CITY OF ALBUQUERQUE

February 15th, 2013

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

Re: Universe Street Capacity Analysis
Engineer's Stamp Date 2/14/13 (C09/D001B)

Dear Mr. Steffen,

Based upon the information provided in your submittal received 2/15/2013, the Universe Street Capacity Analysis is acceptable for approval of the Work Order.

This project requires a National Pollutant Discharge Elimination System (NPDES) permit for storm water discharge for disturbing one acre or more and a Topsoil Disturbance Permit for disturbing ¾ of an acre or more

If you have any questions, you can contact me at 924-3695.

Sincerely,

Shahab Biazar, P.E.
Senior Engineer, Planning Dept.
Development and Building Services

C: e-mail

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

HIGH MESA Consulting Group

6010-B Midway Park Blvd. NE
Albuquerque, New Mexico 87109
Phone: 505.345.4250
Fax: 505.345.4254
www.highmesacg.com

TO:	Curtis Cherne, PE, City Hydrologist
FROM:	J. Graeme Means, PE
CC:	Martin Eckert, APS Real Estate Director, Annelle Darby, APS Staff Architect Jeff Mortensen, HMCG Principal Engineer
DATE:	02/26/2013
PROJECT:	APS Volcano Vista High School – City Hydrology File C7/D9
RE:	Summary Analysis of Connection to Proposed Storm Drain in Universe Blvd. NW
JOB NO:	HMCG 2012.182.9

Dear Curtis,

Thank you for meeting with me last Friday, February 22, 2013, to evaluate and coordinate implementation of a storm drain connection between an existing storm inlet and a proposed storm drain in Universe Blvd. NW. The inlet and a 48 inch lateral were constructed in 2006 under City Project # 766981 in anticipation of a future connection to a proposed 60 inch storm drain that was expected provide the programmed outfall from the temporary retention pond located on Volcano Vista High School, thereby allowing eventual conversion from retention to detention pond with controlled release.

As identified during our meeting, the proposed construction plans recently submitted to the City for approval of a public storm drain in Universe identify a 36 inch pipe at this location and do not provide any connection to the existing 48 inch lateral. Instead, the plans propose to trim the lateral back as it conflicts with the proposed storm drain.

Based on the following, we have determined that it would be feasible to construct an 18 inch connection (sleeved within the existing 48 inch lateral) between the existing inlet and the proposed storm drain with an orifice plate in the back of the inlet or in the upstream private APS storm drain:

1) Review of the Engineer's Certification for Volcano Vista HS Phase 2 shows that the invert out of the bottom of the Volcano Vista HS pond is at elevation 5375 (NGVD 1929) which is above the elevation of the storm inlet grate in Universe of 5373.6 (NGVD 1929). This ensures that flow from the Universe storm drain will not back up into the pond as it would overflow at the grate before reaching that elevation.
2) Review of the proposed construction plans show the existing storm inlet grate elevation of 5376.4 (NAVD 88) is 3.2 ft higher than the proposed hydraulic grade line (HGL) in the 36 inch Universe storm drain at the existing lateral location of approximately 5373.2 (NAVD 88), thereby resulting in 3.2 ft of elevation head for positive flow and drainage from the inlet to the storm drain without resulting in a backflow condition surging up at the grate.
3) Hydraulic calculations (attached) that demonstrate a potential flow rate of 29.6 cfs from the storm inlet to the storm drain through an 18 inch lateral under pressure with 3.2 feet of elevation head.

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4) The 18 inch connection would be sleeved through the existing 48 inch lateral with the excess area grouted. This would avoid any disturbance to traffic and avoid cutting the street.

5) The orifice plate would be sized to limit outflow from the private storm drain to whatever rate is determined by the City based on a function of downstream capacity and design storm requirements for this storm drain.

A storm drain connection as analyzed and described by the preceding would not only provide an outfall for an existing retention pond located on public school property, but it would also accept street flows that currently bypass this inlet.

Please let us know if you have any questions or comments regarding this information.

_____

J. Graeme Means, NMPE 13676

Worksheet
Worksheet for Pressure Pipe

Project Description	
Worksheet	Pressure Pipe
Flow Element	Pressure Pipe
Method	Manning's For
Solve For	Discharge

Input Data		
Pressure at 1	0.00	psi
Pressure at 2	0.00	psi
Elevation at 1	76.37	ft
Elevation at 2	73.20	ft
Length	10.00	ft
Mannings Coeffic	0.013	
Diameter	18	in

Results		
Discharge	29.57	cfs
Headloss	3.17	ft
Energy Grade at	80.72	ft
Energy Grade at	77.55	ft
Hydraulic Grade :	76.37	ft
Hydraulic Grade :	73.20	ft
Flow Area	1.8	ft²
Wetted Perimeter	4.71	ft
Velocity	16.73	ft/s
Velocity Head	4.35	ft
Friction Slope	079250	ft/ft

Jeff Mortensen & Associates, Inc.
37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666

Eckert, Martin W

From: Graeme Means <GMeans@highmesacg.com>
Sent: Wednesday, February 27, 2013 8:32 AM
To: Cherne, Curtis
Cc: Jeffrey Mortensen; Eckert, Martin W
Subject: RE: Volcano Vista HS Storm Drain Connection in Universe
Attachments: AVG Certification.txt

As a follow-up to our conversation yesterday, we understand you were going to follow up with BHI to discuss the options to make this connection happen. At this point, we believe the easiest solution would be for BHI to add the connection to the plans prior to DRC approval. We ask that the City hold off on plan approval to allow APS time to coordinate.

Can you commit to the City not approving the current plan set at this time so APS can have adequate time to get this revision to the plans done as soon as possible?

HIGH MESA Consulting Group

J. Graeme Means, P.E.
Principal

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Albuquerque, NM 87109
www.highmesacg.com

Phone: 505.345.4250
Fax: 505.345.4254
gmeans@highmesacg.com

From: Cherne, Curtis [mailto:CCherne@cabq.gov]
Sent: Tuesday, February 26, 2013 12:00 PM
To: Graeme Means
Cc: Jeffrey Mortensen; Eckert, Martin W
Subject: RE: Volcano Vista HS Storm Drain Connection in Universe

Graeme,
Shahab and I have reviewed this draft and offer the following:
The Q allowable for the APS site equals Q (pressure flow in lateral) minus Q (inlet)

Therefore, 29.5 cfs (from pressure flow analysis) minus 3.3 cfs (inlet), equals 26.2 cfs.

The Q Allowable for the APS site is 26.2 cfs.
The orifice plate would need to be installed upstream (private side) of the inlet in Universe Blvd.

Hydrology reviewed the HGL in the Universe storm drain and the additional head would crawl up the pipe approx. 200 ft. There would be no adverse impact to the Trails system.
Please submit to Hydrology for Work Order approval.

Incorporating this into the existing construction plans would be preferable to an additional set. Is this something that you and Scott Steffen can work out?

Curtis

Eckert, Martin W

From: Eckert, Martin W
Sent: Monday, January 14, 2013 3:24 PM
To: 'Dourte, Richard H. (RDourte@cabq.gov)'
Cc: Alarid, Karen; Mason, Tyler M; Darby, Annelle; Livingston, John; 'Lovato, Jerry (jlovato@amafca.org)'; 'Cherne, Curtis (CCherne@cabq.gov)'; "Curran, Kevin J.' (kcurran@cabq.gov)'; 'Bingham, Brad (bbingham@amafca.org)'; 'Jeffrey Mortensen (JMortensen@highmesacg.com)'; 'Graeme Means (GMeans@highmesacg.com)'
Subject: Boca Negra Dam Agreement FW: Volcano Vista FW: Universe Blvd. Storm Drain
Attachments: Universe SD concept 6-12.pdf; Volcano Vista Legible approved MDP 061512.PDF; Volcano Vista approved MDP.PDF

Importance: High

Tracking:

Recipient	Delivery
'Dourte, Richard H. (RDourte@cabq.gov)'	
Alarid, Karen	Delivered: 1/14/2013 3:24 PM
Mason, Tyler M	Delivered: 1/14/2013 3:24 PM
Darby, Annelle	Delivered: 1/14/2013 3:24 PM
Livingston, John	Delivered: 1/14/2013 3:24 PM
'Lovato, Jerry (jlovato@amafca.org)'	
'Cherne, Curtis (CCherne@cabq.gov)'	
"Curran, Kevin J.' (kcurran@cabq.gov)'	
'Bingham, Brad (bbingham@amafca.org)'	
'Jeffrey Mortensen (JMortensen@highmesacg.com)'	
'Graeme Means (GMeans@highmesacg.com)'	

Richard, please see the below e-mails from June of 2012 (I'm sending the same attachments since they were referenced in the below e-mail, but APS does not agree with the Concept that is shown in the first pdf "Universe ... 6-12"). I noticed that you were not copied to those e-mails, but Kevin Curran, Esq. and Curtis Cherne were involved from the City of Albuquerque ("City") at that time.

It is my understanding that the Boca Negra Dam (the "Dam") is now under construction. As I believe you are aware, the Dam is the programmed outfall for the Volcano Vista High School ("V V HS") site. I understand that the City recently entered into an Agreement with The Trails and/or Longford Homes and/or other entities that allowed the Dam construction project to move forward. It is my understanding that the Agreement may have included some provisions regarding the future design and construction of the Universe Storm Drain that will drain into the Dam. I would like to get a copy of the Agreement as soon as possible in order that the Albuquerque Public Schools ("APS") can assess what implications the Agreement may have regarding APS and the V V HS site.

As I stated in my below e-mail, APS has built all of the drainage improvements it was required to build based on APS's drainage plan that was approved by the City. It was understood when APS purchased the State Land Office property and when APS's drainage plans for V V HS were approved that the Boca Negra Dam and the Universe SD would be built by others, at no expense to APS. APS would like to see the Universe SD outfall pipe built to allow the full 95.04 cfs to discharge from the V V HS site per the approved drainage plans. APS does not have any money to fund the Universe SD and is not interested in participating in the cost to construct the Universe SD which was supposed to be built by others long ago at no expense to APS.

It is my understanding that if the Universe Storm Drain is constructed as it was designed many years ago, APS will be able to convert a portion of its existing interim retention pond into a permanent detention pond and that the construction of the Universe Storm Drain will allow a major portion of the existing interim retention pond to be reclaimed by APS for future development on the V V HS site, and this is what APS has envisioned for years and what APS wants to happen. It is my further understanding that if the Universe Storm Drain is not constructed, that the entire existing interim retention pond on the APS V V HS site will in essence become a permanent retention pond, which I believe is in violation of the City Drainage Ordinance. This will cause a financial hardship to APS.

I request that you please send me a copy the requested Agreement as soon as possible, or let me know where I can pick-up a copy for review.

Thanks, Marty

Martin W. Eckert, SR/WA
Real Estate Director
Albuquerque Public Schools
Lincoln Complex Room 8
915 Locust St. SE
Albuquerque, NM 87106
E-mail: eckert_m@aps.edu
Phone: (505) 765-5950 ext 265
Fax: (505) 768-1583

From: Cherne, Curtis [mailto:CCherne@cabq.gov]
Sent: Thursday, June 21, 2012 9:42 AM
To: Eckert, Martin W; steven.metro@wilsonco.com; Curran, Kevin J.
Cc: Jeff Mulbery; Jeffrey Mortensen; Mason, Tyler M; Livingston, John; Bingham, Brad; Lovato, Jerry
Subject: RE: Volcano Vista FW: Universe Blvd. Storm Drain

Hydrology has no comment on this at this time.

Curtis

From: Eckert, Martin W
Sent: Friday, June 15, 2012 12:26 PM
To: 'steven.metro@wilsonco.com'; 'Curran, Kevin J.'
Cc: 'Jeff Mulbery'; Jeffrey Mortensen; Mason, Tyler M; Livingston, John; 'Cherne, Curtis '; 'Bingham, Brad'; 'Lovato, Jerry'
Subject: FW: Volcano Vista FW: Universe Blvd. Storm Drain
Importance: High

I have now talked to both Jeff Mulbery from BHI and Jeff Mortensen from HMCG. The 1st attachment is what Steve Metro sent me this morning – it is a conceptual plan that shows APS might be allowed a discharge of 10cfs under this scenario. The 2nd is a blow up of the BHI approved grading plan for V V HS which shows APS allowed 95.04 cfs discharge out of the 101 cfs allowed per the approved Master Drainage Plan, and the 3rd includes the BHI approved plans as well as portions of the previously approved Master Drainage Plan from HMCG.

APS has built the all of the drainage improvements it was required to build in its approved drainage plan. It was understood when APS purchased the State Land Office property and got its drainage plans for V V HS approved that the Boca Negra Dam and the Universe SD would be built by others, at no expense to APS. APS would like to see the Universe SD outfall pipe built to allow the full 95.04 cfs to discharge from the V V HS site. APS does not have any money to fund the Universe SD and is not interested in participating in the cost to construct the Universe SD which was supposed to be built by others long ago at no expense to APS. I apologize for my stupidity, but I have not been focusing as closely on this as I should have been because I'm trying to get another critical project wrapped up. I read the 1.44 cfs in the MDP, but failed to understand that it stated 1.44 cfs / acre (V V HS is 70 + acres).

Thanks, Marty

From: Jeff Mulbery [mailto:jmulbery@bhinc.com]
Sent: Friday, June 15, 2012 11:52 AM
To: Eckert, Martin W
Cc: Kevin Patton; Livingston, John
Subject: Re: Volcano Vista FW: Universe Blvd. Storm Drain

Marty, per our discussion the approved dmp for vvhs shows an outfall of approx. 95 cfs into the storm drain in universe to be built by others.

