R	2250.0002616.300	3	.015				.000	.000 0
R	2612.5732621.190	3	.015				.000	.000 0
R	2682.1602622.130	3	.015				39.870	.000 0
R	2751.7502623.070	3	.015				-39.870	.000 0
R	2770.0002623.360	3	.015				.000	.000 0
JX	2778.9302623.500	3 4	.015	70.000		2624.000	-45.0	.000
R	2830.0002624.300	3	.015				.000	.000 0
JX	2846.9402624.570	3 10	.015	25.000		2625.070	-63.0	.000
R	3218.4002630.400	3	.015				.000	.000 0
R	3251.9002631.070	3	.015				-19.193	.000 0
R	3286.3202631.760	3	.015				19.721	.000 0
R	3400.0002634.030	3	.015				.000	
JX	3440.0002634.830	3 5	.015	210.000		2634.830	-30.0	.000
R	3455.4902635.140	3	.015				.000	
R	3499.2802636.020	3	.015				8.364	
R	3544.8302636.400	3	.015				-8.718	
JX	3544.9302636.400	3 9	.015	6.000		2636.900	-80.0	.000
R	3600.0002636.860	3	.015				.000	
R	4000.0002640.180	3	.015				.000	
R	4400.0002643.500	3	.015				.000	
R	4803.8502646.850	3	.015				.000	
JX	4806.7802646.890	3 7	.015	123.000		2647.390	-64.0	.000
R	5470.0002655.420	3	.015				.000	
JX	5486.7002655.630	3 6	.015	26.000		2656.130	-45.0	
R	5578.2502656.810	3	.015				.000	.000 0
R	5994.1802660.970	3	.015				.000	.000 0
R	6064.3002661.660	3	.015				-25.611	.000 0
JX	6064.4002661.670	3 11	.015	185.000		2661.670	6.0	
R	6064.5002661.680	8	.015				.000	.000 0
R	6080.9602661.840	8	.015				-6.140	.000 0
R	6135.1302663.140	8	.015				-23.997	.000 0
R	6234.9902665.540	8	.015				-33.124	.000 0
R	6400.0002669.500	8	.015				.000	.000 0
SH	6400.0002669.500	8				2674.250		
CD	1 2 0	.000	7.000	14.000	.000	.000	.000	.00
CD	2 2 0	.000	7.000	12.000	.000	.000	.000	.00
CD	3 3 0	.000	6.000	12.000	.000	.000	.000	.00
CD	4 4 1	.000	3.000	.000	.000	.000	.000	.00
CD	5 3 0	.000	4.000	4.000	.000	.000	.000	.00
CD	6 4 1	.000	2.500	.000	.000	.000	.000	.00
CD	7 4 1	.000	4.000	.000	.000	.000	.000	.00
CD	8 3 0	.000	6.000	7.000	.000	.000	.000	.00
CD	9 4 1	.000	2.000	.000	.000	.000	.000	.00
CD	10 4 1	.000	1.500	.000	.000	.000	.000	.00
CD	11 3 0	.000	5.000	5.000	.000	.000	.000	.00
CD	12 2 0	.000	6.870	13.730	.000	.000	.000	.00
Q	815.000	.0						

