CITY OF ALBUQUERQUE

Planning Department
Brennon Williams, Director

Mayor Timothy M. Keller

November 24, 2020

Jeremy Shell, P.E.
Respec
5971 Jefferson St. NE
Albuquerque, NM 8710

RE: Sonta Trails Unit 4 Apartments
Conceptual Drainage Report
Engineer's Stamp Date: 10/14/20
Hydrology File: C10D001A

Dear Mr. Shell:

Based upon the information provided in your resubmittal received 10/15/2020, the Conceptual Drainage Report is approved for action by the DRB on Site Plan for Building Permit and Site Plan for Subdivision.

The following comments will need to be addressed prior to Building Permit and Work Order approval by Hydrology:

1. Address AMAFCA's pond issue. AMAFCA believes that if pond J is reduced by 1.5 AF, then Pond K should be increased by that same amount unless it is proved otherwise.

As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Doug Hughes, PE, jhughes@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

If you have any questions, please contact me at 924-3995 or rbrissette@cabq.gov.

Sincerely,

Renée C. Brissette

Renée C. Brissette, P.E. CFM
Senior Engineer, Hydrology
Planning Department

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET (REV 11/2018)

Project Title: Sonata Trails Unit 4 Apartments Building Permit #: _____ Hydrology File #: C10-D001A

DRB#: 2020-003707 EPC#: _____ Work Order#: _____

Legal Description: Tracts 1, 2, and 3, The Trails Unit 4

City Address: N/A

Applicant: RESPEC Contact: Jeremy Shell

Address: 5971 Jefferson Street NE Suite 101 Albuquerque NM 87109

Phone#: (505) 253-9811 Fax#: _____ E-mail: Jeremy.shell@respec.com

Owner: Sonata Trails, LLC Contact: _____

Address: _____

Phone#: _____ Fax#: _____ E-mail: _____

TYPE OF SUBMITTAL: ____ PLAT (___# OF LOTS) ____ RESIDENCE _X_ DRB SITE ____ ADMIN SITE

IS THIS A RESUBMITTAL?: _X_ Yes _____ No

DEPARTMENT: ____ TRAFFIC/ TRANSPORTATION _X_ HYDROLOGY/ DRAINAGE

Check all that Apply:

TYPE OF SUBMITTAL:

____ ENGINEER/ARCHITECT CERTIFICATION
____ PAD CERTIFICATION
_X_ CONCEPTUAL G & D PLAN
____ GRADING PLAN
____ DRAINAGE MASTER PLAN
_X_ DRAINAGE REPORT
____ FLOODPLAIN DEVELOPMENT PERMIT APPLIC
____ ELEVATION CERTIFICATE
____ CLOMR/LOMR
____ TRAFFIC CIRCULATION LAYOUT (TCL)
____ TRAFFIC IMPACT STUDY (TIS)
____ OTHER (SPECIFY) _____
____ PRE-DESIGN MEETING?

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

____ BUILDING PERMIT APPROVAL
____ CERTIFICATE OF OCCUPANCY
____ PRELIMINARY PLAT APPROVAL
_X_ SITE PLAN FOR SUB'D APPROVAL
_X_ SITE PLAN FOR BLDG. PERMIT APPROVAL
____ FINAL PLAT APPROVAL
____ SIA/ RELEASE OF FINANCIAL GUARANTEE
____ FOUNDATION PERMIT APPROVAL
____ GRADING PERMIT APPROVAL
____ SO-19 APPROVAL
____ PAVING PERMIT APPROVAL
____ GRADING/ PAD CERTIFICATION
____ WORK ORDER APPROVAL
____ CLOMR/LOMR
____ FLOODPLAIN DEVELOPMENT PERMIT
____ OTHER (SPECIFY) _____

DATE SUBMITTED: October 15, 2020 By: Jeremy Shell

COA STAFF: ELECTRONIC SUBMITTAL RECEIVED: _____

FEE PAID: _____

CITY OF ALBUQUERQUE

Comments from
Planning Department
Hydrology
Development Review Board
Sonata Trails Unit 4 Apartments
Prepared By
RESPEC, Dated October 2020

Based on the submittal received by the Planning Development on 10/12/20, RESPEC received the following comments below from Renée C. Brissette, P.E., CFM. Our responses to the comments are provided below each comment in *italics* font.

Comment:

1. Drainage Report. There are several minor editorial comments within the report from both AMAFCA and the City. Please correct them as indicated on the attached pdf.

Response:
We have revised the drainage report per the editorial comments. The 60" pipe at Pond J is an existing pipe and we are proposing removing the existing 60" pipe and installing a new 48" pipe into the new Pond J location.

Comment:

2. SWMM Final Model. Models should be run for 96 hours to confirm and document that the ponds drain in less than 96 hours.

Response:
PCSWMM model run time has been changed from 24 hours to 96 hours. See response to comment 4 for additional information.

Comment:

3. SWMM Final Model. Please explain why does Link 45 have an inlet offset of 2.46' and an outlet offset of 0.62'

Response:
We have reviewed the survey from SURVTEK dated May 2013 and the PCSWMM model inlet and outlet offsets match the survey. The new survey was completed in the new datum so there is an elevation shift, but the differences in elevation are consistent. We have provided the SURVTEK survey as an attachment for your use.

Comment:

4. SWMM Final Model. Please verify that this 2.46' of dead storage in Pond K could be accounted for in your volume scenario since it appears it could be filled by a previous storm event.

Response:
There is 2.19' of elevation difference from the pipe outlet to the bottom of the pond for Link63 and 2.46' of elevation difference for Link45. Therefore, Pond K will drain out of Link63 before Link45. There is only approximately 0.28 ac-ft of storage below the Link63 pipe outlet. Pond K

has 23.99 ac-ft of storage capacity to the emergency spillway, so the first 2.19' of the pond is only approximately 1.2% of the total available volume. Assuming a conservative treatment type 'c' soil with an infiltration rate of 0.83 in/hr, the pond will drain 2.19' of water in 31.66 hours following the storm event. The 0.28 ac-ft of retained storage volume also serves as water quality storage in the interim condition until the ultimate design for Pond K is completed.

Comment:

5. SWMM Final Model. AMAFCA has asked that the Peak Flow leaving the model Outfall not exceed 45cfs and thus reduce the burden of an already overtaxed downstream infrastructure. That request was not accommodated in this submittal. Upon investigation, this request can be achieved and exceeded with the following modifications:
    a. Change ORF_K to 2' diameter, Correct the outflow pipe (Link 45) to have an Inlet offset of only 0.72', Increase the Pond K storage (approximated at 10%). These modifications result in an outfall flow of 36 cfs.

Response:
This report for the Sonata Apartments development provides a peak flow at the outfall of 56 cfs of the allowable 62 cfs. The changes made to the model are described in the report text and appendices.

Comment:

6. As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Doug Hughes, PE, jhughes@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

Response:
Acknowledged, we will provide an ESC and NOI 14 days prior to any earth disturbance.

Comment:

7. Standard review fee of $300 (for DRB Site) will be required at the time of resubmittal.

Response:
Acknowledged, we will provide the $300 review fee at the time of resubmittal.

Brissette, Renee C.

From: Brad Bingham <bbingham@amafca.org>
Sent: Monday, November 23, 2020 2:21 PM
To: Brissette, Renee C.; Nicole Friedt
Subject: RE: Sonata Apartments

External

Renee, we are okay with the DRB action as long as the Infrastructure List is the latest one. We are not ready to approve Work Order or Building Permit until the pond issue is resolved. We think that if pond J is reduced by 1.5 AF, then Pond K should be increased by that same amount unless it is proved otherwise. The latest IL I saw had that improvement on it.

From: Brissette, Renee C. <rbrissette@cabq.gov>
Sent: Monday, November 23, 2020 10:20 AM
To: Brad Bingham <bbingham@amafca.org>; Nicole Friedt <nfriedt@amafca.org>
Subject: RE: Sonata Apartments
Importance: High

Brad / Nicole,

So is AMAFCA ok with this project? If so, then I will issue Hydrology's approval letter for this project. Please let me know. Thanks.

ONE ALBUQUERQUE planning

RENÉE CHRISTINA BRISSETTE, PE CFM
senior engineer, hydrology
o 505.924.3995
e rbrissette@cabq.gov
cabq.gov/planning

From: Brad Bingham <bbingham@amafca.org>
Sent: Tuesday, November 17, 2020 4:03 PM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

External

Especially if you have an orifice plate between the stubs

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Tuesday, November 17, 2020 3:34 PM
To: Brad Bingham <bbingham@amafca.org>; Brissette, Renee C. <rbrissette@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>

Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Brad,
Thank you so much! I really appreciate you working with us on this to keep us moving forward!! I agree with you regarding Pond K/L3. We are currently finalizing a model that splits the pond into two separate ponds. I will send that information along with the drainage covenant exhibit as soon as I have it all put together.

Thanks again!

Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

From: Brad Bingham <bbingham@amafca.org>
Sent: Tuesday, November 17, 2020 3:22 PM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Jeremy,
I would like to be able to keep you guys moving forward. I concur that the latest Infrastructure List is acceptable. AMAFCA will conceptually approve the report with the following conditions: **Prior to DRC or Building Permit approval, the existing volume in Pond K/L3 must be verified, and it must be modeled as appropriate.** Looking at the Thompson plan (the only one with both items needed to support your pond model) there is about 3.56 feet of depth between the invert of the L3 portion of the pond to the overflow spillway. This may need to be modeled as two ponds. If your HGL in the Universe trunk line exceeds this elevation (8.76, NAVD 29), you would be spilling out to the southeast. This is what we need to avoid.

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Tuesday, November 17, 2020 11:44 AM
To: Brad Bingham <bbingham@amafca.org>; Brissette, Renee C. <rbrissette@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Hey Brad,
Just following up on yesterdays conversation. Is the latest infrastructure acceptable? Will you be able to issue conceptual approval and tie final approval to either Building Permit or DRC? Feel free to call if discussing this in more detail would be helpful.

Thanks a bunch!

Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

From: Jeremy Shell
Sent: Monday, November 16, 2020 4:47 PM
To: Brad Bingham <bbingham@amafca.org>; Brissette, Renee C. <rbrissette@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

How is this, Brad?

Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

From: Brad Bingham <bbingham@amafca.org>
Sent: Monday, November 16, 2020 4:41 PM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Your ponds A, J, and K should also note there should be an new (or amended) Agreement and Covenant for each one.

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Monday, November 16, 2020 4:28 PM
To: Brad Bingham <bbingham@amafca.org>; Brissette, Renee C. <rbrissette@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Brad – I agree that once financially guaranteed it is difficult to go back to revise the infrastructure list. We could hold off on submitting for the financial guaranty until final approval is received? I attached the updated infrastructure list with the additional capacity item added at the end on page 3. The new stub and orifice plate items are included as well. Would this be acceptable?

Thanks,

Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

From: Brad Bingham <bbingham@amafca.org>
Sent: Monday, November 16, 2020 4:08 PM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Jeremy, Modifying the infrastructure list after you financial guarantee is in place is problematic for the City (I know, I used to work there). I would have to concur with Renee and Nicole, once we all know Pond K is good to go, then AMAFCA is satisfied. My understanding (from previous conversations with Hugh and yourself) is that you need 1.5 AF more volume in Pond K (which may or may not be available currently). If you put that "improvement" on the infrastructure list, as well as all the stubs into it, then AMAFCA is whole with respect to the public infrastructure financial guaranty. If you prove after DRB you don't need it, you can always amend the IL to remove this item.

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Monday, November 16, 2020 3:57 PM
To: Brissette, Renee C. <rbrissette@cabq.gov>; Brad Bingham <bbingham@amafca.org>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Brad – Please see attached latest *draft* of the Infrastructure List. This can always be amended if needed, even after DRB approval.

Thanks,

Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

From: Brissette, Renee C. <rbrissette@cabq.gov>
Sent: Monday, November 16, 2020 3:35 PM
To: 'Brad Bingham' <bbingham@amafca.org>; Jeremy Shell <Jeremy.Shell@respec.com>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Brad,

Yes all work within Pond K & Basin L3 along with any changes within the orifice K in the manhole need to be placed on the infrastructure list which will be signed at the DRB. Also I too would like to see the exhibit for the Agreement & Covenant that will bee needed for Pond K & Basin L3.

ONE ALBUQUERQUE planning

RENÉE CHRISTINA BRISSETTE, PE CFM
senior engineer, hydrology
o 505.924.3995
e rbrissette@cabq.gov
cabq.gov/planning

From: Brad Bingham <bbingham@amafca.org>
Sent: Monday, November 16, 2020 3:32 PM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

External
What is on the infrastructure list with respect to the work being done in Pond J and pond K/Basin L3?

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Monday, November 16, 2020 3:28 PM
To: Brad Bingham <bbingham@amafca.org>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd

<Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Hey Brad,
We are requesting approval for Site Plan, Preliminary/Final Plat, and some easement vacations at DRB. Perhaps we could make final approval a condition of DRC approval? Or maybe even get an exception in this case and provide AMAFCA with the authority to be a part of the Building Permit approval process through COA Hydrology? Shahab/Renee, your thoughts? Everyone's consideration in this matter is greatly appreciated!

Thanks,

Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

From: Brad Bingham <bbingham@amafca.org>
Sent: Monday, November 16, 2020 3:20 PM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

What action(s) are being requested at DRB? We do not have any input on whether a Building Permit is issued or not, so we don't have that "bite of the apple". We are afforded the opportunity to provide comment at DRC.

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Monday, November 16, 2020 2:46 PM
To: Nicole Friedt <nfriedt@amafca.org>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Hi Nicole,
Thank you for your response. Being that this is a conceptual drainage report, I would like to respectfully request that AMAFCA issue a conceptual approval with the conditions you lay out below prior to final approval. I will most certainly address your comments and get updated survey of Pond K, the Drainage Covenant exhibit, and an updated model separating both portions of Pond K to verify the hydraulics still work. The reason I am requesting this is because the developer is under the gun by their investor and need to get DRB approval to meet the conditions of their agreement and funding. By issuing conceptual approval now, this will buy us some additional time to sufficiently address the outstanding concerns. Then final approval can come at Building Permit. None of the infrastructure can be built until Building Permit approval is received by the City, so you can piggyback on that. Our next DRB hearing is scheduled for December 2 and we need to resubmit this week in order to keep that date. Please let me know your thoughts on this. In the meantime, I will begin working to provide the requested information.

Thank you,

Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

From: Nicole Friedt <nfriedt@amafca.org>
Sent: Monday, November 16, 2020 1:16 PM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

See comments/questions below.

Nicole

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Monday, November 16, 2020 11:43 AM
To: Nicole Friedt <nfriedt@amafca.org>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Hi Nicole & Brad,

Just wanted to verify that you received the information I sent on Friday? I hope that addressed the concerns on Pond K's capacity.

Also, the developer's lender is getting nervous regarding AMAFCA (and ultimately DRB) approval. So the developer would like to set up a time early this week to get together with you guys to discuss the project. I am currently available anytime Monday thru Wednesday but cannot do Thursday or Friday. Is there a time tomorrow morning that works for you both?

Thank you,

Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

From: Jeremy Shell
Sent: Friday, November 13, 2020 9:16 AM
To: Nicole Friedt <nfriedt@amafca.org>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Hi Nicole,

The certification note you are referring to is standard language included in grading certifications for the City of Albuquerque. Much of the Trails storm drain system PCSWMM model is based on as-builts and record drawings that include this same note. This has been accepted by the City and AMAFCA in previously approved reports. Yes, but it is basically saying you shouldn't use that information for design; and certainly not for key design decisions.

The dimensions shown in the image you provided are for a smaller portion of Pond K. The larger pond also includes Basin L3 (or Tract 3) as you eluded to below. I added the limits of Pond K to the grading cert and included it in this email for your reference. I also attached an ortho LIDAR exhibit because I thought it may be helpful. However, please keep in mind that there is a datum difference when comparing the LIDAR contour elevations to the elevations in the SWMM model. Please send the exhibit that you are planning on included in your Drainage Covenant. If you are going to rely on both, then both areas must be part of the Drainage Covenant.

I also understand your concern of the smaller portion of Pond K needing to fill and then spill into the larger portion. However, there will be three storm drain stubs into Pond K in developed conditions. One goes into the smaller portion of Pond K and two go into the larger portion of Pond K. I depict these stubs in green on the markup of the grading cert attached for your reference. As head builds on the downstream orifice, water will *surge* into both portions of Pond K. The Universe storm drain and stubs into the pond will create equilibrium between each portion of the pond. Therefore, the pond can function as a single larger pond. But because the three connections are separated up to the certain elevation, aren't they functioning as two independent ponds until they reach the elevation when they become physically connected?

I do not have a copy of the agreement and covenant for Pond K readily available. I will see if the property owner has that information on file. Or perhaps the City has this and can provide it? If you have any further concerns, please call me. The developer/owner is hoping to have approval today.

Thank you,

RESPEC
Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

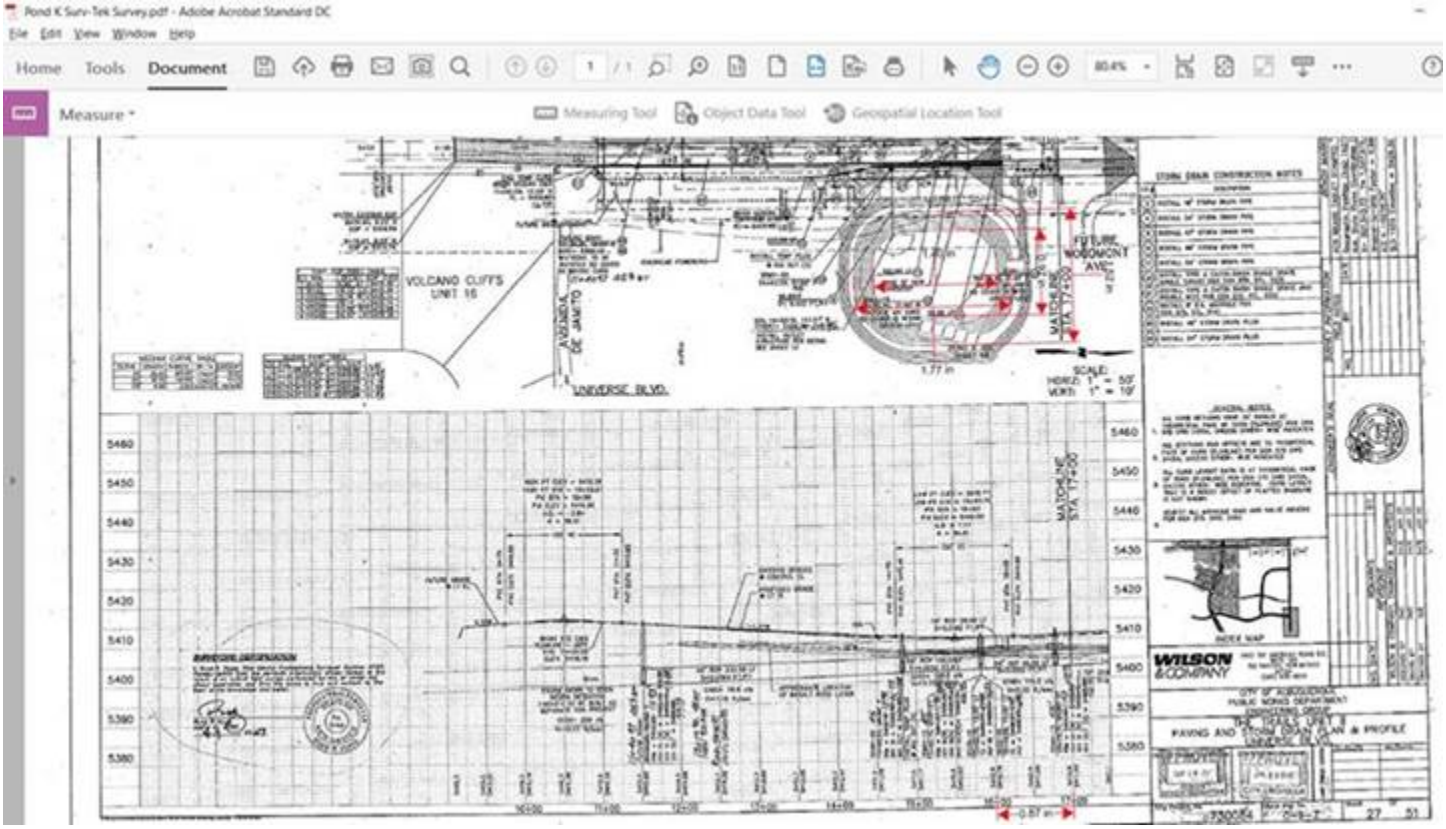
From: Nicole Friedt <nfriedt@amafca.org>
Sent: Thursday, November 12, 2020 12:24 PM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Did you read the certification note? **"Those relying on this record document are advised to obtain independent verification of its accuracy before using it for any other purpose."**

When I measure the rough dimensions of the Pond K off these drawings (accounting for the fact they are not true to the labeled scale) I don't get Areas that are not anywhere close to those shown in the Pond K Storage Curve Table in SWMM. I get roughly a bottom area that is 161'x112' = 18,032sf. Let's say that's roughly at an elevation as shown of 5406. The top where the spill would occur is just shy of 5410, based on the contours. That rough area is 192'x158' = 30,336sf. (see image below for my rough measurements as reference). The rating table in the SWMM shows 204,819 sf at the approximate elevation of 5410.

So, Is Pond K really Pond K PLUS Basin L3? Is that what is reflected as the area in the Drainage Covenant? This is the only way that the SWMM model would make sense. But it also means that this doesn't act as a uniform pond because one area has to get to a depth greater than the Pond K spillway for the flows to merge.

Please send the exhibit for the Drainage Covenant; it also needs to show the existing outfall (size, material, elevations), the existing inflow (size, material, elevation), and proposed inflow (size material elevation).



From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Thursday, November 12, 2020 11:02 AM
To: Nicole Friedt <nfriedt@amafca.org>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Hi Nicole,

The PDF titled “Pond K Grading Plan” is the approved grading cert for Pond K. The other PDF of the Surv-Tek survey only displays a small portion of the larger pond area as shown on the Pond K grading cert.

Thanks!

Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

From: Nicole Friedt <nfriedt@amafca.org>
Sent: Thursday, November 12, 2020 10:27 AM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Jeremy –
Of these two pdfs, which is the one that is supposed to show me an as-built of Pond K?

Nicole

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Friday, October 30, 2020 4:24 PM
To: Nicole Friedt <nfriedt@amafca.org>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Hello Nicole & Brad,
Thanks again for your time this morning. Please see attached supplemental information as discussed.

- PCSWMM model removing volume retained at the bottom
- Updated pond results for existing and developed conditions
- Surv-Tek survey for Pond K
- Grading plan for Pond K
- Draft infrastructure list

Thank you and have a great weekend!

Jeremy Shell, PE
Community Design Solutions
c. 505.918.1053 // o. 505.253.9811

From: Nicole Friedt <nfriedt@amafca.org>
Sent: Wednesday, October 21, 2020 10:03 AM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Brad Bingham <bbingham@amafca.org>; Biazar, Shahab <sbiazar@cabq.gov>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>
Subject: RE: Sonata Apartments

Jeremy –
I will be reviewing it in the order received. If you have addressed my comments, then it should go quickly. If you have not accommodated my comments, then you may want to request deferral.

Have you included proposed modifications that reduce the peak flow at the Outlet (Outfall Node) to 45 cfs?

Nicole

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Wednesday, October 21, 2020 9:33 AM
To: Brad Bingham <bbingham@amafca.org>; Biazar, Shahab <sbiazar@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>
Subject: RE: Sonata Apartments

Good Morning Brad & Nicole,
Just wanted to follow up on the Sonata MDP to see if you had any questions on the review so far? Our current DRB hearing date is November 4 (2 weeks from today). In order to keep that date, I will need to have your approval by Monday EOD at the latest. Do you think that will be feasible?

Thank you,

Jeremy Shell, PE
Community Design Solutions
505.253.9811 // c. 505.918.1053

From: Jeremy Shell
Sent: Thursday, October 15, 2020 4:14 PM
To: Brad Bingham <bbingham@amafca.org>; Biazar, Shahab <sbiazar@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>; Hugh Floyd <Hugh.Floyd@respec.com>
Subject: RE: Sonata Apartments

Brad/Nicole - See revised drainage report attached. I will send the PCSWMM files in a subsequent email due to file size. Let me know if you do not receive those.

Renee – I will be submitting this separately to PLNDRS as well and tag you.

Let me know if any of you have any questions. Thank you!

