

# Bohannon Huston

Courtyard I  
7500 Jefferson St. NE  
Albuquerque, NM  
87109-4335

[www.bhinc.com](http://www.bhinc.com)

April 30, 2012

voice: 505.823.1000  
facsimile: 505.798.7988  
toll free: 800.877.5332

Curtis Cherne, P. E.  
Hydrology Section  
City of Albuquerque  
P. O. Box 1293  
Albuquerque, NM 87103

Re: Cantata at the Trails, DRB 1002962 (C-09/D001B)

Dear Curtis:

This letter is an addendum to the approved drainage report for Cantata at the Trails, dated 8/22/07. The purpose of this addendum is to remove Sump Inlet 8 (and corresponding storm drain), at the intersection of Streets #4 and #10, as shown on the attached drainage basin map. This inlet is being removed because Street 10 has capacity to carry the 14.92 cfs at Sump Inlet 8, plus the 4.51 cfs from Basin 3A1, to Sump Inlet 12 at the intersection of Streets #2 and #10. In addition, Inlet 12 has the capacity to pass 21.2 cfs (14.92 cfs from Inlet 8 and 6.3 cfs from Inlet 12).

The carrying capacity of Street #10 is limited by the 20' wide street section at the southeast corner of the Pool/Clubhouse area. This section has a capacity of approximately 25 cfs, which is greater than the combined flow at Sump Inlet 8 and from Basin 3A1. See the attached street capacity calculation.

Also attached for your information are the following: 1) a summary of the Basin flows at Sump Inlet 8 and Sump Inlet 12, and 2) Inlet capacity calculation for the double D inlet at the intersection of Streets #2 and #10.

This addendum shows that Street 10 can safely convey flows to Sump Inlet 12 and that Sump Inlet 12 has the capacity to accept these additional flows. Therefore, Sump Inlet 8 and the 24-inch storm drain between inlets 12 and 8 are not required for the site to drain.

If you have any questions or require further information, please feel free to contact me.

Sincerely,



Scott J. Steffen, P.E.  
Vice President  
Community Development and Planning Group



Enclosures

Engineering ▲

Spatial Data ▲

Advanced Technologies ▲

<b>Cantata at the Trails</b>				
<b>Sump Inlet Summary</b>				
<b>BASIN ID</b>	<b>Q(100) (cfs)</b>	<b>Flow Intercepted by Inlet (cfs)</b>	<b>Bypass Flow to Sump Inlet 8 (cfs)</b>	<b>Bypass Flow to Sump Inlet 12 (cfs)</b>
<b>B1A</b>	<b>1.94</b>		<b>1.94</b>	
<b>B1B</b>	<b>4.57</b>		<b>4.57</b>	
<b>B1C</b>	<b>2.84</b>		<b>2.84</b>	
<b>B1D</b>	<b>1.23</b>		<b>1.23</b>	
<b>B1E</b>	<b>1.69</b>		<b>1.69</b>	
<b>B1G</b>	<b>2.00</b>		<b>2.00</b>	
<b>B1E1</b>	<b>4.21</b>	<b>3.80</b>	<b>0.41</b>	
<b>B1F</b>	<b>2.93</b>	<b>2.70</b>	<b>0.23</b>	
<b>Subtotal</b>			<b>14.92</b>	
<b>B3A1</b>	<b>4.51</b>			<b>4.51</b>
<b>B3A2</b>	<b>1.09</b>			<b>1.09</b>
<b>B3B+B3D</b>	<b>7.08</b>	<b>6.40</b>		<b>0.68</b>
<b>Subtotal</b>				<b>6.28</b>
<b>Total @ Sump Inlet 12</b>				<b>21.20</b>

20ft inverted crown 1% slope

MANNING'S N = 0.016 SLOPE = 0.011

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.8	4.0	10.0	0.0	7.0	20.0	0.8
2.0	0.1	0.3	5.0	11.0	0.1			
3.0	9.0	0.1	6.0	19.9	0.3			

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	TOTAL
FT.	INC	AREA	RATE	PER	VEL	PLUS	ENERGY
		SQ. FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS	(FT)
0.050	0.050	0.040	0.033	1.603	0.816	1.600	0.060
0.100	0.100	0.190	0.211	4.815	1.109	4.811	0.119
0.150	0.150	0.524	0.779	8.564	1.486	8.558	0.184
0.200	0.200	1.046	1.933	12.313	1.848	12.305	0.253
0.250	0.250	1.755	3.835	16.062	2.185	16.053	0.324
0.300	0.300	2.651	6.633	19.810	2.502	19.800	0.397
0.350	0.350	3.642	11.220	19.912	3.081	19.820	0.498
0.400	0.400	4.633	16.703	20.014	3.605	19.840	0.602
0.450	0.450	5.626	23.005	20.116	4.089	19.860	0.710
0.500	0.500	6.619	30.066	20.218	4.542	19.880	0.821
0.550	0.550	7.614	37.838	20.320	4.970	19.900	0.934
0.600	0.600	8.609	46.284	20.422	5.376	19.920	1.050
0.650	0.650	9.606	55.368	20.524	5.764	19.940	1.167
0.700	0.700	10.603	65.064	20.626	6.136	19.960	1.286
0.750	0.750	11.602	75.345	20.728	6.494	19.980	1.406

← STREET 10  
CAPACITY

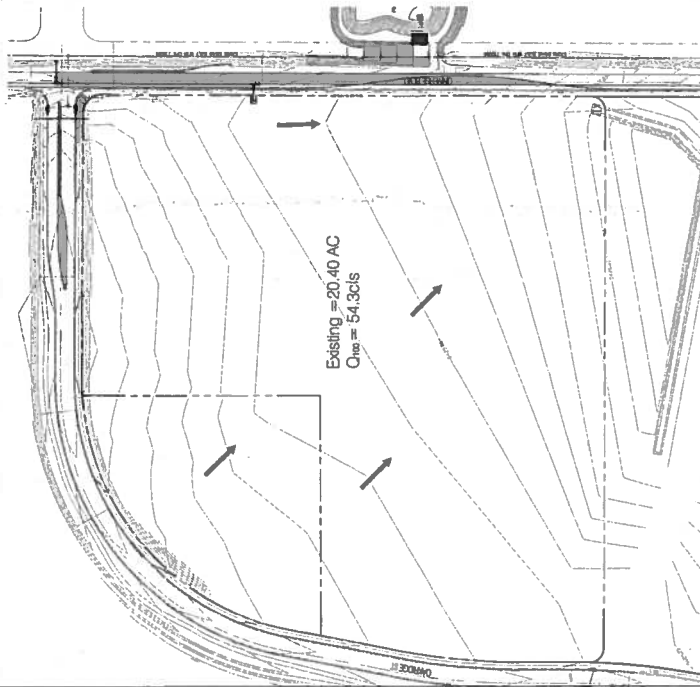
Double D inlet, in sump condition with short edges adjoined:

Open Area (for orifice calc in sq. ft.): 7.7977431

Length of Weir (feet): 13.645833

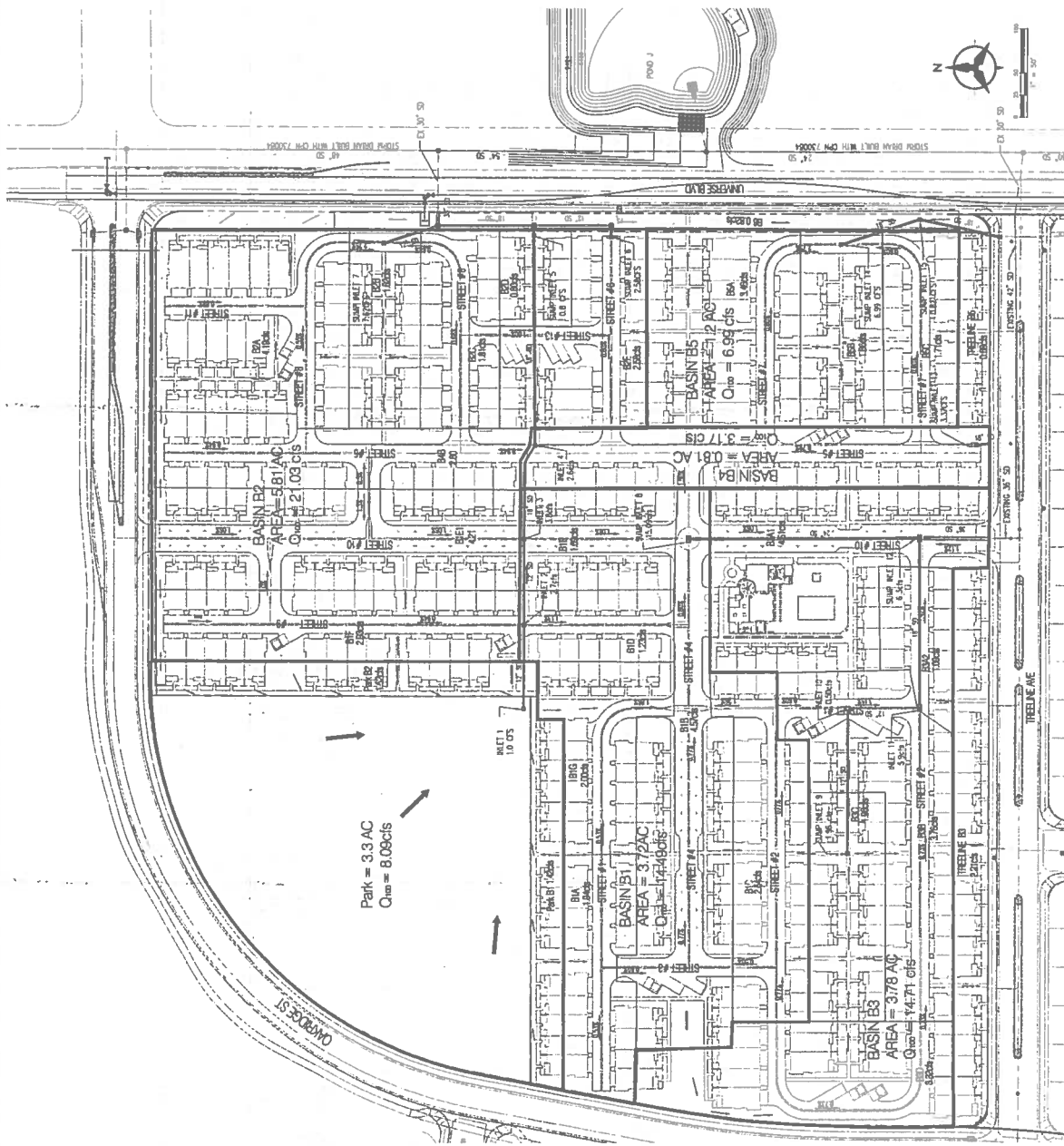
Head (ft)	Head (in)	Weir Q (cfs)	Orifice Q (cfs)	Control Q (cfs)
0.05	0.6	0.41	8.40	0.41
0.1	1.2	1.16	11.87	1.16
0.15	1.8	2.12	14.54	2.12
0.2	2.4	3.27	16.79	3.27
0.25	3	4.57	18.77	4.57
0.3	3.6	6.01	20.56	6.01
0.35	4.2	7.57	22.21	7.57
0.4	4.8	9.25	23.75	9.25
0.45	5.4	11.04	25.19	11.04
0.5	6	12.93	26.55	12.93
0.55	6.6	14.92	27.84	14.92
0.6	7.2	17.00	29.08	17.00
0.65	7.8	19.16	30.27	19.16
0.7	8.4	21.42	31.41	21.42
0.75	9	23.75	32.52	23.75
0.8	9.6	26.17	33.58	26.17
0.85	10.2	28.66	34.62	28.66
0.9	10.8	31.22	35.62	31.22
0.95	11.4	33.86	36.60	33.86
1	12	36.57	37.55	36.57
1.05	12.6	39.35	38.47	38.47
1.1	13.2	42.19	39.38	39.38
1.15	13.8	45.10	40.26	40.26
1.2	14.4	48.07	41.13	41.13
0.365	4.38	8.06	22.68	8.06