Program Package Serial Number: 1455

WATER SURFACE PROFILE LISTING

Date: 4-29-2013 Time: 2:25:33

Ranch-Fort Apache Storm Drain Project

Main Storm Drain - Mannings's N = 0.015

By FKR, 4/23/2013 Checked By JSD, 4/28/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	Base Wt I.D.	ZL	No Prs/Pip	Wth
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type	Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
800.000	2588.104	3.873	2591.977	1471.00	27.13	11.43	2603.40	.00	7.00	14.00	7.000	14.000	.00	0	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
111.170	.0218					.0223	2.47	3.87	2.43	3.90	.015	.00	.00	RECTANG	
911.170	2590.528	3.863	2594.391	1471.00	27.20	11.49	2605.88	.00	7.00	14.00	7.000	14.000	.00	0	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
101.020	.0218					.0225	2.27	3.86	2.44	3.90	.015	.00	.00	RECTANG	
1012.190	2592.730	3.849	2596.579	1471.00	27.30	11.57	2608.15	.00	7.00	14.00	7.000	14.000	.00	0	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
TRANS STR	.0193					.0224	.15	3.85	2.45		.015	.00	.00	RECTANG	
1018.940	2592.860	3.934	2596.794	1471.00	27.23	11.51	2608.31	.00	7.09	13.73	6.870	13.730	.00	0	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
JUNCT STR	1.0000					.0225	.00	3.93	2.42		.015	.00	.00	RECTANG	
1018.950	2592.870	3.899	2596.769	1465.00	27.37	11.63	2608.40	.00	7.07	13.73	6.870	13.730	.00	0	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
TRANS STR	.0208					.0215	.93	3.90	2.44		.015	.00	.00	RECTANG	
1062.160	2593.770	4.578	2598.348	1465.00	26.67	11.04	2609.39	.00	6.00	12.00	6.000	12.000	.00	0	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
JUNCT STR	.0209					.0197	7.95	4.58	2.20		.015	.00	.00	BOX	
1465.000	2602.180	4.665	2606.845	1460.00	26.08	10.56	2617.41	.00	6.00	12.00	6.000	12.000	.00	0	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
8.753	.0208					.0191	.17	4.66	2.13	4.52	.015	.00	.00	BOX	
1473.753	2602.362	4.669	2607.031	1460.00	26.06	10.54	2617.58	.00	6.00	12.00	6.000	12.000	.00	0	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
252.008	.0208					.0179	4.52	4.67	2.13	4.52	.015	.00	.00	BOX	
1725.761	2607.612	4.897	2612.509	1460.00	24.85	9.59	2622.09	.00	6.00	12.00	6.000	12.000	.00	0	.0
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
124.239	.0208					.0157	1.96	4.90	1.98	4.52	.015	.00	.00	BOX	

WATER SURFACE PROFILE LISTING

Date: 4-29-2013 Time: 2:25:33

Ranch-Fort Apache Storm Drain Project

Main Storm Drain - Mannings's $N = 0.015$

By FKR, 4/23/2013 Checked By JSD, 4/28/2013

[illegible]

WATER SURFACE PROFILE LISTING

Date: 4-29-2013 Time: 2:25:33

Ranch-Fort Apache Storm Drain Project

Main Storm Drain - Mannings's N = 0.015

By FKR, 4/23/2013 Checked By JSD, 4/28/2013

Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	Base Wt/ I.D.	ZL	No Wth Prs/Pip
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****
2770.000	2623.360	5.654	2629.014	1460.00	21.52	7.19	2636.20	.00	6.00	12.00	6.000	12.000	.00	0 .0
JUNCT STR	.0157					.0129	.11	5.65	1.59		.015	.00	.00	BOX
----- WARNING - Flow depth near top of box conduit -----														
2778.930	2623.500	4.996	2628.496	1390.00	23.19	8.35	2636.84	.00	6.00	12.00	6.000	12.000	.00	0 .0
51.070	.0157					.0143	.73	5.00	1.83	4.84	.015	.00	.00	BOX
2830.000	2624.300	5.027	2629.327	1390.00	23.04	8.25	2637.57	.00	6.00	12.00	6.000	12.000	.00	0 .0
JUNCT STR	.0159					.0147	.25	5.03	1.81		.015	.00	.00	BOX
2846.940	2624.570	4.818	2629.388	1365.00	23.61	8.65	2638.04	.00	6.00	12.00	6.000	12.000	.00	0 .0
371.460	.0157					.0147	5.45	4.82	1.90	4.78	.015	.00	.00	BOX
3218.400	2630.400	4.973	2635.373	1365.00	22.87	8.12	2643.50	6.00	6.00	12.00	6.000	12.000	.00	0 .0
33.500	.0200					.0137	.46	6.00	1.81	4.37	.015	.00	.00	BOX
3251.900	2631.070	5.070	2636.140	1365.00	22.43	7.82	2643.96	6.00	6.00	12.00	6.000	12.000	.00	0 .0
34.420	.0200					.0129	.44	6.00	1.76	4.37	.015	.00	.00	BOX
3286.320	2631.760	5.195	2636.955	1365.00	21.90	7.44	2644.40	.00	6.00	12.00	6.000	12.000	.00	0 .0
1.303	.0200					.0125	.02	5.19	1.69	4.38	.015	.00	.00	BOX