Jeremy Shell, PE
Community Design Solutions
505.253.9811 // c. 505.918.1053

From: Jeremy Shell
Sent: Friday, October 2, 2020 1:43 PM
To: 'Brad Bingham' <bbingham@amafca.org>; Biazar, Shahab <sbiazar@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>
Subject: RE: Sonata Apartments

Brad,
Tracts 1-4 of the Trails Unit 4 are all controlled by the same owner, which is where Ponds J and K are located. Both ponds are privately maintained. We have permission to modify the ponds. Please let me know if there is any other information I can provide that will help facilitate your review.

Thank you,

Jeremy Shell, PE
Community Design Solutions
505.253.9811 // c. 505.918.1053

From: Brad Bingham <bbingham@amafca.org>
Sent: Friday, October 2, 2020 1:01 PM
To: Biazar, Shahab <sbiazar@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>; Jeremy Shell <Jeremy.Shell@respec.com>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>
Subject: RE: Sonata Apartments

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Jeremy,
Nicole and I have talked and we should have our comments tabulated soon. We need to do this so we can discuss all elements of your proposed design. But since the approval of the drainage report is contingent on you being able to modify these existing, privately maintained ponds, it is necessary to know if you have the permission of the pond maintainer to do so. Please let us know when you have this permission confirmed.
Thanks

From: Biazar, Shahab <sbiazar@cabq.gov>
Sent: Wednesday, September 30, 2020 1:06 PM
To: Nicole Friedt <nfriedt@amafca.org>; Jeremy Shell <Jeremy.Shell@respec.com>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>
Subject: RE: Sonata Apartments

Jeremy,

Is Pond K a City maintained pond or privately maintained pond. If this a privately maintained pond who is maintaining the pond and are you authorized to make changes to the pond or volume?

Thanks

ONE ALBUQUERQUE planning

SHAHAB BIAZAR, P.E.
city engineer
development review services
o 505.924.3999
e sbiazar@cabq.gov
cabq.gov/planning

From: Nicole Friedt <nfriedt@amafca.org>
Sent: Wednesday, September 30, 2020 10:46 AM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>; Brissette, Renee C. <rbrissette@cabq.gov>
Subject: RE: Sonata Apartments

Jeremy,
For clarification – You did not provide an orifice solution at Pond K that reduces the flow to 45 cfs in this latest submittal; correct?

Nicole

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Tuesday, September 1, 2020 11:36 AM
To: Nicole Friedt <nfriedt@amafca.org>; Brad Bingham <bbingham@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>; rbrissette@cabq.gov
Subject: RE: Sonata Apartments

Brad,
Per our discussion last week, we investigated the possibility of reducing the flow coming out of Pond K to 45 cfs. This can be accomplished by adding an orifice plate. To be clear, the total allowable discharge from the Trails storm drain system is 62 cfs at Ave De Jaimito, and we will be below that at a rate of about 58 cfs. We are making the final adjustments to the report and should have a resubmittal to you and the City this week. Once we resubmit, perhaps it would be good to get on another call to discuss.

Thanks,

Jeremy Shell, PE
Community Design Solutions
505.253.9811 // c. 505.918.1053

From: Nicole Friedt <nfriedt@amafca.org>
Sent: Tuesday, August 25, 2020 10:10 AM
To: Jeremy Shell <Jeremy.Shell@respec.com>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>; Brad Bingham <bbingham@amafca.org>; rbrissette@cabq.gov
Subject: RE: Sonata Apartments

Jeremy –
Please send me the existing and proposed conditions models for review with your report.

The fundamental problem is that your site is connecting to two over taxed storm water systems, with undersized or nonexistent infrastructure. Upstream developers pushed the problem down the road and onto this site. You are now bound by those limitations for your development. If you want to modify things, you have to work within those bounds. With a limited system, a single site development can not use up the remaining capacity in a system.

Development of this site prior to the construction of the North Geologic Window Dam, as identified in the Boca Negra DMP Update, requires discharge from this site be reduced from what is shown in the Trails Units 1, 2, and 3 DMP (Trails DMP). The flows in the Trails DMP only works when the upstream infrastructure is in place for the Boca Negra Dam. So in the interim the flows need to be reduced. This could be reasonably accommodated at Pond K.

The described table for the SWMM model would be fine. In the appendix or report, I want detailed descriptions of each model modification and the purpose. I believe you sort of had it there with the previous submittal in the report itself. But I want to see the Pond J Stage-Storage-Discharge table modification, similar for K, I want details on the change of orifices, including directional placement.

This is going to be your guiding document for the design plans and it will be used to back check your workorder construction plans. So, I want it spelled out in detail, because there is NO wiggle room in this system. It has to be exact and built as such. Close enough is not going to be acceptable for this system.

If you would like to meet again with the City & AMAFCA to discuss the site, we can. But AMAFCA's requirements remain the same.

Regards,
Nicole

Nicole M. Friedt, P.E., CFM
Development Review Engineer
Main: (505) 884-2215
Cell: (505) 362-1272

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Thursday, August 20, 2020 1:56 PM
To: Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>; Brad Bingham <bbingham@amafca.org>; rbrissette@cabq.gov
Subject: RE: Sonata Apartments

Hello Nicole,

I have attached the text from the approved Drainage Master Plan for the Trails Units 1, 2, and 3. To my knowledge, this is the most recent report completed for the Trails storm drain system. Per this report (first paragraph in "Purpose" section), the allowable discharge at the southern extent of the system in Universe at Ave De Jaimito is 62 cfs. For our analysis, we used the PCSWMM model from the Trails DMP and made revisions to it that reflect the changes made with this Sonata project. The rate of discharge from the system in the PCSWMM model approved with the Trails DMP was 61.9 cfs, which is in compliance with the 62 cfs requirement. With this project, the flow rate has been reduced to 58.9 cfs. So in my mind, we are in compliance with the allowable discharge from this system. Can you please help me understand where the 45 cfs requirement is coming from?

We will be revising Pond A to be a 100-yr, 10-day retention pond per City requirements and are working on that now. We will be sure to provide maintenance access for both Pond A and Pond J with our resubmittal.

For the cross roads map for the SWMM model, I am envisioning an exhibit that shows the model and has a table that lists the elevations used in the model (NGVD 29) and the elevations that match the datum used in our survey (NAVD 88). Is this what you are looking for or am I misunderstanding?

Please feel free to give me a call if you would like to discuss any of this in further detail. Thank you.

Jeremy Shell, PE
Community Design Solutions
505.253.9811 // c. 505.918.1053

From: Nicole Friedt <nfriedt@amafca.org>
Sent: Friday, August 7, 2020 9:36 AM
To: Jeremy Shell <Jeremy.Shell@respec.com>; Brissette, Renee C. <rbrissette@cabq.gov>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>; Brad Bingham <bbingham@amafca.org>
Subject: RE: Sonata Apartments

Jeremy –
I see that you addressed the easy comments we had, but you've kind of missed the critical ones. We made it very clear that you can only have 45 cfs leaving, but yet you have 58 cfs. Also, Pond A is a retention pond, and should be sized as such (100-year, 24-hour) plus it needs to include enough room in the placement to allow for maintenance ramps and perimeter access if it is to be a public pond. I didn't see that you addressed maintenance access issues on Pond J at all. While that may not be a public pond, it still needs to be maintainable since it will be fenced in, permanent infrastructure that is handling, connected to, and critical to the performance of public infrastructure.

You need to provide more of a cross roads map on your SWMM modeling since there are different datums and all that needs to be in the appendix of your report.

Nicole

From: Jeremy Shell <Jeremy.Shell@respec.com>
Sent: Wednesday, August 5, 2020 4:26 PM
To: Brissette, Renee C. <rbrissette@cabq.gov>; Nicole Friedt <nfriedt@amafca.org>
Cc: Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

Thank you, Renee.

Nicole, did you have any additional comments?

Jeremy Shell, PE
RESPEC
505.253.9811 office // 505.918.1053 cell

From: Brissette, Renee C. <rbrissette@cabq.gov>
Sent: Wednesday, August 5, 2020 4:13 PM
To: Jeremy Shell <Jeremy.Shell@respec.com>
Cc: 'Nicole Friedt' <nfriedt@amafca.org>; Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>; Biazar, Shahab <sbiazar@cabq.gov>
Subject: RE: Sonata Apartments

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Jeremy,

Attached is a comment letter for the above referenced project. If you have any questions, please contact me.

RENÉE CHRISTINA BRISSETTE, PE CFM
senior engineer, hydrology
o 505.924.3995
e rbrissette@cabq.gov
cabq.gov/planning

From: Jeremy Shell [mailto:Jeremy.Shell@respec.com]
Sent: Wednesday, July 22, 2020 10:39 AM
To: Brissette, Renee C.
Cc: Gomez, Ernest P.; 'Nicole Friedt'; Biazar, Shahab; Robert (Bobby) Egeberg
Subject: RE: Sonata Apartments

Hello Everyone,
Renee mentioned that she did not receive this so I am resending. I excluded the PCSWMM files in hopes that it goes through this time. See below and attached. Please let me know the best way to get the PCSWMM files to you (dropbox, wetransfer, etc.). Also, if you could please confirm that this email was received I would appreciate it.

Thanks!

Jeremy Shell, PE
RESPEC
505.253.9811 office // 505.918.1053 cell

From: Jeremy Shell
Sent: Tuesday, July 21, 2020 4:42 PM
To: 'Brissette, Renee C.' <rbrissette@cabq.gov>
Cc: Gomez, Ernest P. <epgomez@cabq.gov>; 'Nicole Friedt' <nfriedt@amafca.org>; Biazar, Shahab <sbiazar@cabq.gov>; Robert (Bobby) Egeberg <Bobby.Egeberg@respec.com>
Subject: RE: Sonata Apartments

Hello Renee,
Please see attached “unofficial” submittal for your quick review. Nicole, feel free to take a quick look at this as well to make sure nothing major jumps out at you before I “officially” resubmit. Please call me if either of you have any questions or concerns.

Thank you,

Jeremy Shell, PE
RESPEC
505.253.9811 office // 505.918.1053 cell

From: Brissette, Renee C. <rbrissette@cabq.gov>
Sent: Thursday, July 16, 2020 8:24 AM
To: Jeremy Shell <Jeremy.Shell@respec.com>
Cc: Gomez, Ernest P. <epgomez@cabq.gov>; 'Nicole Friedt' <nfriedt@amafca.org>
Subject: RE: Sonata Apartments

Jeremy,

Based on our phone conversation this week, please use this email as a denial to your submittal. I would suggest that you do an unofficial review with me prior to your resubmittal to ensure that you have the public infrastructure correctly identified and designed. Since I did not send you an official comment letter, there will be no fee for the submittal and just send it to me and Nicole. I will make sure that it gets logged in here. If you have any questions please contact me.

RENÉE CHRISTINA BRISSETTE, PE CFM
senior engineer, hydrology
o 505.924.3995
e rbrissette@cabq.gov
cabq.gov/planning

From: Jeremy Shell [mailto:Jeremy.Shell@respec.com]
Sent: Thursday, July 09, 2020 2:44 PM
To: Planning Development Review Services; Brissette, Renee C.
Subject: Sonata Apartments

Hello,
Please find attached Hydrology resubmittal for the Sonata Apartments project (hydro no. C10-D001A).

Thank you,

Jeremy Shell, PE
Engineer
Community Design Solutions

RESPEC
5971 Jefferson NE, Suite 101
Albuquerque, NM 87109
505.253.9811 office // 505.918.1053 cell
respec.com

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CONCEPTUAL DRAINAGE REPORT FOR SONATA TRAILS UNIT 4 APARTMENTS

PREPARED FOR
City of Albuquerque, Planning Department
Development Review Services, Hydrology Section

PREPARED BY
RESPEC, Inc.
5971 Jefferson St. NE, Suite 101
Albuquerque, NM 87109
505.253.9718

OCTOBER 2020

I, Jeremy Shell, do hereby certify that this report was duly prepared by me or under my direction and that I am a duly registered Professional Engineer under the laws of the State of New Mexico.

Jeremy Shell, P.E.
NMPE No. 26341

10 / 14 / 2020

Date

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this conceptual drainage report is to demonstrate that the proposed development of Sonata Trails Unit 4 Apartments safely conveys the peak 100-year storm runoff. The drainage intent for proposed conditions is to fully retain the 100-year, 10-day storm event.

The proposed development of Sonata Trails Unit 4 Apartments site is within the "Upper Piedras Marcadas Watershed Drainage and Water Quality Management Plan" (UPM DMP) by Wilson & Company dated April 2017. The project site ultimately drains into an Albuquerque Metropolitan Arroyo and Flood Control Authority (AMAFCA) facility, the Piedras Marcadas Dam. The proposed development impacts the existing surge pond J from the Trails Units 1, 2, and 3, Drainage Master Plan (DMP). The Amendment to the Trails Units 1, 2, and 3 DMP was completed by Thompson Engineering Consultants (TEC) in April 2014 and approved by the City Hydrologist in May 2014. All the Trails surge ponds were based on conservative assumptions when modeled initially by AHYMO but were later modeled using PCSWMM software to maximize the efficiency of the system while decreasing the footprint of Pond D. The Addendum to the Amendment to the DMP for the Trails Units 1, 2, and 3, was completed by TEC in February 2017. We have revised the Trails PCSWMM model due to the proposed confined footprint of Pond J and propose increasing the water surface elevation in Pond K, without changing the footprint of Pond K, and ultimately be at or below the allowable discharge of 62 cfs at the outfall of the Universe Boulevard storm drain system. All elevations mentioned in this report are based on the North American Vertical Datum of 1988 (NAVD 88). The PCSWMM model elevations differ from the elevations mentioned in this report because they were based on the National Geodetic Vertical Datum of 1929 (NGVD 29).

1.2 LOCATION AND DESCRIPTION

Sonata Trails Unit 4 Apartments is located southeast of Paseo Del Norte NW and Universe Boulevard NE intersection and consists of approximately 17.4 acres. See Figure 1.2.1 below. The legal description of the property is Tracts 1 and 2, The Trails Unit 4, on the plat entitled "Bulk land plat of The Trails Unit 4 within the Town of Alameda Grant in projected Section 15, Township 11 North, Range 2 East, New Mexico Principal Meridian, City of Albuquerque, Bernalillo County, New Mexico, October, 2007." The existing site includes surge pond J for the Trails Units 1, 2, and 3, but is otherwise undeveloped. The existing conditions are described in more detail in Section 3.1 and the proposed conditions are described in Section 3.2.

FIGURE 1.2.1 – PROJECT LOCATION

2.0 METHODOLOGY

The hydrologic analysis was performed for the site in accordance with the Albuquerque Development Process Manual (DPM) Section 22.2. AHYMO-S4 (April 2018) was used to develop peak flow rates for the 100-year, 24-hour design storm to ensure all flow paths are sufficient to carry flows. The temporary public retention pond, Pond A, was designed to fully retain the 100-year, 10-day storm. The required water quality volume was calculated by multiplying the onsite impervious area by the first flush runoff value of 0.34". All hydrologic and hydraulic calculations are included in this report.

3.0 HYDROLOGY

3.1 EXISTING CONDITIONS

The Sonata Trails Unit 4 Apartment receives offsite flows from the Trails Units 1, 2, and 3 and as well as the neighboring parcel to the northwest. The existing site is 100% pervious area and a portion of the site contains a surge pond, Pond J, which receives flows from the Trails Units 1, 2, and 3. The offsite

flows received from the Trails Units 1, 2, and 3 is received via storm drain and surges into Pond J while the neighboring property sheet flows across the northern portion of the site. The total flow generated by the property under existing conditions is 47.71 cfs. The existing site has been split into three sub-basins. Exhibit 1 shows the existing sub-basin boundaries for the site.

Basin A is located in the western corner of the site and is primarily made up of existing surge pond, Pond J, and undeveloped pervious area. In general, the basin slopes from north to south and south to north at varying slopes between 1%-20%. Under existing conditions, runoff from the Universe Blvd. storm drain system surges into Pond J and exits the surge pond back into the Universe Blvd. storm drain system or at the overflow weir at the northwest corner of the pond and discharges into Basin B and Basin C. The existing Pond J has a maximum water surface elevation of 5418.46 ft, maximum volume of 3.70 ac-ft, maximum inflow of 136.80 cfs, and maximum outflow of 26.65 cfs. Historically, before the berm and pond were built, the basin flowed northeast into Basins B and Basin C. Basin A generates 6.88 cfs.

Basin B consists of the southeast corner of the site and is undeveloped pervious area. In general, the basin slopes from south to north at varying slopes between 1-8%. After ponding a small amount, roughly 6", runoff exits this basin at the northern end of the basin and discharges into Basin C. Basin B generates 12.21 cfs.

Basin C consists of the north end of the site and offsite area west of the property boundary. The area contains undeveloped pervious area. In general, the basin slopes from southwest to northeast at varying slopes between 1-16%. Runoff exits this basin at the northern end of the basin. Basin C generates 28.63 cfs.

TABLE 3.1.1 – HYDROLOGIC DATA - EXISTING

HYDROLOGIC DATA - EXISTING							
SUB-BASIN	AREA (AC)	LAND USE PERCENTAGES				Q100 (CFS)	V100 (AC-FT)
		A	B	C	D		
A	5.14	100%	0%	0%	0%	6.88	0.188
B	9.14	100%	0%	0%	0%	12.21	0.335
C	21.44	100%	0%	0%	0%	28.63	0.785
TOTAL	**35.73**					**47.71**	**1.308**

3.2 PROPOSED CONDITIONS

The proposed site development for the Trails Unit 4 Apartments includes apartment buildings, parking lots, public and private streets, surge ponds, and landscaping. Under the proposed condition, approximately 80% of the site will consist of impervious area and 20% will be landscaped. The total flow generated by the proposed development is 82.34 cfs. There is no downstream infrastructure built for the watershed. Therefore, the drainage from the proposed conditions will be discharged into a temporary retention pond, Pond A, which will retain the 100-year, 10-day storm event. See Appendix A for the AHYMO input and output results, Pond A volume requirement calculations, and Pond A volume calculation. The proposed site has been split into nine proposed basins. Exhibit 2 shows the proposed private basin boundaries for the site.

3.2.1 PRIVATE DRAINAGE BASINS

Basin A consists of the edges of the property from the southwest corner to the northeast corner and is made up of apartment buildings, asphalt roads and parking, and landscaping. In general, the basin slopes from southwest to northeast at varying slopes between 0.5%-1%. Runoff is collected in proposed drop inlets in the new road which discharges into a storm drain that will connect to the public storm drain system, and ultimately discharge into the proposed Pond A. The proposed flow is 23.58 cfs.

Basin B consists of the center portion of the property and is made up of apartment buildings, asphalt roads and parking, and landscaping. In general, the basin slopes from west to east at varying slopes between 0.5%-1%. Runoff is collected in the new road which discharges into Basin A. The proposed flow is 11.40 cfs.

Basin C consists of the center portion of the property and is made up of apartment buildings, asphalt roads and parking, and landscaping. In general, the basin slopes from west to east at varying slopes between 0.5%-1%. Runoff is collected in the new road which discharges into Basin A. The proposed flow is 15.56 cfs.

Basin D is an undeveloped off-site basin to the west and north of the property. The basin also includes a proposed temporary public retention Pond A at the northeast corner of the basin. In general, the basin slopes from southwest to northeast at varying slopes between 3-5%. The southwestern portion of the basin discharges into the swale in Basin F. For a storm larger than the 100-year, 10-day event, runoff will exit Basin D at the overflow weir spillway in the proposed temporary retention Pond A and discharge to the northwest to match the historic discharge. We are proposing a wide spillway to best replicate the sheet flow that historically discharges to this point. The pond will retain the 100-year, 10-day storm event. The proposed temporary public retention Pond A has a maximum water surface elevation of 5411.40 ft, maximum inflow of 82.34 cfs, and no outflow. Basin D generates 16.41 cfs.

When this off-site basin is developed in the future the runoff will no longer be allowed to discharge into temporary public retention Pond A. The runoff from the future off-site developed area must be retained within their own site until adequate downstream public infrastructure has been provided to accept the flow, per City procedure for this area.

Basin F consists of the northwestern boundary of the property and is made up of landscaping and a swale. In general, the basin slopes east and then north at varying slopes between 0.5%-1%. Runoff is conveyed in a proposed swale. The primary purpose of the swale is to convey offsite drainage from Basin D to prevent the offsite drainage from affecting the proposed property. The proposed swale ultimately discharges into the ROW at the northwest corner of the property, into Basin D and then temporary public retention Pond A. The proposed flow is 0.84 cfs.

The hydrologic data table below depicts in further detail each private sub-basin and its characteristics.

TABLE 3.2.1 – HYDROLOGIC DATA – PROPOSED PRIVATE

HYDROLOGIC DATA - PROPOSED PRIVATE							
SUB-BASIN	AREA (AC)	LAND USE PERCENTAGES				Q100 (CFS)	V100 (AC-FT)
		A	B	C	D		
A	5.91	0%	10%	10%	80%	23.58	1.036
B	2.85	0%	10%	10%	80%	11.40	0.500
C	3.90	0%	10%	10%	80%	15.56	0.683
D	10.03	90%	0%	0%	10%	16.41	0.533
F	0.31	0%	45%	45%	10%	0.84	0.025
TOTAL	**22.99**					**67.79**	**2.777**

3.2.2 PUBLIC DRAINAGE BASINS

Basin E is an off-site basin and consists of the proposed public street, Oak Ridge Ave. In general, the basin slopes continuously from west to east at varying slopes between 0.5%-1%. Runoff is collected in storm drain in Oak Ridge and discharges into temporary public retention Pond A. The storm drain in Oak Ridge will be stubbed to the west for future connections as Oak Ridge expands to the west, see Exhibit 3. The proposed flow is 2.38 cfs.

Basin G is an off-site basin and consists primarily of the proposed public streets, Treeline Avenue and Chatsworth Drive but also includes small segments of on-site landscaping. The portion of on-site landscaping will discharge to the public right-of-way through sidewalk culverts and will not flow over the sidewalk. Treeline Ave is proposed as a full road width at the intersection of Treeline Ave and Universe Dr and transitions to half-road improvements at the Treeline Ave and Chatsworth Dr intersection. Chatsworth Dr is proposed as half-road improvements. In general, the basin slopes from west to east on Treeline Ave and south to north on Chatsworth Dr at varying slopes between 0.5%-1%. Chatsworth Dr will have a high point at the Treeline Ave and Chatsworth Dr intersection. Runoff north of Treeline Ave in Chatsworth Dr will flow north and future Chatsworth south of Treeline Ave will flow south. Runoff is collected in drop inlets which discharges into the proposed temporary public retention Pond A in Basin D via storm drain. There is a storm drain in Chatsworth that collects roadway flows from Treeline Ave and Chatsworth Dr as well as runoff from the private property. The proposed storm drain within Chatsworth Dr has been sized per the full developed road width. Exhibit 3 shows the proposed public and conceptual future public infrastructure. The proposed flow is 12.55 cfs.

Basin H is an off-site basin and consists of the half-street expansion of the proposed public street, Universe Boulevard. In general, the basin has a continuous slope from north to south at 0.5%. Runoff in Universe Boulevard continues south until it is collected in drop inlets immediately south of Woodmont Avenue which discharges directly into Pond K. There will be a high point in Treeline Ave at its intersection with Universe Boulevard to separate the runoff from those roadways. The proposed flow is 2.88 cfs. This flow has been accounted for in the existing PCSWMM model.

Basin I consists of the reconfiguration of Pond J and landscaping. In general, the basin slopes from north to south at varying slopes between 0.5%-1%. Runoff is collected in Pond J which discharges into the existing storm drain network paralleling Universe Blvd. The proposed flow in this basin is 2.00 cfs.

The hydrologic data table below depicts in further detail each public sub-basin and its characteristics.

TABLE 3.2.2 – HYDROLOGIC DATA – PROPOSED PUBLIC

HYDROLOGIC DATA - PROPOSED PUBLIC							
SUB-BASIN	AREA (AC)	LAND USE PERCENTAGES				Q100 (CFS)	V100 (AC-FT)
		A	B	C	D		
E	0.64	0%	17.5%	17.5%	65%	2.38	0.099
G	2.99	0%	5%	5%	90%	12.55	0.565
H	0.69	0%	5%	5%	90%	2.88	0.129
I	0.47	0%	5%	5%	90%	2.00	0.089
TOTAL	**4.79**					**19.81**	**0.882**

The pond data table in Appendix A depicts in further detail the characteristics and hydraulic results of the proposed temporary public retention Pond A. The existing flowrate for the site is 47.71 cfs, developed is 82.34, and 0.00 cfs is released from temporary public retention Pond A. The existing volume for the site is 1.308 ac-ft, developed is 3.441 ac-ft, and nothing is released. Temporary public retention Pond A is required to retain the 100-year, 10-day storm volume, 4.64 ac-ft. Temporary public retention Pond A has 4.71 ac-ft of retention volume, 1 foot of freeboard, 5.78 ac-ft of total volume and the spillway has capacity to pass the 100-year, 24-hour peak flow rate in an emergency situation. Additional calculations regarding temporary public retention Pond A are in Appendices A & B. Exhibit 4 provides detailed grading information for temporary public retention Pond A.