← MAX HEAD @  
SUMP INLET 12



### EXISTING CONDITIONS

Cantata at the Trails									
Existing Conditions Data Table									
Basin ID	Area (sq ft)	Area (ac)	Land Treatment Percentage	A	B	C	D	Q (MG)	V (MG)
Existing	100000	2.28	8.4%	33.0%	18.0%	0.0%	0.0%	2.46	94.38
Existing	100000	2.28	8.4%	33.0%	18.0%	0.0%	0.0%	2.46	94.38
Existing	100000	2.28	8.4%	33.0%	18.0%	0.0%	0.0%	2.46	94.38



SEE APPENDIX A FOR BASIN CALCULATIONS

## BASIN MAP FOR SUBDIVISION AND BUILDING PERMIT **CANTATA AT THE TRAILS**

Prepared for:  
CANTATA AT THE TRAILS INC.  
7007 Jefferson St. NE  
Suite A  
Albuquerque, NM 87109  
8/22/07

**Botanman & Huston**  
Completed: 7007 Jefferson St. NE, Albuquerque, NM 87109-2009  
ENGINEERING • SURVEILLANCE • DESIGN • CONSTRUCTION

May 16, 2012

Curtis Cherne, P. E.  
Hydrology Section  
City of Albuquerque  
P. O. Box 1293  
Albuquerque, NM 87103

*Analysis for removal of inlet  
for CO, interim condition with  
SD of this location not built.*

Re: Cantata at the Trails, DRB 1002962 (C-09/D001B)

Dear Curtis:

This letter provides additional information to the original addendum, dated 4/30/12, for the approved Cantata at the Trails drainage report, dated 8/22/07. The purpose of the original addendum was to show that the removal of Sump Inlet 8 (and corresponding storm drain), at the intersection of Streets #4 and #10, as shown on the drainage basin map from the 8/22/07 drainage report, was valid. The analysis provided looked at the fully developed condition and showed that the inlet was not needed. The conclusions of the original addendum are still valid. This letter looks at the interim condition in response to your letter dated 5/14/12.

There is additional flow getting to Street 10 and Sump Inlet 12 from Basins B1F and B1E1 in the interim condition because the inlets at the south end of these basins have not been constructed at this time. The flow reaching the intersection of Streets #4 and #10 in the interim condition is 19.6 cfs. Street 10 has capacity to carry the 19.6 cfs at the intersection of Streets #4 and #10, plus the 4.5 cfs from Basin 3A1, to Sump Inlet 12 at the intersection of Streets #2 and #10. In addition, Inlet 12 has the capacity to pass 25.9 cfs (19.6 cfs from Inlet 8 and 6.3 cfs from Inlet 12) in the interim condition.

The carrying capacity of Street #10 is limited by the 20' wide street section at the southeast corner of the Pool/Clubhouse area. This section has a capacity of approximately 28 cfs, which is greater than the combined flow (24.1 cfs) at the intersection of Streets #4 and #10 and from Basin 3A1 in the interim condition. See the attached street capacity calculation.

In addition, we looked at the "park" area (Cantata Tract A) in the interim condition. Tract A was supposed to be a park that detained flow and discharged to the Cantata Tract B storm drain at 1 cfs in the approved Cantata drainage report. Since that time the zoning for Tract A has changed to allow for apartments to be developed on the 3.2 acre tract. Currently, Tract A is lower than Tract B based on a topographic survey provided by SurvTek dated 5/15/12, creating a pond that holds runoff in the interim condition. The volume of the "pond" is 2.4 acre-feet which is 8 times the 100-year, 24-hour runoff volume of 0.3 acre-feet from Basins Park B1, Park B2 and Park in the interim condition.

Engineering ▲

Spatial Data ▲

Advanced Technologies ▲

Curtis Cherne, P.E.  
Planning Department  
May 16, 2011  
Page 2

Therefore, flow from Tract A does not impact the hydraulic analysis for Street #10 or Sump Inlet 12.

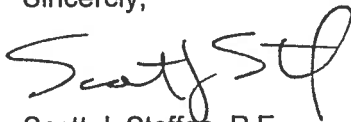
At this time there is not an approved grading and drainage plan that allows the development of Tract A based on the current zoning. Until a plan is approved Tract A will continue to retain flows from Basins Park B1, Park B2 and Park. Once the Cantata Tract B storm drain that drains to Universe Boulevard is built the maximum discharge allowed from Tract A will be 1 cfs per the approved Cantata drainage plan. However, the existing low point on Tract A does not correspond to the storm drain inlet so it is likely that Tract A will retain runoff until such time that it is developed per a future grading and drainage plan. Therefore, runoff from Cantata Tract A does not impact the Cantata Tract B development in interim condition.

Also attached for your information are the following: 1) a summary of the Basin flows at Sump Inlet 8 and Sump Inlet 12, 2) Inlet capacity calculation for the double D inlet at the intersection of Streets #2 and #10, 3) existing topography for Tract A, and 4) Tract A volume calculation based on existing topography.

This addendum shows that in the interim condition Street 10 can safely convey flows to Sump Inlet 12 and that Sump Inlet 12 has the capacity to accept the interim flows.

If you have any questions or require further information, please feel free to contact me.

Sincerely,



Scott J. Steffen, P.E.  
Vice President  
Community Development and Planning Group



Enclosures

<b>Cantata at the Trails</b>				
<b>Sump Inlet Summary</b>				
<b>BASIN</b>	<b>Q(100)</b>	<b>Flow</b>	<b>Bypass Flow to</b>	<b>Bypass Flow to</b>
<b>ID</b>	<b>(cfs)</b>	<b>Intercepted by</b>	<b>Sump Inlet 8</b>	<b>Sump Inlet 12</b>
		<b>Inlet</b>	<b>(cfs)</b>	<b>(cfs)</b>
		<b>(cfs)</b>		
<b>B1A</b>	<b>1.94</b>		<b>1.94</b>	
<b>B1B</b>	<b>4.57</b>		<b>4.57</b>	
<b>B1C</b>	<b>2.84</b>		<b>2.84</b>	
<b>B1D</b>	<b>1.23</b>		<b>1.23</b>	
<b>B1E</b>	<b>1.69</b>		<b>1.69</b>	
<b>B1G</b>	<b>2.00</b>		<b>2.00</b>	
<b>B1E1</b>	<b>3.10</b>		<b>3.10</b>	
<b>B1F</b>	<b>2.20</b>		<b>2.20</b>	
<b>Subtotal</b>			<b>19.58</b>	
<b>B3A1</b>	<b>4.51</b>			<b>4.51</b>
<b>B3A2</b>	<b>1.09</b>			<b>1.09</b>
<b>B3B+B3D</b>	<b>7.08</b>	<b>6.40</b>		<b>0.68</b>
<b>Subtotal</b>				<b>6.28</b>
<b>Total @ Sump Inlet 12</b>				<b>25.86</b>



20ft inverted crown 1% slope

MANNING'S N = 0.016 SLOPE = 0.011

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.8	4.0	10.0	0.0	7.0	20.0	0.8
2.0	0.1	0.3	5.0	11.0	0.1			
3.0	9.0	0.1	6.0	19.9	0.3			

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	TOTAL
FT.	INC	AREA	RATE	PER	VEL	PLUS	ENERGY
		SQ.FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS	(FT)
0.050	0.050	0.040	0.033	1.603	0.816	1.600	0.060
0.100	0.100	0.190	0.211	4.815	1.109	4.811	0.119
0.150	0.150	0.524	0.779	8.564	1.486	8.558	0.184
0.200	0.200	1.046	1.933	12.313	1.848	12.305	0.253
0.250	0.250	1.755	3.835	16.062	2.185	16.053	0.324
0.300	0.300	2.651	6.633	19.810	2.502	19.800	0.397
0.350	0.350	3.642	11.220	19.912	3.081	19.820	0.498
0.400	0.400	4.633	16.703	20.014	3.605	19.840	0.602
0.450	0.450	5.626	23.005	20.116	4.089	19.860	0.710
0.500	0.500	6.619	30.066	20.218	4.542	19.880	0.821
0.550	0.550	7.614	37.838	20.320	4.970	19.900	0.934
0.600	0.600	8.609	46.284	20.422	5.376	19.920	1.050
0.650	0.650	9.606	55.368	20.524	5.764	19.940	1.167
0.700	0.700	10.603	65.064	20.626	6.136	19.960	1.286
0.750	0.750	11.602	75.345	20.728	6.494	19.980	1.406

← STREET 10  
CAPACITY

Double D inlet, in sump condition with short edges adjoined:

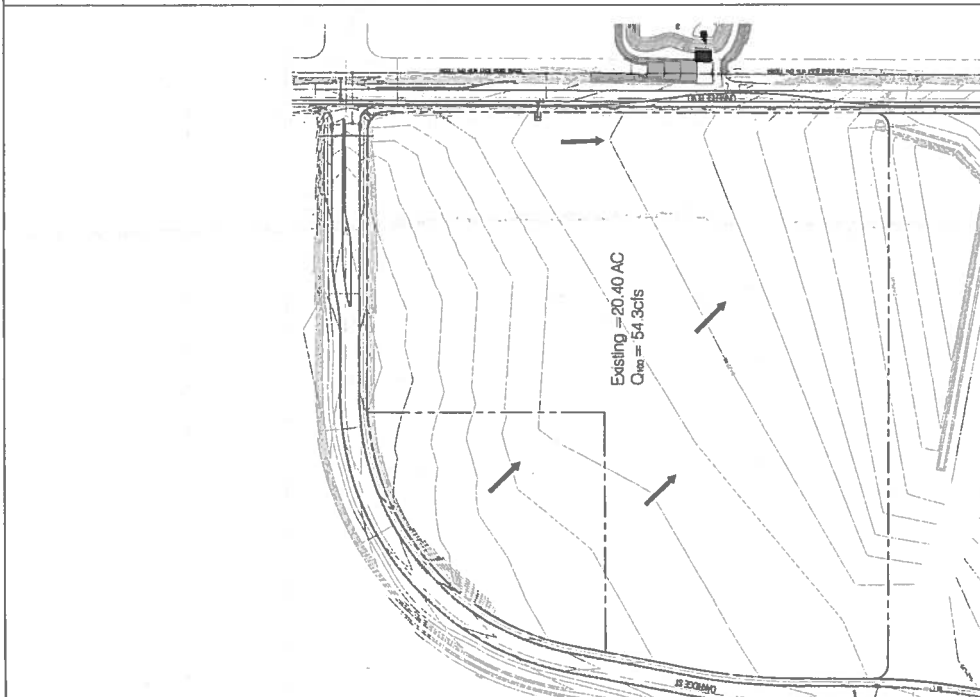
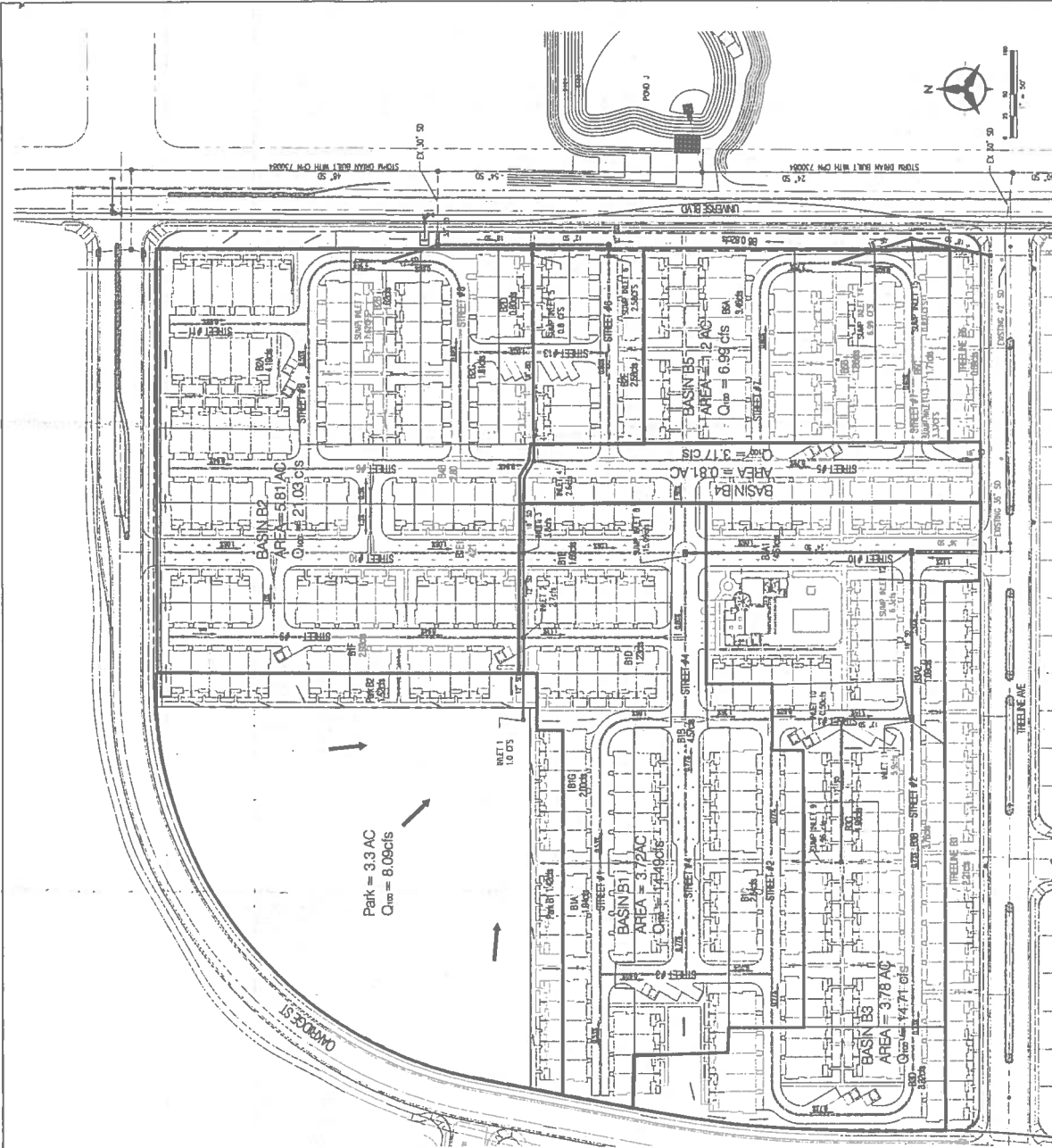
Open Area (for orifice calc in sq. ft.): 7.7977431

Length of Weir (feet): 13.645833

Head (ft)	Head (in)	Weir Q (cfs)	Orifice Q (cfs)	Control Q (cfs)
0.05	0.6	0.41	8.40	0.41
0.1	1.2	1.16	11.87	1.16
0.15	1.8	2.12	14.54	2.12
0.2	2.4	3.27	16.79	3.27
0.25	3	4.57	18.77	4.57
0.3	3.6	6.01	20.56	6.01
0.35	4.2	7.57	22.21	7.57
0.4	4.8	9.25	23.75	9.25
0.45	5.4	11.04	25.19	11.04
0.5	6	12.93	26.55	12.93
0.55	6.6	14.92	27.84	14.92
0.6	7.2	17.00	29.08	17.00
0.65	7.8	19.16	30.27	19.16
0.7	8.4	21.42	31.41	21.42
0.75	9	23.75	32.52	23.75
0.8	9.6	26.17	33.58	26.17
0.85	10.2	28.66	34.62	28.66
0.9	10.8	31.22	35.62	31.22
0.95	11.4	33.86	36.60	33.86
1	12	36.57	37.55	36.57
1.05	12.6	39.35	38.47	38.47
1.1	13.2	42.19	39.38	39.38
1.15	13.8	45.10	40.26	40.26
1.2	14.4	48.07	41.13	41.13
0.365	4.38	8.06	22.68	8.06

← MAX HEAD @  
SUMP INLET 12

Elevation	Tract A interim volume.txt		Acre-Feet	Surface Area
	Incremental Volume	Cumulative Volume		
	cu ft	cu ft		sq ft
5423.0000	67.6507	67.6507	0.0016	589.9768
5423.2000	199.8923	267.5430	0.0061	1475.4207
5423.4000	416.8457	684.3887	0.0157	2758.0305
5423.6000	707.9408	1392.3294	0.0320	4370.5404
5423.8000	1098.0992	2490.4286	0.0572	7229.0531
5424.0000	1900.1031	4390.5317	0.1008	10735.1387
5424.2000	2321.0175	6711.5492	0.1541	12545.3047
5424.4000	2727.2624	9438.8116	0.2167	14802.8723
5424.6000	3531.7659	12970.5775	0.2978	18265.8723
5424.8000	3880.1482	16850.7258	0.3868	20515.2908
5425.0000	4316.5439	21167.2697	0.4859	22618.1636
5425.2000	4714.4653	25881.7349	0.5942	24481.8953
5425.4000	5070.7367	30952.4717	0.7106	26233.5020
5425.6000	5428.9464	36381.4181	0.8352	28166.5703
5425.8000	5912.3768	42293.7949	0.9709	31068.5232
5426.0000	6566.0097	48859.8046	1.1217	34723.5972
5426.2000	7374.4355	56234.2401	1.2910	39137.9353
5426.4000	8391.0297	64625.2698	1.4836	45527.4501
5426.6000	9921.1146	74546.3844	1.7113	55309.5009
5426.8000	13333.5655	87879.9499	2.0174	78393.2710
5427.0000	16140.5302	104020.4801	2.3880	88902.3065
5427.0000	0.0000	104020.4801	2.3880	88902.3061



# EXISTING CONDITIONS

CANTATA									
Existing Conditions Data Table									
Notes: 1. Based on the 2011 Survey. 2. Based on the 2011 Survey. 3. Based on the 2011 Survey. 4. Based on the 2011 Survey. 5. Based on the 2011 Survey. 6. Based on the 2011 Survey. 7. Based on the 2011 Survey. 8. Based on the 2011 Survey. 9. Based on the 2011 Survey. 10. Based on the 2011 Survey.									
Area	Area	Area	Area	Area	Area	Area	Area	Area	Area
(AC)	(AC)	(AC)	(AC)	(AC)	(AC)	(AC)	(AC)	(AC)	(AC)
Area	Area	Area	Area	Area	Area	Area	Area	Area	Area
(AC)	(AC)	(AC)	(AC)	(AC)	(AC)	(AC)	(AC)	(AC)	(AC)
Existing	20.40	3.30	3.72	3.78	5.81	14.46	14.71	21.03	54.30
Cap	54.30	8.09	14.46	14.71	21.03	14.46	14.71	21.03	54.30
Cap	54.30	8.09	14.46	14.71	21.03	14.46	14.71	21.03	54.30
Cap	54.30	8.09	14.46	14.71	21.03	14.46	14.71	21.03	54.30