Cherne, Curtis

From: Eckert, Martin W [eckert_m@aps.edu]
Sent: Wednesday, February 27, 2013 1:06 PM
To: Dourte, Richard H.; Curran, Kevin J.; Whitcomb, Blake; Rael, Jane E.; Woodall, Stephen P.; Cherne, Curtis
Cc: Jeffrey Mortensen; Graeme Means (GMeans@highmesacg.com); Ruth M. Schifani (rschifani@modrall.com); Alarid, Karen; 'rbeltramo@gcinm.com'; 'James Topmiller' (Jtopmill@bhinc.com); hrelkin@slo.state.nm.us; Britt, Don (dbritt@slo.state.nm.us); Lovato, Jerry (jlovato@amafca.org); Bingham, Brad (bbingham@amafca.org); 'ssteffen@bhinc.com'; Livingston, John
Subject: Volcano Vista HS Storm Drain Connection in Universe
Importance: High
Attachments: V V HS Universe SD 022713 City Letter with Referenced Attachments.PDF

Richard, please see the attached which I believe is self-explanatory. As you can see, I've copied Ruth Schifani, Esq. from the Modrall Law Firm to this e-mail as APS takes this matter very seriously. Ruth would be happy to discuss this matter with Kevin or Blake if necessary, but I would hope we can resolve this at an Administrative Level before the attorney's need to spend any time on this matter. APS would be happy to meet to discuss this situation with you and all other interested parties at your earliest convenience. I have discussed this matter with representatives from AMAFCA and the New Mexico State Land Office (an adjacent owner that is also adversely impacted by this Project), and they are also copied this e-mail along with other interested parties.

Thanks for your consideration. I would appreciate knowing what the City intends to do, prior to the City signing off on the current plans. Thanks, Marty

Martin W. Eckert, SR/WA
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Albuquerque Public Schools
Lincoln Complex Room 8
915 Locust St. SE
Albuquerque, NM 87106
E-mail: eckert_m@aps.edu
Phone: (505) 765-5950 ext 265
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From: Cherne, Curtis [mailto:CCherne@cabq.gov]
Sent: Tuesday, February 26, 2013 12:00 PM
To: Graeme Means
Cc: Jeffrey Mortensen; Eckert, Martin W
Subject: RE: Volcano Vista HS Storm Drain Connection in Universe

Graeme,
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Therefore, 29.5 cfs (from pressure flow analysis) minus 3.3 cfs (inlet), equals 26.2 cfs.

The Q Allowable for the APS site is 26.2 cfs.
The orifice plate would need to be installed upstream (private side) of the inlet in Universe Blvd.

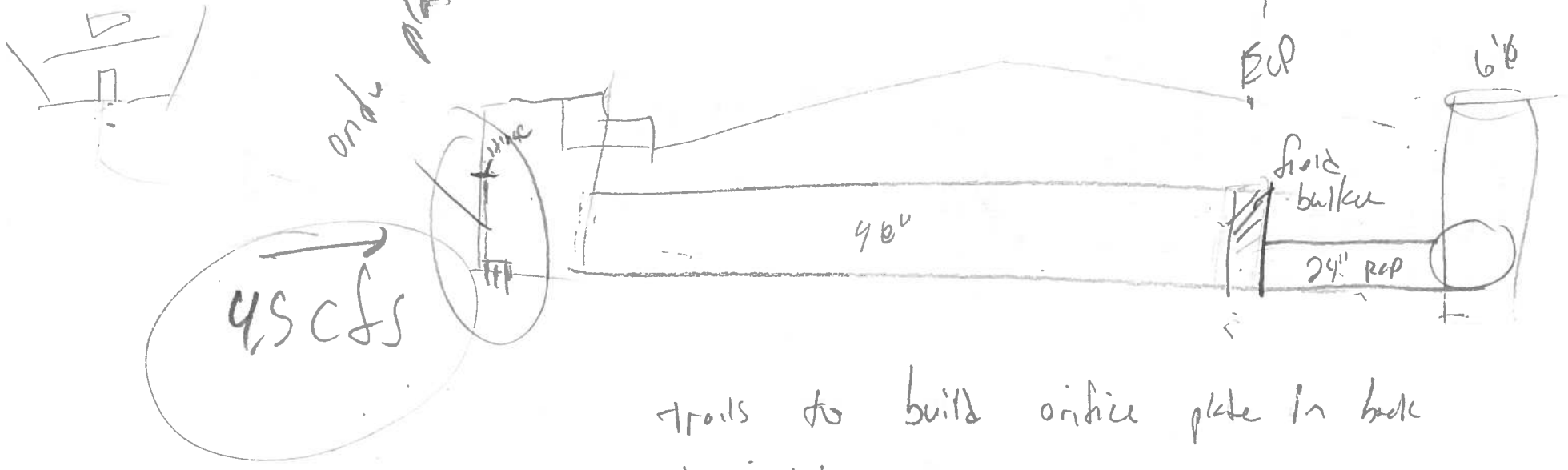
Hydrology reviewed the HGL in the Universe storm drain and the additional head would crawl up the pipe approx. 200 ft. There would be no adverse impact to the Trails system.
Please submit to Hydrology for Work Order approval.

Incorporating this into the existing construction plans would be preferable to an additional set. Is this something

meeting: Rick Beltrano
Scott Stetler
Curtis Cherne
Shahab Biazar (partial)

6-26-13
CL

4,5 cfs from APS to not require pressure manhole covers.
- if APS wants a higher flow, they can do the hydraulic analysis and replace the orifice plate.



Trails to build orifice plate in back of inlet.

I agreed to a field or prefab bulkhead to connect the 24" to the 48".
I agreed to the 468' spacing between manholes.

process

1. Scott Stetler will revise sheet in construction set
2. Hydrology will initial sheet when acceptable
3. City Engineer Sign construction plans.

Cherne, Curtis

From: Scott Steffen [ssteffen@bhinc.com]
Sent: Tuesday, March 12, 2013 11:02 AM
To: Dourte, Richard H.; Cherne, Curtis
Subject: Universe Storm Drain
Attachments: Universe SD Manhole Surge Summary APS flow.xlsx

Richard/Curtis,

Here is a summary of the hydraulic analysis of the Universe storm drain (as designed), showing the hydraulic surge at manholes that results from introducing flows from APS into the system.

Please call to discuss if you have questions.

Thanks,

Scott J. Steffen
Vice President
Community Development and Planning
Bohannan Huston
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

APS Flowrate (cfs)	Manhole #1 Surge (ft)	Manhole #2 Surge (ft)	Manhole #3 Surge (ft)
4.5	0		
5	0.18		
6	0.62		
7	1.08		
8	1.54	0.10	0.31
9	2.00	0.40	0.87

Cherne, Curtis

From: Scott Steffen [ssteffen@bhinc.com]
Sent: Tuesday, March 12, 2013 12:33 PM
To: Cherne, Curtis
Cc: Dourte, Richard H.
Subject: RE: Universe Storm Drain

Curtis,

The Q includes the street flow. So 4.5 cfs = 1.5 cfs APS + 3 cfs street.

Scott J. Steffen
Vice President
Community Development and Planning
Bohannan ▲ Huston
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7500 Jefferson St. NE
Albuquerque, NM 87109-4335
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voice: 505.823.1000 **facsimile:** 505.798.7988 **toll free:** 800.877.5332

From: Cherne, Curtis [mailto:CCherne@cabq.gov]
Sent: Tuesday, March 12, 2013 12:33 PM
To: Scott Steffen
Cc: Dourte, Richard H.
Subject: RE: Universe Storm Drain

Scott,
Does these Q's include the street flows or are in addition to. E.g. 7 cfs is 7 cfs from APS plus 3 cfs from street flows= 10 cfs.

Curtis

From: Scott Steffen [mailto:ssteffen@bhinc.com]
Sent: Tuesday, March 12, 2013 11:02 AM
To: Dourte, Richard H.; Cherne, Curtis
Subject: Universe Storm Drain

Richard/Curtis,

Here is a summary of the hydraulic analysis of the Universe storm drain (as designed), showing the hydraulic surge at manholes that results from introducing flows from APS into the system.

Please call to discuss if you have questions.

Thanks,

Scott J. Steffen
Vice President
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ALBUQUERQUE PUBLIC SCHOOLS
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Winston Brooks
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Martin W. Eckert, SR/WA
REAL ESTATE DIRECTOR
eckert_m@aps.edu

February 27, 2013
Via Hand Delivery and
e-mail to rdourte@cabq.gov

Mr. Richard Dourte, PE, City Engineer
City of Albuquerque
PO Box 1293
Albuquerque, NM 87103

Re: Universe Storm Drain – City Project # 761283

Dear Mr. Dourte:

On behalf of the Board of Education of the Albuquerque Municipal School District No. 12, Counties of Bernalillo and Sandoval, New Mexico, a political subdivision of the State of New Mexico, a.k.a. Albuquerque Public Schools ("APS"), this letter is being sent in order to **request/demand that the City of Albuquerque ("City") stop processing the plans for the above referenced project at this time.**

Please see the enclosed:

- HMCG February 26, 2013 Drainage Analysis – HMCG Job No. 2012.182.9
- E-mails from February 26th and 27th between HMCG and Curtis Cherne, PE
- E-mails from June 15, 2012 through January 14, 2013 between me and the City

Subsequent to my January 14th e-mail, the City provided me a copy of a Settlement Agreement between the City and the Trails, LLC ("Trails"), RCS - Cantada Residences I, LLC, RCS - Taos, LLC and RCS – Trails 9-A, LLC (collectively referred to as "RCS") and the Albuquerque Metropolitan Arroyo Flood Control Authority ("AMAFCA"), the ("Settlement Agreement"). The Settlement Agreement is not dated, but was signed by the City on November 28, 2012, and the Settlement Agreement refers to other previous agreements between the parties which were also provided to me.

APS made it perfectly clear to the City in the above referenced e-mails that APS previously built all of the drainage improvements it was required to build based on APS's drainage plan that was approved by the City. It was understood when APS purchased the State Land Office property and when APS's drainage plans for Volcano Vista High School ("V V HS") were approved by the City that the Boca Negra Dam and the Universe Storm Drain ("Universe SD") would be built by others, at no expense to APS. In addition, it was made perfectly clear that APS believed the Universe SD outfall pipe needed to be built to allow the full 95.04 cfs to discharge from the V V HS site per the approved drainage plans. APS is very disappointed that the City chose to enter into agreements with these private entities after APS put the City on notice what APS expected, particularly without giving APS the courtesy of

knowing that the City was negotiating said agreements. We do not believe this is how one governmental agency should treat another governmental agency.

It is my understanding that the City is ready to approve plans for a 36 inch SD pipe in Universe Blvd. (originally was supposed to be a 60 inch SD pipe) that will have no pipe connection from the existing 48 inch lateral SD pipe that APS constructed in 2006 under City Project # 766981 in anticipation of a future connection to the proposed 60 inch SD pipe that was to have been built by others within the Universe Blvd. right-of-way. If the City allows the currently designed Universe SD project (City Project # 761283) to proceed as designed, **the City will be damaging APS tremendously** as APS will not be able to convert a major portion of its existing interim retention pond into a permanent detention pond, and thus APS will not be able to reclaim a major portion of the existing interim retention pond for future APS development on the V V HS site. Thus, **the entire existing interim retention pond on the APS V V HS site will in essence become a permanent retention pond which I understand is in violation of the City Drainage Ordinance**. This will cause a financial hardship to APS, and I believe will result in an Inverse Condemnation Action by the City against APS.

APS has also informed the City that APS was not interested in participating in the cost to construct the Universe SD which was supposed to be built by others long ago at no expense to APS. APS is still not interested in spending any of the Districts' tax payer's money to construct drainage improvements that should have been built by others long ago; however, APS may be willing to spend a limited amount of APS funds to make sure that a partial / interim solution is built at this time. That partial / interim solution would be for Bohannan Huston ("BHI") to revise as soon as possible the current project plans (City Project # 761283), prior to the plans being approved by the City, to include the recommended installation of the 18 inch connection and orifice plate, etc. (all per attached HMCG Job No. 2012.182.9) and for said 18 inch connection and orifice plate, etc. to be built with the current project.

Please note, it is my understanding that these minor plan revisions, if constructed, will only allow APS to discharge approximately 26.2 +/- cfs, which is substantially less than the 95.04 +/- cfs that APS has been approved to discharge. The reason I have referred to this as a "partial / interim solution" is that **APS is willing to allow City Project # 761283 to move forward if these revisions to the project are made as a way to ameliorate the situation at this time**, as APS has been backed into a corner and has no other reasonable relief at this time. APS will be willing to agree to this partial / interim solution, but APS will not be 100% satisfied and APS will reserve its right to have the entire 95.04 +/- cfs drainage outfall constructed by others in the future, at no additional expense to APS.

APS believes this is a reasonable interim solution that all parties should and can agree to administratively at this time. However, if the City will not agree to delay the approval of the plans for City Project # 761283 at this time to include the requested APS plan revisions, APS will do everything it can to seek and obtain all legal relief in this matter, including but not limited to seeking a Court Order to stop City Project # 761283 until adequate relief can be provided to APS.

I have enjoyed working with you over the years, and I appreciate your assistance on this matter. I look forward to continuing our good working relationship into the future. Please let me know as soon as possible what the City intends to do with regard to this matter.

Sincerely,
Albuquerque Public Schools

Martin W. Eckert, Real Estate Director

Enclosures As Indicated

Xc: Kevin Curran, Esq. (via e-mail)
Blake Whitcomb, Esq. (via e-mail)
Jane Rael (via e-mail)
Stephen Woodall (via e-mail)
Curtis Cherne (via e-mail)
Ruth Schifani, Esq. (via e-mail)
Karen Alarid (via e-mail)
Jeff Mortensen (via e-mail)
Graeme Means (via e-mail)
Rick Beltramo (via e-mail)
Scott Steffen (via e-mail)
James Topmiller (via e-mail)
Harry Relkin, Esq. (via e-mail)
Don Britt (via e-mail)
Jerry Lovato (via e-mail)
Brad Bingham (via e-mail)

Cherne, Curtis

From: Dourte, Richard H.
Sent: Monday, March 18, 2013 10:57 AM
To: 'Eckert, Martin W'; Jeffrey Mortensen; Scott Steffen (ssteffen@bhinc.com)
Cc: Cherne, Curtis; Whitcomb, Blake; Graeme Means; Ruth M. Schifani (rschifani@modrall.com); Alarid, Karen; Darby, Annelle; Livingston, John
Subject: RE: Volcano Vista HS RE: APS and Universe Storm Drain
Attachments: Universe SD Manhole Surge Summary APS flow.xlsx

Martin,

I don't have a detailed analysis to provide. Mr. Steffen at BHI did an analysis as attached, showing that if we allow 6 cfs (3cfs from the street and 3 from APS) we will surcharge the manhole by .6ft. Normally, it is not allowed to have any surcharge, but I feel that something needs to be provided. We may be able to give 4 cfs but in either case we will need to tie the manhole down which is undesirable for many reasons. If you can provide an analysis that would allow for more discharge from your site we will be glad to take a look at it, sometimes the flow timing can make a difference. Although 3 to 4 cfs may not sound like alot, it does provide some relief to your pond.