As the surrounding properties are developed, temporary public retention Pond A will ultimately discharge into the Upper Piedras Marcadas future 36" storm drain system within the Oak Ridge Ave extension crossing Paseo Del Norte Blvd NE. A copy of the Upper Piedras Marcadas Watershed Drainage map by Wilson & Company has been provided in Appendix A and shown conceptually on Exhibits 2 & 3. The proposed storm drain in Chatsworth and Oak Ridge discharges into temporary public retention Pond A in the interim condition. When the adjacent property to the northeast develops and builds the next portion of the downstream storm drain in Oak Ridge, the future developer will be responsible for retaining the runoff from their development, our proposed development, and all upstream basins, per City procedure, in this area. Once the adjacent property has been developed, the temporary public retention Pond A can be removed. Once downstream infrastructure is built to accept runoff from this area, a 48" storm drain will be extended east from the Chatsworth and Oak Ridge intersection in the future, see Exhibit 3. We anticipate that the storm drain crossing Paseo Del Norte Blvd NE will be a 48" pipe rather than 36" as shown on Exhibits 2 & 3 to accommodate flows that will contribute to this system.

The total first flush value of 0.34" required water quality volume for the site was calculated based on the total proposed onsite impervious area is13,064 cubic feet. The required stormwater quality volume has been provided in the proposed temporary public retention Pond A. More details regarding water quality will be provided at Building Permit review.

3.2.3 FUTURE PUBLIC/PRIVATE DRAINAGE BASINS

Future Basin D-1 is an undeveloped off-site private basin to the west and north of the property. In general, the basin slopes from southwest to northeast at varying slopes between 3-5%. For planning

purposes and conceptual future storm drain sizing, we have assumed this basin will be developed with 80% impervious area and discharge into a future storm drain in future Oak Ridge Ave. If there is not adequate downstream infrastructure available when this basin is developed, then this site must fully retain their runoff and cannot be discharged into temporary public retention Pond A. Basin D-1 generates 18.63 cfs.

Future Basin D-2 is an undeveloped off-site private basin to the west and north of the property. In general, the basin slopes from southwest to northeast at varying slopes between 3-5%. For planning purposes and conceptual future storm drain sizing, we have assumed this basin will be developed with 80% impervious area and discharge into a future storm drain in future Oak Ridge Ave. If there is not adequate downstream infrastructure available when this basin is developed, then this site must fully retain their runoff and cannot be discharged into temporary public retention Pond A. Future Basin D-2 generates 19.96 cfs.

Future Basin D-3 includes a proposed temporary public retention Pond A and undeveloped area around the pond. In general, the basin slopes from west to east at varying slopes between 1-5%. Runoff is retained within temporary public retention Pond A. Future Basin D-3 generates 5.17 cfs.

Future Basin G-2 is an off-site public basin and consists of the proposed public street, Chatsworth Drive. Chatsworth Dr is proposed as future half-road improvements. In general, the basin slopes from south to north at varying slopes between 0.5%-1%. Runoff is collected in future drop inlets which discharges into the proposed temporary public retention Pond A in Basin D via storm drain within Chatsworth Dr. Exhibit 3 shows the proposed public and conceptual future public infrastructure. The proposed flow is 5.37 cfs.

Future Basin H-2 is an off-site basin and consists of the future half-street expansion of the proposed public street, Universe Blvd. In general, the basin slopes from north to south at 0.5%. Runoff in Universe Blvd continues south until it is collected in drop inlets immediately south of Woodmont Avenue which discharges directly into Pond K. The proposed flow is 1.81 cfs. This flow has been accounted for in the existing PCSWMM model.

The hydrologic data table below depicts in further detail each future public/private sub-basin and its characteristics.

TABLE 3.2.3 – HYDROLOGIC DATA – FUTURE PUBLIC/PRIVATE

HYDROLOGIC DATA – FUTURE PUBLIC/PRIVATE							
FUTURE SUB-BASIN	AREA (AC)	LAND USE PERCENTAGES				Q100 (CFS)	V100 (AC-FT)
		A	B	C	D		
D-1	4.67	0%	10%	10%	80%	18.63	0.818
D-2	5.00	0%	10%	10%	80%	19.96	0.876
D-3	1.29	0%	10%	10%	80%	5.17	0.227
G-2	1.28	0%	5%	5%	90%	5.37	0.242
H-2	**0.43**	0%	5%	5%	90%	1.81	0.081
TOTAL	**12.67**					**50.94**	**2.244**

3.2.4 PCSWMM MODEL REVISIONS

Per the (UPM DMP), Section 1.4. Boca Negra Diversion, the Universe Boulevard storm drain system is designed to convey 62 cfs from properties owned by the Trails Subdivision through existing ponds J & K. The design basis and requirement for this system is to limit the discharge to a maximum peak flow of 62 cfs. Due to Pond J losing volume, we propose sending more drainage into Pond K, raising the 100-yr water surface elevation 0.26 feet from 5407.86' to 5408.12'. Pond K will still have 2.18' of freeboard available with the increase in water surface elevation and a peak discharge of 42.81 cfs. We propose installing a 3.7' diameter orifice plate on the southern downstream outfall storm drain in storm drain manhole "SDMH-5A" and reducing the diameter of the existing orifice on the southern downstream outfall storm drain in manhole "ORF_K" from 2.72' to 2.61'. The proposed Pond J has a maximum stored volume of 0.53 ac-ft, maximum inflow of 44.23 cfs, and maximum outflow of 30.85 cfs. In order to keep the hydraulic grade line below the existing manhole rim elevations, we propose installing a 24" storm drain out of the next storm drain manhole to the south into Pond K and installing a 3.5' diameter orifice plate in the Pond J manhole on the southern downstream outfall storm drain "MH-1". The PCSWMM model included the offsite basin flows from Basin D discharging into Pond J, so we removed input hydrograph "12" from the model since the offsite flows do not discharge into Pond J they flow to proposed temporary public retention Pond A. Also, input hydrograph "88" was revised from 12.31 cfs to 2.00 cfs to match the peak flow in Basin I. Also, after a field investigation it was discovered a 30" pipe discharges into Pond K at storm drain manhole "SDMH-5A". The existing 60" storm drain connecting to Pond J has been reduced to 48" since it does not negatively impact the system and will be replaced during construction. Although the maximum outflow increased from Ponds J & K, due to the reduction of input hydrograph "88", the removal of input hydrograph "12", and the differences in the time to maximum HGL, the Universe Blvd. storm drain discharge improved from 61.88 cfs to 55.76 cfs and remains below the 62 cfs design capacity. Even though the flow discharging out of Pond K is increasing, the overall system is discharging less flow south to the Boca Negra Dam and, therefore, the rest of the system outside of Ponds J and K are not negatively impacted. The existing and proposed results for all of the ponds in the PCSWMM model, including Ponds J and K, an overview map of the PCSWMM model revisions, and an elevation comparison table are included in Appendix A. Exhibit 5 provides detailed grading information for Pond J.

4.0 HYDRAULICS

4.1 STREETS

Runoff flow rates and volumes for the hydraulic design of the Sonata Trails Unit 4 development are those calculated by the AHYMO model. Private street capacities were checked at certain locations throughout the roadways where flow runoff rates are critical. These include the proposed roadways in Basins A, B, and C. The proposed public street capacities were calculated as well for their typical cross sections.

The maximum street capacity was determined for a given street section using ManningSolver Version 1.019 to ensure the design criteria mentioned in Section 2.0 of this report were met. Calculations for street capacities are shown in Appendix B.

4.2 STORM INLETS AND STORM DRAINS

Flow intercepted by drainage inlets were determined using the orifice and weir equations based on the City of Albuquerque Type "D" inlets. Flow quantities intercepted by curb inlets were determined using the Albuquerque DPM grating capacities rating curves for the appropriate inlets. All proposed storm drain capacities were determined using ManningSolver Version 1.019. The storm drain piping beneath the proposed public roads, Treeline and Chatsworth, were sized based on the full road width. For further information on drainage inlet and storm drain capacity calculations see Appendix B.

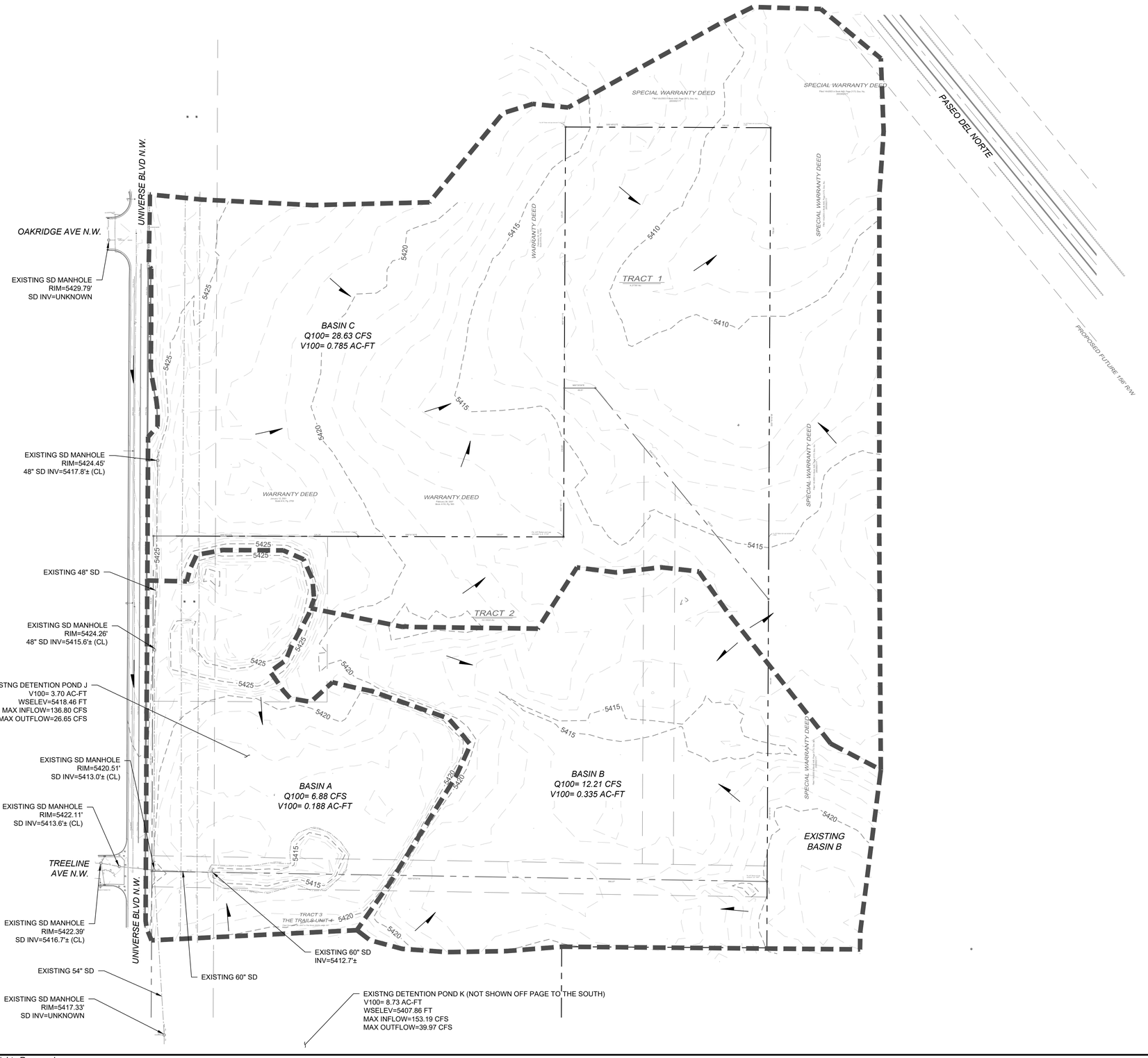
5.0 DRAINAGE MAINTENANCE COVENANTS

The existing Agreement and Covenants for ponds J & K will need to be modified to account for the revisions made to pond J and Universe storm drain system per Article 6-15 (C) of the DPM. The modified Agreement and Covenants will be provided before the building permit is approved. A new Agreement and Covenant for temporary public retention Pond A will need to be written and submitted before building permit approval.

6.0 CONCLUSION

This drainage report is prepared in support of the new development for Sonata Trails Unit 4 Apartments. The existing site is undeveloped and the new development will include apartments, parking, landscaping, public roadways, public Pond A, and revising existing Pond J. The existing surge Pond J will be redesigned to allow for the development of the apartment complex sending more drainage to existing Pond K. The 100-year water surface elevation in Pond K increases from 5407.86' to 5408.12', a 0.26' increase. Pond K will have 2.18' of remaining freeboard and a peak flow of 42.81 cfs after the proposed increase. The allowable peak discharge at the outfall of the Universe storm drain system is 62 cfs. The flow rate resulting from the proposed conditions of this development is 55.76 cfs, which is below the allowable rate. The proposed 100-year, 10-day storm event volume, 4.64 ac-ft is fully retained in proposed temporary public retention Pond A. The proposed spillway for temporary public retention Pond A is wide to best replicate the sheet flow that historically discharges out of Basin D. Water discharging over the spillway from temporary public retention Pond A will only occur in emergency situations when the 100-year, 10-day storm event is exceeded.

As the surrounding properties are developed and capacity is made available, temporary public retention Pond A will ultimately discharge into the Upper Piedras Marcadas future 36" storm drain system within the future Oak Ridge Ave extension crossing Paseo Del Norte Blvd NE. We anticipate that the storm drain crossing Paseo Del Norte Blvd NE will be a 48" pipe rather than 36" as shown on Exhibit 2 to accommodate flows that will contribute to this system. The hydrologic calculations are included in Appendix A. The hydraulic calculations are included in Appendix B.



LEGEND

- PROPERTY BOUNDARY
- BASIN BOUNDARY
- EXISTING STORM DRAIN
- FLOW ARROW
- EXISTING STORM DRAIN MANHOLE
- EXISTING STORM DRAIN INLET

N

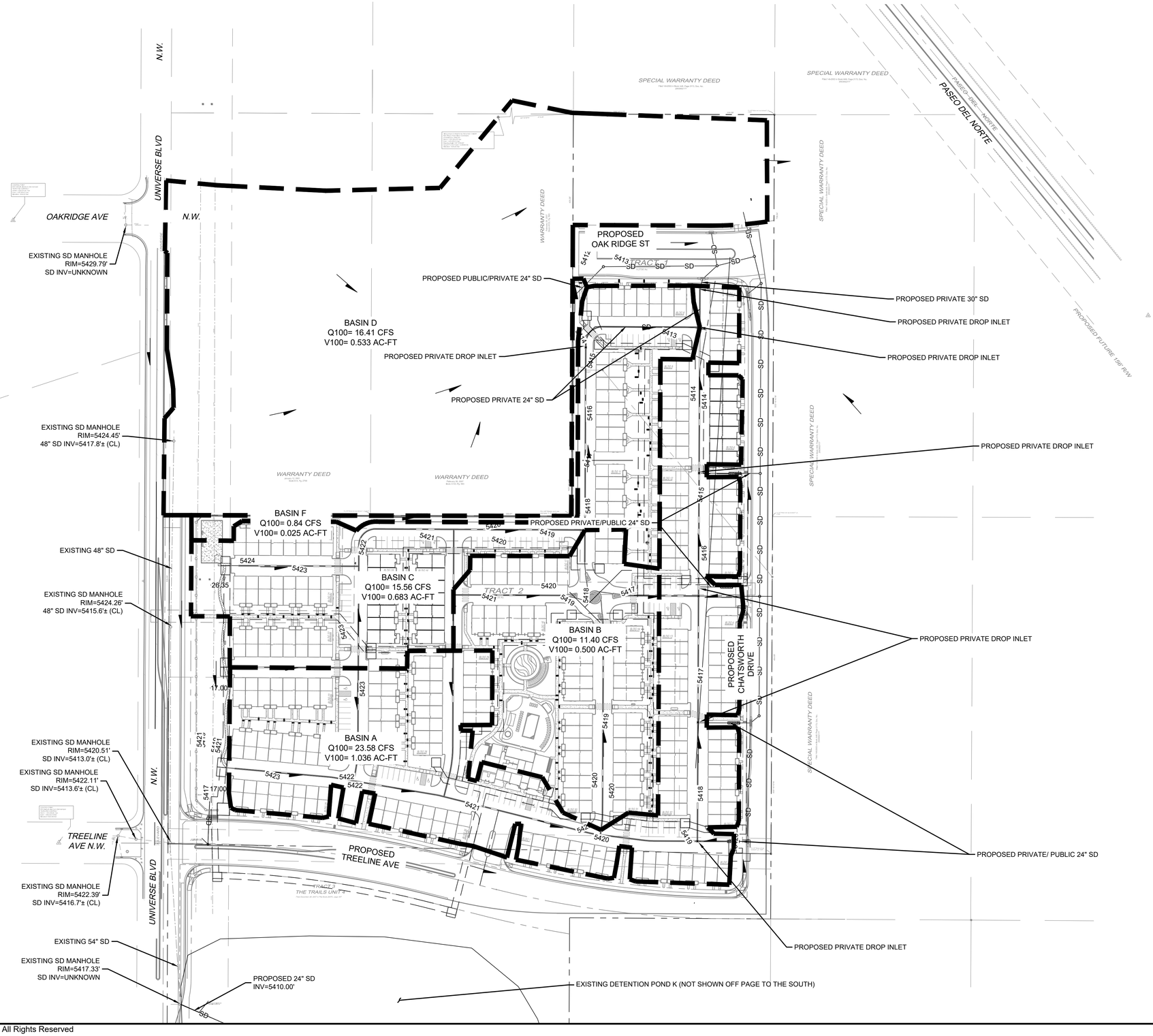
0 80 160
SCALE IN FEET

EXHIBIT 1 EXISTING BASINS

RESPEC
COMMUNITY DESIGN SOLUTIONS
5971 JEFFERSON STREET SUITE 101
ALBUQUERQUE, NEW MEXICO 87109
WWW.RESPEC.COM PHONE: (505)253-9718

NAME: L:\Active Projects\04022 Sonata Trails Unit 4 Apartments\3. DWG\Onsite Plan Set\Exhibits\04022 Drainage Existing Conditions.dwg PLOT DATE: May 29, 2020 1:59pm

NOTE:
RUNOFF FROM PRIVATE PROPERTY THAT DISCHARGES DIRECTLY INTO THE RIGHT-OF-WAY WILL BE EITHER SIDEWALK CULVERTS OR STORM DRAIN.



LEGEND

- PROPERTY BOUNDARY
- BASIN BOUNDARY
- EXISTING STORM DRAIN
- FLOW ARROW
- EXISTING STORM DRAIN MANHOLE
- EXISTING STORM DRAIN INLET
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET
- PROPOSED STORM DRAIN
- CONCEPTUAL FUTURE STORM DRAIN

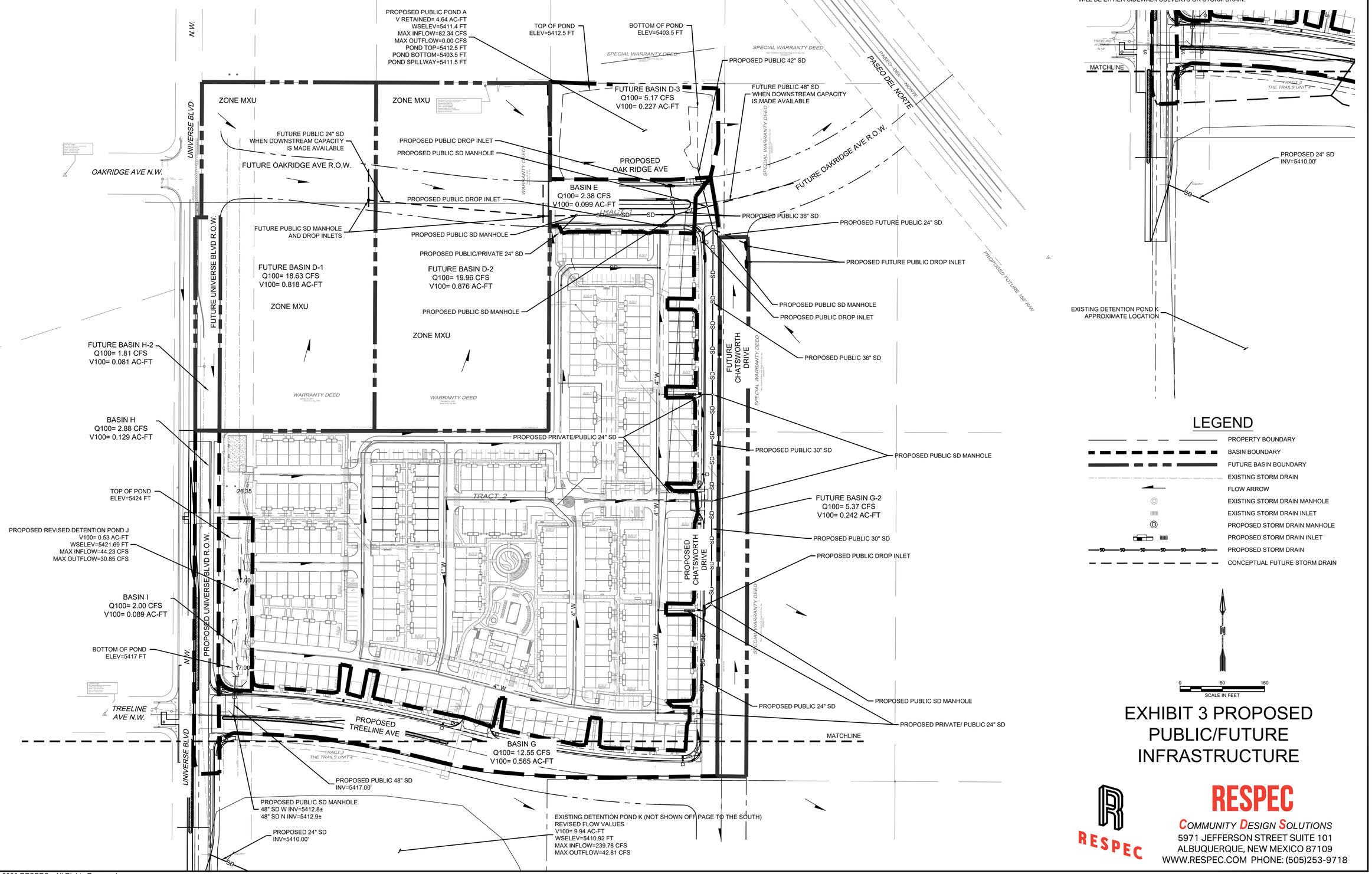
0 80 160
SCALE IN FEET

EXHIBIT 2 PROPOSED BASINS

RESPEC
COMMUNITY DESIGN SOLUTIONS
5971 JEFFERSON STREET SUITE 101
ALBUQUERQUE, NEW MEXICO 87109
WWW.RESPEC.COM PHONE: (505)253-9718

NAME: L:\Active Projects\04022 Sonata Trails Unit 4 Apartments\3. DWG\Onsite Plan Set\Exhibits\04022 Drainage Proposed Conditions.dwg PLOT DATE: Sep 02, 2020 11:31am

NOTE:
RUNOFF FROM PRIVATE PROPERTY THAT DISCHARGES DIRECTLY INTO THE RIGHT-OF-WAY WILL BE EITHER SIDEWALK CULVERTS OR STORM DRAIN.