## BASIN MAP FOR SUBDIVISION AND BUILDING PERMIT **CANTATA AT THE TRAILS**

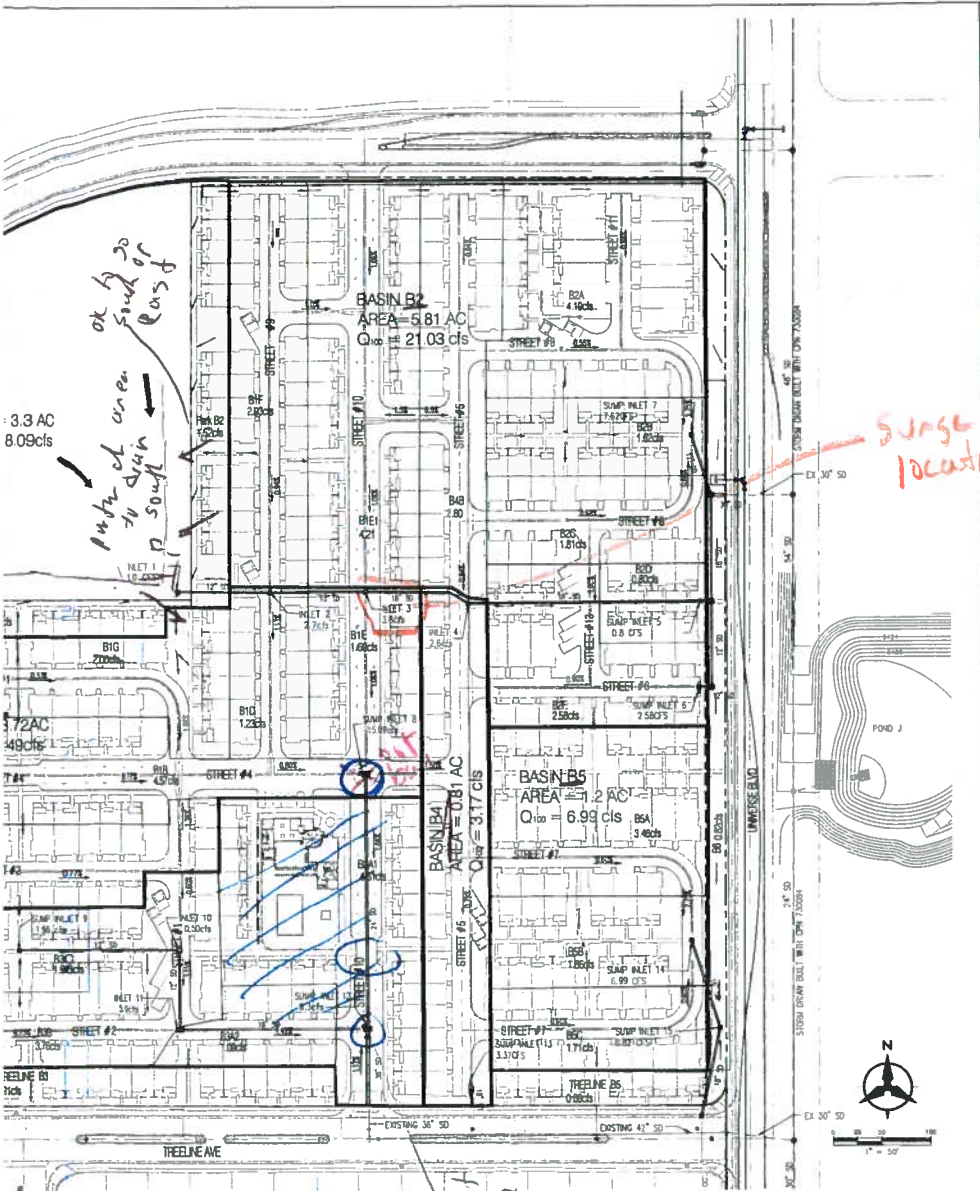
SEE APPENDIX A FOR BASIN CALCULATIONS



Prepared by:  
CANTATA AT THE TRAILS, INC.  
7007 Jefferson St. NE  
Suite A  
Albuquerque, NM 87109  
822207

**Botanman & Huston**  
Engineers & Surveyors  
7007 Jefferson St. NE  
Albuquerque, NM 87109  
822207





**CALCULATIONS**

**BASIN MAP  
FOR SUBDIVISION AND BUILDING PERMIT  
CANTATA AT THE TRAILS**

Prepared for:  
CANTATA AT THE TRAILS INC,  
7007 Jefferson St. NE  
Suite A  
Albuquerque, NM 87109

Prepared by:  
Bohannon & Huston  
7500 Jefferson NE  
Albuquerque, NM 87109  
8/22/07

**Bohannon & Huston**

Copyright © 1990 Jefferson St. NE Albuquerque, NM 87109-4000  
ENGINEERING • SPATIAL DATA • ADVANCED TECHNOLOGIES

October 2, 2012

Curtis Cherne, P. E.  
Hydrology Section  
City of Albuquerque  
P. O. Box 1293  
Albuquerque, NM 87103

Re: Cantata at the Trails, DRB 1002962 (C-09/D001B)

Dear Curtis:

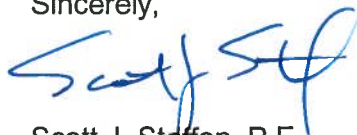
Enclosed for your review is the revised Cantata Tract B grading plan showing the revision to the storm drain serving Cantata Tract A. This revision is pursuant to Item #10 of the Memorandum of Agreement between the City, RCS and The Trails. The purpose of the storm drain revision is to accommodate an increase in developed flows from Tract A due to a zoning change from park to multi-family.

The attached storm drain hydraulic analysis is based on the hydraulic grade line (HGL) elevation in Universe Boulevard where the Cantata storm drain connects to the proposed storm drain in Universe. The HGL elevation was provided by Thompson Engineering Consultants (TEC) and is based on the 100-year, 6-hour analysis performed by TEC for the Universe storm drain. The allowable discharge from Tract A has increased from 1 cfs to 10 cfs based on the revised storm drain design. The 100-year, 6-hour runoff from Tract A is 12.7 cfs  $\frac{3.26}{3.26} \approx 3.9 \text{ cfs}$

The additional 2.7 cfs will need to be accommodated for in the design of Tract A. Depending on the proposed grading plan for Tract A, the flow may be directed to Oakridge Street or Cantata Tract B. The drainage report for Tract A will need to include an analysis of capacity in Oakridge Street (and downstream storm drain) and/or Cantata Tract B to show there is sufficient capacity to accept flow from Tract A. If there is insufficient capacity to accept the flows on-site detention ponding will be required on Tract A.

If you have any questions or require further information, please feel free to contact me.

Sincerely,



Scott J. Steffen, P.E.  
Vice President  
Community Development and Planning Group

RECEIVED  
OCT - 2 2012

Enclosures

cc: Brian Paul, RCS

Engineering ▲

Spatial Data ▲

Advanced Technologies ▲

20ft inverted crown 1% slope

MANNING'S N = 0.016 SLOPE = 0.011

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.8	4.0	10.0	0.0	7.0	20.0	0.8
2.0	0.1	0.3	5.0	11.0	0.1			
3.0	9.0	0.1	6.0	19.9	0.3			

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	TOTAL
FT.	INC	AREA	RATE	PER	VEL	PLUS	ENERGY
		SQ. FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS	(FT)
0.050	0.050	0.040	0.033	1.603	0.816	1.600	0.060
0.100	0.100	0.190	0.211	4.815	1.109	4.811	0.119
0.150	0.150	0.524	0.779	8.564	1.486	8.558	0.184
0.200	0.200	1.046	1.933	12.313	1.848	12.305	0.253
0.250	0.250	1.755	3.835	16.062	2.185	16.053	0.324
0.300	0.300	2.651	6.633	19.810	2.502	19.800	0.397
0.350	0.350	3.642	11.220	19.912	3.081	19.820	0.498
0.400	0.400	4.633	16.703	20.014	3.605	19.840	0.602
0.450	0.450	5.626	23.005	20.116	4.089	19.860	0.710
0.500	0.500	6.619	30.066	20.218	4.542	19.880	0.821
0.550	0.550	7.614	37.838	20.320	4.970	19.900	0.934
0.600	0.600	8.609	46.284	20.422	5.376	19.920	1.050
0.650	0.650	9.606	55.368	20.524	5.764	19.940	1.167
0.700	0.700	10.603	65.064	20.626	6.136	19.960	1.286
0.750	0.750	11.602	75.345	20.728	6.494	19.980	1.406

at narrow x-section  
south of clubhouse  
STREET 10  
CAPACITY



Revised SD HGL 10 cfs.txt

# InRoads Storm & Sanitary Design Log

Drainage File: P:\20110305\CDP\Control\Data\utility\20110305 SD Upsize.sdb

Design File: P:\20110305\CDP\DESIGN\WORKAREA\20110305\_REV SD.DWG

Display Log: P:\20110305\CDP\DESIGN\WORKAREA\design.log

Date: Tuesday, October 02, 2012 9:27:47 AM

HGL/EGL Computations:

Table A:

Struct_ID	D (in)	Q (cfs)	L (ft)	V (ft/s)	d (ft)	dc (ft)	Vv2/2g (ft)	Sf (ft/ft)	Dn_softfit (ft)	EGLdn (ft)	HGLdn (ft)	Tot_Loss (ft)	EGLup (ft)	HGLup (ft)	Rim_Elev. (ft)
Outfall1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP18	30	30.18	84.37	6.15	-	-	0.59	0.0054	5417.22	5420.48	5419.89	0.46	5420.93	5420.35	5425.47
SDMH1	-	-	-	-	-	-	-	-	-	5420.93	5420.35	0.35	5421.28	5420.70	5425.47
SDP9	30	22.56	108.94	4.60	-	-	0.33	0.0030	5419.41	5421.28	5420.70	0.33	5421.61	5421.29	5425.47
SDMH4	-	-	-	-	-	-	-	-	-	5421.61	5421.29	0.20	5421.81	5421.48	5425.62
SDP5	24	20.40	59.74	6.49	-	-	0.66	0.0081	5421.00	5421.81	5421.48	0.49	5422.30	5421.64	5425.62
INLET1	-	-	-	-	-	-	-	-	-	5422.30	5421.64	0.05	5422.34	5421.69	5424.83
(Alternate HGL and EGL Used)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDP6	24	19.70	130.66	6.27	-	-	0.61	0.0076	5422.20	5422.81	5422.20	0.99	5423.81	5422.20	5427.20
INLET2	-	-	-	-	-	-	-	-	-	5423.80	5423.19	0.05	5423.86	5423.12	5425.35
SDP12	24	19.10	53.50	6.08	-	-	0.57	0.0071	5422.86	5423.86	5423.25	0.38	5424.24	5423.66	5426.09
IN3	-	-	-	-	-	-	-	-	-	5424.24	5423.66	0.25	5424.49	5423.92	5426.09
SDP19	24	16.50	20.43	5.25	-	-	0.43	0.0053	5423.23	5424.49	5423.92	0.11	5424.60	5424.17	5426.09
Junction	-	-	-	-	-	-	-	-	-	5424.60	5424.17	0.04	5424.64	5424.21	5426.09
SDP20	24	16.50	85.45	5.25	-	-	0.43	0.0053	5423.33	5424.64	5424.21	0.45	5425.10	5424.67	5426.09
IN4	-	-	-	-	-	-	-	-	-	5425.10	5424.67	0.04	5425.14	5424.71	5425.32
SDP21	18	12.70	96.39	7.19	-	-	0.80	0.0146	5423.37	5425.14	5424.71	1.41	5426.55	5425.75	5426.09
IN5	-	-	-	-	-	-	-	-	-	5426.55	5425.75	0.13	5426.68	5425.88	5426.09
SDP22	18	10.00	94.37	5.66	-	-	0.50	0.0091	5424.49	5426.68	5425.88	0.86	5427.54	5427.04	5427.20
IN7	-	-	-	-	-	-	-	-	-	5427.54	5427.04	-	5427.54	5427.04	5427.20
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH1	-	-	-	-	-	-	-	-	-	5420.93	5420.35	0.14	5421.08	5420.49	5425.47
SDP16	18	7.62	63.46	13.90	-	-	3.00	0.0053	5418.41	5421.08	5420.49	-	5425.17	5422.17	5424.66
IN16	-	-	-	-	-	-	-	-	-	5425.17	5422.17	-	5425.17	5422.17	5424.66
New Branch	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SDMH4	-	-	-	-	-	-	-	-	-	5421.61	5421.29	0.05	5421.66	5421.33	5425.62
SDP17	18	2.16	87.65	1.22	-	-	0.02	0.0004	5420.50	5421.66	5421.33	0.04	5421.70	5421.68	5424.35
SDMH2	-	-	-	-	-	-	-	-	-	5421.70	5421.68	0.02	5421.72	5421.70	5424.35
SDP7	18	2.16	25.14	1.22	-	-	0.02	0.0004	5421.15	5421.72	5421.70	0.01	5421.73	5421.71	5423.55
IN18	-	-	-	-	-	-	-	-	-	5421.73	5421.71	-	5421.73	5421.71	5423.55