Please let me know soon,

Richard

From: Eckert, Martin W [mailto:eckert_m@aps.edu]
Sent: Monday, March 18, 2013 10:44 AM
To: Dourte, Richard H.; Jeffrey Mortensen
Cc: Cherne, Curtis; Whitcomb, Blake; Graeme Means; Ruth M. Schifani (rschifani@modrall.com); Alarid, Karen; Darby, Annelle; Livingston, John
Subject: Volcano Vista HS RE: APS and Universe Storm Drain

Richard, you should have received an out of office reply from me last week as I was out of the office on vacation, and I see that Jeff also notified you I was out and that I would respond asap after my return to the office. Thank you for your patience and thank you for trying to make the best out of what I believe to be a bad situation.

Since it does not appear that the City or BHI provided either APS or HMCG a copy of the "detailed analysis" that is referenced in your below e-mail to Jeff, it is hard for me to understand the conclusion of 3 cfs discharge. My initial reaction is "**only 3 cfs**?????". 3 cfs is obviously better than 0 cfs, but substantially less than the 26 to 29 cfs that HMCG had calculated might be possible. I can't express enough how disappointed the School District is with this drastic restriction on its ability to drain this site, particularly in light of the APS Drainage Plan that was approved by the City to allow closer to 100 cfs to be drained.

I request that you please provide APS and HMCG a copy of the "detailed" analysis that demonstrates that APS would be limited to 3 cfs discharge for APS to review. We can't provide the City an answer until we have had adequate time to review this and discuss it internally.

Thanks again for trying to help APS, and the taxpayers of the School District. Marty

Martin W. Eckert, SR/WA
Real Estate Director
Albuquerque Public Schools
Lincoln Complex Room 8
915 Locust St. SE
Albuquerque, NM 87106
E-mail: eckert_m@aps.edu
Phone: (505) 765-5950 ext 265
Fax: (505) 768-1583

CITY OF ALBUQUERQUE

March 14, 2013

Catherine F. Davis, Esq.
Hunt and Davis, PC
2632 Mesilla NE
Albuquerque, NM 87110

Re: City of Albuquerque Work Order for the Universe Storm Drain Project no. 761283

Dear Ms. Davis,

This letter is in response to your correspondence dated March 8, 2013, regarding the above referenced subject.

Prior to issuing a work order for the Universe Storm Drain (City project no. 761283) construction documentation (copy of contract between developer and contractor; contractor bonds, which include warranty/performance bond and labor/material bond; certification of insurance) needs to be submitted to the City. To date, the City has not yet received these documents from your client. Please contact Marilyn Maldonado at 924-3997 for more information.

PO Box 1293

In regard to the general allegations in your letter, as with most projects there are existing field conditions that need to be addressed. There is a storm drain lateral in Universe Boulevard that accepts runoff from this street via a catch basin. This lateral also accepts storm water from a pond on APS property. This issue will need to be resolved at this time or as a change order prior to the City accepting this project. There is no hold on your clients project.

Albuquerque

NM 87103

Sincerely,

www.cabq.gov

Richard Dourte, PE
City Engineer

Cc: Suzanne Lubar, Acting Director, Planning Dept.
Matthew Conrad, Associate Director, Planning Dept.
Kevin Curran, Esq., Deputy City Attorney
Blake Whitcomb, Esq., Assistant City Attorney
Curtis Cherne, PE, City Hydrologist
Jane Rael, PhD, PE, Design Review Manager

Cherne, Curtis

From: Eckert, Martin W [eckert_m@aps.edu]

Sent: Monday, January 14, 2013 3:24 PM

To: Dourte, Richard H.

Cc: Alarid, Karen; Mason, Tyler M; Darby, Annelle; Livingston, John; Lovato, Jerry (jlovato@amafca.org); Cherne, Curtis ; Curran, Kevin J.; Bingham, Brad (bbingham@amafca.org); Jeffrey Mortensen (JMortensen@highmesacg.com); Graeme Means (GMeans@highmesacg.com)

Subject: Boca Negra Dam Agreement FW: Volcano Vista FW: Universe Blvd. Storm Drain

Importance: High

Attachments: Universe SD concept 6-12.pdf; Volcano Vista Legible approved MDP 061512.PDF; Volcano Vista approved MDP.PDF

Richard, please see the below e-mails from June of 2012 (I'm sending the same attachments since they were referenced in the below e-mail, but APS does not agree with the Concept that is shown in the first pdf "Universe ... 6-12"). I noticed that you were not copied to those e-mails, but Kevin Curran, Esq. and Curtis Cherne were involved from the City of Albuquerque ("City") at that time.

It is my understanding that the Boca Negra Dam (the "Dam") is now under construction. As I believe you are aware, the Dam is the programmed outfall for the Volcano Vista High School ("V V HS") site. I understand that the City recently entered into an Agreement with The Trails and/or Longford Homes and/or other entities that allowed the Dam construction project to move forward. It is my understanding that the Agreement may have included some provisions regarding the future design and construction of the Universe Storm Drain that will drain into the Dam. I would like to get a copy of the Agreement as soon as possible in order that the Albuquerque Public Schools ("APS") can assess what implications the Agreement may have regarding APS and the V V HS site.

As I stated in my below e-mail, APS has built all of the drainage improvements it was required to build based on APS's drainage plan that was approved by the City. It was understood when APS purchased the State Land Office property and when APS's drainage plans for V V HS were approved that the Boca Negra Dam and the Universe SD would be built by others, at no expense to APS. APS would like to see the Universe SD outfall pipe built to allow the full 95.04 cfs to discharge from the V V HS site per the approved drainage plans. APS does not have any money to fund the Universe SD and is not interested in participating in the cost to construct the Universe SD which was supposed to be built by others long ago at no expense to APS.

It is my understanding that if the Universe Storm Drain is constructed as it was designed many years ago, APS will be able to convert a portion of its existing interim retention pond into a permanent detention pond and that the construction of the Universe Storm Drain will allow a major portion of the existing interim retention pond to be reclaimed by APS for future development on the V V HS site, and this is what APS has envisioned for years and what APS wants to happen. It is my further understanding that if the Universe Storm Drain is not constructed, that the entire existing interim retention pond on the APS V V HS site will in essence become a permanent retention pond, which I believe is in violation of the City Drainage Ordinance. This will cause a financial hardship to APS.

I request that you please send me a copy the requested Agreement as soon as possible, or let me know where I can pick-up a copy for review.

Thanks, Marty

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Cherne, Curtis

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Sent: Monday, January 14, 2013 3:24 PM

To: Dourte, Richard H.

Cc: Alarid, Karen; Mason, Tyler M; Darby, Annelle; Livingston, John; Lovato, Jerry (jlovato@amafca.org); Cherne, Curtis ; Curran, Kevin J.; Bingham, Brad (bbingham@amafca.org); Jeffrey Mortensen (JMortensen@highmesacg.com); Graeme Means (GMeans@highmesacg.com)

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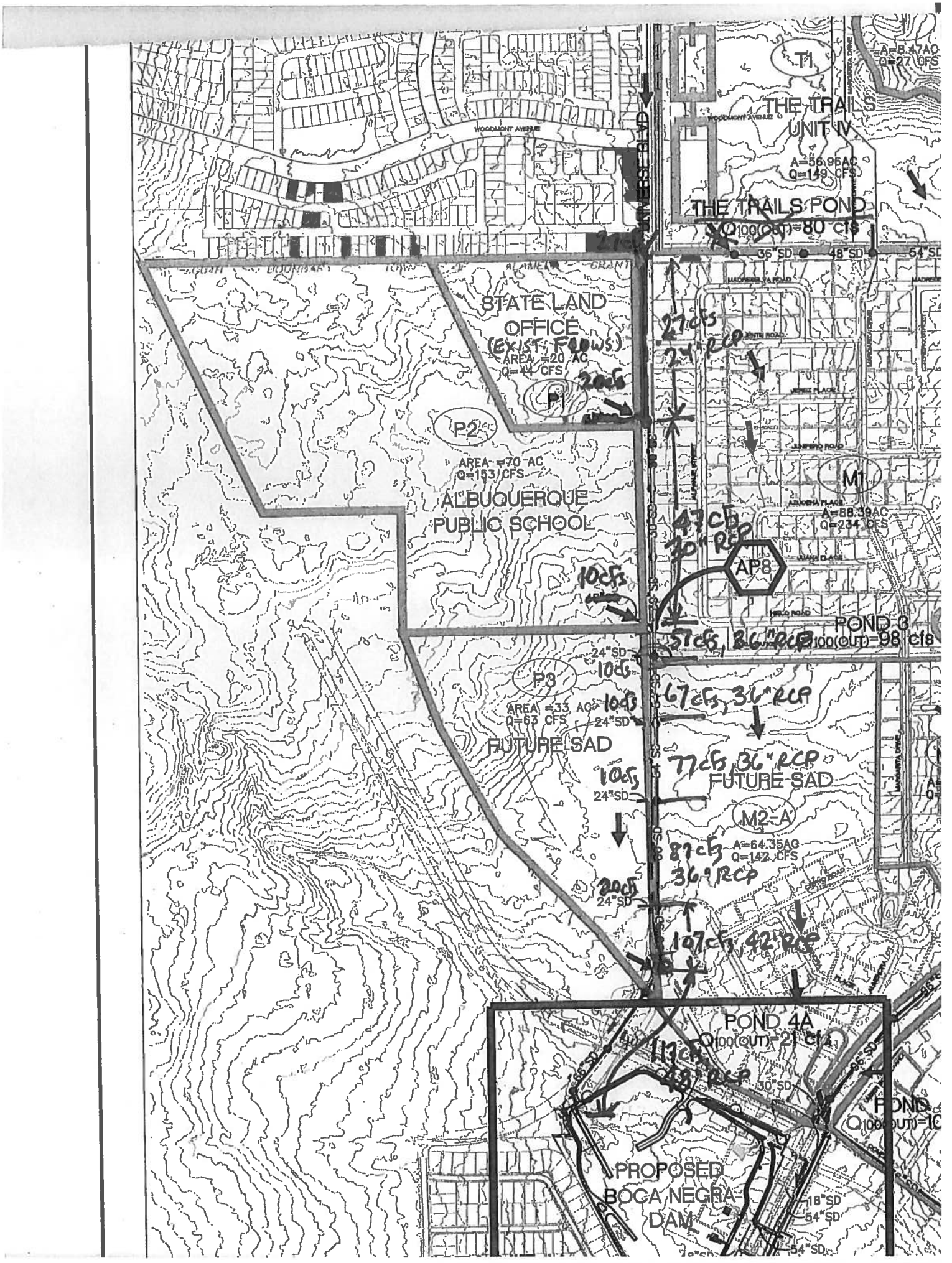
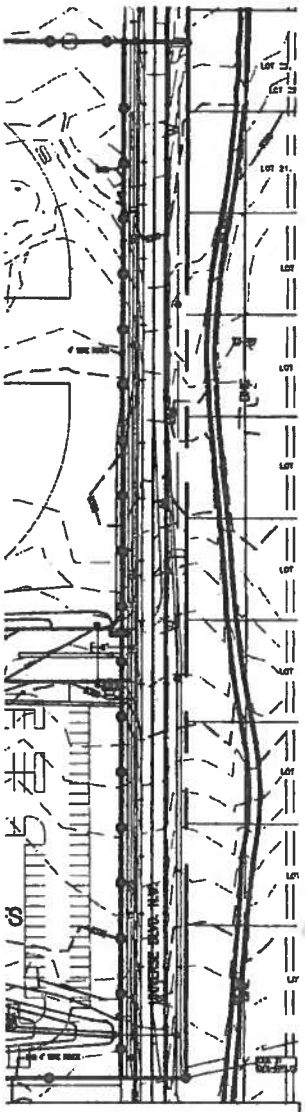

T1
THE TRAILS UNIT IV
A=56.96AC
Q=149 CFS
THE TRAILS POND
Q100(OUT)=80 CFS
36"SD
48"SD
54"SD
WOODMONT AVENUE
STATE LAND OFFICE (EXIST. FLOWS)
AREA =20 AC
Q=44 CFS
P1
P2
AREA =70 AC
Q=153 CFS
ALBUQUERQUE PUBLIC SCHOOL
M1
A=88.39AC
Q=234 CFS
AP8
POND 6
Q100(OUT)=98 CFS
P3
AREA =33 AC
Q=63 CFS
FUTURE SAD
M2-A
A=64.35AC
Q=142 CFS
POND 4A
Q100(OUT)=21 CFS
PROPOSED BOCA NEGRA DAM
18"SD
54"SD



B HI Approved Grading Plan

DRAINAGE MANAGEMENT PLAN

I. INTRODUCTION

The purpose of this submittal is to present a grading and drainage plan for the proposed North West High School for grading permit approval. The site is bounded along the north by "The Trails" a planned subdivision, along the east by Universe Boulevard, to the south by a planned subdivision, Volcano Cliffs Unit 14, and to the west by Rainbow Boulevard. The project will include a new Albuquerque Public School System (APS) high school, with parking lots, playing fields, landscaped areas as well as a drainage detention pond. The proposed hydrologic conditions will be analyzed with AHYMO and results comply with the approved "Master Drainage Report for the APS Northwest Mesa High School" completed by Jeff Mortenson & Associates, Inc. (Engineer's Stamp date 10-14-05, C9/D7; approved November 1, 2005).

II. SITE LOCATION

The site is located within zone atlas maps C-9, C-10, D-9, and D-10. The site is in the Boca Negra Arroyo basin as shown in the Federal Emergency Management Agency (FEMA) map #35001C0111E. The Boca Negra Arroyo is near the site; however, it does not affect on-site flows. Tract B and Tract C, Ancient Mesa are adjacent to the site by do not affect flows on the site. All runoff developed on Tract C, which is located to the southwest of the site, runs to the south. Flows from Tract B, which is northeast of the site, flows to the southeast and will eventually be tied into a storm drain in Universe Boulevard.

III. EXISTING HYDROLOGIC CONDITIONS

This site is currently a vacant lot with mild to medium vegetation cover. Drainage is transmitted across the site from the northwest to the southeast at slopes from 0.5 to 10 percent, with various rock outcroppings throughout the site. All flows developed on the site, historically flow to the Boca Negra Arroyo. The Trails subdivision to the north is detaining all developed flows within an internal detention pond. Rainbow Boulevard and a major gas line that runs parallel to Rainbow serve as a berm so there are no offsite flows that affect the site.