LEGEND

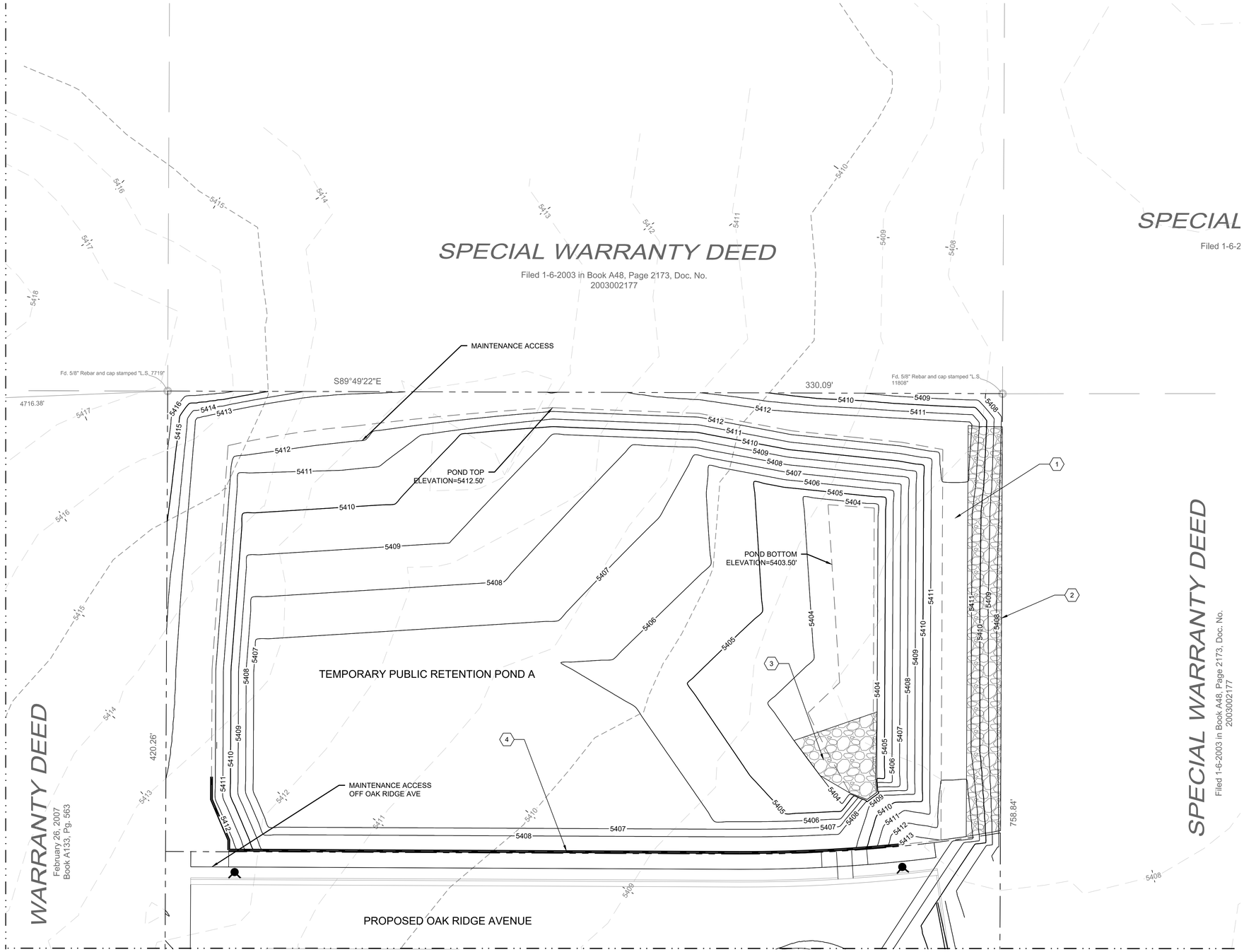
- PROPERTY BOUNDARY
- BASIN BOUNDARY
- FUTURE BASIN BOUNDARY
- EXISTING STORM DRAIN
- FLOW ARROW
- EXISTING STORM DRAIN MANHOLE
- EXISTING STORM DRAIN INLET
- PROPOSED STORM DRAIN MANHOLE
- PROPOSED STORM DRAIN INLET
- PROPOSED STORM DRAIN
- CONCEPTUAL FUTURE STORM DRAIN

0 80 160
SCALE IN FEET

EXHIBIT 3 PROPOSED PUBLIC/FUTURE INFRASTRUCTURE

RESPEC
COMMUNITY DESIGN SOLUTIONS
5971 JEFFERSON STREET SUITE 101
ALBUQUERQUE, NEW MEXICO 87109
WWW.RESPEC.COM PHONE: (505)253-9718

NAME: N:\Projects\04022 Sonata Trails Unit 4 Apartments\3. DWG\Onsite Plan Set\Exhibits\04022 Drainage Proposed Public Conditions.dwg PLOT DATE: Oct 13, 2020 11:22am



LEGEND

MAJOR CONTOUR	4985
MINOR CONTOUR	
EXISTING MAJOR CONTOUR	4985
EXISTING MINOR CONTOUR	
MATCHLINE	
SLOPE ARROW	1.5% 51.2%
SIDEWALK CULVERT	

KEYED NOTES

I.D.#	DESCRIPTION
1	1' OVERFLOW WEIR. TOP OF POND ELEVATION = 5412.50'. TOP OF WEIR ELEVATION = 5411.50'.
2	RIP RAP D50=8" DOWNSTREAM OF OVERFLOW WEIR.
3	RIP RAP D50=8" POND RUNDOWN.
4	WATERPROOF CMU RETAINING WALL. RETAINING WALL HEIGHT VARIES FROM 0'-6'.

0 20 40
SCALE: 1" = 20'

EXHIBIT 4 TEMPORARY PUBLIC RETENTION POND A

RESPEC
COMMUNITY DESIGN SOLUTIONS
5971 JEFFERSON STREET SUITE 101
ALBUQUERQUE, NEW MEXICO 87109
WWW.RESPEC.COM PHONE: (505)253-9718

NAME: L:\Active Projects\04022 Sonata Trails Unit 4 Apartments\3. DWG\Onsite Plan Set\Exhibits\04022 POND A.dwg PLOT DATE: Sep 03, 2020 2:33pm

MAINTENANCE ACCESS
OFF UNIVERSE BLVD

MAINTENANCE ACCESS

POND J

POND TOP
ELEVATION=5424.00'

POND BOTTOM
ELEVATION=5417.00'

BLDG 22

BLDG 23

BLDG 24

BLDG 25

TOP POND

N.W.

PROPOSED TREELINE AVENUE

TREELINE

LEGEND

MAJOR CONTOUR	4985
MINOR CONTOUR	
EXISTING MAJOR CONTOUR	4985
EXISTING MINOR CONTOUR	
MATCHLINE	
SLOPE ARROW	-1.5% -51.2%
SIDEWALK CULVERT	

0 20 40
SCALE: 1" = 20'

EXHIBIT 5 POND J

RESPEC
COMMUNITY DESIGN SOLUTIONS
5971 JEFFERSON STREET SUITE 101
ALBUQUERQUE, NEW MEXICO 87109
WWW.RESPEC.COM PHONE: (505)253-9718

NAME: L:\Active Projects\04022 Sonata Trails Unit 4 Apartments\3. DWG\Onsite Plan Set\Exhibits\04022 POND J.dwg PLOT DATE: Sep 03, 2020 2:57pm

APPENDIX A

HYDROLOGIC CALCULATIONS

Water Quality:

Required Water Quality volume for first flush of 0.34"

Basin	Volume (cu. ft.)	Volume Provided (cu. ft.)
Total Onsite Impervious Area	13,064	122,383

PCSWMM MODEL VS CURRENT SURVEY/DESIGN ELEVATION COMPARISON		
PCSWMM JUNCTION	MODEL ELEVATION (NGVD 29)	SURVEY/DESIGN ELEVATION (NAVD 88)
	FT	FT
MH-1	5418.91	5421.71
SDMH-4A	5414.70	5417.33
PondJ	5414.20	5417.00

Link38 - Revised the 5' diameter storm drain into Pond J to 4' diameter

Pond J - Revised the storage capacity of Pond J

Revised the demand Time Series ID-88 to match new area of Pond J

Removed Node J - offsite flows do not drain to Pond J

MH-1

SDMH-4A

SDMH-5A

OR2 - Added 3.70' diameter orifice to the southern downstream outfall storm drain.

OR1 - Changed orifice plate diameter from 2.03' to 3.50'. The orifice location has not changed, still on the southern downstream outfall storm drain

Pond K - no revisions to the physical storage capacity, but are sending more flow to this pond due to revised storage capacity of Pond K. Discharge of out Pond K is 42.81 cfs.

Link64 - Added 24" diameter storm drain pipe to discharge into Pond K

Link63 - Added 30" diameter storm drain pipe to discharge into Pond K based on field inspection of the system

ORF_K - Changed orifice plate diameter from 2.72' to 2.61'. The orifice location has not changed, still on the southern downstream outfall storm drain

Legend

- Junctions
- Outfalls
- Storages
- Conduits
- Orifices

PCSWMM MODEL REVISIONS

N

1000 ft

Pond Summary				
Pond	Inflow (cfs)	Outflow (cfs)	Volume Prvd (ac-ft)	Peak Volume (ac-ft)
Pond 202B	400 7	197 8	13 40	13 28
Pond 209	63.9	19 2	3 00	1 95
Pond 10	198 3	19 9	7 00	6.9
Sundance Pond	101 7	32 6	2 80	2 76
Unser Pond	188 1	119.3	7 70	7 68
Pond 2	652 6	446.3	16.00	15 9

Proposed Basin Summary Data (100 yr - 24 hr)			
Basin ID	Area (ac)	Peak Flow (cfs)	Volume (ac-ft)
B202A	44 3	130	7 9
B202B	37 1	132	6 5
B202C	32 3	116	6 0
B203A	46 5	133	8 5
B203B	37 4	119	6 4
B204A	53 6	196	9 7
B204B	27 7	104	5 1
B205A	20 6	76	3 7
B205B	21 9	79	3 9
B206A	87 0	258	16.3
B206B	73 2	241	13.0
B206C	46 2	130	8 2
B206D	26 4	97	4 9
B206E	24 3	80	4 0
B207	249 0	72	8 9
B208	111.9	67	5 1
B209	32 9	64	3 5
B210	22 0	66	3 6
Sundance	40 3	102	5 5

LEGEND

- FLOW DIRECTION
- AP3 — ANALYSIS POINT DESIGNATION
- EXISTING INDEX CONTOUR (25')
- EXISTING INTERMEDIATE CONTOUR (5')
- 1 — PIEDRAS MARCADAS DAM
- 2 — JAMES MONROE MIDDLE SCHOOL
- 3 — THE BOULDERS
- 4 — THE TRAILS
- 5 — VENTANA SQUARE
- 6 — VILLA DE LA CHAMISA SUBDIVISION
- 7 — CHAMISA RIDGE SUBUDIVISION
- 8 — SUNDANCE ESTATES
- PROPOSED POND
- EXISTING POND
- PROPOSED BASINS
- PETROGLYPH NATIONAL MONUMENT
- PLANNED LOTS
- PLANNED STORM DRAIN
- EXISTING STORM DRAIN
- ROCK OUTCROP
- BOCA NEGRA DAM WATERSHED
- CALABACILLAS WATERSHED
- MARIPOSA WATERSHED
- PIEDRAS MARCADAS WATERSHED
- THE TRAILS WATERSHED

Analysis Point Summary (100-yr, 24- hr)			
Analysis Point	Area	Peak Flow	Volume
	ac	cfs	ac-ft
AP-1	356.6	570	63.4
AP-2	468.5	612	68.5
AP-3	506.6	157	40.2
AP-4	997 1	730	112 2
AP-5	37 4	119	6 4
AP-6	0 0	47	6 6
AP-7	44.3	130	7 9
AP-8	160.2	198	27.9
AP-9	160.2	402	28.5
AP-10	78.8	226	14.5
AP-11	184 4	119	24 5
AP-12	160.2	473	29.2
AP-13	186.6	537	34.0
AP-14	232.8	653	42.2
AP-15	53.6	196	9 7
AP-16	101.9	177	17.8
AP-17	32.9	19	3 4
AP-18	81.3	110	14.1

GRAPHIC SCALE

600 0 300 600 1200 2400

(IN FEET)

1 inch = 600 ft.

UPPER PIEDRAS MARCADAS WATERSHED DRAINAGE AND WATER QUALITY MANAGEMENT PLAN
PLATE 3 - ALTERNATIVE 3

AMAFCA

WILSON & COMPANY
4900 LANG AVE. NE
ALBUQUERQUE, NM 87109
PHONE: 505-348-4000
www.wilsonco.com

M:\2023\23-0012_PROJECT_DOCS\PLANSHEETS\ALTERNATIVES\DEVELOPED CON - ALT 3 MAP.DWG, 4/2/2024 4:49 PM

Hydrology Calculations

The following calcualtions are based on Albuquerque's Development Process Manual, Section 22.2 (OLD DPM)

Runoff Rate:

Treatment Type Areas

Subbasin	$Area_A$ (ac)	$Area_B$ (ac)	$Area_C$ (ac)	$Area_D$ (ac)	Total (ac)
Proposed Basin A	0.00	0.59	0.59	4.72	5.91
Proposed Basin B	0.00	0.29	0.29	2.28	2.85
Proposed Basin C	0.00	0.39	0.39	3.12	3.90
Proposed Basin D	9.03	0.00	0.00	1.00	10.03
Proposed Basin E	0.00	0.11	0.11	0.41	0.64
Proposed Basin F	0.00	0.15	0.15	0.00	0.31
Proposed Basin G	0.00	0.15	0.15	2.70	2.99
Proposed Basin H	0.00	0.03	0.03	0.62	0.69
Proposed Basin I	0.00	0.02	0.02	0.43	0.47
Total	9.03	1.74	1.74	15.28	27.78
Pond A Total	9.03	1.68	1.68	14.23	26.62

Peak Discharge values based on Zone 1 from Table A-9

Q_A = 1.29 cfs/ac Q_B = 2.03 cfs/ac Q_C = 2.87 cfs/ac Q_D = 4.37 cfs/ac

Peak Discharge values FOR THE 10-YR STORM EVENT based on Zone 1 from Table A-9

Q_A = 0.24 cfs/ac Q_B = 0.76 cfs/ac Q_C = 1.49 cfs/ac Q_D = 2.89 cfs/ac

Peak Discharge calculation for a 100-yr, 24-hr storm event from equation A-10

Subbasin	Discharge (cfs)
Proposed Basin A	23.5
Proposed Basin B	11.4
Proposed Basin C	15.5
Proposed Basin D	16.0
Proposed Basin E	2.4
Proposed Basin F	0.8
Proposed Basin G	12.5
Proposed Basin H	2.9
Proposed Basin I	2.0
Total	82.1

Subbasin	Q10 (cfs)
Proposed Basin A	15.0
Proposed Basin B	7.2
Proposed Basin C	9.9
Proposed Basin D	5.1
Proposed Basin E	1.4
Proposed Basin F	0.3
Proposed Basin G	8.1
Proposed Basin H	1.9
Proposed Basin I	1.3
Total	47.1

Excess Precipitation values for 100-yr, 6hr storm based on Zone 1 from Table A-8

E_A = 0.44 in E_B = 0.67 in E_C = 0.99 in E_D = 1.97 in

EXCESS PRECIPITATION

Weighted E (in)	V_{360} (ac-ft)	V_{10days} (ac-ft)
1.307	2.90	4.64

TEMPORARY PUBLIC RETENTION POND A - PROPOSED												
NAME	Q100-24HR EXISTING DISCHARGE	Q100-10DAY WEIR DISCHARGE	V100-24HR EXISTING VOLUME	V100-10DAY WEIR DISCHARGE	Q100-24HR MAX INFLOW	V100-10DAY MAX INFLOW VOLUME	VOLUME RETAINED	MAX WATER SURFACE ELEVATION	RETENTION VOLUME PROVIDED	TOP OF POND ELEVATION	SPILLWAY ELEVATION	BOTTOM OF POND ELEVATION
	CFS	CFS	AC-FT	AC-FT	CFS	AC-FT	AC-FT	FT	AC-FT	FT	FT	FT
POND-A	47.71	0.00	1.31	0.00	82.34	4.64	4.64	5411.40	4.71	5412.50	5411.50	5403.50

TEMPORARY PUBLIC RETENTION POND A				
Elevation	Area (Sq.Ft)	V (Cu.Ft)	Cum (Cu.Ft)	Cum (Ac.Ft)
5403.50	1918	0	0	0.00
5404.00	3421	1335	1335	0.03
5405.00	7164	5293	6627	0.15
5406.00	11749	9457	16084	0.37
5407.00	26579	19164	35248	0.81
5408.00	32142	29361	64608	1.48
5409.00	37959	35051	99659	2.29
5410.00	41815	39887	139546	3.20
5411.50	45504	65489	205035	4.71
5412.50	48297	46901	251936	5.78

EXISTING PCSWMM STORAGE SUMMARY											
NAME	POND BOTTOM	TOP OF POND	EMERGENCY SPILLWAY ELEVATION	DEPTH TO EMERGENCY SPILLWAY	MAX WATER SURFACE DEPTH	MAX HGL	TIME MAX HGL	MAX TOTAL INFLOW	FREEBOARD TO EMERGENCY SPILLWAY	MAX STORED VOLUME	MAX OUTFLOW
	FT	FT	FT	FT	FT	FT	H:M	CFS	FT	AC-FT	CFS
POND-D	5423.30	5432.30	5431.30	8.00	7.98	5431.28	6:58	159.24	0.02	6.42	14.80
POND-F	5415.08	5426.80	5424.33	9.25	8.16	5423.24	3:32	215.08	1.09	9.87	9.09
POND-F5	5419.30	5426.80	5426.30	7.00	6.91	5426.21	1:48	123.32	0.09	2.71	46.43
POND-G	5415.67	5424.00	5422.50	6.83	6.63	5422.30	14:01	117.66	0.20	6.88	15.80
POND-H	5418.65	5423.00	5422.00	3.35	3.28	5421.93	2:28	110.67	0.07	2.96	24.71
POND-J	5414.00	5418.00	5417.00	3.00	1.66	5415.66	2:03	136.06	1.34	3.70	26.64
POND-K	5404.85	5412.00	5410.30	5.45	3.01	5407.86	4:01	153.19	2.44	8.73	39.97

PROPOSED PCSWMM STORAGE SUMMARY											
NAME	POND BOTTOM	TOP OF POND	EMERGENCY SPILLWAY ELEVATION	DEPTH TO EMERGENCY SPILLWAY	MAX WATER SURFACE DEPTH	MAX HGL	TIME MAX HGL	MAX TOTAL INFLOW	FREEBOARD TO EMERGENCY SPILLWAY	MAX STORED VOLUME	MAX OUTFLOW
	FT	FT	FT	FT	FT	FT	H:M	CFS	FT	AC-FT	CFS
POND-D	5423.30	5432.30	5431.30	8.00	7.98	5431.28	6:58	159.24	0.02	6.42	14.80
POND-F	5415.08	5426.80	5424.33	9.25	8.16	5423.24	3:32	215.33	1.09	9.87	9.09
POND-F5	5419.30	5426.80	5426.30	7.00	6.91	5426.21	1:48	123.31	0.09	2.71	46.43
POND-G	5415.67	5424.00	5422.50	6.83	6.63	5422.30	14:00	117.19	0.20	6.88	15.80
POND-H	5418.65	5423.00	5422.00	3.35	3.28	5421.93	2:28	110.67	0.07	2.96	24.71
POND-J	5414.20	5421.20	5420.20	6.00	4.69	5418.89	1:36	44.23	1.31	0.53	30.85
POND-K	5404.85	5412.00	5410.30	5.45	3.27	5408.12	2:26	239.78	2.18	9.94	42.81

```
*  100 YEAR RAINFALL TABLE
RAINFALL              TYPE=13  RAIN QUARTER=0 IN
                     RAIN ONE=1.87 IN  RAIN SIX=2.20 IN
                     RAIN DAY=2.66 IN  DT=0.033 HR
************************************************************
*S EXISTING CONDITIONS

*S  COMPUTE HYD EXISTING BASIN A
COMPUTE NM HYD      ID=1  HYDNO=101  DA=0.00804SQ MI
                    PER A=100  PER B=0   PER C=0  PER D=0
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=1  CODE=10

*S  COMPUTE HYD EXISTING BASIN B
COMPUTE NM HYD      ID=2  HYDNO=102  DA=0.01428SQ MI
                    PER A=100  PER B=0   PER C=0  PER D=0
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=2  CODE=10

*S  COMPUTE HYD EXISTING BASIN C
COMPUTE NM HYD      ID=3  HYDNO=103  DA=0.03350SQ MI
                    PER A=100  PER B=0   PER C=0  PER D=0
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=3  CODE=10

ADD HYD           ID=4 HYD=101TO102 ID I=1 II=2
PRINT HYD                 ID=4 CODE=10

ADD HYD           ID=5 HYD=COMBINED101-102TO103 ID I=3 II=4
PRINT HYD                 ID=5 CODE=10

************************************************************
*S PROPOSED CONDITIONS

*S  COMPUTE HYD PROPOSED BASIN A
COMPUTE NM HYD      ID=6  HYDNO=104  DA=0.00923SQ MI
                    PER A=0  PER B=10   PER C=10   PER D=80
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=6  CODE=10

*S  COMPUTE HYD PROPOSED BASIN B
COMPUTE NM HYD      ID=7  HYDNO=105  DA=0.00446SQ MI
                    PER A=0  PER B=10   PER C=10   PER D=80
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=7  CODE=10

*S  COMPUTE HYD PROPOSED BASIN C
COMPUTE NM HYD      ID=8  HYDNO=106  DA=0.00609SQ MI
                    PER A=0  PER B=10   PER C=10   PER D=80
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=8  CODE=10
```

```
ADD HYD           ID=10 HYD=BTOA ID I=6 II=7
PRINT HYD                ID=10 CODE=10

ADD HYD           ID=11 HYD=B-CTOA ID I=8 II=10
PRINT HYD                ID=11 CODE=10

*S  COMPUTE HYD PROPOSED BASIN D
COMPUTE NM HYD      ID=12  HYDNO=107  DA=0.01567SQ MI
                    PER A=90  PER B=0   PER C=0   PER D=10
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=12  CODE=10

*S  COMPUTE HYD PROPOSED BASIN E
COMPUTE NM HYD      ID=13  HYDNO=108  DA=0.00100SQ MI
                    PER A=0  PER B=17.5   PER C=17.5   PER D=65
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=13  CODE=10

*S  COMPUTE HYD PROPOSED BASIN F
COMPUTE NM HYD      ID=14  HYDNO=109  DA=0.00048SQ MI
                    PER A=0  PER B=45   PER C=45   PER D=10
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=14  CODE=10

ADD HYD           ID=15 HYD=DTOF ID I=12 II=14
PRINT HYD                ID=15 CODE=10

ADD HYD           ID=16 HYD=ETOF-D ID I=13 II=15
PRINT HYD                ID=16 CODE=10

*S  COMPUTE HYD PROPOSED BASIN G
COMPUTE NM HYD      ID=17  HYDNO=110  DA=0.00468SQ MI
                    PER A=0  PER B=5   PER C=5   PER D=90
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=17  CODE=10

*S  COMPUTE HYD PROPOSED BASIN H
COMPUTE NM HYD      ID=18  HYDNO=111  DA=0.00107SQ MI
                    PER A=0  PER B=5   PER C=5   PER D=90
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=18  CODE=10

*S  COMPUTE HYD PROPOSED BASIN I
COMPUTE NM HYD      ID=19  HYDNO=112  DA=0.00074SQ MI
                    PER A=0  PER B=5   PER C=5   PER D=90
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=19  CODE=10

ADD HYD           ID=20 HYD=HTOI ID I=18 II=19
PRINT HYD                ID=20 CODE=10
```

```
ADD HYD           ID=21 HYD=A-CTOG ID I=11 II=17
PRINT HYD                ID=21 CODE=10

ADD HYD           ID=22 HYD=D-FTOA-DTOG ID I=16 II=21
PRINT HYD                ID=22 CODE=10

************************************************************
*S FUTURE CONDITIONS

*S  COMPUTE HYD FUTURE BASIN D-1
COMPUTE NM HYD      ID=23  HYDNO=113  DA=0.00729SQ MI
                    PER A=0  PER B=10   PER C=10   PER D=80
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=23  CODE=10

*S  COMPUTE HYD FUTURE BASIN D-2
COMPUTE NM HYD      ID=24  HYDNO=114  DA=0.00781SQ MI
                    PER A=0  PER B=10   PER C=10   PER D=80
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=24  CODE=10

*S  COMPUTE HYD FUTURE BASIN D-3
COMPUTE NM HYD      ID=25  HYDNO=115  DA=0.00202SQ MI
                    PER A=0  PER B=10   PER C=10   PER D=80
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=25  CODE=10

*S  COMPUTE HYD FUTURE BASIN G-2
COMPUTE NM HYD      ID=26  HYDNO=116  DA=0.00200SQ MI
                    PER A=0  PER B=5   PER C=5   PER D=90
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=26  CODE=10

*S  COMPUTE HYD FUTURE BASIN H-2
COMPUTE NM HYD      ID=27  HYDNO=117  DA=0.00067SQ MI
                    PER A=0  PER B=5   PER C=5   PER D=90
                    TP=-0.13   RAIN=-1
PRINT HYD           ID=27  CODE=10


ADD HYD           ID=28 HYD=FULLROADWIDTH ID I=17 II=26
PRINT HYD                ID=28 CODE=10



FINISH
```

AHYMO PROGRAM (AHYMO-S4) - Version: S4.02a - Rel: 02a

RUN DATE (MON/DAY/YR) = 09/01/2020

START TIME (HR:MIN:SEC) = 15:00:23 USER NO.= AHYMO-S4TempUser05901704

INPUT FILE = y\ENG Tools\ahymo-s4-r2\ahymo-s4-r2\DISK1\program files\AHYMO-S4\04022 Input.HMI

* 100 YEAR RAINFALL TABLE

RAINFALL TYPE=13 RAIN QUARTER=0 IN

RAIN ONE=1.87 IN RAIN SIX=2.20 IN

RAIN DAY=2.66 IN DT=0.033 HR

COMPUTED 24-HOUR RAINFALL DISTRIBUTION BASED ON NOAA ATLAS 2 - PEAK AT 1.40 HR.