WATER SURFACE PROFILE LISTING

Date: 4-29-2013 Time: 2:25:33

Ranch-Fort Apache Storm Drain Project

Main Storm Drain - Mannings's $N = 0.015$

By FKR, 4/23/2013 Checked By JSD, 4/28/2013

*****															*****	
Station	Invert Elev	Depth (FT)	Water Elev	Q (CFS)	Vel (FPS)	Vel Head	Energy Grd.El.	Super Elev	Critical Depth	Flow Top Width	Height/Dia.-FT	Base Wt./or I.D.	ZL	No Wth Prs/Pip		
L/Elem	Ch Slope					SF Ave	HF	SE Dpth	Froude N	Norm Dp	"N"	X-Fall	ZR	Type Ch		
*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****	*****		
3287.623	2631.786	5.200	2636.986	1365.00	21.88	7.43	2644.42	.00	6.00	12.00	6.000	12.000	.00	0 .0		
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
50.928	.0200					.0117	.60	5.20	1.69	4.38	.015	.00	.00	BOX		
3338.552	2632.803	5.454	2638.257	1365.00	20.86	6.76	2645.01	.00	6.00	12.00	6.000	12.000	.00	0 .0		
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
35.901	.0200					.0103	.37	5.45	1.57	4.38	.015	.00	.00	BOX		
----- WARNING - Flow depth near top of box conduit -----																
3374.452	2633.520	5.720	2639.240	1365.00	19.89	6.14	2645.38	.00	6.00	12.00	6.000	12.000	.00	0 .0		
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
25.548	.0200					.0121	.31	5.72	1.47	4.38	.015	.00	.00	BOX		
----- WARNING - Flow depth near top of box conduit -----																
3400.000	2634.030	6.000	2640.030	1365.00	18.96	5.58	2645.61	.00	6.00	12.00	6.000	12.000	.00	0 .0		
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
JUNCT STR	.0200					.0104	.42	6.00	1.36		.015	.00	.00	BOX		
3440.000	2634.830	7.839	2642.669	1155.00	16.04	4.00	2646.67	.00	6.00	12.00	6.000	12.000	.00	0 .0		
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
15.490	.0200					.0104	.16	7.84	1.15	3.88	.015	.00	.00	BOX		
3455.490	2635.140	7.691	2642.831	1155.00	16.04	4.00	2646.83	.00	6.00	12.00	6.000	12.000	.00	0 .0		
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
43.790	.0201					.0104	.46	.00	1.15	3.87	.015	.00	.00	BOX		
3499.280	2636.020	7.510	2643.530	1155.00	16.04	4.00	2647.53	.00	6.00	12.00	6.000	12.000	.00	0 .0		
- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -		
45.550	.0083					.0104	.47	.00	1.15	5.33	.015	.00	.00	BOX		