Page 1

[illegible]

Table B:

LOSSES		- LOSS_COEFFICIENTS													
str_ID	Hf	Hb	Hstr	Hc	He	Hj	Total	Dstr	Ko	CD	Cd	Cq	CP	Cb	K
Outfall	SDP18	-	-	-	-	-	0.46	-	-	-	-	-	-	-	-
	SDMH1	-	-	0.35	-	-	0.35	3.53	1.502	1.000	0.615	0.644	1.000	1.000	0.595
	SDP9	0.33	-	-	-	-	0.33	-	-	-	-	-	-	-	-
	SDMH4	-	-	0.20	-	-	0.20	2.39	1.502	1.000	0.486	0.828	1.000	1.000	0.605
	SDP5	0.49	-	-	-	-	0.49	-	-	-	-	-	-	-	-
	INLET1	-	-	0.05	-	-	0.05	1.54	0.168	1.000	0.428	1.000	1.000	1.000	0.072
	SDP6	0.99	-	-	-	-	0.99	-	-	-	-	-	-	-	-
	INLET2	-	-	0.05	-	-	0.05	2.34	0.161	1.000	0.549	1.000	1.000	1.000	0.089
	SDP12	0.38	-	-	-	-	0.38	-	-	-	-	-	-	-	-
	IN3	-	-	0.25	-	-	0.25	2.53	0.770	1.000	0.576	1.000	1.000	1.000	0.444
Junction	SDP19	0.11	-	-	-	-	0.11	-	-	-	-	-	-	-	-
	SDP20	-	0.04	-	-	-	0.04	-	-	-	-	-	-	-	-
	IN4	0.45	-	-	-	-	0.45	-	-	-	-	-	-	-	-
	SDP21	-	-	0.04	-	-	0.04	2.92	0.161	1.000	0.627	1.000	1.000	1.000	0.101
	IN5	1.41	-	-	-	-	1.41	-	-	-	-	-	-	-	-
New Branch	SDP22	-	-	0.13	-	-	0.13	2.84	0.225	1.000	0.733	1.000	1.000	1.000	0.165
	IN7	0.86	-	-	-	-	0.86	-	-	-	-	-	-	-	-
	IN7	-	-	-	-	-	-	3.04	-	-	-	-	-	-	-
New Branch	SDMH1	-	-	0.14	-	-	0.14	3.53	1.437	1.000	0.615	0.274	1.000	1.000	0.243
	SDP16	0.33	-	-	-	-	0.33	0.52	-	-	-	-	-	-	-
New Branch	IN16	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	SDMH4	-	-	0.05	-	-	0.05	2.39	0.160	1.000	0.486	1.927	1.000	1.000	0.150
	SDP17	0.04	-	-	-	-	0.04	-	-	-	-	-	-	-	-
	SDMH2	-	-	0.02	-	-	0.02	2.13	1.622	1.000	0.616	1.000	1.000	1.000	0.999
	SDP7	0.01	-	-	-	-	0.01	-	-	-	-	-	-	-	-
	IN18	-	-	-	-	-	-	1.89	-	-	-	-	-	-	-
	IN18	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	IN18	-	-	-	-	-	-	-	-	-	-	-	-	-	-

RECEIVED  
OCT - 2 2012

## Sims, Timothy E.

---

**From:** Cherne, Curtis  
**Sent:** Wednesday, May 23, 2012 1:51 PM  
**To:** 'Scott Steffen'  
**Cc:** 'Rick Beltramo'; Sims, Timothy E.  
**Subject:** RE: cantata updated drainage report

Scott,  
This addendum is acceptable to show that inlet 8 can be removed. Therefore, you have addressed Hydrology's comments and Hydrology can approve Certificate of Occupancy for buildings 1, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20 and 21 as requested.

Curtis

Tim,  
Please write the approval letter.  
Thanks,

Curtis

-----Original Message-----  
From: Scott Steffen [mailto:ssteffen@bhinc.com]  
Sent: Wednesday, May 16, 2012 3:58 PM  
To: Cherne, Curtis  
Cc: Rick Beltramo  
Subject: RE: cantata updated drainage report

Curtis,

I have prepared a second addendum if you will to address the interim drainage condition at Cantata per your letter dated 5/14/12 and our phone conversation of the same day. I am available to meet tomorrow to discuss if that would help.

Thanks,

Scott J. Steffen  
Vice President  
Community Development and Planning  
BohannonHuston  
Courtyard I  
7500 Jefferson St. NE  
Albuquerque, NM 87109-4335  
www.bhinc.com  
voice: 505.823.1000 facsimile: 505.798.7988 toll free: 800.877.5332

-----Original Message-----  
From: Cherne, Curtis [mailto:CCherne@cabq.gov]  
Sent: Monday, May 14, 2012 1:38 PM  
To: Scott Steffen  
Subject: cantata updated drainage report

Curtis

May 16, 2012

Curtis Cherne, P. E.  
Hydrology Section  
City of Albuquerque  
P. O. Box 1293  
Albuquerque, NM 87103

Re: Cantata at the Trails, DRB 1002962 (C-09/D001B)

Dear Curtis:

This letter provides additional information to the original addendum, dated 4/30/12, for the approved Cantata at the Trails drainage report, dated 8/22/07. The purpose of the original addendum was to show that the removal of Sump Inlet 8 (and corresponding storm drain), at the intersection of Streets #4 and #10, as shown on the drainage basin map from the 8/22/07 drainage report, was valid. The analysis provided looked at the fully developed condition and showed that the inlet was not needed. The conclusions of the original addendum are still valid. This letter looks at the interim condition in response to your letter dated 5/14/12.

There is additional flow getting to Street 10 and Sump Inlet 12 from Basins B1F and B1E1 in the interim condition because the inlets at the south end of these basins have not been constructed at this time. The flow reaching the intersection of Streets #4 and #10 in the interim condition is 19.6 cfs. Street 10 has capacity to carry the 19.6 cfs at the intersection of Streets #4 and #10, plus the 4.5 cfs from Basin 3A1, to Sump Inlet 12 at the intersection of Streets #2 and #10. In addition, Inlet 12 has the capacity to pass 25.9 cfs (19.6 cfs from Inlet 8 and 6.3 cfs from Inlet 12) in the interim condition.