DT = 0.033000 HOURS END TIME = 23.990999 HOURS

0.0000	0.0016	0.0033	0.0049	0.0066	0.0084	0.0102
0.0120	0.0139	0.0158	0.0178	0.0198	0.0219	0.0240
0.0262	0.0285	0.0308	0.0332	0.0357	0.0383	0.0409
0.0437	0.0465	0.0495	0.0526	0.0558	0.0592	0.0627
0.0664	0.0704	0.0745	0.0793	0.0847	0.0904	0.0983
0.1220	0.1595	0.2144	0.2903	0.3910	0.5206	0.6830
0.8823	1.1227	1.2303	1.3056	1.3716	1.4312	1.4859
1.5365	1.5836	1.6278	1.6693	1.7085	1.7455	1.7805
1.8136	1.8451	1.8749	1.9032	1.9301	1.9482	1.9541
1.9597	1.9650	1.9700	1.9749	1.9795	1.9840	1.9883
1.9925	1.9965	2.0004	2.0041	2.0078	2.0114	2.0148
2.0182	2.0215	2.0247	2.0278	2.0309	2.0339	2.0368
2.0396	2.0425	2.0452	2.0479	2.0506	2.0532	2.0557
2.0582	2.0607	2.0631	2.0655	2.0678	2.0702	2.0724
2.0747	2.0769	2.0791	2.0812	2.0833	2.0854	2.0875
2.0895	2.0915	2.0935	2.0955	2.0974	2.0993	2.1012
2.1031	2.1049	2.1067	2.1086	2.1103	2.1121	2.1139
2.1156	2.1173	2.1190	2.1207	2.1223	2.1240	2.1256
2.1272	2.1288	2.1304	2.1320	2.1335	2.1351	2.1366
2.1381	2.1396	2.1411	2.1426	2.1440	2.1455	2.1469
2.1484	2.1498	2.1512	2.1526	2.1540	2.1553	2.1567
2.1581	2.1594	2.1607	2.1621	2.1634	2.1647	2.1660
2.1673	2.1686	2.1698	2.1711	2.1723	2.1736	2.1748
2.1761	2.1773	2.1785	2.1797	2.1809	2.1821	2.1833
2.1844	2.1856	2.1868	2.1879	2.1891	2.1902	2.1913
2.1925	2.1936	2.1947	2.1958	2.1969	2.1980	2.1991
2.2002	2.2015	2.2028	2.2041	2.2054	2.2067	2.2080
2.2092	2.2105	2.2118	2.2130	2.2143	2.2156	2.2168
2.2181	2.2193	2.2206	2.2218	2.2231	2.2243	2.2255
2.2268	2.2280	2.2292	2.2305	2.2317	2.2329	2.2341

2.2354	2.2366	2.2378	2.2390	2.2402	2.2414	2.2426
2.2438	2.2450	2.2462	2.2474	2.2486	2.2497	2.2509
2.2521	2.2533	2.2545	2.2556	2.2568	2.2580	2.2591
2.2603	2.2615	2.2626	2.2638	2.2649	2.2661	2.2672
2.2684	2.2695	2.2706	2.2718	2.2729	2.2741	2.2752
2.2763	2.2774	2.2786	2.2797	2.2808	2.2819	2.2830
2.2842	2.2853	2.2864	2.2875	2.2886	2.2897	2.2908
2.2919	2.2930	2.2941	2.2952	2.2963	2.2974	2.2984
2.2995	2.3006	2.3017	2.3028	2.3038	2.3049	2.3060
2.3071	2.3081	2.3092	2.3103	2.3113	2.3124	2.3134
2.3145	2.3155	2.3166	2.3176	2.3187	2.3197	2.3208
2.3218	2.3229	2.3239	2.3249	2.3260	2.3270	2.3280
2.3291	2.3301	2.3311	2.3321	2.3331	2.3342	2.3352
2.3362	2.3372	2.3382	2.3392	2.3402	2.3413	2.3423
2.3433	2.3443	2.3453	2.3463	2.3473	2.3482	2.3492
2.3502	2.3512	2.3522	2.3532	2.3542	2.3552	2.3561
2.3571	2.3581	2.3591	2.3600	2.3610	2.3620	2.3630
2.3639	2.3649	2.3659	2.3668	2.3678	2.3687	2.3697
2.3706	2.3716	2.3726	2.3735	2.3745	2.3754	2.3763
2.3773	2.3782	2.3792	2.3801	2.3811	2.3820	2.3829
2.3839	2.3848	2.3857	2.3867	2.3876	2.3885	2.3894
2.3904	2.3913	2.3922	2.3931	2.3940	2.3950	2.3959
2.3968	2.3977	2.3986	2.3995	2.4004	2.4013	2.4022
2.4031	2.4040	2.4049	2.4058	2.4067	2.4076	2.4085
2.4094	2.4103	2.4112	2.4121	2.4130	2.4139	2.4148
2.4156	2.4165	2.4174	2.4183	2.4192	2.4200	2.4209
2.4218	2.4227	2.4235	2.4244	2.4253	2.4261	2.4270
2.4279	2.4287	2.4296	2.4305	2.4313	2.4322	2.4330
2.4339	2.4348	2.4356	2.4365	2.4373	2.4382	2.4390
2.4399	2.4407	2.4416	2.4424	2.4432	2.4441	2.4449
2.4458	2.4466	2.4474	2.4483	2.4491	2.4499	2.4508
2.4516	2.4524	2.4533	2.4541	2.4549	2.4557	2.4566
2.4574	2.4582	2.4590	2.4599	2.4607	2.4615	2.4623
2.4631	2.4639	2.4647	2.4656	2.4664	2.4672	2.4680
2.4688	2.4696	2.4704	2.4712	2.4720	2.4728	2.4736
2.4744	2.4752	2.4760	2.4768	2.4776	2.4784	2.4792
2.4800	2.4808	2.4816	2.4823	2.4831	2.4839	2.4847
2.4855	2.4863	2.4871	2.4878	2.4886	2.4894	2.4902
2.4910	2.4917	2.4925	2.4933	2.4941	2.4948	2.4956
2.4964	2.4971	2.4979	2.4987	2.4994	2.5002	2.5010
2.5017	2.5025	2.5033	2.5040	2.5048	2.5055	2.5063
2.5070	2.5078	2.5086	2.5093	2.5101	2.5108	2.5116
2.5123	2.5131	2.5138	2.5146	2.5153	2.5161	2.5168
2.5175	2.5183	2.5190	2.5198	2.5205	2.5212	2.5220
2.5227	2.5235	2.5242	2.5249	2.5257	2.5264	2.5271
2.5279	2.5286	2.5293	2.5300	2.5308	2.5315	2.5322
2.5329	2.5337	2.5344	2.5351	2.5358	2.5366	2.5373
2.5380	2.5387	2.5394	2.5401	2.5409	2.5416	2.5423
2.5430	2.5437	2.5444	2.5451	2.5458	2.5465	2.5472
2.5480	2.5487	2.5494	2.5501	2.5508	2.5515	2.5522
2.5529	2.5536	2.5543	2.5550	2.5557	2.5564	2.5571

2.5578	2.5585	2.5591	2.5598	2.5605	2.5612	2.5619
2.5626	2.5633	2.5640	2.5647	2.5654	2.5660	2.5667
2.5674	2.5681	2.5688	2.5695	2.5701	2.5708	2.5715
2.5722	2.5729	2.5735	2.5742	2.5749	2.5756	2.5762
2.5769	2.5776	2.5782	2.5789	2.5796	2.5803	2.5809
2.5816	2.5823	2.5829	2.5836	2.5843	2.5849	2.5856
2.5863	2.5869	2.5876	2.5882	2.5889	2.5896	2.5902
2.5909	2.5915	2.5922	2.5928	2.5935	2.5942	2.5948
2.5955	2.5961	2.5968	2.5974	2.5981	2.5987	2.5994
2.6000	2.6007	2.6013	2.6020	2.6026	2.6032	2.6039
2.6045	2.6052	2.6058	2.6065	2.6071	2.6077	2.6084
2.6090	2.6097	2.6103	2.6109	2.6116	2.6122	2.6128
2.6135	2.6141	2.6147	2.6154	2.6160	2.6166	2.6173
2.6179	2.6185	2.6191	2.6198	2.6204	2.6210	2.6217
2.6223	2.6229	2.6235	2.6241	2.6248	2.6254	2.6260
2.6266	2.6273	2.6279	2.6285	2.6291	2.6297	2.6303
2.6310	2.6316	2.6322	2.6328	2.6334	2.6340	2.6346
2.6353	2.6359	2.6365	2.6371	2.6377	2.6383	2.6389
2.6395	2.6401	2.6407	2.6413	2.6420	2.6426	2.6432
2.6438	2.6444	2.6450	2.6456	2.6462	2.6468	2.6474
2.6480	2.6486	2.6492	2.6498	2.6504	2.6510	2.6516
2.6522	2.6527	2.6533	2.6539	2.6545	2.6551	2.6557
2.6563	2.6569	2.6575	2.6581	2.6587	2.6593	2.6598

```
**********************************************************

*S EXISTING CONDITIONS


*S  COMPUTE HYD EXISTING BASIN A

COMPUTE NM HYD      ID=1  HYDNO=101  DA=0.00804SQ MI

                    PER A=100  PER B=0   PER C=0  PER D=0

                    TP=-0.13   RAIN=-1


        K =  0.159632HR    TP =  0.130000HR    K/TP RATIO =  1.227936
SHAPE CONSTANT, N =  2.899626
        UNIT PEAK =   16.917    CFS   UNIT VOLUME =   0.9988       B =
273.54      P60 = 1.8700
        AREA =     0.008040 SQ MI    IA =   0.65000 INCHES    INF =
1.67000 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000

    PRINT HYD           ID=1  CODE=10
```

PARTIAL HYDROGRAPH 101.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	0.990	0.0	1.980	0.7
2.970	0.1	3.960	0.0		
0.330	0.0	1.320	0.0	2.310	0.3
3.300	0.0	4.290	0.0		
0.660	0.0	1.650	4.1	2.640	0.2
3.630	0.0				

RUNOFF VOLUME = 0.43934 INCHES = 0.1884 ACRE-FEET
PEAK DISCHARGE RATE = 6.88 CFS AT 1.518 HOURS BASIN AREA = 0.0080 SQ. MI.

*S COMPUTE HYD EXISTING BASIN B

COMPUTE NM HYD ID=2 HYDNO=102 DA=0.01428SQ MI

PER A=100 PER B=0 PER C=0 PER D=0

TP=-0.13 RAIN=-1

K = 0.159632HR TP = 0.130000HR K/TP RATIO = 1.227936
SHAPE CONSTANT, N = 2.899626
UNIT PEAK = 30.047 CFS UNIT VOLUME = 0.9991 B = 273.54 P60 = 1.8700
AREA = 0.014280 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

PRINT HYD ID=2 CODE=10

PARTIAL HYDROGRAPH 102.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	0.990	0.0	1.980	1.2
2.970	0.1	3.960	0.0		
0.330	0.0	1.320	0.0	2.310	0.6

```
     3.300       0.1          4.290       0.0
        0.660       0.0          1.650       7.3          2.640       0.3
     3.630       0.0          4.620       0.0

       RUNOFF VOLUME =     0.43934 INCHES     =       0.3346 ACRE-FEET
       PEAK DISCHARGE RATE =      12.21 CFS  AT   1.518 HOURS   BASIN AREA =
0.0143 SQ. MI.




   *S  COMPUTE HYD EXISTING BASIN C

   COMPUTE NM HYD      ID=3  HYDNO=103  DA=0.03350SQ MI

                       PER A=100  PER B=0   PER C=0  PER D=0

                       TP=-0.13   RAIN=-1


        K =  0.159632HR    TP =  0.130000HR    K/TP RATIO =  1.227936
SHAPE CONSTANT, N =  2.899626
        UNIT PEAK =   70.489    CFS   UNIT VOLUME =   0.9994       B =
273.54      P60 = 1.8700
        AREA =     0.033500 SQ MI    IA =   0.65000 INCHES    INF =
1.67000 INCHES PER HOUR
        RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000

   PRINT HYD           ID=3  CODE=10


                                    PARTIAL HYDROGRAPH   103.00

        TIME      FLOW           TIME      FLOW           TIME      FLOW
     TIME      FLOW           TIME      FLOW
         HRS       CFS            HRS       CFS            HRS       CFS
      HRS       CFS            HRS       CFS
        0.000       0.0          1.320       0.0          2.640       0.7
     3.960       0.0
        0.330       0.0          1.650      17.1          2.970       0.3
     4.290       0.0
        0.660       0.0          1.980       2.7          3.300       0.2
     4.620       0.0
        0.990       0.0          2.310       1.3          3.630       0.1
     4.950       0.0

       RUNOFF VOLUME =     0.43934 INCHES     =       0.7850 ACRE-FEET
       PEAK DISCHARGE RATE =      28.63 CFS  AT   1.518 HOURS   BASIN AREA =
0.0335 SQ. MI.
```

ADD HYD ID=4 HYD=101TO102 ID I=1 II=2

PRINT HYD ID=4 CODE=10

HYDROGRAPH FROM AREA 101TO102

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	0.990	0.0	1.980	1.8
2.970	0.2	3.960	0.0		
0.330	0.0	1.320	0.0	2.310	0.9
3.300	0.1	4.290	0.0		
0.660	0.0	1.650	11.4	2.640	0.4
3.630	0.1	4.620	0.0		

RUNOFF VOLUME = 0.43933 INCHES = 0.5230 ACRE-FEET
PEAK DISCHARGE RATE = 19.08 CFS AT 1.518 HOURS BASIN AREA = 0.0223 SQ. MI.

ADD HYD ID=5 HYD=COMBINED101-102TO103 ID I=3 II=4

PRINT HYD ID=5 CODE=10

HYDROGRAPH FROM AREA COMBINED101-102TO103

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.320	0.0	2.640	1.1
3.960	0.1				
0.330	0.0	1.650	28.5	2.970	0.6
4.290	0.0				
0.660	0.0	1.980	4.5	3.300	0.3
4.620	0.0				
0.990	0.0	2.310	2.2	3.630	0.1

```
     4.950       0.0

       RUNOFF VOLUME =     0.43934 INCHES     =       1.3079 ACRE-FEET
       PEAK DISCHARGE RATE =      47.71 CFS  AT   1.518 HOURS   BASIN AREA =
0.0558 SQ. MI.




   ************************************************************

   *S PROPOSED CONDITIONS



   *S  COMPUTE HYD PROPOSED BASIN A

   COMPUTE NM HYD      ID=6  HYDNO=104  DA=0.00923SQ MI

                       PER A=0  PER B=10   PER C=10   PER D=80

                       TP=-0.13   RAIN=-1


         K =  0.070850HR    TP =  0.130000HR    K/TP RATIO =  0.545000
SHAPE CONSTANT, N =  7.106428
         UNIT PEAK =   29.892    CFS   UNIT VOLUME =   0.9994       B =
526.28      P60 = 1.8700
         AREA =     0.007384 SQ MI    IA =   0.10000 INCHES    INF =
0.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000


         K =  0.115497HR    TP =  0.130000HR    K/TP RATIO =  0.888442
SHAPE CONSTANT, N =  3.992344
         UNIT PEAK =   5.0362    CFS   UNIT VOLUME =   0.9977       B =
354.66      P60 = 1.8700
         AREA =     0.001846 SQ MI    IA =   0.42500 INCHES    INF =
1.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000

   PRINT HYD           ID=6  CODE=10


                                     PARTIAL HYDROGRAPH   104.00

         TIME      FLOW           TIME      FLOW           TIME      FLOW
      TIME      FLOW           TIME      FLOW
```

HRS	CFS	HRS	CFS	HRS	CFS
0.000	0.0	5.280	0.1	10.560	0.1
15.840	0.1	21.120	0.1		
0.330	0.0	5.610	0.1	10.890	0.1
16.170	0.1	21.450	0.1		
0.660	0.0	5.940	0.1	11.220	0.1
16.500	0.1	21.780	0.1		
0.990	0.0	6.270	0.2	11.550	0.1
16.830	0.1	22.110	0.1		
1.320	5.7	6.600	0.2	11.880	0.1
17.160	0.1	22.440	0.1		
1.650	12.6	6.930	0.2	12.210	0.1
17.490	0.1	22.770	0.1		
1.980	5.6	7.260	0.2	12.540	0.1
17.820	0.1	23.100	0.1		
2.310	1.2	7.590	0.2	12.870	0.1
18.150	0.1	23.430	0.1		
2.640	0.5	7.920	0.2	13.200	0.1
18.480	0.1	23.760	0.1		
2.970	0.3	8.250	0.2	13.530	0.1
18.810	0.1	24.090	0.1		
3.300	0.2	8.580	0.2	13.860	0.1
19.140	0.1	24.420	0.0		
3.630	0.1	8.910	0.2	14.190	0.1
19.470	0.1	24.750	0.0		
3.960	0.1	9.240	0.2	14.520	0.1
19.800	0.1				
4.290	0.1	9.570	0.2	14.850	0.1
20.130	0.1				
4.620	0.1	9.900	0.1	15.180	0.1
20.460	0.1				
4.950	0.1	10.230	0.1	15.510	0.1
20.790	0.1				

RUNOFF VOLUME = 2.10390 INCHES = 1.0357 ACRE-FEET
PEAK DISCHARGE RATE = 23.58 CFS AT 1.485 HOURS BASIN AREA = 0.0092 SQ. MI.

*S COMPUTE HYD PROPOSED BASIN B

COMPUTE NM HYD ID=7 HYDNO=105 DA=0.00446SQ MI

PER A=0 PER B=10 PER C=10 PER D=80

TP=-0.13 RAIN=-1

K = 0.070850HR TP = 0.130000HR K/TP RATIO = 0.545000
SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 14.444 CFS UNIT VOLUME = 0.9991 B = 526.28 P60 = 1.8700
AREA = 0.003568 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

K = 0.115497HR TP = 0.130000HR K/TP RATIO = 0.888442
SHAPE CONSTANT, N = 3.992344
UNIT PEAK = 2.4335 CFS UNIT VOLUME = 0.9951 B = 354.66 P60 = 1.8700
AREA = 0.000892 SQ MI IA = 0.42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

PRINT HYD ID=7 CODE=10

PARTIAL HYDROGRAPH 105.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.1	9.900	0.1
14.850	0.1	19.800	0.0		
0.330	0.0	5.280	0.1	10.230	0.1
15.180	0.1	20.130	0.0		
0.660	0.0	5.610	0.1	10.560	0.1
15.510	0.1	20.460	0.0		
0.990	0.0	5.940	0.1	10.890	0.1
15.840	0.1	20.790	0.0		
1.320	2.8	6.270	0.1	11.220	0.1
16.170	0.1	21.120	0.0		
1.650	6.1	6.600	0.1	11.550	0.1
16.500	0.1	21.450	0.0		
1.980	2.7	6.930	0.1	11.880	0.1
16.830	0.1	21.780	0.0		
2.310	0.6	7.260	0.1	12.210	0.1
17.160	0.1	22.110	0.0		
2.640	0.2	7.590	0.1	12.540	0.1
17.490	0.1	22.440	0.0		
2.970	0.1	7.920	0.1	12.870	0.1
17.820	0.1	22.770	0.0		
3.300	0.1	8.250	0.1	13.200	0.1
18.150	0.0	23.100	0.0		

```
        3.630       0.1          8.580       0.1         13.530       0.1
     18.480       0.0          23.430       0.0
        3.960       0.1          8.910       0.1         13.860       0.1
     18.810       0.0          23.760       0.0
        4.290       0.1          9.240       0.1         14.190       0.1
     19.140       0.0          24.090       0.0
        4.620       0.1          9.570       0.1         14.520       0.1
     19.470       0.0          24.420       0.0

       RUNOFF VOLUME =     2.10390 INCHES     =       0.5004 ACRE-FEET
       PEAK DISCHARGE RATE =      11.40 CFS  AT   1.485 HOURS   BASIN AREA =
 0.0045 SQ. MI.




    *S  COMPUTE HYD PROPOSED BASIN C

    COMPUTE NM HYD      ID=8  HYDNO=106  DA=0.00609SQ MI

                        PER A=0  PER B=10   PER C=10   PER D=80

                        TP=-0.13   RAIN=-1


         K =  0.070850HR    TP =  0.130000HR    K/TP RATIO =  0.545000
SHAPE CONSTANT, N =  7.106428
         UNIT PEAK =   19.723    CFS   UNIT VOLUME =   0.9993       B =
526.28      P60 = 1.8700
         AREA =     0.004872 SQ MI    IA =   0.10000 INCHES    INF =
0.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000


         K =  0.115497HR    TP =  0.130000HR    K/TP RATIO =  0.888442
SHAPE CONSTANT, N =  3.992344
         UNIT PEAK =   3.3229    CFS   UNIT VOLUME =   0.9964       B =
354.66      P60 = 1.8700
         AREA =     0.001218 SQ MI    IA =   0.42500 INCHES    INF =
1.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000

    PRINT HYD           ID=8  CODE=10


                                      PARTIAL HYDROGRAPH   106.00

         TIME      FLOW           TIME      FLOW           TIME      FLOW
```

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.1	9.900	0.1
14.850	0.1	19.800	0.1		
0.330	0.0	5.280	0.1	10.230	0.1
15.180	0.1	20.130	0.1		
0.660	0.0	5.610	0.1	10.560	0.1
15.510	0.1	20.460	0.1		
0.990	0.0	5.940	0.1	10.890	0.1
15.840	0.1	20.790	0.1		
1.320	3.8	6.270	0.1	11.220	0.1
16.170	0.1	21.120	0.1		
1.650	8.3	6.600	0.1	11.550	0.1
16.500	0.1	21.450	0.1		
1.980	3.7	6.930	0.1	11.880	0.1
16.830	0.1	21.780	0.1		
2.310	0.8	7.260	0.1	12.210	0.1
17.160	0.1	22.110	0.1		
2.640	0.3	7.590	0.1	12.540	0.1
17.490	0.1	22.440	0.1		
2.970	0.2	7.920	0.1	12.870	0.1
17.820	0.1	22.770	0.1		
3.300	0.1	8.250	0.1	13.200	0.1
18.150	0.1	23.100	0.1		
3.630	0.1	8.580	0.1	13.530	0.1
18.480	0.1	23.430	0.1		
3.960	0.1	8.910	0.1	13.860	0.1
18.810	0.1	23.760	0.1		
4.290	0.1	9.240	0.1	14.190	0.1
19.140	0.1	24.090	0.0		
4.620	0.1	9.570	0.1	14.520	0.1
19.470	0.1	24.420	0.0		

RUNOFF VOLUME = 2.10390 INCHES = 0.6833 ACRE-FEET
PEAK DISCHARGE RATE = 15.56 CFS AT 1.485 HOURS BASIN AREA = 0.0061 SQ. MI.