Program Package Serial Number: 1455

WATER SURFACE PROFILE LISTING

Date: 4-29-2013 Time: 2:25:33

Ranch-Fort Apache Storm Drain Project

Main Storm Drain - Mannings's N = 0.015

By FKR, 4/23/2013 Checked By JSD, 4/28/2013

```

*****
Station | Invert | Depth | Water | Q | Vel | Vel | Energy | Super | Critical | Flow Top | Height/ | Base Wt | | No Wth
      | Elev  | (FT)  | Elev  | (CFS) | (FPS) | Head | Grd.El. | Elev | Depth | Width | Dia.-FT | or I.D. | ZL | Prs/Pip
L/Elem | Ch Slope | | | | | SF Ave | HF | SE Dpth | Froude N | Norm Dp | "N" | X-Fall | ZR | Type Ch
*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****|*****
3544.830 | 2636.400 | 7.853 | 2644.252 | 1155.00 | 16.04 | 4.00 | 2648.25 | .00 | 6.00 | 12.00 | 6.000 | 12.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
JUNCT STR .0000 | | | | | .0103 | .00 | 7.85 | 1.15 | | .015 | .00 | .00 | BOX
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
3544.930 | 2636.400 | 7.936 | 2644.335 | 1149.00 | 15.96 | 3.95 | 2648.29 | .00 | 6.00 | 12.00 | 6.000 | 12.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
55.070 | .0084 | | | | .0103 | .57 | 7.94 | 1.15 | 5.30 | .015 | .00 | .00 | BOX
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
3600.000 | 2636.860 | 8.042 | 2644.903 | 1149.00 | 15.96 | 3.95 | 2648.86 | .00 | 6.00 | 12.00 | 6.000 | 12.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
400.000 | .0083 | | | | .0103 | 4.12 | 8.04 | 1.15 | 5.32 | .015 | .00 | .00 | BOX
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
4000.000 | 2640.180 | 8.842 | 2649.022 | 1149.00 | 15.96 | 3.95 | 2652.98 | .00 | 6.00 | 12.00 | 6.000 | 12.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
400.000 | .0083 | | | | .0103 | 4.12 | 8.84 | 1.15 | 5.32 | .015 | .00 | .00 | BOX
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
4400.000 | 2643.500 | 9.641 | 2653.141 | 1149.00 | 15.96 | 3.95 | 2657.10 | .00 | 6.00 | 12.00 | 6.000 | 12.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
403.850 | .0083 | | | | .0103 | 4.16 | 9.64 | 1.15 | 5.32 | .015 | .00 | .00 | BOX
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
4803.850 | 2646.850 | 10.450 | 2657.300 | 1149.00 | 15.96 | 3.95 | 2661.25 | .00 | 6.00 | 12.00 | 6.000 | 12.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
JUNCT STR .0136 | | | | | .0082 | .02 | 10.45 | 1.15 | | .015 | .00 | .00 | BOX
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
4806.780 | 2646.890 | 11.812 | 2658.702 | 1026.00 | 14.25 | 3.15 | 2661.85 | .00 | 6.00 | 12.00 | 6.000 | 12.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
663.220 | .0129 | | | | .0082 | 5.45 | 11.81 | 1.03 | 4.17 | .015 | .00 | .00 | BOX
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
5470.000 | 2655.420 | 8.728 | 2664.148 | 1026.00 | 14.25 | 3.15 | 2667.30 | .00 | 6.00 | 12.00 | 6.000 | 12.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
JUNCT STR .0126 | | | | | .0078 | .13 | 8.73 | 1.03 | | .015 | .00 | .00 | BOX
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
5486.700 | 2655.630 | 8.925 | 2664.555 | 1000.00 | 13.89 | 3.00 | 2667.55 | .00 | 6.00 | 12.00 | 6.000 | 12.000 | .00 | 0 .0
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -
91.550 | .0129 | | | | .0078 | .71 | 8.93 | 1.00 | 4.09 | .015 | .00 | .00 | BOX
      | - | - | - | - | - | - | - | - | - | - | - | - | - | - | -

```

WATER SURFACE PROFILE LISTING

Date: 4-29-2013 Time: 2:25:33

Ranch-Fort Apache Storm Drain Project

Main Storm Drain - Mannings's $N = 0.015$

By FKR, 4/23/2013 Checked By JSD, 4/28/2013

[illegible]