As indicated in the report by JMA, under existing conditions this site has an allowable 100yr discharge of 101cfs for the 70 acre area of Tract A. The analysis of the existing hydrology was performed in accordance with section 22.2 of the Development Process Manual. The JMA approved master drainage report has a listing of background documents that were completed for this site, as well as a description of historical hydrologic conditions.

IV. PROPOSED HYDROLOGIC CONDITIONS

The development of the site will be completed in three phases, however this master drainage plan will be applicable throughout all phases. In order to account for the increase in impervious area a new detention pond will be constructed onsite which will discharge to a storm drain system in Universe Boulevard that will be completed by others. This new system will have a stub out at the southeast corner of the site, designed to accept the allowable 100 year discharge.

Drainage will continue to flow across the site from the northwest to the southeast with slopes similar to the existing conditions. An onsite storm drain system, swales and sheet flow will direct all flows to the onsite detention pond located in the southeast corner of the site. Please see the inlet table, pipe table, pond table, and the proposed conditions basin data table on this sheet for all calculations.

Currently, there are areas within this site that the City of Albuquerque will use to build sports facilities in the future. These areas are noted as basins SF11, SF12, and SF23. It is assumed these sites will ultimately drain to the detention pond. Therefore, the detention pond was sized using the developed Q's for these basins.

According to the AHYMO analysis the developed flow from the entire site is 258 cfs. The pond detains and attenuates the flow so that the 100 year, 24 hour proposed conditions peak discharge from the site is 95.04cfs. The implementation of these concepts would result in the safe passage of the 100 year, 24 hour storm event.

V. CONCLUSION

The total flow discharged from the site is 95.04cfs which is less than the allowable discharge of 101cfs. These flows were computed in accordance with the methodology outlined in section 22.2 of the Development Process Manual. The drainage management plan is capable of safely passing the 100 year, 6 hour storm, complies with the approved Master Drainage Plan for the site and meets city requirements.

11/19/2007

ORIGINAL CFS)	V(100)$_{6HR}$ (inches)	V(100)$_{6HR}$ (CF)
4.41	1.97	9704
2.67	1.97	4293
-	1.97	1154
-	1.97	846
-	1.97	4973
-	1.97	4530
-	1.97	1777
-	1.97	2604
-	1.97	6827
-	1.97	11456
27.31	19.70	47984
11.67	1.81	19281
5.60	1.01	2646
11.27	1.47	18308
-	1.97	4849
-	1.91	8290
-	0.98	16334
-	1.58	100915
-	1.97	4354
-	1.04	13902
-	1.66	4146
-	1.12	19769
-	1.12	9730
-	1.17	9157
-	1.58	19412
-	1.74	4217
-	1.74	1769
-	1.74	3053
-	1.74	12350
1.36	1.86	3193
-	1.86	4418
-	1.97	2032
1.20	1.74	4745
-	0.99	31538
14.56	35.87	318409

NORTHWEST HIGH SCHOOL

Volcano Vista

ADDRESS
8100 Rainbow NW
Albuquerque NM

CONSTRUCTION SET

1	11/19/2007	DRAINAGE CALCULATION REVISON

PROJECT #: 05041
CAD DWG FILE:: 060278dmp_rev.dwg
DWN BY: RWB
CHK BY: JLM

SHEET TITLE:

DRAINAGE MANAGEMENT PLAN

SHEET # OF -

MASTER DRAINAGE REPORT

I. EXECUTIVE SUMMARY AND INTRODUCTION

THE PROPOSED APS NORTHWEST MESA HIGH SCHOOL SITE IS LOCATED IN A RAPIDLY DEVELOPING AREA OF ALBUQUERQUE'S NORTHWEST MESA. THE SITE LIES WITHIN THE BOCA NEGRA WATERSHED ON THE SOUTH SIDE OF THE ALAMEDA GRANT LINE. THE SITE WILL BE SUBJECT TO DISCHARGE RESTRICTIONS AND SHALL UTILIZE DETENTION PONDING TO LIMIT THE PEAK RATE OF STORMWATER RUNOFF DISCHARGING TO PROPOSED DOWNSTREAM PUBLIC DRAINAGE FACILITIES. OFFSITE FLOWS DO NOT IMPACT THE SITE. THE PURPOSE OF THIS SUBMITTAL IS TO OBTAIN WORK ORDER APPROVAL FOR THE FRONTING PUBLIC STREETS AND TO ESTABLISH THE DRAINAGE REQUIREMENTS FOR THE SITE AND FOR THE ADJACENT PUBLIC STREETS THAT ARE REQUIRED TO SUPPORT THE PROJECT. THIS REPORT ADDRESSES TRACTS A AND B, ANCIENT MESA, AND THE FRONTING PORTIONS OF UNIVERSE AND RAINBOW BOULEVARDS. SEPARATE SUBMITTALS WILL BE REQUIRED FOR BUILDING PERMIT APPROVALS FOR THE ACTUAL SCHOOL SITE.

II. PROJECT DESCRIPTION:

AS SHOWN BY VICINITY MAP C-9, THE SITE IS LOCATED ON ALBUQUERQUE'S NORTHWEST MESA BETWEEN RAINBOW BLVD NW, AND UNIVERSE BLVD NW, SOUTH OF WOODMONT AVE NW. RAINBOW (A.K.A. ATRISCO DRIVE) IS A BLADED DIRT ROAD AND UNIVERSE IS PAVED AS A TEMPORARY (NO CURB AND GUTTER) ROAD APPROXIMATELY 25 FT WIDE. THE TRAILS DEVELOPMENT CURRENTLY BEING DEVELOPED BY LONGFORD HOMES ADJOINS THE SITE TO THE NORTH AND WILL CONSTRUCT A PUBLIC STORM DRAIN IN UNIVERSE THAT WILL BE THE DRAINAGE OUTFALL FOR TRACTS A AND B, ANCIENT MESA. THE PROPERTIES TO THE EAST, SOUTH AND WEST ARE UNDEVELOPED. THE UNDEVELOPED LANDS TO THE EAST AND SOUTH ARE PLATTED AS PART OF VOLCANO CLIFFS. THE UNDEVELOPED LAND TO THE WEST IS UNPLATTED STATE LAND. THE PROPOSED LEGAL DESCRIPTION FOR THE HIGH SCHOOL SITE IS TRACT A, ANCIENT MESA. THE SITE IS ZONED RO-20 AND THE PROPOSED USE IS PERMISSIBLE. AS SHOWN BY PANEL 111 OF 825 OF THE NATIONAL FLOOD INSURANCE PROGRAM FLOOD INSURANCE RATE MAPS, BERNALILLO COUNTY, NEW MEXICO, AND INCORPORATED AREAS, DATED NOVEMBER 19, 2003, THE SITE DOES NOT LIE WITHIN A DESIGNATED FLOOD HAZARD ZONE. EXISTING SITE RUNOFF ULTIMATELY DRAINS TO THE BOCA NEGRA ARROYO WHICH HAS A ZONE A FLOOD HAZARD DESIGNATION.

III. BACKGROUND DOCUMENTS

THE FOLLOWING IS A LIST OF DOCUMENTS RELATED TO THE SITE AND SURROUNDING AREA. THIS LIST MAY NOT BE INCLUSIVE, HOWEVER, REPRESENTS A SUMMARY OF RELEVANT PLANS AND DOCUMENTS WHICH ARE KNOWN TO THE ENGINEER AT THE TIME OF PLAN PREPARATION.

A. PLAT OF TRACTS A, B AND C, ANCIENT MESA PREPARED BY JEFF MORTENSEN & ASSOCIATES, INC (JMA) DATED 06/01/2005. THIS PLAT (PROJECT NUMBER 1004071) WAS APPROVED BY THE CITY DEVELOPMENT REVIEW BOARD (DRB) ON JUNE 22, 2005. RECORDATION OF THE PLAT IS CONTINGENT UPON THE LAND ACQUISITION DEAL BETWEEN APS AND THE SELLER, THE STATE LAND OFFICE (SLO). TRACT A WILL BE THE HIGH SCHOOL SITE. THIS DRAINAGE REPORT ADDRESSES TRACTS A AND B WHICH WILL DRAIN TO THE PROPOSED STORM DRAIN IN UNIVERSE.

B. BOCA NEGRA – MARIPOSA ARROYO DRAINAGE MANAGEMENT PLAN DATED APRIL, 2005, PREPARED FOR AMAFCA BY RESOURCE TECHNOLOGY, INC. (RTI). THIS PLAN, ADOPTED BY AMAFCA, PRESENTS AN OVERALL DRAINAGE MANAGEMENT PLAN FOR THE WATERSHED INCLUDING THE DESIGN AND CONSTRUCTION OF THE BOCA NEGRA DAM TO BE LOCATED NEAR THE INTERSECTION OF UNSER BLVD NW AND RAINBOW (ATRISCO) BLVD NW. THIS DAM, TO BE MAINTAINED BY AMAFCA, IS THE DESIGNATED OUTFALL FOR DEVELOPED RUNOFF FROM THE PROPOSED HIGH SCHOOL SITE AND IS CURRENTLY IN THE FINAL STAGES OF DESIGN. DAM CONSTRUCTION IS PLANNED TO BEGIN IN 2006 UNDER A COST-SHARING AGREEMENT BETWEEN AMAFCA AND PRIVATE DEVELOPERS THAT WILL BENEFIT FROM THE PROJECT.

C. PRELIMINARY CONSTRUCTION PLANS FOR THE TRAILS OFFSITE STORM DRAIN (CPN 761281) BY WILSON & COMPANY DATED JULY, 2005. THIS PLAN SET (NOT YET APPROVED AT THE TIME THIS REPORT WAS PREPARED) ADDRESSES THE PUBLIC (CITY OF ALBUQUERQUE) UNIVERSE STORM DRAIN THAT WILL RUN FROM THE ALAMEDA GRANT LINE AT THE SOUTHEAST CORNER OF THE TRAILS PROJECT SOUTH TO THE AFOREMENTIONED BOCA NEGRA DAM (REF. B). THE STORM DRAIN WILL SERVE AS THE OUTFALL FOR THE TRAILS PROJECT AND FOR TRACTS A AND B, ANCIENT MESA. THE STORM DRAIN WILL COVER THE UNIVERSE BLVD NW FRONTAGES OF TRACTS A AND B, ANCIENT MESA. AS IDENTIFIED ON THE PRELIMINARY STORM DRAIN PLANS, THE PROJECT WILL CONSTRUCT A 48 INCH RCP STUBOUT TO THE SW CORNER OF THE HIGH SCHOOL SITE (TRACT A). BASED ON THE INCREASE IN STORM DRAIN FLOW RATE SHOWN ON THE PROFILE, THE STUB IS SIZED TO INTRODUCE 130 CFS INTO THE UNIVERSE STORM DRAIN FROM THE SLO PROPERTY.

D. AMENDMENT TO THE TRAILS SUBDIVISION MASTER DRAINAGE STUDY PREPARED FOR LONGFORD HOMES BY WILSON & COMPANY, INC, DATED JULY 29, 2004. THE ORIGINAL PLAN FOR THE TRAILS WAS PREPARED BY BOHANNON-HUSTON, INC (BHI). THE AMENDMENT BY WILSON & COMPANY REVISED THE DRAINAGE CONCEPT FOR THE TRAILS TO ONE WHEREBY STORMWATER WOULD BE DETAINED IN PONDS DISCHARGING TO THE PROPOSED UNIVERSE STORM DRAIN (REF. C). THE AMENDED PLAN IDENTIFIED THE SLO PROPERTY AS AN 83 ACRE BASIN CONTRIBUTING 137 CFS TO THE PROPOSED UNIVERSE STORM DRAIN. THIS FLOW RATE AND CONCEPT IS CONSISTENT WITH THE BOCA NEGRA DMP (REF. B) AND UNIVERSE STORM DRAIN (REF. C).

E. PRE-DESIGN MEETING WITH THE CITY HYDROLOGIST DATED 08/21/2005 (COPY OF MEETING RECAP SUBMITTED HEREWITH). THE RECAP SUMMARIZES THE DRAINAGE CRITERIA FOR DEVELOPMENT OF THE APS AND SLO PROPERTIES WHICH ARE REQUIRED TO USE ONSITE DETENTION TO LIMIT RUNOFF TO THE ALLOWABLE RATES TO BE ESTABLISHED FOR THE UNIVERSE STORM DRAIN (REF. C) AND BOCA NEGRA DAM (REF. B).

THE PROPOSED DRAINAGE CONCEPT OF USING DETENTION TO LIMIT SITE DISCHARGE FROM TRACTS A AND B TO THE PROPOSED PUBLIC UNIVERSE STORM DRAIN AS PROPOSED AND DESCRIBED HEREIN IS IN ACCORDANCE WITH THE POLICIES AND REQUIREMENTS OF THE ABOVE LISTED DOCUMENTS.

IV. EXISTING CONDITIONS:

TRACTS A AND B, ANCIENT MESA ARE UNDEVELOPED WITH A SPARSE GROUND COVER OF NATIVE VEGETATION. THE SITE GENERALLY SLOPES FROM NORTHWEST TO SOUTHEAST AND EXISTING SITE RUNOFF DRAINS TO THE UNDEVELOPED BOCA NEGRA ARROYO. THE SITE IS BOUNDED ON THE NORTH BY THE TRAILS SUBDIVISION CURRENTLY UNDER CONSTRUCTION. THE TRAILS PROJECT WILL DRAIN TO AN INTERNAL DETENTION POND AND STORM DRAIN SYSTEM AND WILL NOT CONTRIBUTE OFFSITE FLOWS TO THE ANCIENT MESA SITE. THE SITE IS BOUNDED ON THE WEST BY RAINBOW BLVD NW, A BLADED DIRT ROAD. A MAJOR GAS PIPELINE IS LOCATED WEST OF THE RAINBOW ROW AND RUNS PARALLEL TO RAINBOW. THE EXISTING TOPOGRAPHY COMBINED WITH THE GRADING ASSOCIATED WITH THE EXISTING PIPELINE ROAD COMBINE ACT AS A DIVERSION BERM THAT INTERCEPTS OFFSITE FLOWS FROM TRACT C WEST SIDE OF RAINBOW AND DIRECTS THEM TO THE SOUTHEAST ALONG THE WEST SIDE OF THE RAINBOW ROW TO THE BOCA NEGRA ARROYO. OFFSITE FLOWS THEREFORE DO NO IMPACT THE SITE FROM THE WEST. THE EAST BOUNDARY OF THE SITE IS UNIVERSE BLVD NW WHICH IS IMPROVED AS A TEMPORARY ROAD PAVED 24 FEET WIDE WITHOUT CURB AND GUTTER. UNIVERSE AND THE LANDS EAST OF UNIVERSE EXHIBIT PARALLEL TOPOGRAPHY AND DO NOT CONTRIBUTE OFFSITE FLOWS. THE PLATTED VOLCANO CLIFFS UNIT 14 SUBDIVISION TO THE SOUTH IS UNDEVELOPED AND LIES TOPOGRAPHICALLY LOWER THAN THE SITE AND IS INCAPABLE OF GENERATING OFFSITE FLOWS.