ADD HYD ID=10 HYD=BTOA ID I=6 II=7

PRINT HYD ID=10 CODE=10

HYDROGRAPH FROM AREA BTOA

TIME	FLOW	TIME	FLOW	TIME	FLOW

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	5.280	0.2	10.560	0.2
15.840	0.2	21.120	0.1		
0.330	0.0	5.610	0.2	10.890	0.2
16.170	0.2	21.450	0.1		
0.660	0.0	5.940	0.2	11.220	0.2
16.500	0.2	21.780	0.1		
0.990	0.0	6.270	0.3	11.550	0.2
16.830	0.2	22.110	0.1		
1.320	8.5	6.600	0.3	11.880	0.2
17.160	0.2	22.440	0.1		
1.650	18.7	6.930	0.3	12.210	0.2
17.490	0.2	22.770	0.1		
1.980	8.3	7.260	0.3	12.540	0.2
17.820	0.2	23.100	0.1		
2.310	1.8	7.590	0.3	12.870	0.2
18.150	0.2	23.430	0.1		
2.640	0.7	7.920	0.2	13.200	0.2
18.480	0.2	23.760	0.1		
2.970	0.4	8.250	0.2	13.530	0.2
18.810	0.1	24.090	0.1		
3.300	0.2	8.580	0.2	13.860	0.2
19.140	0.1	24.420	0.0		
3.630	0.2	8.910	0.2	14.190	0.2
19.470	0.1	24.750	0.0		
3.960	0.2	9.240	0.2	14.520	0.2
19.800	0.1				
4.290	0.2	9.570	0.2	14.850	0.2
20.130	0.1				
4.620	0.2	9.900	0.2	15.180	0.2
20.460	0.1				
4.950	0.2	10.230	0.2	15.510	0.2
20.790	0.1				

RUNOFF VOLUME = 2.10386 INCHES = 1.5361 ACRE-FEET
PEAK DISCHARGE RATE = 34.98 CFS AT 1.485 HOURS BASIN AREA = 0.0137 SQ. MI.

```
   ADD HYD                      ID=11 HYD=B-CTOA ID I=8 II=10

   PRINT HYD                    ID=11 CODE=10
```

HYDROGRAPH FROM AREA B-CTOA

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	5.280	0.3	10.560	0.3
15.840	0.2	21.120	0.2		
0.330	0.0	5.610	0.3	10.890	0.3
16.170	0.2	21.450	0.2		
0.660	0.0	5.940	0.3	11.220	0.3
16.500	0.2	21.780	0.2		
0.990	0.0	6.270	0.4	11.550	0.3
16.830	0.2	22.110	0.2		
1.320	12.3	6.600	0.4	11.880	0.3
17.160	0.2	22.440	0.2		
1.650	27.0	6.930	0.4	12.210	0.3
17.490	0.2	22.770	0.2		
1.980	11.9	7.260	0.4	12.540	0.3
17.820	0.2	23.100	0.2		
2.310	2.6	7.590	0.4	12.870	0.3
18.150	0.2	23.430	0.2		
2.640	1.1	7.920	0.4	13.200	0.3
18.480	0.2	23.760	0.2		
2.970	0.5	8.250	0.4	13.530	0.3
18.810	0.2	24.090	0.1		
3.300	0.4	8.580	0.3	13.860	0.3
19.140	0.2	24.420	0.0		
3.630	0.3	8.910	0.3	14.190	0.3
19.470	0.2	24.750	0.0		
3.960	0.3	9.240	0.3	14.520	0.3
19.800	0.2				
4.290	0.3	9.570	0.3	14.850	0.3
20.130	0.2				
4.620	0.3	9.900	0.3	15.180	0.2
20.460	0.2				
4.950	0.3	10.230	0.3	15.510	0.2
20.790	0.2				

RUNOFF VOLUME = 2.10386 INCHES = 2.2194 ACRE-FEET
PEAK DISCHARGE RATE = 50.55 CFS AT 1.485 HOURS BASIN AREA = 0.0198 SQ. MI.

*S COMPUTE HYD PROPOSED BASIN D

COMPUTE NM HYD ID=12 HYDNO=107 DA=0.01567SQ MI

PER A=90 PER B=0 PER C=0 PER D=10

TP=-0.13 RAIN=-1

K = 0.070850HR TP = 0.130000HR K/TP RATIO = 0.545000
SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 6.3436 CFS UNIT VOLUME = 0.9979 B = 526.28 P60 = 1.8700
AREA = 0.001567 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

K = 0.159632HR TP = 0.130000HR K/TP RATIO = 1.227936
SHAPE CONSTANT, N = 2.899626
UNIT PEAK = 29.675 CFS UNIT VOLUME = 0.9991 B = 273.54 P60 = 1.8700
AREA = 0.014103 SQ MI IA = 0.65000 INCHES INF = 1.67000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

PRINT HYD ID=12 CODE=10

PARTIAL HYDROGRAPH 107.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0	14.850	0.0
0.330	0.0	5.280	0.0	10.230	0.0	15.180	0.0
0.660	0.0	5.610	0.0	10.560	0.0	15.510	0.0
0.990	0.0	5.940	0.0	10.890	0.0	15.840	0.0
1.320	1.2	6.270	0.0	11.220	0.0	16.170	0.0
1.650	9.5	6.600	0.0	11.550	0.0	16.500	0.0
1.980	2.3	6.930	0.0	11.880	0.0	16.830	0.0
2.310	0.8	7.260	0.0	12.210	0.0	17.160	0.0
2.640	0.4	7.590	0.0	12.540	0.0	17.490	0.0
2.970	0.2	7.920	0.0	12.870	0.0		

```
    17.820       0.0         22.770       0.0
        3.300       0.1          8.250       0.0         13.200       0.0
    18.150       0.0         23.100       0.0
        3.630       0.1          8.580       0.0         13.530       0.0
    18.480       0.0         23.430       0.0
        3.960       0.0          8.910       0.0         13.860       0.0
    18.810       0.0         23.760       0.0
        4.290       0.0          9.240       0.0         14.190       0.0
    19.140       0.0         24.090       0.0
        4.620       0.0          9.570       0.0         14.520       0.0
    19.470       0.0         24.420       0.0

       RUNOFF VOLUME =     0.63801 INCHES     =       0.5332 ACRE-FEET
       PEAK DISCHARGE RATE =      16.41 CFS  AT   1.518 HOURS   BASIN AREA =
 0.0157 SQ. MI.




   *S  COMPUTE HYD PROPOSED BASIN E

   COMPUTE NM HYD      ID=13  HYDNO=108  DA=0.00100SQ MI

                       PER A=0  PER B=17.5   PER C=17.5   PER D=65

                       TP=-0.13   RAIN=-1


         K =  0.070850HR    TP =  0.130000HR    K/TP RATIO =  0.545000
SHAPE CONSTANT, N =  7.106428
         UNIT PEAK =   2.6314    CFS   UNIT VOLUME =   0.9956       B =
526.28      P60 = 1.8700
         AREA =     0.000650 SQ MI    IA =   0.10000 INCHES    INF =
0.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000


         K =  0.115497HR    TP =  0.130000HR    K/TP RATIO =  0.888442
SHAPE CONSTANT, N =  3.992344
         UNIT PEAK =  0.95486    CFS   UNIT VOLUME =   0.9868       B =
354.66      P60 = 1.8700
         AREA =     0.000350 SQ MI    IA =   0.42500 INCHES    INF =
1.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000

   PRINT HYD           ID=13  CODE=10
```

PARTIAL HYDROGRAPH 108.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0
14.850	0.0	19.800	0.0		
0.330	0.0	5.280	0.0	10.230	0.0
15.180	0.0	20.130	0.0		
0.660	0.0	5.610	0.0	10.560	0.0
15.510	0.0	20.460	0.0		
0.990	0.0	5.940	0.0	10.890	0.0
15.840	0.0	20.790	0.0		
1.320	0.5	6.270	0.0	11.220	0.0
16.170	0.0	21.120	0.0		
1.650	1.3	6.600	0.0	11.550	0.0
16.500	0.0	21.450	0.0		
1.980	0.5	6.930	0.0	11.880	0.0
16.830	0.0	21.780	0.0		
2.310	0.1	7.260	0.0	12.210	0.0
17.160	0.0	22.110	0.0		
2.640	0.0	7.590	0.0	12.540	0.0
17.490	0.0	22.440	0.0		
2.970	0.0	7.920	0.0	12.870	0.0
17.820	0.0	22.770	0.0		
3.300	0.0	8.250	0.0	13.200	0.0
18.150	0.0	23.100	0.0		
3.630	0.0	8.580	0.0	13.530	0.0
18.480	0.0	23.430	0.0		
3.960	0.0	8.910	0.0	13.860	0.0
18.810	0.0	23.760	0.0		
4.290	0.0	9.240	0.0	14.190	0.0
19.140	0.0	24.090	0.0		
4.620	0.0	9.570	0.0	14.520	0.0
19.470	0.0				

RUNOFF VOLUME = 1.86230 INCHES = 0.0993 ACRE-FEET
PEAK DISCHARGE RATE = 2.38 CFS AT 1.485 HOURS BASIN AREA = 0.0010 SQ. MI.

*S COMPUTE HYD PROPOSED BASIN F

COMPUTE NM HYD ID=14 HYDNO=109 DA=0.00048SQ MI

PER A=0 PER B=45 PER C=45 PER D=10

K = 0.070850HR TP = 0.130000HR K/TP RATIO = 0.545000
SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 0.19432 CFS UNIT VOLUME = 0.9411 B = 526.28 P60 = 1.8700
AREA = 0.000048 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

K = 0.115497HR TP = 0.130000HR K/TP RATIO = 0.888442
SHAPE CONSTANT, N = 3.992344
UNIT PEAK = 1.1786 CFS UNIT VOLUME = 0.9891 B = 354.66 P60 = 1.8700
AREA = 0.000432 SQ MI IA = 0.42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

PRINT HYD ID=14 CODE=10

PARTIAL HYDROGRAPH 109.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	1.980	0.1	3.960	0.0
0.330	0.0	2.310	0.0	4.290	0.0
0.660	0.0	2.640	0.0	4.620	0.0
0.990	0.0	2.970	0.0	4.950	0.0
1.320	0.1	3.300	0.0	5.280	0.0
1.650	0.5	3.630	0.0	5.610	0.0

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
5.940	0.0	7.920	0.0
6.270	0.0	8.250	0.0
6.600	0.0	8.580	0.0
6.930	0.0	8.910	0.0
7.260	0.0		
7.590	0.0		

RUNOFF VOLUME = 0.97645 INCHES = 0.0250 ACRE-FEET
PEAK DISCHARGE RATE = 0.84 CFS AT 1.518 HOURS BASIN AREA = 0.0005 SQ. MI.

ADD HYD ID=15 HYD=DTOF ID I=12 II=14

PRINT HYD ID=15 CODE=10

HYDROGRAPH FROM AREA DTOF

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0
14.850	0.0	19.800	0.0		
0.330	0.0	5.280	0.0	10.230	0.0
15.180	0.0	20.130	0.0		
0.660	0.0	5.610	0.0	10.560	0.0
15.510	0.0	20.460	0.0		
0.990	0.0	5.940	0.0	10.890	0.0
15.840	0.0	20.790	0.0		
1.320	1.3	6.270	0.0	11.220	0.0
16.170	0.0	21.120	0.0		
1.650	10.0	6.600	0.0	11.550	0.0
16.500	0.0	21.450	0.0		
1.980	2.4	6.930	0.0	11.880	0.0
16.830	0.0	21.780	0.0		
2.310	0.8	7.260	0.0	12.210	0.0
17.160	0.0	22.110	0.0		
2.640	0.4	7.590	0.0	12.540	0.0
17.490	0.0	22.440	0.0		
2.970	0.2	7.920	0.0	12.870	0.0
17.820	0.0	22.770	0.0		
3.300	0.1	8.250	0.0	13.200	0.0
18.150	0.0	23.100	0.0		
3.630	0.1	8.580	0.0	13.530	0.0
18.480	0.0	23.430	0.0		
3.960	0.0	8.910	0.0	13.860	0.0
18.810	0.0	23.760	0.0		
4.290	0.0	9.240	0.0	14.190	0.0
19.140	0.0	24.090	0.0		
4.620	0.0	9.570	0.0	14.520	0.0
19.470	0.0	24.420	0.0		

RUNOFF VOLUME = 0.64701 INCHES = 0.5573 ACRE-FEET
PEAK DISCHARGE RATE = 17.25 CFS AT 1.518 HOURS BASIN AREA = 0.0162 SQ. MI.

ADD HYD ID=16 HYD=ETOF-D ID I=13 II=15

PRINT HYD ID=16 CODE=10

HYDROGRAPH FROM AREA ETOF-D

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0
14.850	0.0	19.800	0.0		
0.330	0.0	5.280	0.0	10.230	0.0
15.180	0.0	20.130	0.0		
0.660	0.0	5.610	0.0	10.560	0.0
15.510	0.0	20.460	0.0		
0.990	0.0	5.940	0.0	10.890	0.0
15.840	0.0	20.790	0.0		
1.320	1.8	6.270	0.1	11.220	0.0
16.170	0.0	21.120	0.0		
1.650	11.3	6.600	0.1	11.550	0.0
16.500	0.0	21.450	0.0		
1.980	2.9	6.930	0.1	11.880	0.0
16.830	0.0	21.780	0.0		
2.310	0.9	7.260	0.1	12.210	0.0
17.160	0.0	22.110	0.0		
2.640	0.4	7.590	0.1	12.540	0.0
17.490	0.0	22.440	0.0		
2.970	0.2	7.920	0.1	12.870	0.0
17.820	0.0	22.770	0.0		
3.300	0.1	8.250	0.1	13.200	0.0
18.150	0.0	23.100	0.0		
3.630	0.1	8.580	0.0	13.530	0.0
18.480	0.0	23.430	0.0		
3.960	0.1	8.910	0.0	13.860	0.0
18.810	0.0	23.760	0.0		
4.290	0.0	9.240	0.0	14.190	0.0
19.140	0.0	24.090	0.0		
4.620	0.0	9.570	0.0	14.520	0.0
19.470	0.0	24.420	0.0		

RUNOFF VOLUME = 0.71786 INCHES = 0.6566 ACRE-FEET
PEAK DISCHARGE RATE = 19.63 CFS AT 1.518 HOURS BASIN AREA = 0.0172 SQ. MI.

```
    *S  COMPUTE HYD PROPOSED BASIN G

    COMPUTE NM HYD      ID=17  HYDNO=110  DA=0.00468SQ MI

                        PER A=0  PER B=5   PER C=5   PER D=90

                        TP=-0.13   RAIN=-1


         K =  0.070850HR    TP =  0.130000HR    K/TP RATIO =  0.545000
SHAPE CONSTANT, N =  7.106428
         UNIT PEAK =   17.051    CFS   UNIT VOLUME =   0.9992       B =
526.28      P60 = 1.8700
         AREA =     0.004212 SQ MI    IA =   0.10000 INCHES    INF =
0.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000


         K =  0.115497HR    TP =  0.130000HR    K/TP RATIO =  0.888442
SHAPE CONSTANT, N =  3.992344
         UNIT PEAK =   1.2768    CFS   UNIT VOLUME =   0.9902       B =
354.66      P60 = 1.8700
         AREA =     0.000468 SQ MI    IA =   0.42500 INCHES    INF =
1.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000

    PRINT HYD           ID=17  CODE=10


                                      PARTIAL HYDROGRAPH   110.00

        TIME      FLOW           TIME      FLOW           TIME      FLOW
      TIME      FLOW           TIME      FLOW
         HRS       CFS            HRS       CFS            HRS       CFS
       HRS       CFS            HRS       CFS
        0.000       0.0          4.950       0.1          9.900       0.1
     14.850       0.1         19.800       0.1
        0.330       0.0          5.280       0.1         10.230       0.1
     15.180       0.1         20.130       0.1
        0.660       0.0          5.610       0.1         10.560       0.1
     15.510       0.1         20.460       0.1
        0.990       0.0          5.940       0.1         10.890       0.1
     15.840       0.1         20.790       0.1
        1.320       3.3          6.270       0.1         11.220       0.1
     16.170       0.1         21.120       0.1
        1.650       6.7          6.600       0.1         11.550       0.1
     16.500       0.1         21.450       0.1
        1.980       3.1          6.930       0.1         11.880       0.1
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    16.830       0.1         21.780       0.1
        2.310       0.7          7.260       0.1         12.210       0.1
    17.160       0.1         22.110       0.1
        2.640       0.3          7.590       0.1         12.540       0.1
    17.490       0.1         22.440       0.1
        2.970       0.1          7.920       0.1         12.870       0.1
    17.820       0.1         22.770       0.1
        3.300       0.1          8.250       0.1         13.200       0.1
    18.150       0.1         23.100       0.1
        3.630       0.1          8.580       0.1         13.530       0.1
    18.480       0.1         23.430       0.0
        3.960       0.1          8.910       0.1         13.860       0.1
    18.810       0.1         23.760       0.0
        4.290       0.1          9.240       0.1         14.190       0.1
    19.140       0.1         24.090       0.0
        4.620       0.1          9.570       0.1         14.520       0.1
    19.470       0.1         24.420       0.0

       RUNOFF VOLUME =     2.26496 INCHES     =       0.5653 ACRE-FEET
       PEAK DISCHARGE RATE =      12.55 CFS  AT   1.485 HOURS   BASIN AREA =
 0.0047 SQ. MI.




   *S  COMPUTE HYD PROPOSED BASIN H

   COMPUTE NM HYD      ID=18  HYDNO=111  DA=0.00107SQ MI

                       PER A=0  PER B=5   PER C=5   PER D=90

                       TP=-0.13   RAIN=-1


         K =  0.070850HR    TP =  0.130000HR    K/TP RATIO =  0.545000
SHAPE CONSTANT, N =  7.106428
         UNIT PEAK =   3.8985    CFS   UNIT VOLUME =   0.9967       B =
526.28      P60 = 1.8700
         AREA =     0.000963 SQ MI    IA =   0.10000 INCHES    INF =
0.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000


         K =  0.115497HR    TP =  0.130000HR    K/TP RATIO =  0.888442
SHAPE CONSTANT, N =  3.992344
         UNIT PEAK =  0.29192    CFS   UNIT VOLUME =   0.9534       B =
354.66      P60 = 1.8700
         AREA =     0.000107 SQ MI    IA =   0.42500 INCHES    INF =
1.04000 INCHES PER HOUR
```

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

PRINT HYD ID=18 CODE=10

PARTIAL HYDROGRAPH 111.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0
14.850	0.0	19.800	0.0		
0.330	0.0	5.280	0.0	10.230	0.0
15.180	0.0	20.130	0.0		
0.660	0.0	5.610	0.0	10.560	0.0
15.510	0.0	20.460	0.0		
0.990	0.0	5.940	0.0	10.890	0.0
15.840	0.0	20.790	0.0		
1.320	0.7	6.270	0.0	11.220	0.0
16.170	0.0	21.120	0.0		
1.650	1.5	6.600	0.0	11.550	0.0
16.500	0.0	21.450	0.0		
1.980	0.7	6.930	0.0	11.880	0.0
16.830	0.0	21.780	0.0		
2.310	0.1	7.260	0.0	12.210	0.0
17.160	0.0	22.110	0.0		
2.640	0.1	7.590	0.0	12.540	0.0
17.490	0.0	22.440	0.0		
2.970	0.0	7.920	0.0	12.870	0.0
17.820	0.0	22.770	0.0		
3.300	0.0	8.250	0.0	13.200	0.0
18.150	0.0	23.100	0.0		
3.630	0.0	8.580	0.0	13.530	0.0
18.480	0.0	23.430	0.0		
3.960	0.0	8.910	0.0	13.860	0.0
18.810	0.0	23.760	0.0		
4.290	0.0	9.240	0.0	14.190	0.0
19.140	0.0	24.090	0.0		
4.620	0.0	9.570	0.0	14.520	0.0
19.470	0.0				

RUNOFF VOLUME = 2.26496 INCHES = 0.1293 ACRE-FEET
PEAK DISCHARGE RATE = 2.88 CFS AT 1.485 HOURS BASIN AREA = 0.0011 SQ. MI.

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    *S  COMPUTE HYD PROPOSED BASIN I

    COMPUTE NM HYD      ID=19  HYDNO=112  DA=0.00074SQ MI

                        PER A=0  PER B=5   PER C=5   PER D=90

                        TP=-0.13   RAIN=-1


         K =  0.070850HR    TP =  0.130000HR    K/TP RATIO =  0.545000
SHAPE CONSTANT, N =  7.106428
         UNIT PEAK =   2.6961    CFS   UNIT VOLUME =   0.9956       B =
526.28      P60 = 1.8700
         AREA =     0.000666 SQ MI    IA =   0.10000 INCHES    INF =
0.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000


         K =  0.115497HR    TP =  0.130000HR    K/TP RATIO =  0.888442
SHAPE CONSTANT, N =  3.992344
         UNIT PEAK =  0.20189    CFS   UNIT VOLUME =   0.9316       B =
354.66      P60 = 1.8700
         AREA =     0.000074 SQ MI    IA =   0.42500 INCHES    INF =
1.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT =  0.033000

    PRINT HYD           ID=19  CODE=10


                                      PARTIAL HYDROGRAPH   112.00

         TIME      FLOW           TIME      FLOW           TIME      FLOW
       TIME      FLOW           TIME      FLOW
          HRS       CFS            HRS       CFS            HRS       CFS
        HRS       CFS            HRS       CFS
         0.000       0.0          4.950       0.0          9.900       0.0
     14.850       0.0         19.800       0.0
         0.330       0.0          5.280       0.0         10.230       0.0
     15.180       0.0         20.130       0.0
         0.660       0.0          5.610       0.0         10.560       0.0
     15.510       0.0         20.460       0.0
         0.990       0.0          5.940       0.0         10.890       0.0
     15.840       0.0         20.790       0.0
         1.320       0.5          6.270       0.0         11.220       0.0
     16.170       0.0         21.120       0.0
         1.650       1.1          6.600       0.0         11.550       0.0
     16.500       0.0         21.450       0.0
         1.980       0.5          6.930       0.0         11.880       0.0
     16.830       0.0         21.780       0.0
```

2.310	0.1	7.260	0.0	12.210	0.0
17.160	0.0	22.110	0.0		
2.640	0.0	7.590	0.0	12.540	0.0
17.490	0.0	22.440	0.0		
2.970	0.0	7.920	0.0	12.870	0.0
17.820	0.0	22.770	0.0		
3.300	0.0	8.250	0.0	13.200	0.0
18.150	0.0	23.100	0.0		
3.630	0.0	8.580	0.0	13.530	0.0
18.480	0.0	23.430	0.0		
3.960	0.0	8.910	0.0	13.860	0.0
18.810	0.0	23.760	0.0		
4.290	0.0	9.240	0.0	14.190	0.0
19.140	0.0	24.090	0.0		
4.620	0.0	9.570	0.0	14.520	0.0
19.470	0.0				

RUNOFF VOLUME = 2.26496 INCHES = 0.0894 ACRE-FEET
PEAK DISCHARGE RATE = 2.00 CFS AT 1.485 HOURS BASIN AREA = 0.0007 SQ. MI.

ADD HYD ID=20 HYD=HTOI ID I=18 II=19

PRINT HYD ID=20 CODE=10

HYDROGRAPH FROM AREA HTOI

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0
14.850	0.0	19.800	0.0		
0.330	0.0	5.280	0.0	10.230	0.0
15.180	0.0	20.130	0.0		
0.660	0.0	5.610	0.0	10.560	0.0
15.510	0.0	20.460	0.0		
0.990	0.0	5.940	0.0	10.890	0.0
15.840	0.0	20.790	0.0		
1.320	1.3	6.270	0.0	11.220	0.0
16.170	0.0	21.120	0.0		
1.650	2.6	6.600	0.0	11.550	0.0
16.500	0.0	21.450	0.0		
1.980	1.2	6.930	0.0	11.880	0.0
16.830	0.0	21.780	0.0		

2.310	0.2	7.260	0.0	12.210	0.0
17.160	0.0	22.110	0.0		
2.640	0.1	7.590	0.0	12.540	0.0
17.490	0.0	22.440	0.0		
2.970	0.1	7.920	0.0	12.870	0.0
17.820	0.0	22.770	0.0		
3.300	0.0	8.250	0.0	13.200	0.0
18.150	0.0	23.100	0.0		
3.630	0.0	8.580	0.0	13.530	0.0
18.480	0.0	23.430	0.0		
3.960	0.0	8.910	0.0	13.860	0.0
18.810	0.0	23.760	0.0		
4.290	0.0	9.240	0.0	14.190	0.0
19.140	0.0	24.090	0.0		
4.620	0.0	9.570	0.0	14.520	0.0
19.470	0.0				

RUNOFF VOLUME = 2.26462 INCHES = 0.2186 ACRE-FEET
PEAK DISCHARGE RATE = 4.88 CFS AT 1.485 HOURS BASIN AREA = 0.0018 SQ. MI.

ADD HYD ID=21 HYD=A-CTOG ID I=11 II=17

PRINT HYD ID=21 CODE=10

HYDROGRAPH FROM AREA A-CTOG

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	5.280	0.4	10.560	0.4
15.840	0.3	21.120	0.3		
0.330	0.0	5.610	0.4	10.890	0.4
16.170	0.3	21.450	0.2		
0.660	0.0	5.940	0.4	11.220	0.4
16.500	0.3	21.780	0.2		
0.990	0.0	6.270	0.5	11.550	0.4
16.830	0.3	22.110	0.2		
1.320	15.6	6.600	0.5	11.880	0.4
17.160	0.3	22.440	0.2		
1.650	33.7	6.930	0.5	12.210	0.4
17.490	0.3	22.770	0.2		

1.980	15.0	7.260	0.5	12.540	0.4
17.820	0.3	23.100	0.2		
2.310	3.3	7.590	0.5	12.870	0.3
18.150	0.3	23.430	0.2		
2.640	1.3	7.920	0.5	13.200	0.3
18.480	0.3	23.760	0.2		
2.970	0.7	8.250	0.4	13.530	0.3
18.810	0.3	24.090	0.2		
3.300	0.5	8.580	0.4	13.860	0.3
19.140	0.3	24.420	0.0		
3.630	0.4	8.910	0.4	14.190	0.3
19.470	0.3	24.750	0.0		
3.960	0.3	9.240	0.4	14.520	0.3
19.800	0.3				
4.290	0.3	9.570	0.4	14.850	0.3
20.130	0.3				
4.620	0.3	9.900	0.4	15.180	0.3
20.460	0.3				
4.950	0.3	10.230	0.4	15.510	0.3
20.790	0.3				

RUNOFF VOLUME = 2.13467 INCHES = 2.7847 ACRE-FEET
PEAK DISCHARGE RATE = 63.10 CFS AT 1.485 HOURS BASIN AREA = 0.0245 SQ. MI.

ADD HYD ID=22 HYD=D-FTOA-DTOG ID I=16 II=21

PRINT HYD ID=22 CODE=10

HYDROGRAPH FROM AREA D-FTOA-DTOG

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	5.280	0.4	10.560	0.4
15.840	0.3	21.120	0.3		
0.330	0.0	5.610	0.4	10.890	0.4
16.170	0.3	21.450	0.3		
0.660	0.0	5.940	0.5	11.220	0.4
16.500	0.3	21.780	0.3		
0.990	0.0	6.270	0.5	11.550	0.4
16.830	0.3	22.110	0.3		
1.320	17.3	6.600	0.5	11.880	0.4
17.160	0.3	22.440	0.3		

```
     1.650      45.0          6.930       0.5         12.210       0.4
    17.490       0.3         22.770       0.3
     1.980      17.9          7.260       0.5         12.540       0.4
    17.820       0.3         23.100       0.3
     2.310       4.2          7.590       0.5         12.870       0.4
    18.150       0.3         23.430       0.3
     2.640       1.8          7.920       0.5         13.200       0.4
    18.480       0.3         23.760       0.3
     2.970       0.9          8.250       0.5         13.530       0.4
    18.810       0.3         24.090       0.2
     3.300       0.6          8.580       0.5         13.860       0.4
    19.140       0.3         24.420       0.0
     3.630       0.5          8.910       0.5         14.190       0.4
    19.470       0.3         24.750       0.0
     3.960       0.4          9.240       0.5         14.520       0.4
    19.800       0.3
     4.290       0.4          9.570       0.5         14.850       0.4
    20.130       0.3
     4.620       0.4          9.900       0.4         15.180       0.3
    20.460       0.3
     4.950       0.4         10.230       0.4         15.510       0.3
    20.790       0.3

        RUNOFF VOLUME =     1.55071 INCHES     =       3.4413 ACRE-FEET
        PEAK DISCHARGE RATE =      82.34 CFS  AT   1.518 HOURS   BASIN AREA =
 0.0416 SQ. MI.