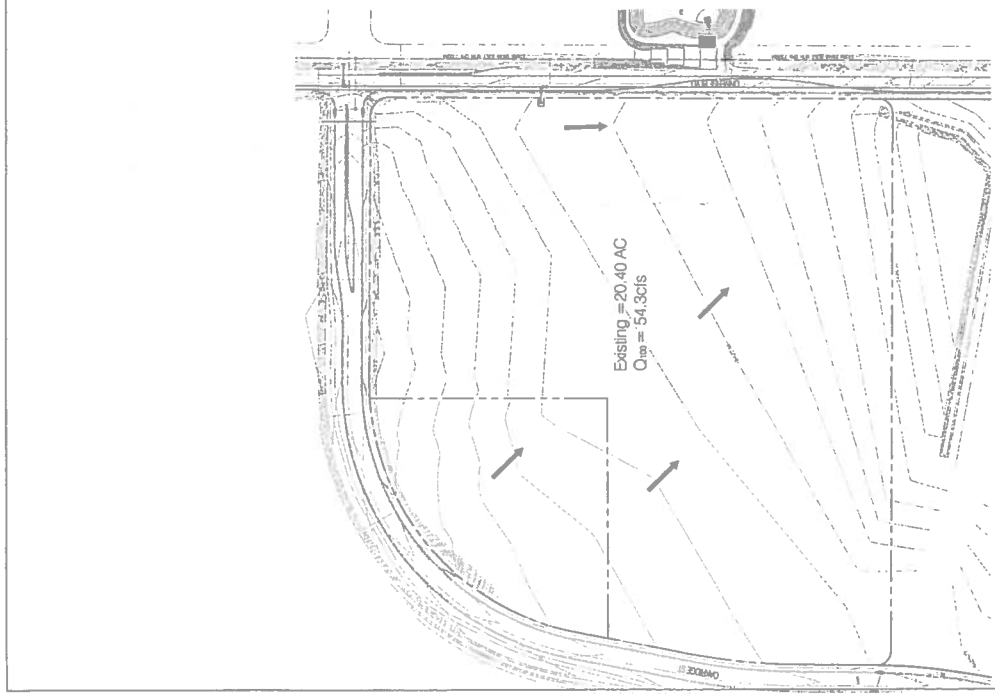
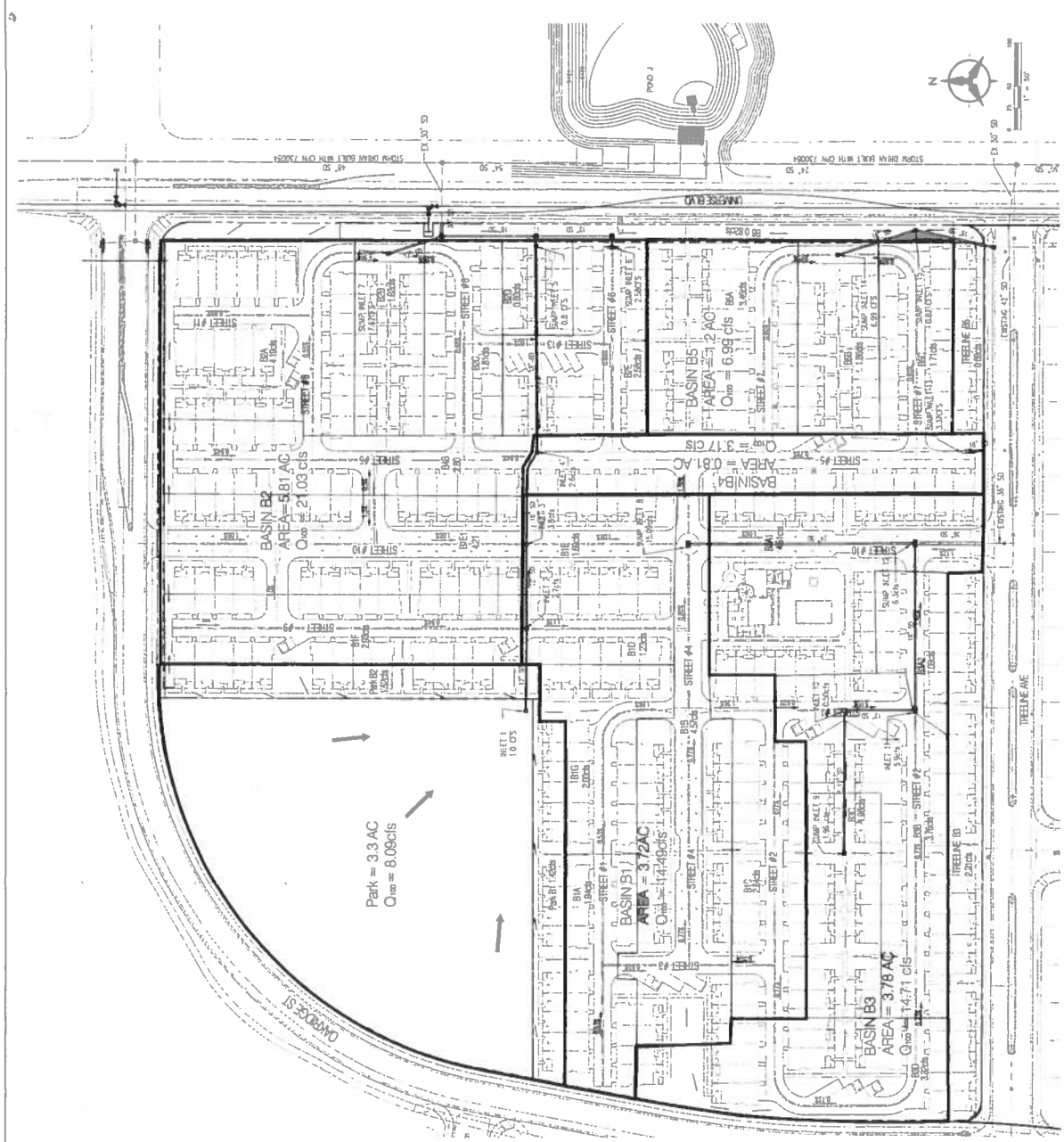
The carrying capacity of Street #10 is limited by the 20' wide street section at the southeast corner of the Pool/Clubhouse area. This section has a capacity of approximately 28 cfs, which is greater than the combined flow (24.1 cfs) at the intersection of Streets #4 and #10 and from Basin 3A1 in the interim condition. See the attached street capacity calculation.

In addition, we looked at the "park" area (Cantata Tract A) in the interim condition. Tract A was supposed to be a park that detained flow and discharged to the Cantata Tract B storm drain at 1 cfs in the approved Cantata drainage report. Since that time the zoning for Tract A has changed to allow for apartments to be developed on the 3.2 acre tract. Currently, Tract A is lower than Tract B based on a topographic survey provided by SurvTek dated 5/15/12, creating a pond that holds runoff in the interim condition. The volume of the "pond" is 2.4 acre-feet which is 8 times the 100-year, 24-hour runoff volume of 0.3 acre-feet from Basins Park B1, Park B2 and Park in the interim condition.

Engineering ▲

Spatial Data ▲

Advanced Technologies ▲



### EXISTING CONDITIONS

Table 1: Existing Conditions Basin Data Table

Basin ID	Area (AC)	Land Treatment Percentages				Q <sub>100</sub> (cfs)	Q <sub>100</sub> (MGD)	WT E (feet)	V <sub>100</sub> (cu ft)	V <sub>100</sub> (MG)
		A	B	C	D					
Existing	20.40	0.0%	0.0%	73.7%	0.0%	2.45	0.0	0.0	0.0	0.0

## BASIN MAP FOR SUBDIVISION AND BUILDING PERMIT

# CANTATA AT THE TRAILS

Prepared for:  
CANTATA AT THE TRAILS INC.  
7007 Jefferson St. NE  
Suite A  
Abuquerque, NM 87109

Prepared by:  
Behanman & Huston  
7500 Jefferson NE  
Abuquerque, NM 87109  
8/22/07

Copyright © 2007 Behanman & Huston, All Rights Reserved.  
INSTRUMENT - SPATIAL DATA - PROJECT TECHNOLOGIES

SHEET 1 OF 1



20ft inverted crown 1% slope

MANNING'S N = 0.016 SLOPE = 0.011

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.8	4.0	10.0	0.0	7.0	20.0	0.8
2.0	0.1	0.3	5.0	11.0	0.1			
3.0	9.0	0.1	6.0	19.9	0.3			

WSEL	DEPTH	FLOW	FLOW	WETTED	FLOW	TOPWID	TOTAL
FT.	INC	AREA	RATE	PER	VEL	PLUS	ENERGY
		SQ. FT.	(CFS)	(FT)	(FPS)	OBSTRUCTIONS	(FT)
0.050	0.050	0.040	0.033	1.603	0.816	1.600	0.060
0.100	0.100	0.190	0.211	4.815	1.109	4.811	0.119
0.150	0.150	0.524	0.779	8.564	1.486	8.558	0.184
0.200	0.200	1.046	1.933	12.313	1.848	12.305	0.253
0.250	0.250	1.755	3.835	16.062	2.185	16.053	0.324
0.300	0.300	2.651	6.633	19.810	2.502	19.800	0.397
0.350	0.350	3.642	11.220	19.912	3.081	19.820	0.498
0.400	0.400	4.633	16.703	20.014	3.605	19.840	0.602
0.450	0.450	5.626	23.005	20.116	4.089	19.860	0.710
0.500	0.500	6.619	30.066	20.218	4.542	19.880	0.821
0.550	0.550	7.614	37.838	20.320	4.970	19.900	0.934
0.600	0.600	8.609	46.284	20.422	5.376	19.920	1.050
0.650	0.650	9.606	55.368	20.524	5.764	19.940	1.167
0.700	0.700	10.603	65.064	20.626	6.136	19.960	1.286
0.750	0.750	11.602	75.345	20.728	6.494	19.980	1.406

← STREET 10  
CAPACITY

Double D inlet, in sump condition with short edges adjoined:

Open Area (for orifice calc in sq. ft.): 7.7977431

Length of Weir (feet): 13.645833

Head (ft)	Head (in)	Weir Q (cfs)	Orifice Q (cfs)	Control Q (cfs)
0.05	0.6	0.41	8.40	0.41
0.1	1.2	1.16	11.87	1.16
0.15	1.8	2.12	14.54	2.12
0.2	2.4	3.27	16.79	3.27
0.25	3	4.57	18.77	4.57
0.3	3.6	6.01	20.56	6.01
0.35	4.2	7.57	22.21	7.57
0.4	4.8	9.25	23.75	9.25
0.45	5.4	11.04	25.19	11.04
0.5	6	12.93	26.55	12.93
0.55	6.6	14.92	27.84	14.92
0.6	7.2	17.00	29.08	17.00
0.65	7.8	19.16	30.27	19.16
0.7	8.4	21.42	31.41	21.42
0.75	9	23.75	32.52	23.75
0.8	9.6	26.17	33.58	26.17
0.85	10.2	28.66	34.62	28.66
0.9	10.8	31.22	35.62	31.22
0.95	11.4	33.86	36.60	33.86
1	12	36.57	37.55	36.57
1.05	12.6	39.35	38.47	38.47
1.1	13.2	42.19	39.38	39.38
1.15	13.8	45.10	40.26	40.26
1.2	14.4	48.07	41.13	41.13
0.365	4.38	8.06	22.68	8.06

← MAX HEAD @  
SUMP INLET 12

# CITY OF ALBUQUERQUE



May 14, 2012

Scott Steffen, P.E.  
Bohannon Huston Inc.  
7500 Jefferson St NE  
Albuquerque, NM 87109

**Re: Cantata at the Trails Updated Drainage Report for CO  
Engineer's Stamp and letter dated 4-30-12 (C09-D001B)**

Dear Mr. Steffen,

Based upon the information provided in your submittal received 5-2-12, the above referenced plan cannot be approved for updated drainage report for CO until the following comments have been addressed:

- The sump inlet summary does not contain all of the contributing basins. Since the inlets in Street 9 and 10 north of the clubhouse have not been built, basins B1F and B1E1 drain to sump inlet # 12. In addition, the summary does not include the "park" area.
- The next submittal should include Basins B1F and B1E1 as land treatment "C" and include the "park" area.

If you have any questions, you can contact me at 924-3986.

Sincerely,

Curtis Cherne, P.E., CFM  
Principal Engineer, Planning Dept.  
Development and Building Services

C: e-mail



# DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(Rev. 12/05)

PROJECT TITLE: Cantata at the Trails ZONE MAP PAGE: C-9/D1B  
 DRB#: 1002962 EPC#: \_\_\_\_\_ WORK ORDER#: \_\_\_\_\_

LEGAL DESCRIPTION: Tract B, Cantata at the Trails Unit 2

CITY ADDRESS: Southwest Corner of Oakridge St. and Universe Blvd. NW

ENGINEERING FIRM: Bohannon Huston Inc.