IX. CONCLUSIONS

1) THE PROPOSED SITE IMPROVEMENTS AND DRAINAGE CONCEPT ARE CONSISTENT WITH THE DEVELOPMENT CR BY PREVIOUSLY APPROVED PLANS FOR THIS SITE (BOCA NEGRA DMP, TRAILS MDP) AND WITH THE PROPOSED OTHER AREA PLANS THAT ARE NOT YET APPROVED (UNIVERSE STORM DRAIN, BOCA NEGRA DAM).

2) LONGFORD HOMES WILL CONSTRUCT A PUBLIC STORM DRAIN IN UNIVERSE BOULEVARD NW THAT WILL SERV ANCIENT MESA. THIS STORM DRAIN WILL COVER THE SITE FRONTAGE AND NO ADDITIONAL STORM DRAIN WILL TRACTS A AND B.

3) AMAFCA WILL CONSTRUCT THE BOCA NEGRA DAM WHICH WILL BE THE OUTFALL FOR THE UNIVERSE STORM A AND B. THE DAM WILL BE FUNDED BY PRIVATE DEVELOPMENT AND APS IS NOT A PARTICIPANT IN THE PR

4) TRACTS A AND B WILL DRAIN DIRECTLY TO THE PROPOSED UNIVERSE STORM DRAIN AND WILL LIKELY REQU DETENTION TO LIMIT DISCHARGE TO AVAILABLE DOWNSTREAM CAPACITY WHICH IS TENTATIVELY DETERMINED TO I (1.44 cfs/ac) RESPECTIVELY. THESE RATES WILL NEED TO BE CONFIRMED UPON COMPLETION AND APPROVAL UNIVERSE STORM DRAIN AND THE BOCA NEGRA DAM WHICH WERE NOT YET APPROVED AT THE TIME THIS PLAN

5) UNIVERSE BLVD NE AND RAINBOW BLVD NE ARE NOT INTENDED TO ACCEPT SURFACE RUNOFF FROM ADJAC

6) AS DEMONSTRATED HEREIN, THE 10-YEAR FREE DRIVING LANE CRITERIA FOR ARTERIAL STREETS WILL BE M RAINBOW BLVD NW AND UNIVERSE BLVD NW IN THE ULTIMATE CONDITION WITHOUT ADDITIONAL STORM DRAINAG

7) THIS SUBMITTAL SUPPORTS THE FORTHCOMING WORK ORDER PLANS TO CONSTRUCT PUBLIC HALF-WIDTH S IN THE FRONTAGE OF TRACT A, ANCIENT MESA. SEPARATE SUBMITTALS WILL BE REQUIRED TO SUPPORT PROI ON TRACTS A AND B. THE SEPARATE SUBMITTALS MUST ADDRESS ONSITE DETENTION PONDING AND CONFIRM CAPACITY IDENTIFIED BY THIS PLAN.

8) THE PROPOSED UNIVERSE STORM DRAIN WILL BE OWNED, OPERATED AND MAINTAINED BY THE CITY OF ALE

9) THE PROPOSED BOCA NEGRA DAM WILL BE OWNED, OPERATED AND MAINTAINED BY AMAFCA.

10) RUNOFF GENERATED BY THE DEVELOPED RAINBOW BLVD NW FRONTAGE WILL DISCHARGE FREELY TO THE U DOWNSTREAM RIGHT OF WAY. THIS IS QUALITATIVELY JUSTIFIED DUE TO THE SIGNIFICANT DECREASE IN DOWNS RESULTING FROM THE UPSTREAM TRAILS DEVELOPMENT ELIMINATING OFFSITE FLOWS FROM THE AREA NORTH C GRANT LINE.

11) THERE ARE NO DPM DESIGN VARIANCES, PUBLIC OR PRIVATE DRAINAGE EASEMENTS PROPOSED BY THIS PI FACILITY DRAINAGE COVENANTS WILL BE REQUIRED FOR THE FUTURE DETENTION PONDS ON TRACTS A AND B.

2005.180.3

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/28/2003rd)

PROJECT TITLE: APS NW Mesa High School
DRB #: 1004071 EPC #:
ZONE ATLAS/DRNG. FILE #: C9
WORK ORDER #: 766981

LEGAL DESCRIPTION: Tracts A and B, Ancient Mesa (Plat recordation pending land acquisition)
CITY ADDRESS: Universe Blvd NW

ENGINEERING FIRM: Jeff Mortensen & Assoc., Inc. CONTACT: J. Graeme Means
ADDRESS: 6010-B Midway Park Blvd. NE PHONE: (505) 345-4250
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

OWNER: Albuquerque Public Schools (Purchaser) CONTACT: Tyler Mason
ADDRESS: 915 Oak Street SE PHONE: 242-5865
CITY, STATE: Albuquerque, NM ZIP CODE: 87106

ARCHITECT: SMPC CONTACT: Chris Willadsen
ADDRESS: 115 Amherst SE PHONE: 255-8668
CITY, STATE: Albuquerque, NM ZIP CODE: 87106

SURVEYOR: Jeff Mortensen and Associates CONTACT: Chuck Cala
ADDRESS: PHONE: 345-4250
CITY, STATE: ZIP CODE:

CONTRACTOR: Not Selected CONTACT:
ADDRESS: PHONE:
CITY, STATE: ZIP CODE:

TYPE OF SUBMITTAL:
- [X] DRAINAGE REPORT
- [ ] DRAINAGE PLAN 1st SUBMITTAL, ***REQUIRES TCL or equal****
  ****DRB approved site plan will be TCL***
- [ ] DRAINAGE PLAN RESUBMITTAL
- [ ] CONCEPTUAL GRADING & DRAINAGE PLAN
- [ ] GRADING PLAN
- [ ] EROSION CONTROL PLAN
- [ ] ENGINEER'S CERTIFICATION (HYDROLOGY)
- [ ] CLOMR/LOMR
- [ ] TRAFFIC CIRCULATION LAYOUT (TCL)
- [ ] ENGINEER'S CERTIFICATION (TCL)
- [ ] ENGINEER'S CERTIFICATION (DRB APPR. SITE PLAN)
- [ ] OTHER

CHECK TYPE OF APPROVAL SOUGHT:
- [ ] SIA/FINANCIAL GUARANTEE RELEASE
- [ ] PRELIMINARY PLAT APPROVAL
- [ ] S. DEV. PLAN FOR SUB'D APPROVAL
- [ ] S. DEV. PLAN 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
- [X] WORK ORDER APPROVAL
- [ ] OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:
- [X] YES
- [ ] NO
- [X] COPY PROVIDED

RECEIVED
OCT 14 2005
HYDROLOGY SECTION

DATE SUBMITTED: 10/14/2005 BY: J. Graeme Means

Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based upon 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 subdivisions containing more than ten (10) lots or constituting five (5) acres or more.

xc: Roger Lujan, Gil Berry, Mary Kenney, Mike McGuire

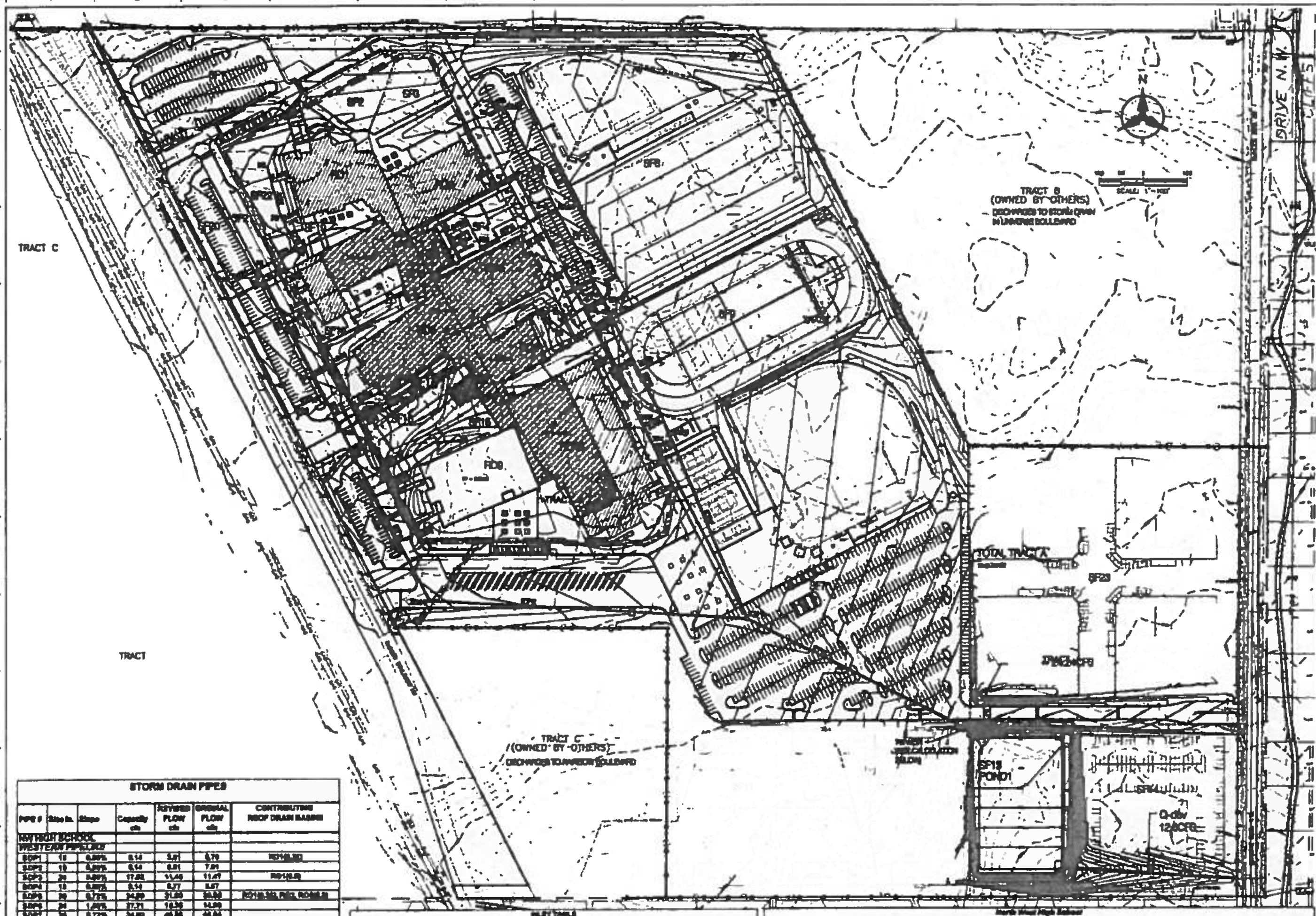
8. THE DISCHARGE OF DEVELOPED RUNOFF FROM THE SITE TO UNIVERSE ROAD NW IN ADVANCE OF THE BOCA NEGRA DAM/UNIVERSE STORM DRAIN MAY UTILIZE INTERIM RETENTION PONDING AS A TEMPORARY SOLUTION.
9. DETENTION PONDING PRIOR TO DISCHARGE TO THE BOCA NEGRA DAM/UNIVERSE STORM DRAIN MAY BE NECESSARY DEPENDING UPON AVAILABLE DOWNSTREAM CAPACITY AND THE MAGNITUDE OF ONSITE RUNOFF BEING GENERATED.
10. THE DISCHARGE OF DEVELOPED RUNOFF FROM THE SITE TO RAINBOW BLVD. NW MUST ADDRESS DOWNSTREAM CAPACITY; STORM DRAIN PROBABLY NOT REQUIRED DUE TO BEING THE UPPERMOST PORTION OF THE BASIN, FLOWS BEING CUT-OFF BY THE TRAILS DEVELOPMENT AND RAINBOW BEING UPHILL FROM THE SITE.
11. DEVELOPMENT ON THE SITE MUST COMPLY WITH NPDES REQUIREMENTS FOR STORM WATER POLLUTION PREVENTION.

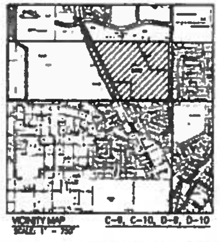
THE UNDERSIGNED AGREE THAT THE ABOVE FINDINGS ARE SUMMARIZED ACCURATELY AND ARE ONLY SUBJECT TO CHANGE IF FURTHER INVESTIGATION REVEALS THAT THE FINDINGS ARE NOT REASONABLE OR THAT THEY ARE BASED UPON INACCURATE INFORMATION.

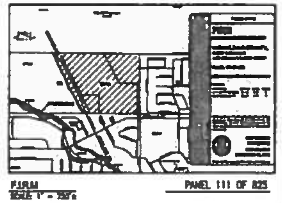
SIGNED: Bradley L. Bingham
TITLE: CITY HYDROLOGIST
DATE: 6/24/05

SIGNED:
TITLE: CONSULTANT
DATE: 10/24/2005

NOTE: PROVIDE A COPY OF THIS RECAP WITH DRAINAGE SUBMITTAL







STORM DRAIN PIPES

PIPE #	Size in.	Slope	Capacity cfs	REVISED FLOW cfs	ORIGINAL FLOW cfs	CONTRIBUTING ROOF DRAIN BASINS
NW HIGH SCHOOL						
WESTERN PIPELINE						
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
EASTERN PIPELINE						
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
NOT USED						
OUTFALL TO POND						
OUTFALL TO STORM DRAIN WITHIN UNIVERSE BLVD.						