    ************************************************************

    *S FUTURE CONDITIONS



    *S  COMPUTE HYD FUTURE BASIN D-1

    COMPUTE NM HYD      ID=23  HYDNO=113  DA=0.00729SQ MI

                        PER A=0  PER B=10   PER C=10   PER D=80

                        TP=-0.13   RAIN=-1


         K =  0.070850HR    TP =  0.130000HR    K/TP RATIO =  0.545000
SHAPE CONSTANT, N =  7.106428
         UNIT PEAK =   23.610    CFS   UNIT VOLUME =   0.9993       B =
526.28      P60 = 1.8700
         AREA =     0.005832 SQ MI    IA =   0.10000 INCHES    INF =
```

0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT = 0.033000

K = 0.115497HR TP = 0.130000HR K/TP RATIO = 0.888442
SHAPE CONSTANT, N = 3.992344
UNIT PEAK = 3.9777 CFS UNIT VOLUME = 0.9971 B =
354.66 P60 = 1.8700
AREA = 0.001458 SQ MI IA = 0.42500 INCHES INF =
1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
DT = 0.033000

PRINT HYD ID=23 CODE=10

PARTIAL HYDROGRAPH 113.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.1	9.900	0.1
14.850	0.1	19.800	0.1		
0.330	0.0	5.280	0.1	10.230	0.1
15.180	0.1	20.130	0.1		
0.660	0.0	5.610	0.1	10.560	0.1
15.510	0.1	20.460	0.1		
0.990	0.0	5.940	0.1	10.890	0.1
15.840	0.1	20.790	0.1		
1.320	4.5	6.270	0.1	11.220	0.1
16.170	0.1	21.120	0.1		
1.650	10.0	6.600	0.1	11.550	0.1
16.500	0.1	21.450	0.1		
1.980	4.4	6.930	0.1	11.880	0.1
16.830	0.1	21.780	0.1		
2.310	1.0	7.260	0.1	12.210	0.1
17.160	0.1	22.110	0.1		
2.640	0.4	7.590	0.1	12.540	0.1
17.490	0.1	22.440	0.1		
2.970	0.2	7.920	0.1	12.870	0.1
17.820	0.1	22.770	0.1		
3.300	0.1	8.250	0.1	13.200	0.1
18.150	0.1	23.100	0.1		
3.630	0.1	8.580	0.1	13.530	0.1
18.480	0.1	23.430	0.1		
3.960	0.1	8.910	0.1	13.860	0.1
18.810	0.1	23.760	0.1		
4.290	0.1	9.240	0.1	14.190	0.1
19.140	0.1	24.090	0.0		

4.620 0.1 9.570 0.1 14.520 0.1
19.470 0.1 24.420 0.0

RUNOFF VOLUME = 2.10390 INCHES = 0.8180 ACRE-FEET
PEAK DISCHARGE RATE = 18.63 CFS AT 1.485 HOURS BASIN AREA = 0.0073 SQ. MI.

*S COMPUTE HYD FUTURE BASIN D-2

COMPUTE NM HYD ID=24 HYDNO=114 DA=0.00781SQ MI

PER A=0 PER B=10 PER C=10 PER D=80

TP=-0.13 RAIN=-1

K = 0.070850HR TP = 0.130000HR K/TP RATIO = 0.545000
SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 25.294 CFS UNIT VOLUME = 0.9993 B = 526.28 P60 = 1.8700
AREA = 0.006248 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

K = 0.115497HR TP = 0.130000HR K/TP RATIO = 0.888442
SHAPE CONSTANT, N = 3.992344
UNIT PEAK = 4.2614 CFS UNIT VOLUME = 0.9971 B = 354.66 P60 = 1.8700
AREA = 0.001562 SQ MI IA = 0.42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

PRINT HYD ID=24 CODE=10

PARTIAL HYDROGRAPH 114.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.1	9.900	0.1	14.850	0.1
19.800	0.1						
0.330	0.0	5.280	0.1	10.230	0.1		

15.180	0.1	20.130	0.1		
0.660	0.0	5.610	0.1	10.560	0.1
15.510	0.1	20.460	0.1		
0.990	0.0	5.940	0.1	10.890	0.1
15.840	0.1	20.790	0.1		
1.320	4.9	6.270	0.2	11.220	0.1
16.170	0.1	21.120	0.1		
1.650	10.7	6.600	0.2	11.550	0.1
16.500	0.1	21.450	0.1		
1.980	4.7	6.930	0.1	11.880	0.1
16.830	0.1	21.780	0.1		
2.310	1.0	7.260	0.1	12.210	0.1
17.160	0.1	22.110	0.1		
2.640	0.4	7.590	0.1	12.540	0.1
17.490	0.1	22.440	0.1		
2.970	0.2	7.920	0.1	12.870	0.1
17.820	0.1	22.770	0.1		
3.300	0.1	8.250	0.1	13.200	0.1
18.150	0.1	23.100	0.1		
3.630	0.1	8.580	0.1	13.530	0.1
18.480	0.1	23.430	0.1		
3.960	0.1	8.910	0.1	13.860	0.1
18.810	0.1	23.760	0.1		
4.290	0.1	9.240	0.1	14.190	0.1
19.140	0.1	24.090	0.1		
4.620	0.1	9.570	0.1	14.520	0.1
19.470	0.1	24.420	0.0		

RUNOFF VOLUME = 2.10390 INCHES = 0.8763 ACRE-FEET
PEAK DISCHARGE RATE = 19.96 CFS AT 1.485 HOURS BASIN AREA = 0.0078 SQ. MI.

*S COMPUTE HYD FUTURE BASIN D-3

COMPUTE NM HYD ID=25 HYDNO=115 DA=0.00202SQ MI

PER A=0 PER B=10 PER C=10 PER D=80

TP=-0.13 RAIN=-1

K = 0.070850HR TP = 0.130000HR K/TP RATIO = 0.545000
SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 6.5420 CFS UNIT VOLUME = 0.9982 B = 526.28 P60 = 1.8700
AREA = 0.001616 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR

RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

K = 0.115497HR TP = 0.130000HR K/TP RATIO = 0.888442 SHAPE CONSTANT, N = 3.992344
UNIT PEAK = 1.1022 CFS UNIT VOLUME = 0.9880 B = 354.66 P60 = 1.8700
AREA = 0.000404 SQ MI IA = 0.42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

PRINT HYD ID=25 CODE=10

PARTIAL HYDROGRAPH 115.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0
14.850	0.0	19.800	0.0		
0.330	0.0	5.280	0.0	10.230	0.0
15.180	0.0	20.130	0.0		
0.660	0.0	5.610	0.0	10.560	0.0
15.510	0.0	20.460	0.0		
0.990	0.0	5.940	0.0	10.890	0.0
15.840	0.0	20.790	0.0		
1.320	1.3	6.270	0.0	11.220	0.0
16.170	0.0	21.120	0.0		
1.650	2.8	6.600	0.0	11.550	0.0
16.500	0.0	21.450	0.0		
1.980	1.2	6.930	0.0	11.880	0.0
16.830	0.0	21.780	0.0		
2.310	0.3	7.260	0.0	12.210	0.0
17.160	0.0	22.110	0.0		
2.640	0.1	7.590	0.0	12.540	0.0
17.490	0.0	22.440	0.0		
2.970	0.1	7.920	0.0	12.870	0.0
17.820	0.0	22.770	0.0		
3.300	0.0	8.250	0.0	13.200	0.0
18.150	0.0	23.100	0.0		
3.630	0.0	8.580	0.0	13.530	0.0
18.480	0.0	23.430	0.0		
3.960	0.0	8.910	0.0	13.860	0.0
18.810	0.0	23.760	0.0		
4.290	0.0	9.240	0.0	14.190	0.0
19.140	0.0	24.090	0.0		
4.620	0.0	9.570	0.0	14.520	0.0

19.470 0.0 24.420 0.0

RUNOFF VOLUME = 2.10390 INCHES = 0.2267 ACRE-FEET
PEAK DISCHARGE RATE = 5.17 CFS AT 1.485 HOURS BASIN AREA = 0.0020 SQ. MI.

*S COMPUTE HYD FUTURE BASIN G-2

COMPUTE NM HYD ID=26 HYDNO=116 DA=0.00200SQ MI

PER A=0 PER B=5 PER C=5 PER D=90

TP=-0.13 RAIN=-1

K = 0.070850HR TP = 0.130000HR K/TP RATIO = 0.545000
SHAPE CONSTANT, N = 7.106428
UNIT PEAK = 7.2869 CFS UNIT VOLUME = 0.9982 B = 526.28 P60 = 1.8700
AREA = 0.001800 SQ MI IA = 0.10000 INCHES INF = 0.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

K = 0.115497HR TP = 0.130000HR K/TP RATIO = 0.888442
SHAPE CONSTANT, N = 3.992344
UNIT PEAK = 0.54564 CFS UNIT VOLUME = 0.9763 B = 354.66 P60 = 1.8700
AREA = 0.000200 SQ MI IA = 0.42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

PRINT HYD ID=26 CODE=10

PARTIAL HYDROGRAPH 116.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0	14.850	0.0
0.330	0.0	5.280	0.0	10.230	0.0	15.180	0.0
19.800	0.0	20.130	0.0				

```
     0.660       0.0          5.610       0.0         10.560       0.0
    15.510       0.0         20.460       0.0
     0.990       0.0          5.940       0.0         10.890       0.0
    15.840       0.0         20.790       0.0
     1.320       1.4          6.270       0.0         11.220       0.0
    16.170       0.0         21.120       0.0
     1.650       2.9          6.600       0.0         11.550       0.0
    16.500       0.0         21.450       0.0
     1.980       1.3          6.930       0.0         11.880       0.0
    16.830       0.0         21.780       0.0
     2.310       0.3          7.260       0.0         12.210       0.0
    17.160       0.0         22.110       0.0
     2.640       0.1          7.590       0.0         12.540       0.0
    17.490       0.0         22.440       0.0
     2.970       0.1          7.920       0.0         12.870       0.0
    17.820       0.0         22.770       0.0
     3.300       0.0          8.250       0.0         13.200       0.0
    18.150       0.0         23.100       0.0
     3.630       0.0          8.580       0.0         13.530       0.0
    18.480       0.0         23.430       0.0
     3.960       0.0          8.910       0.0         13.860       0.0
    18.810       0.0         23.760       0.0
     4.290       0.0          9.240       0.0         14.190       0.0
    19.140       0.0         24.090       0.0
     4.620       0.0          9.570       0.0         14.520       0.0
    19.470       0.0         24.420       0.0

       RUNOFF VOLUME =     2.26496 INCHES     =       0.2416 ACRE-FEET
       PEAK DISCHARGE RATE =       5.37 CFS  AT   1.485 HOURS   BASIN AREA =
 0.0020 SQ. MI.




   *S  COMPUTE HYD FUTURE BASIN H-2

   COMPUTE NM HYD      ID=27  HYDNO=117  DA=0.00067SQ MI

                       PER A=0  PER B=5   PER C=5   PER D=90

                       TP=-0.13   RAIN=-1


         K =  0.070850HR    TP =  0.130000HR    K/TP RATIO =  0.545000
SHAPE CONSTANT, N =  7.106428
         UNIT PEAK =   2.4411    CFS   UNIT VOLUME =   0.9949       B =
526.28      P60 = 1.8700
         AREA =     0.000603 SQ MI    IA =   0.10000 INCHES    INF =
0.04000 INCHES PER HOUR
         RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -
```

DT = 0.033000

K = 0.115497HR TP = 0.130000HR K/TP RATIO = 0.888442
SHAPE CONSTANT, N = 3.992344
UNIT PEAK = 0.18279 CFS UNIT VOLUME = 0.9248 B = 354.66 P60 = 1.8700
AREA = 0.000067 SQ MI IA = 0.42500 INCHES INF = 1.04000 INCHES PER HOUR
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT = 0.033000

PRINT HYD ID=27 CODE=10

PARTIAL HYDROGRAPH 117.00

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.0	9.900	0.0	14.850	0.0
0.330	0.0	5.280	0.0	10.230	0.0	15.180	0.0
0.660	0.0	5.610	0.0	10.560	0.0	15.510	0.0
0.990	0.0	5.940	0.0	10.890	0.0	15.840	0.0
1.320	0.5	6.270	0.0	11.220	0.0	16.170	0.0
1.650	1.0	6.600	0.0	11.550	0.0	16.500	0.0
1.980	0.4	6.930	0.0	11.880	0.0	16.830	0.0
2.310	0.1	7.260	0.0	12.210	0.0	17.160	0.0
2.640	0.0	7.590	0.0	12.540	0.0	17.490	0.0
2.970	0.0	7.920	0.0	12.870	0.0	17.820	0.0
3.300	0.0	8.250	0.0	13.200	0.0	18.150	0.0
3.630	0.0	8.580	0.0	13.530	0.0	18.480	0.0
3.960	0.0	8.910	0.0	13.860	0.0	18.810	0.0
4.290	0.0	9.240	0.0	14.190	0.0	19.140	0.0
4.620	0.0	9.570	0.0	14.520	0.0	19.470	0.0

RUNOFF VOLUME = 2.26496 INCHES = 0.0809 ACRE-FEET
PEAK DISCHARGE RATE = 1.81 CFS AT 1.485 HOURS BASIN AREA = 0.0007 SQ. MI.

ADD HYD ID=28 HYD=FULLROADWIDTH ID I=17 II=26

PRINT HYD ID=28 CODE=10

HYDROGRAPH FROM AREA FULLROADWIDTH

TIME HRS	FLOW CFS	TIME HRS	FLOW CFS	TIME HRS	FLOW CFS
0.000	0.0	4.950	0.1	9.900	0.1
14.850	0.1	19.800	0.1		
0.330	0.0	5.280	0.1	10.230	0.1
15.180	0.1	20.130	0.1		
0.660	0.0	5.610	0.1	10.560	0.1
15.510	0.1	20.460	0.1		
0.990	0.0	5.940	0.1	10.890	0.1
15.840	0.1	20.790	0.1		
1.320	4.7	6.270	0.1	11.220	0.1
16.170	0.1	21.120	0.1		
1.650	9.5	6.600	0.1	11.550	0.1
16.500	0.1	21.450	0.1		
1.980	4.4	6.930	0.1	11.880	0.1
16.830	0.1	21.780	0.1		
2.310	1.0	7.260	0.1	12.210	0.1
17.160	0.1	22.110	0.1		
2.640	0.4	7.590	0.1	12.540	0.1
17.490	0.1	22.440	0.1		
2.970	0.2	7.920	0.1	12.870	0.1
17.820	0.1	22.770	0.1		
3.300	0.1	8.250	0.1	13.200	0.1
18.150	0.1	23.100	0.1		
3.630	0.1	8.580	0.1	13.530	0.1
18.480	0.1	23.430	0.1		
3.960	0.1	8.910	0.1	13.860	0.1
18.810	0.1	23.760	0.1		
4.290	0.1	9.240	0.1	14.190	0.1
19.140	0.1	24.090	0.1		

```
     4.620       0.1          9.570       0.1         14.520       0.1
    19.470       0.1         24.420       0.0

       RUNOFF VOLUME =     2.26487 INCHES     =       0.8069 ACRE-FEET
       PEAK DISCHARGE RATE =      17.92 CFS  AT   1.485 HOURS   BASIN AREA =
0.0067 SQ. MI.




   FINISH


       NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 15:00:27
```

AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4) - Ver. S4.02a, Rel: 02a RUN DATE (MON/DAY/YR) =09/01/2020

INPUT FILE = G Tools\ahymo-s4-r2\ahymo-s4-r2\DISK1\program files\AHYMO-S4\04022 Input.HMI USER NO.= AHYMO-S4TempUser05901704

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
RAINFALL TYPE=13										RAIN24= 2.660
*S EXISTING CONDITIONS										
*S COMPUTE HYD EXISTING BASIN A										
COMPUTE NM HYD	101.00	-	1	0.00804	6.88	0.188	0.43934	1.518	1.336	PER IMP= 0.00
*S COMPUTE HYD EXISTING BASIN B										
COMPUTE NM HYD	102.00	-	2	0.01428	12.21	0.335	0.43934	1.518	1.336	PER IMP= 0.00
*S COMPUTE HYD EXISTING BASIN C										
COMPUTE NM HYD	103.00	-	3	0.03350	28.63	0.785	0.43934	1.518	1.335	PER IMP= 0.00
ADD HYD	101TO102	1& 2	4	0.02232	19.08	0.523	0.43933	1.518	1.336	
ADD HYD	COMBINED101-	3& 4	5	0.05582	47.71	1.308	0.43934	1.518	1.336	
*S PROPOSED CONDITIONS										
*S COMPUTE HYD PROPOSED BASIN A										
COMPUTE NM HYD	104.00	-	6	0.00923	23.58	1.036	2.10390	1.485	3.992	PER IMP= 80.00
*S COMPUTE HYD PROPOSED BASIN B										
COMPUTE NM HYD	105.00	-	7	0.00446	11.40	0.500	2.10390	1.485	3.995	PER IMP= 80.00
*S COMPUTE HYD PROPOSED BASIN C										
COMPUTE NM HYD	106.00	-	8	0.00609	15.56	0.683	2.10390	1.485	3.993	PER IMP= 80.00
ADD HYD	BTOA	6& 7	10	0.01369	34.98	1.536	2.10386	1.485	3.993	
ADD HYD	B-CTOA	8&10	11	0.01978	50.55	2.219	2.10386	1.485	3.993	
*S COMPUTE HYD PROPOSED BASIN D										
COMPUTE NM HYD	107.00	-	12	0.01567	16.41	0.533	0.63801	1.518	1.637	PER IMP= 10.00
*S COMPUTE HYD PROPOSED BASIN E										
COMPUTE NM HYD	108.00	-	13	0.00100	2.38	0.099	1.86230	1.485	3.719	PER IMP= 65.00
*S COMPUTE HYD PROPOSED BASIN F										
COMPUTE NM HYD	109.00	-	14	0.00048	0.84	0.025	0.97645	1.518	2.727	PER IMP= 10.00
ADD HYD	DTOF	12&14	15	0.01615	17.25	0.557	0.64701	1.518	1.669	
ADD HYD	ETOF-D	13&15	16	0.01715	19.63	0.657	0.71786	1.518	1.788	
*S COMPUTE HYD PROPOSED BASIN G										
COMPUTE NM HYD	110.00	-	17	0.00468	12.55	0.565	2.26496	1.485	4.191	PER IMP= 90.00
*S COMPUTE HYD PROPOSED BASIN H										
COMPUTE NM HYD	111.00	-	18	0.00107	2.88	0.129	2.26496	1.485	4.210	PER IMP= 90.00
*S COMPUTE HYD PROPOSED BASIN I										
COMPUTE NM HYD	112.00	-	19	0.00074	2.00	0.089	2.26496	1.485	4.220	PER IMP= 90.00
ADD HYD	HTOI	18&19	20	0.00181	4.88	0.219	2.26462	1.485	4.214	
ADD HYD	A-CTOG	11&17	21	0.02446	63.10	2.785	2.13467	1.485	4.031	
ADD HYD	D-FTOA-DTOG	16&21	22	0.04161	82.34	3.441	1.55071	1.518	3.092	
*S FUTURE CONDITIONS										
*S COMPUTE HYD FUTURE BASIN D-1										
COMPUTE NM HYD	113.00	-	23	0.00729	18.63	0.818	2.10390	1.485	3.993	PER IMP= 80.00
*S COMPUTE HYD FUTURE BASIN D-2										
COMPUTE NM HYD	114.00	-	24	0.00781	19.96	0.876	2.10390	1.485	3.993	PER IMP= 80.00
*S COMPUTE HYD FUTURE BASIN D-3										
COMPUTE NM HYD	115.00	-	25	0.00202	5.17	0.227	2.10390	1.485	4.001	PER IMP= 80.00
*S COMPUTE HYD FUTURE BASIN G-2										