CONTACT: Scott Steffen

ADDRESS: 7500 Jefferson Street NE

PHONE: (505) 823-1000

CITY, STATE: Albuquerque, NM

ZIP CODE: 87109

OWNER: Longford Homes

CONTACT: Rick Beltramo

ADDRESS: 6330 Riverside Plaza Lane #160

PHONE: (505) 761-9911

CITY, STATE: Albuquerque, NM

ZIP CODE: 87120

ARCHITECT: \_\_\_\_\_

CONTACT: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

PHONE: \_\_\_\_\_

CITY, STATE: \_\_\_\_\_

ZIP CODE: \_\_\_\_\_

SURVEYOR: \_\_\_\_\_

CONTACT: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

PHONE: \_\_\_\_\_

CITY, STATE: \_\_\_\_\_

ZIP CODE: \_\_\_\_\_

CONTRACTOR: \_\_\_\_\_

CONTACT: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

PHONE: \_\_\_\_\_

CITY, STATE: \_\_\_\_\_

ZIP CODE: \_\_\_\_\_

## TYPE OF SUBMITTAL:

- ☒ DRAINAGE REPORT
- ☐ DRAINAGE PLAN 1<sup>st</sup> SUBMITTAL
- ☐ DRAINAGE PLAN RESUBMITTAL
- ☐ CONCEPTUAL G & D PLAN
- ☐ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERT (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT
- ☐ ENGINEER/ARCHITECT CERT (TCL)
- ☐ ENGINEER/ARCHITECT CERT (DRB S.P.)
- ☐ ENGINEER/ARCHITECT CERT (AA)
- ☐ OTHER (SPECIFY) \_\_\_\_\_

## CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SIA/FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D APPROVAL
- ☐ S. DEV. FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☐ BUILDING PERMIT APPROVAL
- ☒ CERTIFICATE OF OCCUPANCY (PERM)
- ☐ CERTIFICATE OF OCCUPANCY (TEMP)
- ☐ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☐ OTHER (SPECIFY) \_\_\_\_\_

WAS A PRE-DESIGN CONFERENCE ATTENDED:

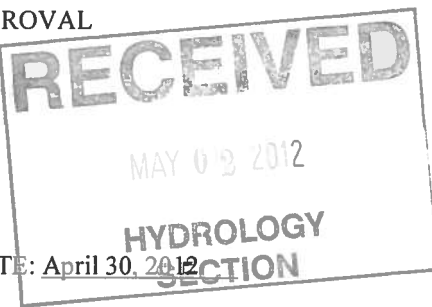
- ☐ YES
- ☐ NO
- ☐ COPY PROVIDED

SUBMITTED BY: Scott J. Steffen

DATE: April 30, 2012

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope to the proposed development define the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans.
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres.
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more.



April 30, 2012

voice: 505.823.1000  
facsimile: 505.798.7988  
toll free: 800.877.5332

Curtis Cherne, P. E.  
Hydrology Section  
City of Albuquerque  
P. O. Box 1293  
Albuquerque, NM 87103

Re: Cantata at the Trails, DRB 1002962 (C-09/D001B)

Dear Curtis:

This letter is an addendum to the approved drainage report for Cantata at the Trails, dated 8/22/07. The purpose of this addendum is to remove Sump Inlet 8 (and corresponding storm drain), at the intersection of Streets #4 and #10, as shown on the attached drainage basin map. This inlet is being removed because Street 10 has capacity to carry the 14.92 cfs at Sump Inlet 8, plus the 4.51 cfs from Basin 3A1, to Sump Inlet 12 at the intersection of Streets #2 and #10. In addition, Inlet 12 has the capacity to pass 21.2 cfs (14.92 cfs from Inlet 8 and 6.3 cfs from Inlet 12).

The carrying capacity of Street #10 is limited by the 20' wide street section at the southeast corner of the Pool/Clubhouse area. This section has a capacity of approximately 25 cfs, which is greater than the combined flow at Sump Inlet 8 and from Basin 3A1. See the attached street capacity calculation.

Also attached for your information are the following: 1) a summary of the Basin flows at Sump Inlet 8 and Sump Inlet 12, and 2) Inlet capacity calculation for the double D inlet at the intersection of Streets #2 and #10.

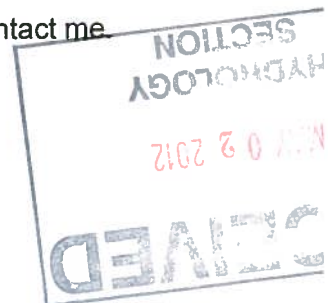
This addendum shows that Street 10 can safely convey flows to Sump Inlet 12 and that Sump Inlet 12 has the capacity to accept these additional flows. Therefore, Sump Inlet 8 and the 24-inch storm drain between inlets 12 and 8 are not required for the site to drain.

If you have any questions or require further information, please feel free to contact me.

Sincerely,



Scott J. Steffen, P.E.  
Vice President  
Community Development and Planning Group



Enclosures

Engineering ▲

Spatial Data ▲

Advanced Technologies ▲

Double D inlet, in sump condition with short edges adjoined:

Open Area (for orifice calc in sq. ft.): 7.7977431

Length of Weir (feet): 13.645833

Head (ft)	Head (in)	Weir Q (cfs)	Orifice Q (cfs)	Control Q (cfs)
0.05	0.6	0.41	8.40	0.41
0.1	1.2	1.16	11.87	1.16
0.15	1.8	2.12	14.54	2.12
0.2	2.4	3.27	16.79	3.27
0.25	3	4.57	18.77	4.57
0.3	3.6	6.01	20.56	6.01
0.35	4.2	7.57	22.21	7.57
0.4	4.8	9.25	23.75	9.25
0.45	5.4	11.04	25.19	11.04
0.5	6	12.93	26.55	12.93
0.55	6.6	14.92	27.84	14.92
0.6	7.2	17.00	29.08	17.00
0.65	7.8	19.16	30.27	19.16
0.7	8.4	21.42	31.41	21.42
0.75	9	23.75	32.52	23.75
0.8	9.6	26.17	33.58	26.17
0.85	10.2	28.66	34.62	28.66
0.9	10.8	31.22	35.62	31.22
0.95	11.4	33.86	36.60	33.86
1	12	36.57	37.55	36.57
1.05	12.6	39.35	38.47	38.47
1.1	13.2	42.19	39.38	39.38
1.15	13.8	45.10	40.26	40.26
1.2	14.4	48.07	41.13	41.13
0.365	4.38	8.06	22.68	8.06

← MAX HEAD @  
SUMP INLET 12

20ft inverted crown 1% slope

MANNING'S N = 0.016 SLOPE = 0.011

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.8	4.0	10.0	0.0	7.0	20.0	0.8
2.0	0.1	0.3	5.0	11.0	0.1			
3.0	9.0	0.1	6.0	19.9	0.3			

WSEL FT.	DEPTH INC	FLOW AREA SQ. FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.050	0.050	0.040	0.033	1.603	0.816	1.600	0.060
0.100	0.100	0.190	0.211	4.815	1.109	4.811	0.119
0.150	0.150	0.524	0.779	8.564	1.486	8.558	0.184
0.200	0.200	1.046	1.933	12.313	1.848	12.305	0.253
0.250	0.250	1.755	3.835	16.062	2.185	16.053	0.324
0.300	0.300	2.651	6.633	19.810	2.502	19.800	0.397
0.350	0.350	3.642	11.220	19.912	3.081	19.820	0.498
0.400	0.400	4.633	16.703	20.014	3.605	19.840	0.602
0.450	0.450	5.626	23.005	20.116	4.089	19.860	0.710
0.500	0.500	6.619	30.065	20.218	4.542	19.880	0.821
0.550	0.550	7.614	37.838	20.320	4.970	19.900	0.934
0.600	0.600	8.609	46.284	20.422	5.376	19.920	1.050
0.650	0.650	9.606	55.368	20.524	5.764	19.940	1.167
0.700	0.700	10.603	65.064	20.626	6.136	19.960	1.286
0.750	0.750	11.602	75.345	20.728	6.494	19.980	1.406

← STREET 10  
CAPACITY

Cantata at the Trails				
Sump Inlet Summary				
BASIN	Q(100)	Flow	Bypass Flow to	Bypass Flow to
ID	(cfs)	Intercepted by	Sump Inlet 8	Sump Inlet 12
		Inlet	(cfs)	(cfs)
		(cfs)		
<del>Park</del>	<del>15.8</del>			
B1A	1.94		1.94	
B1B	4.57		4.57	
B1C	2.84		2.84	
B1D	1.23		1.23	
B1E	1.69		1.69	
B1G	2.00		2.00	
B1E1	4.21	<del>3.80</del> <sup>3.80</sup>	0.41	- inlet in?
B1F	2.93	<del>2.70</del>	0.23	-
Subtotal			14.92	
B3A1	4.51			4.51
B3A2	1.09			1.09
B3B+B3D	7.08	6.40	0.68	0.68
Subtotal				6.28
Total @ Sump Inlet 12				21.20

Anna Cantata Drainage Mpt  
for Northern area

B1F - 2.2  
B1E - 3.1 cfs

+15  
36

# CITY OF ALBUQUERQUE



September 20, 2007

Kevin Murtagh, PE  
Bohannon Huston, Inc  
7500 Jefferson NE  
Albuquerque, NM 87109

**Re: Cantata at the Trails Drainage Report**  
**Engineer Stamp dated 8-22-07 (C9/D1B)**

Dear Mr. Murtagh,

Based upon the information provided in your submittal dated 8-23-07, the above referenced plan is approved for Building Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit. In addition to submitting an NOI to the EPA and preparing a SWPPP, please send a copy of the SWPPP on a CD in .pdf format to the following address:

P.O. Box 1293

Albuquerque

New Mexico 87103

Department of Municipal Development  
Storm Drainage Division  
P.O. Box 1293, One Civic Plaza, Rm. 301  
Attn: Kathy Verhage  
Albuquerque, NM 87103

If you have any questions about this permit, please feel free to call the Municipal Development Department, Hydrology section at 768-3654.

[www.cabq.gov](http://www.cabq.gov)

Also, prior to Certificate of Occupancy release, Engineer Certification of the grading plan per the DPM checklist will be required.