INLET TABLE

[illegible]

North West High School

[illegible]

DRAINAGE MANAGEMENT PLAN

I. INTRODUCTION

[illegible]

II. SITE LOCATION

[illegible]

III. EXISTING HYDROLOGIC CONDITIONS

[illegible]

IV. PROPOSED HYDROLOGIC CONDITIONS

[illegible]

V. CONCLUSION

[illegible]

SMPC ARCHITECTS

ALBUQUERQUE PUBLIC SCHOOLS

NORTHWEST HIGH SCHOOL

8100 Rainbow NW
Albuquerque NM

CONSTRUCTION SET

Copyright:
SMPC Architects © 2008

SHEET TITLE:

DRAINAGE MANAGEMENT PLAN

SHEET [illegible] OF [illegible]

Cherne, Curtis

From: Dourte, Richard H.
Sent: Wednesday, March 13, 2013 8:44 AM
To: Jeffrey Mortensen
Cc: Cherne, Curtis; Whitcomb, Blake
Subject: APS and Universe Storm Drain

Jeff,

After a detailed analysis regarding the storm drain in Universe Boulevard, it has been determined that the APS site adjacent to this may drain into the pipe at a rate of 3cfs. Although this is not the allowing free discharge for this site, it will allow the pond to change from a retention pond to a detention pond. This will provide benefit to APS.

I do want to point out that the City is allowing more storm water into this system than normally allowed. The addition of 3cfs will generate a hydraulic grade line above the top of a manhole in this system, this manhole will need to be secured.

Since you have been an interacting agency between the City and APS, I am requesting that you contact APS to see if they wish to utilize this option. APS would need to coordinate with RCS/Trails with regards to a change order to the Universe Storm Drain construction plans and with regards to the associated costs, if they choose to proceed with this option.

Thank you for your help.

Richard

Cherne, Curtis

From: Eckert, Martin W [eckert_m@aps.edu]
Sent: Wednesday, February 27, 2013 1:06 PM
To: Dourte, Richard H.; Curran, Kevin J.; Whitcomb, Blake; Rael, Jane E.; Woodall, Stephen P.; Cherne, Curtis
Cc: Jeffrey Mortensen; Graeme Means (GMeans@highmesacg.com); Ruth M. Schifani (rschifani@modrall.com); Alarid, Karen; 'rbeltramo@gcinm.com'; 'James Topmiller' (Jtopmill@bhinc.com); hrelkin@slo.state.nm.us; Britt, Don (dbritt@slo.state.nm.us); Lovato, Jerry (jlovato@amafca.org); Bingham, Brad (bbingham@amafca.org); 'ssteffen@bhinc.com'; Livingston, John
Subject: Volcano Vista HS Storm Drain Connection in Universe
Importance: High
Attachments: V V HS Universe SD 022713 City Letter with Referenced Attachments.PDF

Richard, please see the attached which I believe is self-explanatory. As you can see, I've copied Ruth Schifani, Esq. from the Modrall Law Firm to this e-mail as APS takes this matter very seriously. Ruth would be happy to discuss this matter with Kevin or Blake if necessary, but I would hope we can resolve this at an Administrative Level before the attorney's need to spend any time on this matter. APS would be happy to meet to discuss this situation with you and all other interested parties at your earliest convenience. I have discussed this matter with representatives from AMAFCA and the New Mexico State Land Office (an adjacent owner that is also adversely impacted by this Project), and they are also copied this e-mail along with other interested parties.

Thanks for your consideration. I would appreciate knowing what the City intends to do, prior to the City signing off on the current plans. Thanks, Marty

Martin W. Eckert, SR/WA
Real Estate Director
Albuquerque Public Schools
Lincoln Complex Room 8
915 Locust St. SE
Albuquerque, NM 87106
E-mail: eckert_m@aps.edu
Phone: (505) 765-5950 ext 265
Fax: (505) 768-1583

From: Cherne, Curtis [mailto:CCherne@cabq.gov]
Sent: Tuesday, February 26, 2013 12:00 PM
To: Graeme Means
Cc: Jeffrey Mortensen; Eckert, Martin W
Subject: RE: Volcano Vista HS Storm Drain Connection in Universe

Graeme,
Shahab and I have reviewed this draft and offer the following:
The Q allowable for the APS site equals Q (pressure flow in lateral) minus Q (inlet)

Therefore, 29.5 cfs (from pressure flow analysis) minus 3.3 cfs (inlet), equals 26.2 cfs.

The Q Allowable for the APS site is 26.2 cfs.
The orifice plate would need to be installed upstream (private side) of the inlet in Universe Blvd.

Hydrology reviewed the HGL in the Universe storm drain and the additional head would crawl up the pipe approx. 200 ft. There would be no adverse impact to the Trails system.
Please submit to Hydrology for Work Order approval.

Incorporating this into the existing construction plans would be preferable to an additional set. Is this something

Cherne, Curtis

From: Cherne, Curtis
Sent: Tuesday, February 26, 2013 12:00 PM
To: 'Graeme Means'
Cc: 'Jeffrey Mortensen'; 'Eckert, Martin W'
Subject: RE: Volcano Vista HS Storm Drain Connection in Universe

Graeme,
Shahab and I have reviewed this draft and offer the following:
The Q allowable for the APS site equals Q (pressure flow in lateral) minus Q (inlet)

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Please submit to Hydrology for Work Order approval.

Incorporating this into the existing construction plans would be preferable to an additional set. Is this something that you and Scott Steffen can work out?

Curtis

From: Graeme Means [mailto:GMeans@highmesacg.com]
Sent: Tuesday, February 26, 2013 9:16 AM
To: Cherne, Curtis
Cc: Jeffrey Mortensen; Eckert, Martin W
Subject: Volcano Vista HS Storm Drain Connection in Universe

Curtis,

Jeff passed on your request for us to put together a summary report in a reviewable format that documents our discussions and findings from our informal meeting last Thursday regarding the hydraulic feasibility of a storm drain connection from Volcano Vista HS to the proposed storm drain in Universe.

Attached herewith is a draft version for your review and comment. Please review and let me know if this is what you're looking for. We can then finalize and I'll sign, stamp and date.

Thank you,

Graeme Means

HIGH MESA Consulting Group

6010-B Midway Park Blvd. NE
Albuquerque, New Mexico 87109
Phone: 505.345.4250
Fax: 505.345.4254
www.highmesacg.com

TO:	Curtis Cherne, PE, City Hydrologist
FROM:	J. Graeme Means, PE
CC:	Martin Eckert, APS Real Estate Director, Annelle Darby, APS Staff Architect Jeff Mortensen, HMCG Principal Engineer
DATE:	02/26/2013
PROJECT:	APS Volcano Vista High School – City Hydrology File C7/D9
RE:	Summary Analysis of Connection to Proposed Storm Drain in Universe Blvd. NW
JOB NO:	HMCG 2012.182.9

Dear Curtis,

Thank you for meeting with me last Friday, February 22, 2013, to evaluate and coordinate implementation of a storm drain connection between an existing storm inlet and a proposed storm drain in Universe Blvd. NW. The inlet and a 48 inch lateral were constructed in 2006 under City Project # 766981 in anticipation of a future connection to a proposed 60 inch storm drain that was expected provide the programmed outfall from the temporary retention pond located on Volcano Vista High School, thereby allowing eventual conversion from retention to detention pond with controlled release.

As identified during our meeting, the proposed construction plans recently submitted to the City for approval of a public storm drain in Universe identify a 36 inch pipe at this location and do not provide any connection to the existing 48 inch lateral. Instead, the plans propose to trim the lateral back as it conflicts with the proposed storm drain.

Based on the following, we have determined that it would be feasible to construct an 18 inch connection (sleeved within the existing 48 inch lateral) between the existing inlet and the proposed storm drain with an orifice plate in the back of the inlet or in the upstream private APS storm drain:

1) Review of the Engineer's Certification for Volcano Vista HS Phase 2 shows that the invert out of the bottom of the Volcano Vista HS pond is at elevation 5375 (NGVD 1929) which is above the elevation of the storm inlet grate in Universe of 5373.6 (NGVD 1929). This ensures that flow from the Universe storm drain will not back up into the pond as it would overflow at the grate before reaching that elevation.
2) Review of the proposed construction plans show the existing storm inlet grate elevation of 5376.4 (NAVD 88) is 3.2 ft higher than the proposed hydraulic grade line (HGL) in the 36 inch Universe storm drain at the existing lateral location of approximately 5373.2 (NAVD 88), thereby resulting in 3.2 ft of elevation head for positive flow and drainage from the inlet to the storm drain without resulting in a backflow condition surging up at the grate.
3) Hydraulic calculations (attached) that demonstrate a potential flow rate of 29.6 cfs from the storm inlet to the storm drain through an 18 inch lateral under pressure with 3.2 feet of elevation head.

1.0% Longitudinal Slope in Universe SD 46+50

43+50 456 1250 LF

HIGH MESA Consulting Group

6010-B Midway Park Blvd. NE
Albuquerque, New Mexico 87109
Phone: 505.345.4250
Fax: 505.345.4254
www.highmesacg.com

4) The 18 inch connection would be sleeved through the existing 48 inch lateral with the excess area grouted. This would avoid any disturbance to traffic and avoid cutting the street.

5) The orifice plate would be sized to limit outflow from the private storm drain to whatever rate is determined by the City based on a function of downstream capacity and design storm requirements for this storm drain.

A storm drain connection as analyzed and described by the preceding would not only provide an outfall for an existing retention pond located on public school property, but it would also accept street flows that currently bypass this inlet.

Please let us know if you have any questions or comments regarding this information.

_____

J. Graeme Means, NMPE 13676

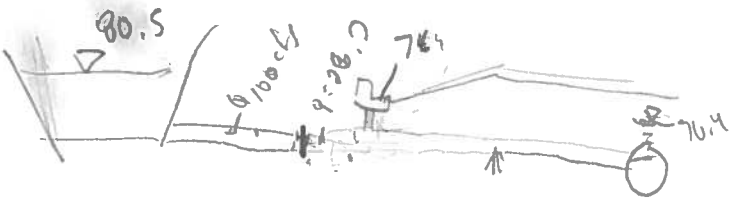
Worksheet
Worksheet for Pressure Pipe

Project Description	
Worksheet	Pressure Pipe
Flow Element	Pressure Pipe
Method	Manning's For
Solve For	Discharge

Input Data		
Pressure at 1	0.00	psi
Pressure at 2	0.00	psi
Elevation at 1	76.37	ft
Elevation at 2	73.20	ft
Length	10.00	ft
Mannings Coeffic	0.013	
Diameter	18	in

Results		
Discharge	29.57	cfs
Headloss	3.17	ft
Energy Grade at	80.72	ft
Energy Grade at	77.55	ft
Hydraulic Grade	76.37	ft
Hydraulic Grade	73.20	ft
Flow Area	1.8	ft²
Wetted Perimeter	4.71	ft
Velocity	16.73	ft/s
Velocity Head	4.35	ft
Friction Slope	079250	ft/ft

> 29 cfs of



Q
29 cfs - Q min
29.5-3.3 = 26.2 cfs
Q min ok

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(Rev. 12/05)

PROJECT TITLE: The Trails Universe Storm Drain ZONE MAP PAGE: C-9/D1B
DRB#: 1002962 EPC#: _____ WORK ORDER#: 761283

LEGAL DESCRIPTION: Tract B, Cantata at the Trails Unit 2
CITY ADDRESS: Southwest Corner of Oakridge St. and Universe Blvd. NW

ENGINEERING FIRM: Bohannan Huston Inc. CONTACT: Scott Steffen
ADDRESS: 7500 Jefferson Street NE PHONE: (505) 823-1000
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

OWNER: Galway Construction 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 1st 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)
__X__ OTHER (STREET CAPACITY ANALYSIS)

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
__X__ WORK ORDER APPROVAL
_____ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:
__X__ YES
_____ NO
_____ COPY PROVIDED

SUBMITTED BY: Scott J. Steffen DATE: February 14, 2013

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UNIVERSE BLVD 58' ROW S=1.0%

MANNING'S N = 0.017 SLOPE = 0.010

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	4.0	14.0	0.1	7.0	46.0	0.0
2.0	12.0	0.7	5.0	29.0	0.4	8.0	46.0	0.7
3.0	12.0	0.0	6.0	44.0	0.1	9.0	58.0	0.9

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.05	0.05	0.04	0.03	1.70	0.72	1.60	0.06
0.10	0.10	0.16	0.18	3.41	1.14	3.20	0.12
0.15	0.15	0.38	0.49	6.81	1.28	6.50	0.18
0.20	0.20	0.83	1.23	11.91	1.48	11.50	0.23
0.25	0.25	1.53	2.69	17.01	1.76	16.50	0.30
0.30	0.30	2.48	5.05	22.11	2.03	21.50	0.36
0.35	0.35	3.68	8.48	27.21	2.30	26.50	0.43
0.40	0.40	5.13	13.15	32.31	2.56	31.50	0.50
0.45	0.45	6.80	19.97	34.91	2.94	34.00	0.58
0.50	0.50	8.50	28.91	35.01	3.40	34.00	0.68
0.55	0.55	10.20	39.11	35.11	3.83	34.00	0.78
0.60	0.60	11.90	50.47	35.21	4.24	34.00	0.88
0.65	0.65	13.60	62.93	35.31	4.63	34.00	0.98
0.70	0.70	15.35	72.60	38.54	4.73	37.13	1.05
0.75	0.75	17.33	81.60	43.86	4.71	42.35	1.09
0.80	0.80	19.58	92.64	49.18	4.73	47.57	1.15
0.85	0.85	22.09	105.76	54.50	4.79	52.78	1.21

UNIVERSE BLVD 58' ROW S=2.0%

MANNING'S N = 0.017 SLOPE = 0.020

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	4.0	14.0	0.1	7.0	46.0	0.0
2.0	12.0	0.7	5.0	29.0	0.4	8.0	46.0	0.7
3.0	12.0	0.0	6.0	44.0	0.1	9.0	58.0	0.9

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.05	0.05	0.04	0.04	1.70	1.01	1.60	0.07
0.10	0.10	0.16	0.26	3.41	1.61	3.20	0.14
0.15	0.15	0.38	0.69	6.81	1.81	6.50	0.20
0.20	0.20	0.83	1.74	11.91	2.10	11.50	0.27
0.25	0.25	1.53	3.80	17.01	2.48	16.50	0.35
0.30	0.30	2.48	7.14	22.11	2.88	21.50	0.43
0.35	0.35	3.68	11.99	27.21	3.26	26.50	0.52
0.40	0.40	5.13	18.60	32.31	3.63	31.50	0.60
0.45	0.45	6.80	28.24	34.91	4.15	34.00	0.72
0.50	0.50	8.50	40.89	35.01	4.81	34.00	0.86
0.55	0.55	10.20	55.31	35.11	5.42	34.00	1.01
0.60	0.60	11.90	71.37	35.21	6.00	34.00	1.16
0.65	0.65	13.60	88.99	35.31	6.54	34.00	1.32
0.70	0.70	15.35	102.68	38.54	6.69	37.13	1.40
0.75	0.75	17.33	115.39	43.86	6.66	42.35	1.44
0.80	0.80	19.58	131.01	49.18	6.69	47.57	1.50
0.85	0.85	22.09	149.56	54.50	6.77	52.78	1.56

UNIVERSE BLVD 77' ROW S=2.2%

MANNING'S N = 0.02 SLOPE = 0.02

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	5.0	30.5	0.4	9.0	62.5	0.1
2.0	12.0	0.7	6.0	31.0	0.9	10.0	64.5	0.0
3.0	12.5	0.0	7.0	46.0	0.9	11.0	65.0	0.7
4.0	14.5	0.1	8.0	46.5	0.4	12.0	77.0	0.9

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.05	0.05	0.06	0.07	2.63	1.07	17.57	0.07
0.10	0.10	0.27	0.41	6.25	1.55	21.15	0.14
0.15	0.15	0.70	1.39	11.38	1.98	26.22	0.21
0.20	0.20	1.39	3.38	16.50	2.43	31.30	0.29
0.25	0.25	2.33	6.69	21.63	2.87	36.37	0.38
0.30	0.30	3.53	11.57	26.76	3.28	41.45	0.47
0.35	0.35	4.98	18.27	31.88	3.67	46.52	0.56
0.40	0.40	6.68	27.02	37.01	4.05	51.60	0.65
0.45	0.45	8.51	40.30	37.27	4.73	51.77	0.80
0.50	0.50	10.36	55.60	37.54	5.37	51.95	0.95
0.55	0.55	12.21	72.79	37.81	5.96	52.12	1.10
0.60	0.60	14.07	91.77	38.07	6.52	52.30	1.26
0.65	0.65	15.94	112.45	38.34	7.06	52.47	1.42
0.70	0.70	17.86	128.89	41.53	7.22	55.60	1.51
0.75	0.75	20.02	144.21	46.67	7.20	60.70	1.56
0.80	0.80	22.43	162.59	51.82	7.25	65.80	1.62
0.85	0.85	25.10	184.09	56.96	7.33	70.90	1.69
0.90	0.90	28.02	208.80	62.10	7.45	76.00	1.76

UNIVERSE BOULEVARD STREET CAPACITY ANALYSIS

10-YEAR STORM		100-YEAR STORM	
Basin 1 - 77' R/W		Basin 1 - 77' R/W	
Q=	10.3 cfs	Q=	15.9 cfs
Analysis Pt #1		Analysis Pt #1	
38% Basin 1		38% Basin 1	
Roadway slope, S=	2.2 %	Roadway slope, S=	2.2 %
Q=	3.9 cfs	Q=	6.0 cfs
depth of flow=	0.25 ft	depth of flow=	0.28 ft
water spread from flowline=	8.25 ft	water spread from flowline=	9.75 ft
drive lane clear from median=	9.75 ft	drive lane clear from median=	8.25 ft
inlet capacity=	2.1 cfs	inlet capacity=	2.7 cfs
Bypass flow to AP#2=	0 cfs	Bypass flow to AP#2=	0.6 cfs
Analysis Pt #2		Analysis Pt #2	
50% Basin 1		50% Basin 1	
Q=	5.2 cfs	Q=	8.6 cfs
depth of flow=	0.27 ft	depth of flow=	0.31 ft
water spread from flowline=	9.25 ft	water spread from flowline=	11.25 ft
drive lane clear from median=	8.75 ft	drive lane clear from median=	6.75 ft
inlet capacity=	2.3 cfs	inlet capacity=	3.3 cfs
Bypass flow to AP#3=	2.9 cfs	Bypass flow to AP#3=	5.3 cfs
Analysis Pt #3		Analysis Pt #3	
12% Basin 1		12% Basin 1	
Q=	4.1 cfs	Q=	7.2 cfs
depth of flow=	0.25 ft	depth of flow=	0.30 ft
water spread from flowline=	8.25 ft	water spread from flowline=	10.75 ft
drive lane clear from median=	9.75 ft	drive lane clear from median=	7.25 ft
inlet capacity=	2.1 cfs	inlet capacity=	3.1 cfs
Bypass flow to Basin 2=	0.0 cfs	Bypass flow to Basin 2=	1.0 cfs
Basin 2 - 58' R/W		Basin 2 - 58' R/W	
Q=	7.7 cfs	Q=	11.8 cfs
Analysis Pt #4		Analysis Pt #4	
11% Basin 2		11% Basin 2	
Roadway slope, S=	2.0 %	Roadway slope, S=	2.0 %
Q=	0.8 cfs	Q=	2.3 cfs
depth of flow=	0.17 ft	depth of flow=	0.24 ft
water spread from flowline=	4.25 ft	water spread from flowline=	7.75 ft
drive lane clear from centerline=	12.25 ft	drive lane clear from centerline=	8.75 ft
inlet capacity=	1.0 cfs	inlet capacity=	1.5 cfs
Bypass flow to AP#5=	0.0 cfs	Bypass flow to AP#5=	0.0 cfs
Analysis Pt #5		Analysis Pt #5	
23% Basin 2		23% Basin 2	
Roadway slope, S=	1.0 %	Roadway slope, S=	1.0 %
Q=	1.8 cfs	Q=	2.7 cfs
depth of flow=	0.22 ft	depth of flow=	0.25 ft
water spread from flowline=	6.75 ft	water spread from flowline=	8.25 ft
drive lane clear from centerline=	9.75 ft	drive lane clear from centerline=	8.25 ft
inlet capacity=	1.1 cfs	inlet capacity=	1.5 cfs
Bypass flow to AP#6=	0.0 cfs	Bypass flow to AP#6=	0.0 cfs
Analysis Pt #6		Analysis Pt #6	
23% Basin 2		23% Basin 2	
Roadway slope, S=	1.0 %	Roadway slope, S=	1.0 %
Q=	1.8 cfs	Q=	2.7 cfs
depth of flow=	0.22 ft	depth of flow=	0.25 ft
water spread from flowline=	6.75 ft	water spread from flowline=	8.25 ft
drive lane clear from centerline=	9.75 ft	drive lane clear from centerline=	8.25 ft
inlet capacity=	1.1 cfs	inlet capacity=	1.5 cfs
Bypass flow to AP#7=	0.0 cfs	Bypass flow to AP#7=	0.0 cfs
Analysis Pt #7		Analysis Pt #7	
43% Basin 2		43% Basin 2	
Roadway slope, S=	1.0 %	Roadway slope, S=	1.0 %
Q=	3.3 cfs	Q=	5.1 cfs
depth of flow=	0.26 ft	depth of flow=	0.30 ft
water spread from flowline=	8.75 ft	water spread from flowline=	10.75 ft
drive lane clear from centerline=	7.75 ft	drive lane clear from centerline=	5.75 ft
inlet capacity=	1.5 cfs	inlet capacity=	2 cfs
Bypass flow to Rainbow=	0.3 cfs	Bypass flow to Rainbow=	1.1 cfs

DRAINAGE AND TRANSPORTATION INFORMATION SHEET
(Rev. 12/05)

PROJECT TITLE: The Trails Universe Storm Drain ZONE MAP PAGE: C-9/D18
DRB#: 1002962 EPC#: WORK ORDER#: 761283

LEGAL DESCRIPTION: Tract B, Cantata at the Trails Unit 2
CITY ADDRESS: Southwest Corner of Oakridge St. and Universe Blvd. NW

761283

ENGINEERING FIRM: Bohannan Huston Inc. CONTACT: Scott Steffen
ADDRESS: 7500 Jefferson Street NE PHONE: (505) 823-1000
CITY, STATE: Albuquerque, NM ZIP CODE: 87109

OWNER: Galway Construction 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 1st 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)
__X__ OTHER (STREET CAPACITY ANALYSIS)

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
__X__ WORK ORDER APPROVAL
_____ OTHER (SPECIFY)

WAS A PRE-DESIGN CONFERENCE ATTENDED:
__X__ YES
_____ NO
_____ COPY PROVIDED

SUBMITTED BY: Scott J. Steffen DATE: February 4, 2013

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.

C9/D100

58' ROW
n=.017
s=0.01

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.00	0.900	4.0	14.00	0.125	7.0	46.00	0.000
2.0	12.00	0.670	5.0	29.00	0.425	8.0	46.00	0.670
3.0	12.00	0.000	6.0	44.00	0.125	9.0	58.00	0.900

58' ROW
n=.017
s=0.02

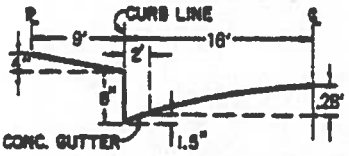
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.00	0.900	4.0	14.00	0.125	7.0	46.00	0.000
2.0	12.00	0.670	5.0	29.00	0.425	8.0	46.00	0.670
3.0	12.00	0.000	6.0	44.00	0.125	9.0	58.00	0.900

77' ROW
n=.017
s=0.022

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.00	0.900	4.0	14.50	0.125	7.0	46.50	0.945	10.0	64.50	0.000
2.0	12.50	0.670	5.0	30.50	0.445	8.0	46.50	0.445	11.0	64.50	0.670
3.0	12.50	0.000	6.0	30.50	0.945	9.0	62.50	0.125	12.0	77.00	0.900

GRATING CAPACITIES FOR TYPE 'A' , 'C' and 'D'

GRATING & GUTTER PLAN



TYPICAL HALF STREET SECTION
(ABOVE BASIN)

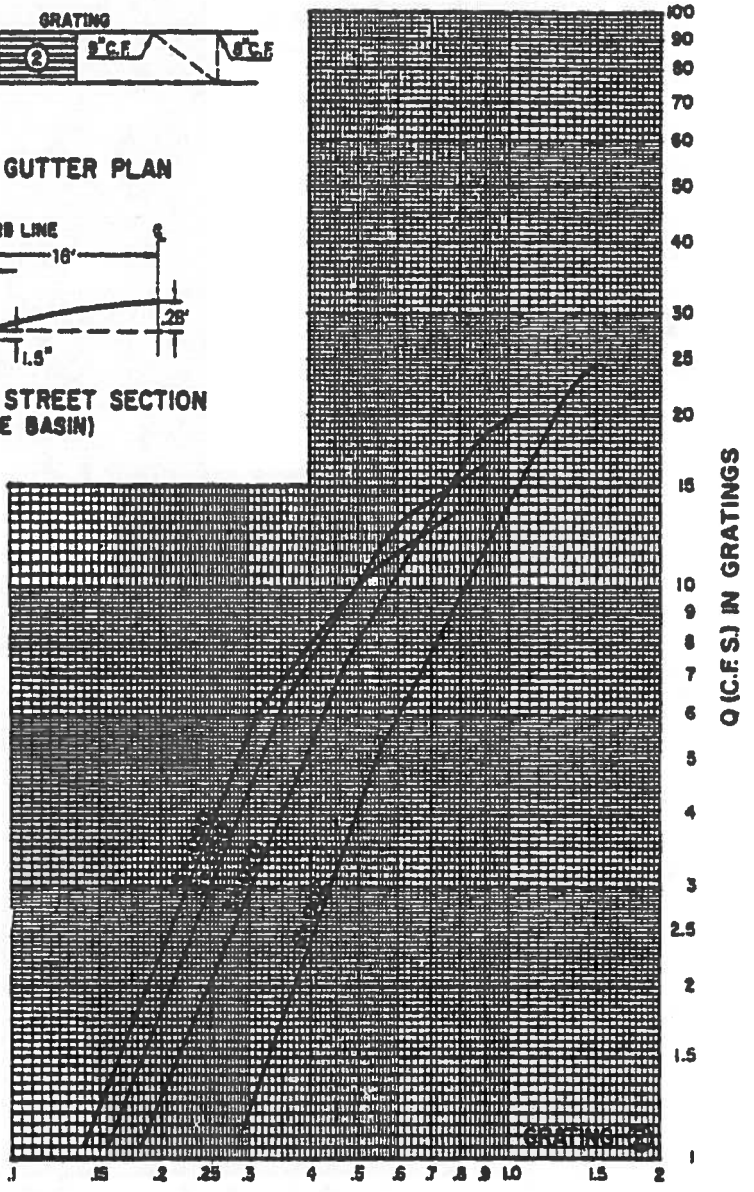


PLATE 22.3 D-5

C9-D100

UNIVERSE BOULEVARD STREET CAPACITY ANALYSIS

10-YEAR STORM		100-YEAR STORM	
Basin 1 - 77' R/W		Basin 1 - 77' R/W	
Q=	10.3 cfs	Q=	15.9 cfs
Analysis Pt #1		Analysis Pt #1	
79% Basin 1		79% Basin 1	
Roadway slope, S=	2.2 %	Roadway slope, S=	2.2 %
Q=	8.1 cfs	Q=	12.6 cfs
depth of flow=	0.26 ft	depth of flow=	0.31 ft
water spread from flowline=	8.75 ft	water spread from flowline=	11.25 ft
drive lane clear from median=	9.25 ft	drive lane clear from median=	6.75 ft
inlet capacity=	2.9 cfs	inlet capacity=	3.5 cfs
Analysis Pt #1		Analysis Pt #1	
88% Basin 1		88% Basin 1	
Q=	9.1 cfs	Q=	14.0 cfs
depth of flow=	0.27 ft	depth of flow=	0.31 ft
water spread from flowline=	9.25 ft	water spread from flowline=	11.25 ft
drive lane clear from median=	8.75 ft	drive lane clear from median=	6.75 ft
inlet capacity=	3.0 cfs	inlet capacity=	3.5 cfs
Bypass flow to Basin 2=	4.4 cfs	Bypass flow to Basin 2=	8.9 cfs
Basin 2 - 58' R/W		Basin 2 - 58' R/W	
Q=	7.7 cfs	Q=	11.8 cfs
Analysis Pt #3		Analysis Pt #3	
11% Basin 1		11% Basin 1	
Roadway slope, S=	2.0 %	Roadway slope, S=	2.0 %
Q=	5.2 cfs	Q=	10.2 cfs
depth of flow=	0.23 ft	depth of flow=	0.29 ft
water spread from flowline=	7.25 ft	water spread from flowline=	10.25 ft
drive lane clear from centerline=	9.25 ft	drive lane clear from centerline=	6.25 ft
inlet capacity=	2.1 cfs	inlet capacity=	3.1 cfs
Bypass flow to AP#4=	1.05 cfs	Bypass flow to AP#4=	4.00 cfs
Analysis Pt #4		Analysis Pt #4	
46% Basin 2		46% Basin 2	
Roadway slope, S=	1.0 %	Roadway slope, S=	1.0 %
Q=	4.6 cfs	Q=	9.4 cfs
depth of flow=	0.25 ft	depth of flow=	0.27 ft
water spread from flowline=	8.25 ft	water spread from flowline=	9.25 ft
drive lane clear from centerline=	8.25 ft	drive lane clear from centerline=	7.25 ft
inlet capacity=	1.5 cfs	inlet capacity=	2 cfs
Bypass flow to Basin 2=	1.6 cfs	Bypass flow to Basin 2=	5.4 cfs
Analysis Pt #5		Analysis Pt #5	
43% Basin 2		43% Basin 2	
Roadway slope, S=	1.0 %	Roadway slope, S=	1.0 %
Q=	4.9 cfs	Q=	10.5 cfs
depth of flow=	0.25 ft	depth of flow=	0.29 ft
water spread from flowline=	8.25 ft	water spread from flowline=	10.25 ft
drive lane clear from centerline=	8.25 ft	drive lane clear from centerline=	6.25 ft
inlet capacity=	1.5 cfs	inlet capacity=	3.1 cfs
Bypass flow to Rainbow=	1.9 cfs	Bypass flow to Rainbow=	4.3 cfs