If you have any other questions, you can contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE  
Principal Engineer, Planning Dept.  
Development and Building Services

C: Kathy Verhage, DMD  
file

**DRAINAGE REPORT  
FOR  
CANTATA AT THE TRAILS**

C 9-D18

**AUGUST 22, 2007**

Prepared for:

**LONGFORD HOMES  
7007 JEFFERSON STREET NE – SUITE A  
ALBUQUERQUE, NM 87109**

Prepared by:

**BOHANNAN HUSTON, INC.  
COURTYARD I  
7500 JEFFERSON STREET NE  
ALBUQUERQUE, NM 87109**



C 09/00018

PREPARED BY:

  
Kevin J. Murtagh, P.E.

8-22-07  
Date

**Bohannon ▲ Huston<sub>inc.</sub>**

## TABLE OF CONTENTS

I.	PURPOSE .....	1
II.	METHODOLOGIES .....	1
III.	SITE LOCATION AND CHARACTERISTICS .....	1
IV.	EXISTING HYDRAULIC AND HYDROLOGIC CONDITIONS .....	1
V.	DEVELOPED HYDRAULIC AND HYDROLOGIC CONDITIONS .....	1
A.	Off-Site Basin .....	2
B.	On-Site Basins .....	2
VI.	CONCLUSION .....	3

## APPENDICES

APPENDIX A – BASIN CALCULATIONS .....	2
APPENDIX B – STREET CAPACITIES .....	3
APPENDIX C – INLET AND PIPE CAPACITIES .....	4

## EXHIBITS

EXHIBIT 1:	PROPOSED & EXISTING DRAINAGE BASIN MAPS
EXHIBIT 2:	GRADING AND DRAINAGE PLAN



**I. PURPOSE**

The purpose of this report is to present the drainage management plan for Cantata at the Trails and to obtain approval of the grading plan by the Development Review Board.

**II. METHODOLOGIES**

Site conditions will be analyzed for a 10-year and 100-year, 6-hour storm event in accordance with the City of Albuquerque Drainage Ordinance and the Development Process Manual (DPM) Volume 2, Design Criteria, Section 22.2, Hydrology, for the City of Albuquerque, January 1993.

**III. SITE LOCATION AND CHARACTERISTICS**

The proposed development of Cantata at the Trails consists of 260 single family units including 3-plexes, 4-plexes, 5-plexes and 6-plexes on approximately 17.5 acres.

Cantata at the Trails is located south and west of Oakridge Street, east of Universe Blvd and north of future Treeline Avenue which is being constructed at the time of this report and will be substantially complete prior to development of Cantata at the Trails. The storm drain infrastructure to be built with Treeline will be referred to as "existing" in this report.

The present condition of the area is mass graded in the southern two thirds and undisturbed in the northern third. The site slopes gradually to the southwest corner of the site.

**IV. EXISTING HYDRAULIC AND HYDROLOGIC CONDITIONS**

For additional assistance throughout this portion of the report, please refer to the Drainage Basin Map (Exhibit 1) enclosed in the Exhibit section of this report.

Cantata at the Trails has been mass graded to closely match existing drainage patterns with slopes ranging from 0.5% to 3%. An average of 4 feet of fill has been imported to raise the site above the preexisting undeveloped site where it is assumed that substantial basalt exists. This assumption is based on design and development of previous projects in the area.

There is one existing onsite basin which encompasses the site in its entirety. The existing basin (20.7ac,  $Q_{100}=55.1$ cfs) gradually slopes from the northeast to a low point/retention area in the southwest corner of the site. This area was created as part of the mass grading operations.

**V. DEVELOPED HYDRAULIC AND HYDROLOGIC CONDITIONS**

For additional assistance throughout this portion of the report, please refer to the Basin Map (Exhibit 1) and the Grading and Drainage Plan (Exhibit 2) enclosed in the Exhibit section of this report.

Storm runoff generated by development (17.4ac, 67.0cfs) in Cantata at the Trails will be conveyed by an inverted crown and a centerline concrete valley gutter in all the streets with the exception of Street 5, where the street is cross sloped at 2% to a median curb and gutter along the ~~west~~ side of the street.

Six (6) onsite basins are proposed and the runoff from each basin will be captured by inlets, as required by COA street capacity criteria (see Appendix A for street capacity calculations). Each basins have been divided into subbasins for the purpose of analyzing street capacities and inlet capacities. Each basin has a low point that will ultimately capture all residual flows in sump inlets and be conveyed by the RCP stubouts in Treeline Ave. and Universe Blvd. All onsite flows will be conveyed by private storm drain systems and ultimately drain to the storm drain in Universe Blvd. and outfall to Ponds J and K located west of the Universe Blvd. The storm drain system and ponds were constructed under CPN 700384.

Please refer to the Trails Unit 2 Drainage Management Plan, Wilson and Co, for further information. All six onsite basins and one offsite basin (3.3ac, 8.1cfs) are discussed below.

#### A. Off-Site Basin

One offsite basin – Park (3.3ac, 8.1cfs) is located in the northwest portion of the site and is designated as a future park. This area will be graded with this project to borrow fill for the onsite grading (see Sheet C2.04 of Exhibit 2). This grading of this park will closely match the pre-mass grading conditions. Land treatments for the park are estimated to be 50% B and 50% C, any impervious areas created by future parking areas will drain to Oakridge and not contribute to this basin. Additionally two (2) small onsite basins ParkB1 (0.36ac, 1.42cfs) and ParkB2 (0.39ac, 1.52cfs) contribute to this basin bringing the total runoff generated in this area to 11.0cfs. The flow from this basin will be directed toward the southwest corner of the park, where it will be intercepted by a standpipe/inlet which will attenuate the runoff by orifice to approximately 1cfs. A storm drain system running east to west will convey the flow to Pond J as it combines with Basin B2 flows.

#### B. On-Site Basins

The developed site is composed of six (6) basins, B1, B2, B3, B4, B5 and B6. Land treatments for the onsite basins are estimated to be 12.5% B, 12.5% C and 75% D. These basins are discussed below, please refer to the exhibits, appendices during this section.

Basin B2 (5.41ac,  $Q_{100} = 21.03.0\text{cfs}$ ) encompasses approximately 88 units and adjacent streets. Flow is conveyed in the streets and captured by inlets on grade in Streets 9, 10 and 5. These inlets (2, 3 & 4) capture 90% of the flow and the bypass is picked up by inlets downstream. Additionally the remaining flow in this basin is captured by sump inlets (5, 6, & 7) in Streets 6 and 8 and small "backyard" drain and is conveyed to the existing 30" storm drain stubout in Universe Blvd which ultimately outfalls to Pond J west of Universe Blvd.

Basin B1 (3.72ac,  $Q_{100} = 14.5\text{cfs} + 0.6\text{cfs}$  bypass from Basin 2) encompasses 51 units and adjacent streets. Flow is conveyed in Streets 1, 2, 3, 4, 9, and 10 to the intersection of Streets 10 and 4

no pond  
calcs cont  
50% B  
50% C  
after grading  
pond - work order

where it is captured in sump inlet #8 and drains south through the new private storm drain in Street 10 to the future 36" RCP stubout in Treeline Ave.

Basin B3 (3.78ac,  $Q_{100} = 14.71$  cfs) encompasses approximately 60 units, the community center area and adjacent streets. A storm drain system will pick up "backyard" flows (inlet #9) as well as flows conveyed in Streets 2, 1 and 10 (inlets 10, 11, 12) and drain to a low point in Street 10 where it is captured in a sump inlet #12. The captured flow from Basin 3 will combine with the flow from Basin 1 and be conveyed through the existing 36" and 42" storm drain in Treeline Ave.

Basin B4 (0.81ac,  $Q_{100} = 3.17$  cfs) encompasses the southern half of Street 5 and approximately 8 units. Flow is conveyed in Street 5 where the flow is captured by sump inlet (#13) at the south end of Street 5 and drains through the existing stubout in Treeline Ave.

Basin B5 (1.2ac,  $Q_{100} = 6.99$  cfs) encompasses approximately 28 units Street 7. Flow is conveyed in Street 7 to a low point where the flow is captured by sump inlet #14 drains through the new private storm drain to the existing inlet in Treeline

Basin B6 (0.3ac,  $Q_{100} = 0.82$  cfs) is a landscaped area outside the developed area. The small amount of flow from this basin is captured in inlet #15 and combines with Basin 5 in the private storm drain mentioned above.

Finally, two small basins TreelineB3 (2.21 cfs) and Treeline B5 (0.69 cfs) discharge to Treeline Ave. and are picked up by the existing inlets in Treeline.

In summary the Park basin and Basin 2 (30.1cfs) outfall to Pond J and Basins B1, B3, B4, B5 & B6 (43.4cfs) out fall to Pond K located southwest of the Treeline Ave. and Universe Blvd. intersection.

## VI. CONCLUSION

This report presents the hydrologic and hydraulic considerations for the proposed development of Cantata at the Trails. These flows can be safely conveyed by the improvements proposed in this drainage plan to the existing storm drain in Universe Blvd and outfall ponds. Erosion and dust control, consisting of erosion control berms, silt fencing and sedimentation basins, are proposed to prevent soil washing or blowing into paved streets, storm drains, and existing development areas. This report supports the grading plan and should be approved as requested.

## PIPE CAPACITIES

Private storm drain 1							
INLET #	PIPE SIZE IN.	SLOPE	FLOW IN INLET	FLOW IN PIPE	MAXIMUM CAPACITY		
9	12	0.30%		1.96	1.96		
10	12	1.80%	0.5	2.46	4.78		
11	18	1.50%	5.9	8.36	12.87		
12			6.3	14.66			
8	24	1.07%	15.09	15.09	23.41		
	36	0.50%	Combined flows from inlets 8 & 12		29.75	47.18	
Private storm drain 2							
INLET #	PIPE SIZE IN.	SLOPE	FLOW IN INLET	FLOW IN PIPE	CAPACITY		
1	12	1.10%	1.0	1.0	3.7		
2	12	1.10%	2.7	3.7	3.7		
3	18	1.10%	3.8	7.5	11.02		
4	18	1.10%	2.6	10.1	11.02		
5	18	1.10%	0.8	10.9	11.02		
MH							
6	12	1.32%	2.58	2.6	4.1		
MH	12	1.32%		2.58	4.1		
	18	1.32%	Combined flows from inlets 5 & 6		13.5	12.1	
MH							
7	12	5.88%	7.62	7.62	8.63		
MH	30	0.50%	Combined flows from inlets 5, 6 & 7		21.1	29.01	
Private storm drain 3							
INLET #	PIPE SIZE IN.	SLOPE	FLOW IN INLET	FLOW IN PIPE	CAPACITY		
14	18	0.70%	7.0	7.0	8.79		
15	18	0.70%	0.82	7.81	8.79		
13	18	0.50%		3.37	7.4		