C9/D100

Bohannan Huston

Engineering
Spatial Data
Advanced Technologies

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

CLIENT/COURIER TRANSMITTAL

To: Shahab Biazar
Hydroloby Review Division
Plaza del Sol - 2nd Floor
600 2nd St NW
Alb, NM 87120

Requested by: Scott Steffen

Date: 2/4/13

Time Due:
- ☐ This A.M.
- ☒ This P.M.
- ☐ Rush _____
- ☐ By Tomorrow

Phone: 924-3695
Job No.: 20130203.002.01.cdpabq

Job Name: Trails Universe Storm Drain

DELIVERY VIA
- ☒ Courier ☐ Federal Express
- ☐ Mail ☐ UPS
- ☐ Other

PICK UP
Item: _____

ITEM NO.	QUANTITY	DESCRIPTION
1	1	Universe Blvd street capacity analysis

RECEIVED
FEB - 4 2013

COMMENTS / INSTRUCTIONS

Shahab,

Attached is the street capacity analysis showing that a minimum 8' clear drive is maintained for the future Universe Blvd roadway sections. We will show storm stubs at Analysis Points #1, 3 and 4 on the Universe storm drain plans.

Let me know if you have any questions or comments.

Thanks,
Scott

REC'D BY:_____ **DATE:**_____ **TIME:**_____

Universe Blvd 77' ROW 2.2% slope.txt

MANNING'S N = 0.02 SLOPE = 0.02

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	5.0	30.5	0.4	9.0	62.5	0.1
2.0	12.0	0.7	6.0	31.0	0.9	10.0	64.5	0.0
3.0	12.5	0.0	7.0	46.0	0.9	11.0	65.0	0.7
4.0	14.5	0.1	8.0	46.5	0.4	12.0	77.0	0.9

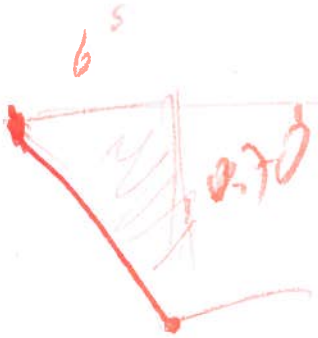
WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.05	0.05	0.06	0.07	2.63	1.07	17.57	0.07
0.10	0.10	0.27	0.41	6.25	1.55	21.15	0.14
0.15	0.15	0.70	1.39	11.38	1.98	26.22	0.21
0.20	0.20	1.39	3.38	16.50	2.43	31.30	0.29
0.25	0.25	2.33	6.69	21.63	2.87	36.37	0.38
0.30	0.30	3.53	11.57	26.76	3.28	41.45	0.47
0.35	0.35	4.98	18.27	31.88	3.67	46.52	0.56
0.40	0.40	6.68	27.02	37.01	4.05	51.60	0.65
0.45	0.45	8.51	40.30	37.27	4.73	51.77	0.80
0.50	0.50	10.36	55.60	37.54	5.37	51.95	0.95
0.55	0.55	12.21	72.79	37.81	5.96	52.12	1.10
0.60	0.60	14.07	91.77	38.07	6.52	52.30	1.26
0.65	0.65	15.94	112.45	38.34	7.06	52.47	1.42
0.70	0.70	17.86	128.89	41.53	7.22	55.60	1.51
0.75	0.75	20.02	144.21	46.67	7.20	60.70	1.56
0.80	0.80	22.43	162.59	51.82	7.25	65.80	1.62
0.85	0.85	25.10	184.09	56.96	7.33	70.90	1.69
0.90	0.90	28.02	208.80	62.10	7.45	76.00	1.76

Universe Blvd 58' ROW 1% slope.txt

MANNING'S N = 0.02 SLOPE = 0.01

POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	4.0	14.5	0.1	7.0	45.5	0.0
2.0	12.0	0.7	5.0	29.0	0.4	8.0	46.0	0.7
3.0	12.5	0.0	6.0	43.5	0.1	9.0	58.0	0.9

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.05	0.05	0.06	0.05	2.63	0.74	2.57	0.06
0.10	0.10	0.27	0.29	6.25	1.07	6.15	0.12
0.15	0.15	0.70	0.96	11.38	1.36	11.22	0.18
0.20	0.20	1.39	2.33	16.50	1.68	16.30	0.24
0.25	0.25	2.33	4.62	21.63	1.98	21.37	0.31
0.30	0.30	3.53	7.99	26.76	2.26	26.45	0.38
0.35	0.35	4.98	12.61	31.88	2.53	31.52	0.45
0.40	0.40	6.63	19.51	34.01	2.94	33.60	0.53
0.45	0.45	8.32	28.36	34.13	3.41	33.67	0.63
0.50	0.50	10.00	38.48	34.26	3.85	33.75	0.73
0.55	0.55	11.69	49.78	34.38	4.26	33.82	0.83
0.60	0.60	13.38	62.22	34.51	4.65	33.90	0.94
0.65	0.65	15.08	75.73	34.63	5.02	33.97	1.04
0.70	0.70	16.83	85.92	37.68	5.11	37.00	1.11
0.75	0.75	18.80	95.13	42.68	5.06	42.00	1.15
0.80	0.80	21.03	106.47	47.68	5.06	47.00	1.20
0.85	0.85	23.50	119.92	52.68	5.10	52.00	1.26
0.90	0.90	26.23	135.53	57.69	5.17	57.00	1.32

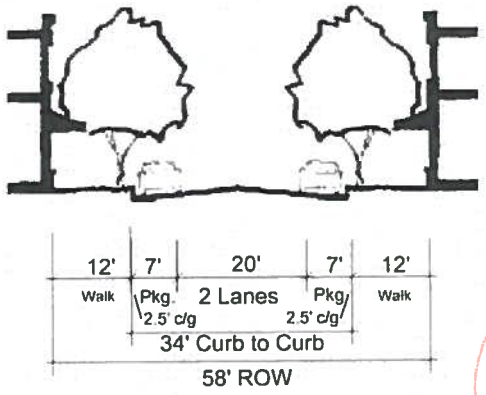


Universe Blvd 58' ROW 2% slope.txt

MANNING'S N = 0.02 SLOPE = 0.02

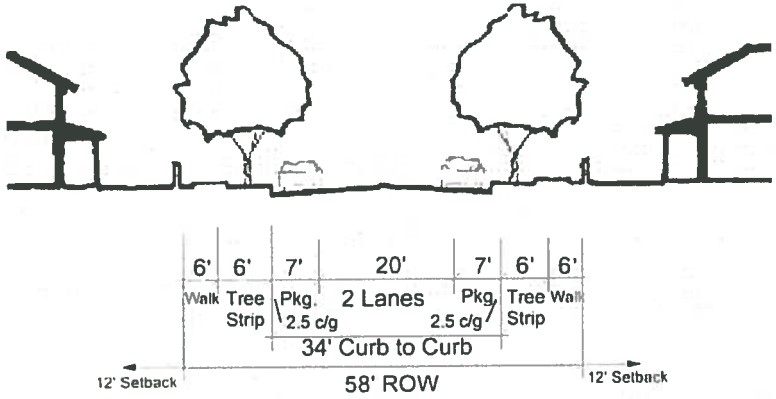
POINT	DIST	ELEV	POINT	DIST	ELEV	POINT	DIST	ELEV
1.0	0.0	0.9	4.0	14.5	0.1	7.0	45.5	0.0
2.0	12.0	0.7	5.0	29.0	0.4	8.0	46.0	0.7
3.0	12.5	0.0	6.0	43.5	0.1	9.0	58.0	0.9

WSEL FT.	DEPTH INC	FLOW AREA SQ.FT.	FLOW RATE (CFS)	WETTED PER (FT)	FLOW VEL (FPS)	TOPWID PLUS OBSTRUCTIONS	TOTAL ENERGY (FT)
0.05	0.05	0.06	0.07	2.63	1.04	2.57	0.07
0.10	0.10	0.27	0.40	6.25	1.51	6.15	0.14
0.15	0.15	0.70	1.35	11.38	1.93	11.22	0.21
0.20	0.20	1.39	3.30	16.50	2.37	16.30	0.29
0.25	0.25	2.33	6.53	21.63	2.80	21.37	0.37
0.30	0.30	3.53	11.29	26.76	3.20	26.45	0.46
0.35	0.35	4.98	17.83	31.88	3.58	31.52	0.55
0.40	0.40	6.63	27.59	34.01	4.16	33.60	0.67
0.45	0.45	8.32	40.10	34.13	4.82	33.67	0.81
0.50	0.50	10.00	54.41	34.26	5.44	33.75	0.96
0.55	0.55	11.69	70.41	34.38	6.02	33.82	1.11
0.60	0.60	13.38	87.99	34.51	6.57	33.90	1.27
0.65	0.65	15.08	107.10	34.63	7.10	33.97	1.43
0.70	0.70	16.83	121.50	37.68	7.22	37.00	1.51
0.75	0.75	18.80	134.54	42.68	7.16	42.00	1.55
0.80	0.80	21.03	150.57	47.68	7.16	47.00	1.60
0.85	0.85	23.50	169.59	52.68	7.22	52.00	1.66
0.90	0.90	26.23	191.68	57.69	7.31	57.00	1.73

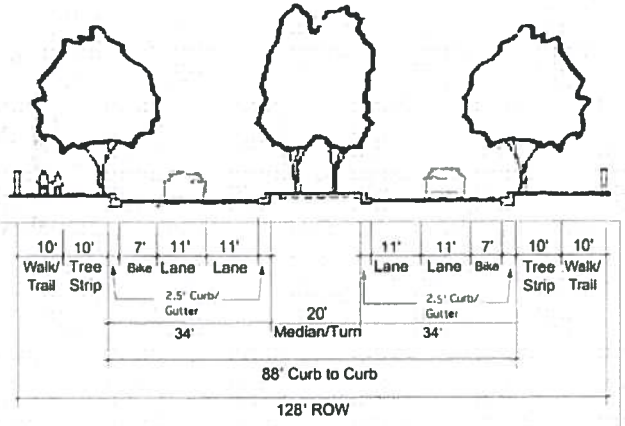


Cross Section 8 – Typical Retail Collector (2 Lanes)
Where urban uses like retail, apartment or townhouses are anticipated, parking lanes should also be provided.

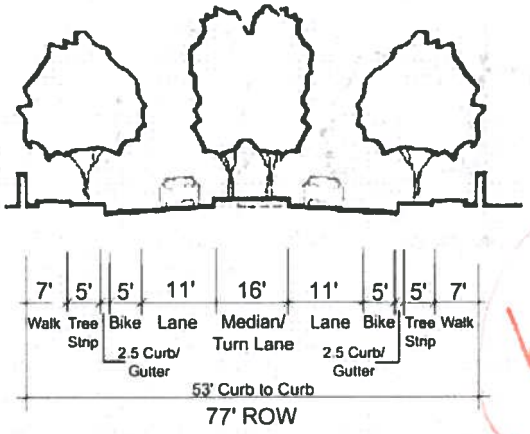
** Note: c/g stands for "curb and gutter"*



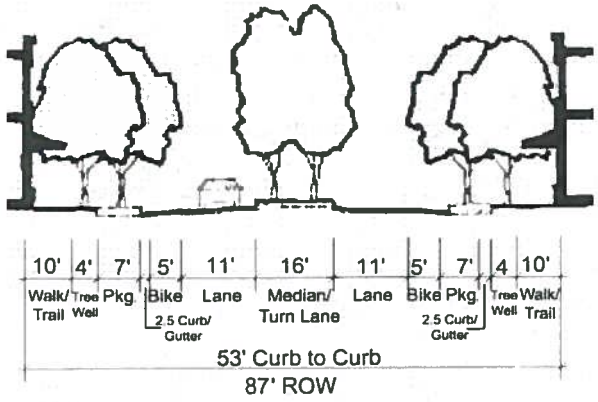
Cross Section 9 – Typical Residential Collector (2 Lanes)
Collectors have two 10-foot travel lanes and parking lanes as shown in Cross Sections 8. Collectors are key to creating an outdoor room effect in the interior of pedestrian-oriented centers.



Cross Section 5 – Unser Blvd. at Escarpment (4 Lanes) / Rainbow Principal Arterial



Cross Section 6 – Minor Arterial (1 drive lane in each direction and one median/turn lane.)



Cross Section 7, Minor Retail Arterial* (With parking lanes where urban uses like retail, apartment, or townhouses are anticipated.)

** Note: Cross Section 7 is not used within the Volcano Cliffs Plan area*