```
                                                                AHYMO.SUM
COMPUTE NM HYD        116.00   -    26       0.00200         5.37       0.242      2.26496    1.485    4.198 PER IMP=  90.00
*S  COMPUTE HYD FUTURE BASIN H-2
COMPUTE NM HYD        117.00   -    27       0.00067         1.81       0.081      2.26496    1.485    4.225 PER IMP=  90.00
ADD HYD         FULLROADWIDT 17&26  28       0.00668        17.92       0.807      2.26487    1.485    4.193
FINISH
```

APPENDIX B

HYDRAULIC CALCULATIONS

Manning Formula: Proposed 24" SD Max Flow

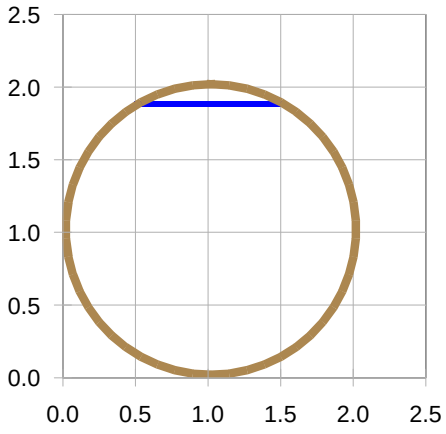
Circular Channel

Input

Flow	17.20 cfs
Slope	0.005 ft/ft
Manning's n	0.013
Diameter	24 in

Output

Depth	1.862 ft
Flow Area	3.05 sf
Velocity	5.65 fps
Velocity Head	0.495 ft
Top Width	1.01 ft
Froude Number	0.574
Critical Depth	1.495 ft
Critical Slope	0.00701 ft/ft



Manning Formula: Proposed 30" SD Max Flow

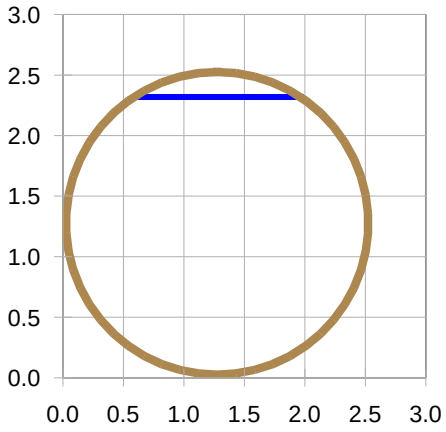
Circular Channel

Input

Flow	31.1 cfs
Slope	0.005 ft/ft
Manning's n	0.013
Diameter	30 in

Output

Depth	2.292 ft
Flow Area	4.71 sf
Velocity	6.60 fps
Velocity Head	0.677 ft
Top Width	1.38 ft
Froude Number	0.630
Critical Depth	1.900 ft
Critical Slope	0.00670 ft/ft



Manning Formula: Proposed 36" SD Max Flow

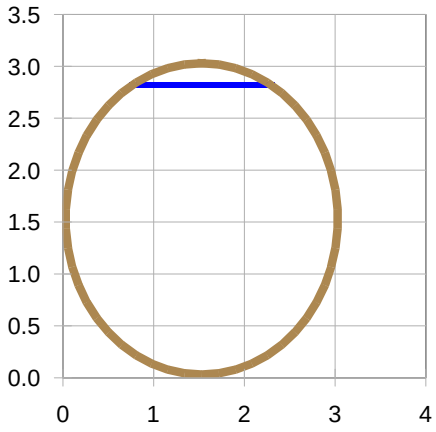
Circular Channel

Input

Flow	50.7 cfs
Slope	0.005 ft/ft
Manning's n	0.013
Diameter	36 in

Output

Depth	2.787 ft
Flow Area	6.85 sf
Velocity	7.41 fps
Velocity Head	0.852 ft
Top Width	1.54 ft
Froude Number	0.619
Critical Depth	2.317 ft
Critical Slope	0.00651 ft/ft



Manning Formula: Proposed 42" SD Max Flow

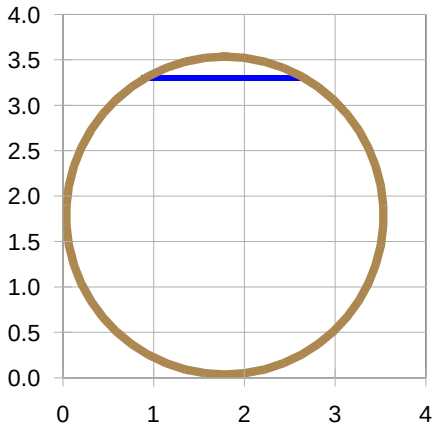
Circular Channel

Input

Flow	76.5 cfs
Slope	0.005 ft/ft
Manning's n	0.013
Diameter	42 in

Output

Depth	3.261 ft
Flow Area	9.34 sf
Velocity	8.19 fps
Velocity Head	1.04 ft
Top Width	1.77 ft
Froude Number	0.628
Critical Depth	2.737 ft
Critical Slope	0.00634 ft/ft



Manning Formula: Proposed 54" SD Max Flow

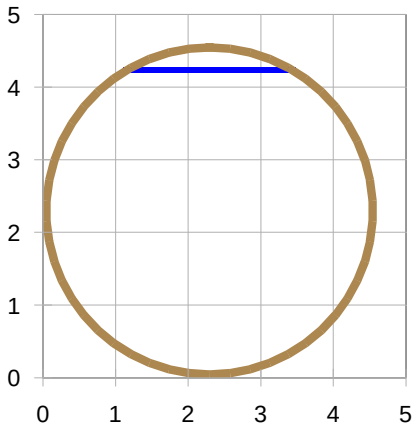
Circular Channel

Input

Flow	149.5 cfs
Slope	0.005 ft/ft
Manning's n	0.013
Diameter	54 in

Output

Depth	4.185 ft
Flow Area	15.4 sf
Velocity	9.70 fps
Velocity Head	1.46 ft
Top Width	2.30 ft
Froude Number	0.660
Critical Depth	3.588 ft
Critical Slope	0.00609 ft/ft



Manning Formula: Proposed 60" SD Max Flow

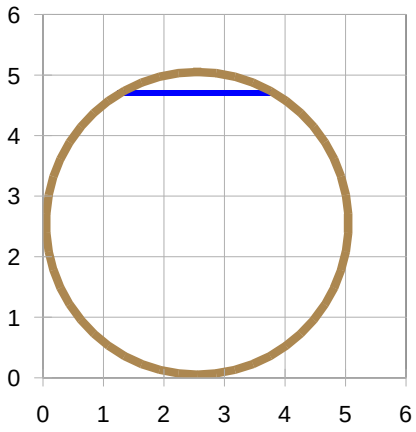
Circular Channel

Input

Flow	198.0 cfs
Slope	0.005 ft/ft
Manning's n	0.013
Diameter	60 in

Output

Depth	4.651 ft
Flow Area	19.0 sf
Velocity	10.4 fps
Velocity Head	1.68 ft
Top Width	2.55 ft
Froude Number	0.671
Critical Depth	4.019 ft
Critical Slope	0.00599 ft/ft



Basin A Type D Inlet Calculation

Orifice (Unknown Q)

Head Water Depth (h):	0.5	ft	User Enter Desired Value
Discharge Coeff. (C_d):	0.6		
Open Area (A):	4.6900	ft^2	
Gravity (g):	32.2	ft/s^2	

Flow (Q) = C · A · (2 · g · h) ^ (0.5)

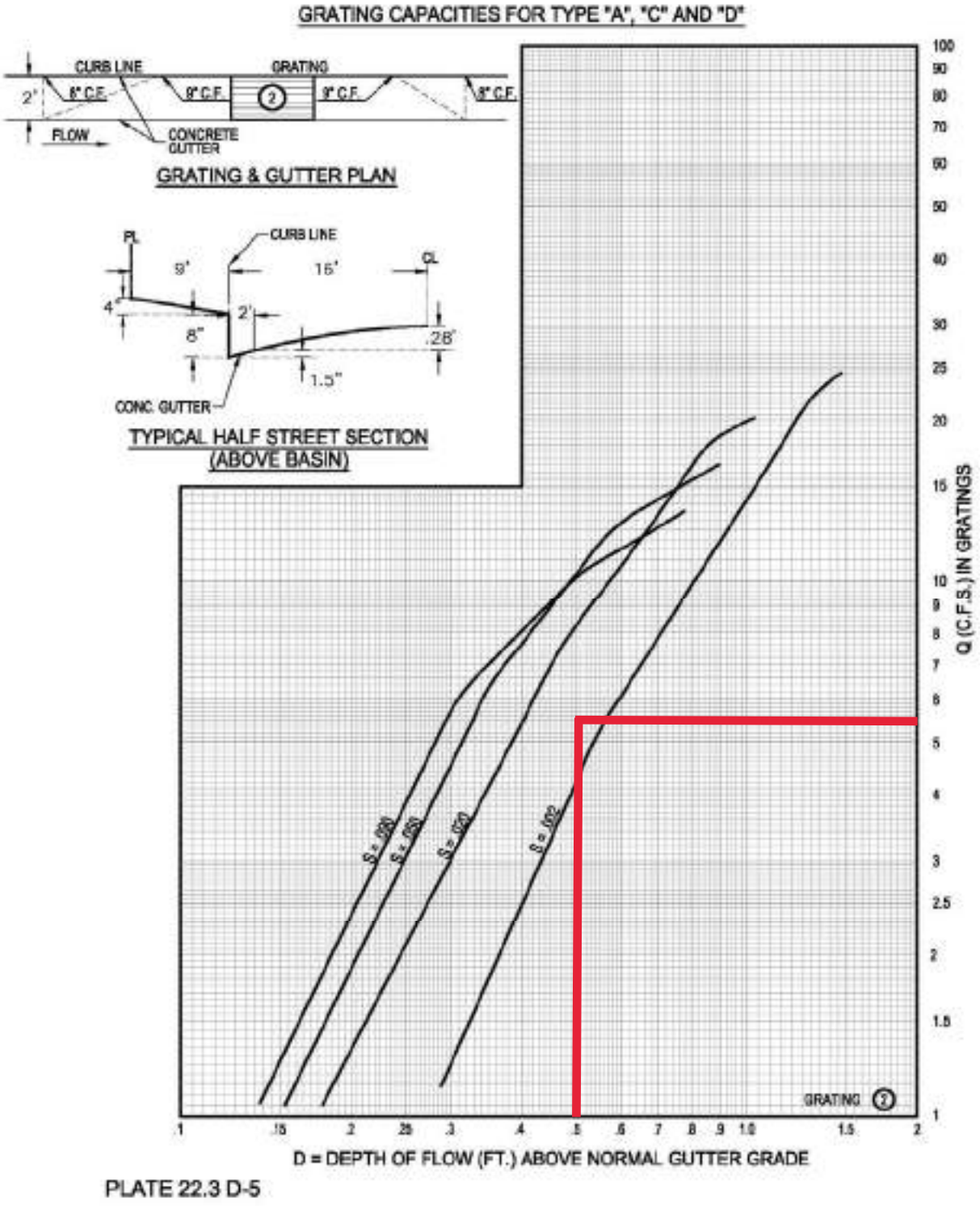
Flow (Q) = 16.0 cfs

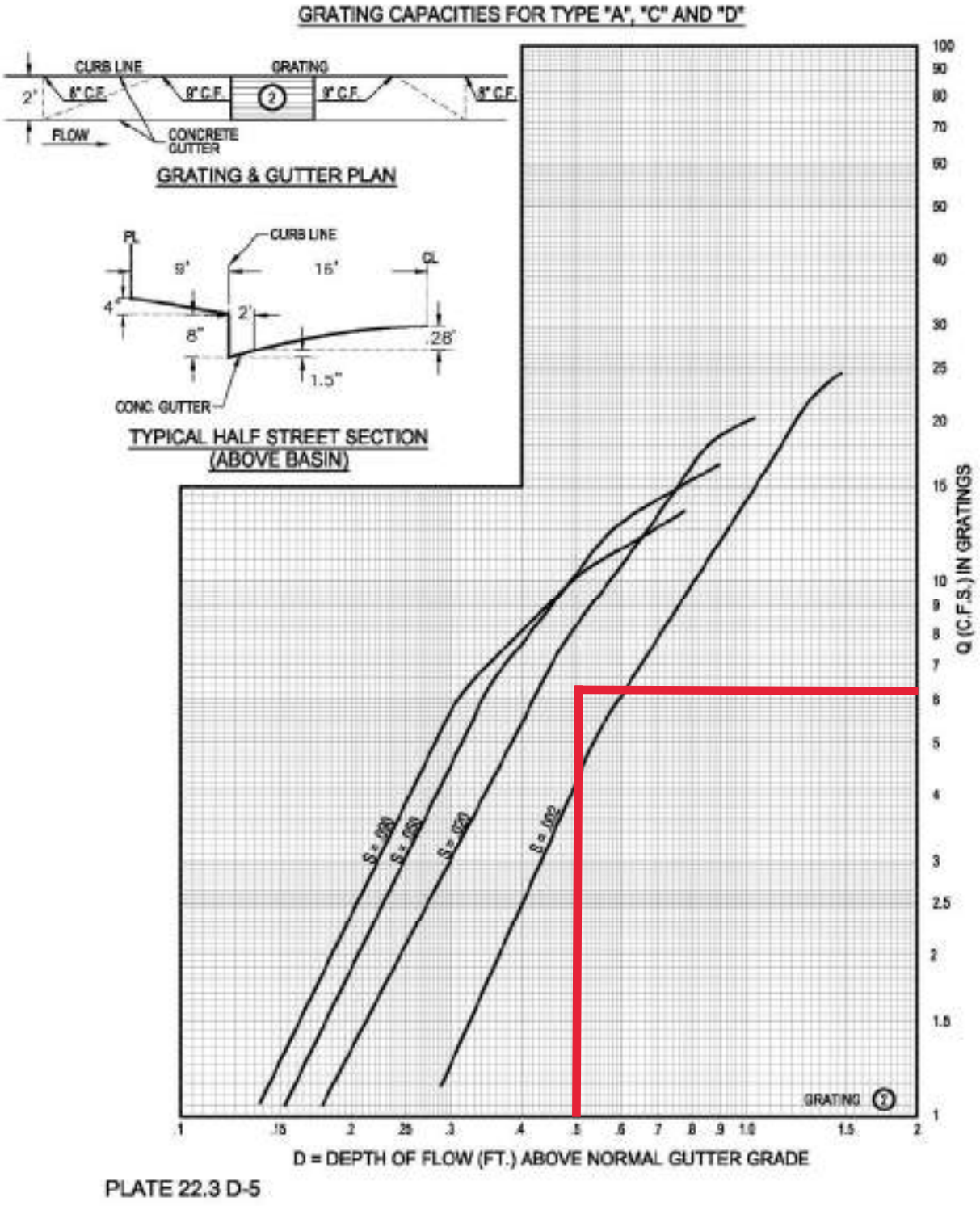
Weir (Unknown Q):

Discharge Coeff. (C_w):	3.367	
Length (L):	10.67	ft

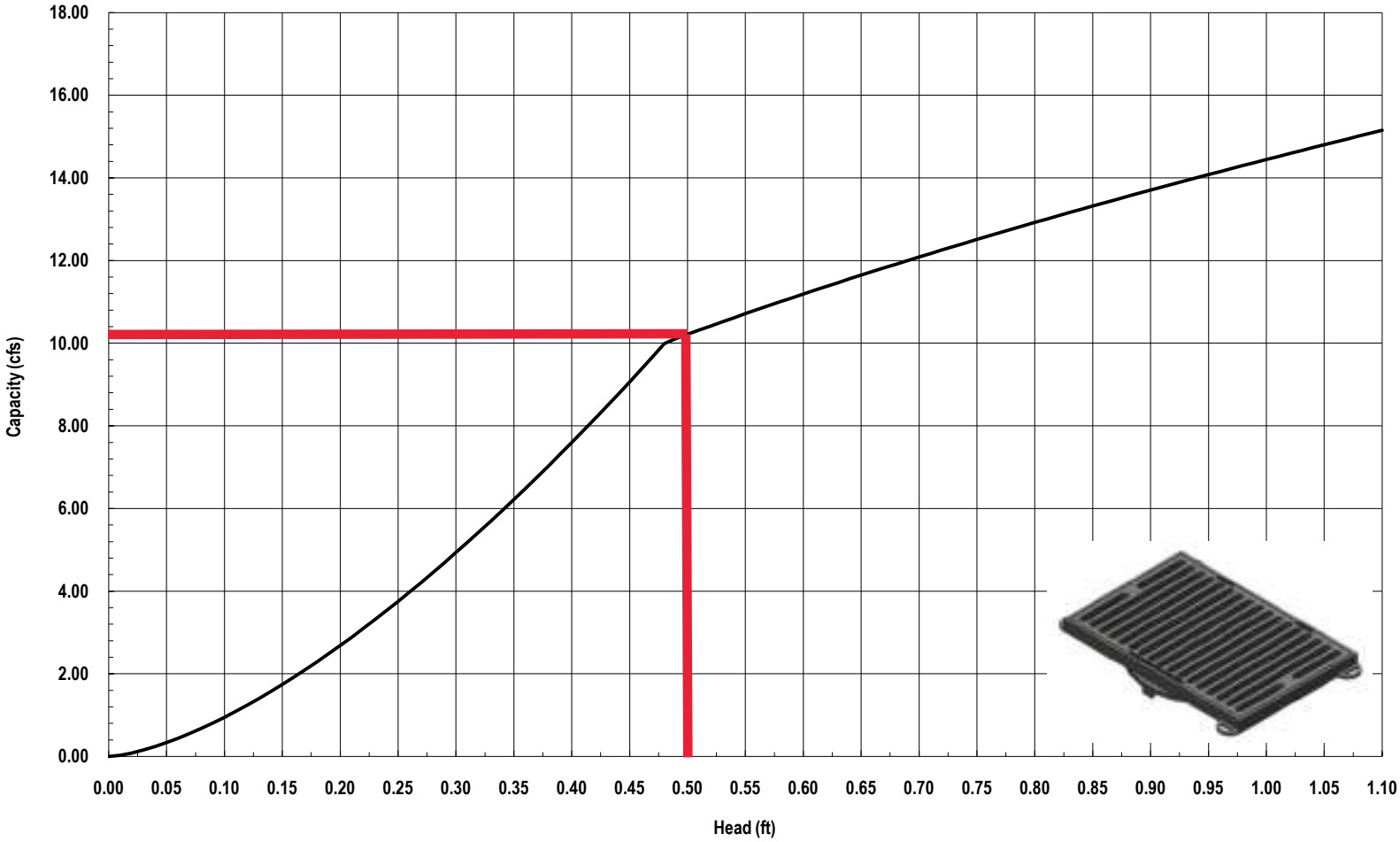
Flow (Q) = C_w · L · h ^ (1.5)

Flow (Q) = 12.7 cfs


GRATING CAPACITIES FOR TYPE "A", "C" AND "D"
CURB LINE
GRATING
2'
8" C.F.
9" C.F.
2
9" C.F.
8" C.F.
FLOW
CONCRETE GUTTER
GRATING & GUTTER PLAN
PL
CURB LINE
9'
15'
CL
4"
2'
8"
.28"
1.5"
CONC. GUTTER
TYPICAL HALF STREET SECTION (ABOVE BASIN)
S = .020
S = .030
S = .040
S = .060
GRATING 2
Q (C.F.S.) IN GRATINGS
D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE
PLATE 22.3 D-5


GRATING CAPACITIES FOR TYPE "A", "C" AND "D"
CURB LINE
GRATING
2'
8" C.F.
9" C.F.
2
9" C.F.
8" C.F.
FLOW
CONCRETE GUTTER
GRATING & GUTTER PLAN
PL
CURB LINE
9'
15'
CL
4"
2'
8"
.28"
1.5"
CONC. GUTTER
TYPICAL HALF STREET SECTION (ABOVE BASIN)
S = .020
S = .030
S = .040
S = .060
GRATING 2
Q (C.F.S.) IN GRATINGS
D = DEPTH OF FLOW (FT.) ABOVE NORMAL GUTTER GRADE
PLATE 22.3 D-5

Nyloplast 2' x 3' Road & Highway Grate Inlet Capacity Chart



Nyloplast
3130 Verona Avenue • Buford, GA 30518
(866) 888-8479 / (770) 932-2443 • Fax: (770) 932-2490

Manning Formula: Typical Public Half-Road Section

Irregular Section

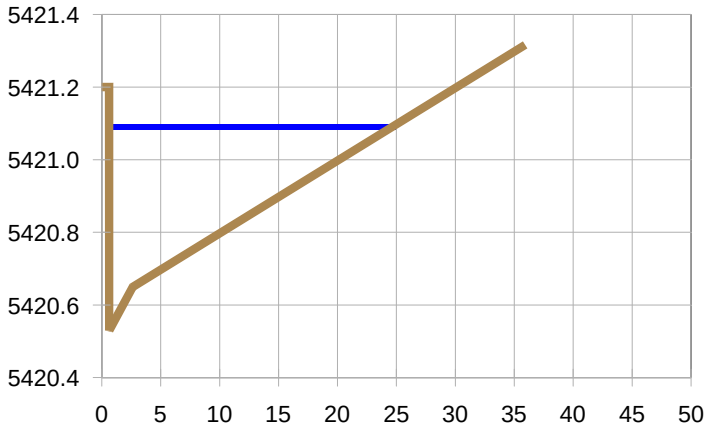
Input

Flow	14.88 cfs
Slope	0.005 ft/ft

Sta	Elev	n	Sta	Elev	n	Sta	Elev	n	Sta	Elev	n
0	5421.20	0.017	0.62	5421.20	0.017	0.63	5420.53	0.017	2.63	5420.65	0.017
35.63	5421.31	0.017	68.63	5420.65	0.017	70.63	5420.53	0.017	70.64	5421.20	0.017

Output

WSElev	5,421.091 ft
Flow Area	5.87 sf
Velocity	2.53 fps
Velocity Head	0.0999 ft
Top Width	24.1 ft
Froude Number	0.905
Critical WSElev	5,421.072 ft
Critical Slope	ft/ft



Manning Formula: Typical Public Road Section

Irregular Section

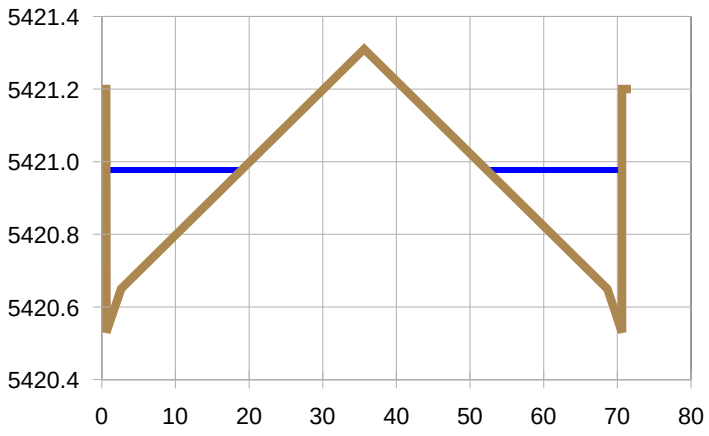
Input

Flow	14.88 cfs
Slope	0.005 ft/ft

Sta	Elev	n	Sta	Elev	n	Sta	Elev	n	Sta	Elev	n
0	5421.20	0.017	0.62	5421.20	0.017	0.63	5420.53	0.017	2.63	5420.65	0.017
35.63	5421.31	0.017	68.63	5420.65	0.017	70.63	5420.53	0.017	70.64	5421.20	0.017
71.26	5421.20	0.017									

Output

WSElev	5,420.976 ft
Flow Area	6.87 sf
Velocity	2.17 fps
Velocity Head	0.0729 ft
Top Width	36.6 ft
Froude Number	0.882
Critical WSElev	5,420.958 ft
Critical Slope	ft/ft



Manning Formula: Proposed Internal Roadway Max Flow

Irregular Section

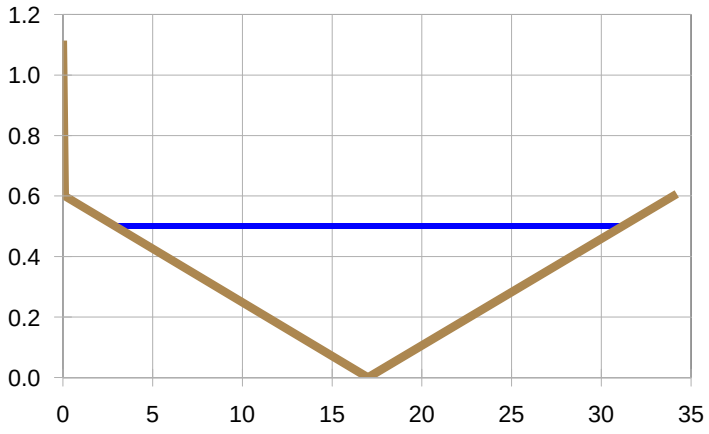
Input

Flow	17.3 cfs
Slope	0.005 ft/ft

Sta	Elev	n	Sta	Elev	n	Sta	Elev	n	Sta	Elev	n
0	1.1	0.017	0.1	0.6	0.017	17	0	0.017	34	0.6	0.017

Output

WSElev	0.500 ft
Flow Area	7.06 sf
Velocity	2.45 fps
Velocity Head	0.0934 ft
Top Width	28.2 ft
Froude Number	0.864
Critical WSElev	0.472 ft
Critical Slope	ft/ft



Temporary Public Retention Pond A Weir Calculation

Head Water Depth (h):	1	ft	User Enter Desired Value

Weir (Unknown Q):

Discharge Coeff. (C_w):	3.33	
Length (L):	24.70	ft

Flow (Q) = $C_w \cdot L \cdot h \wedge (1.5)$

Flow (Q) = 82.3 cfs

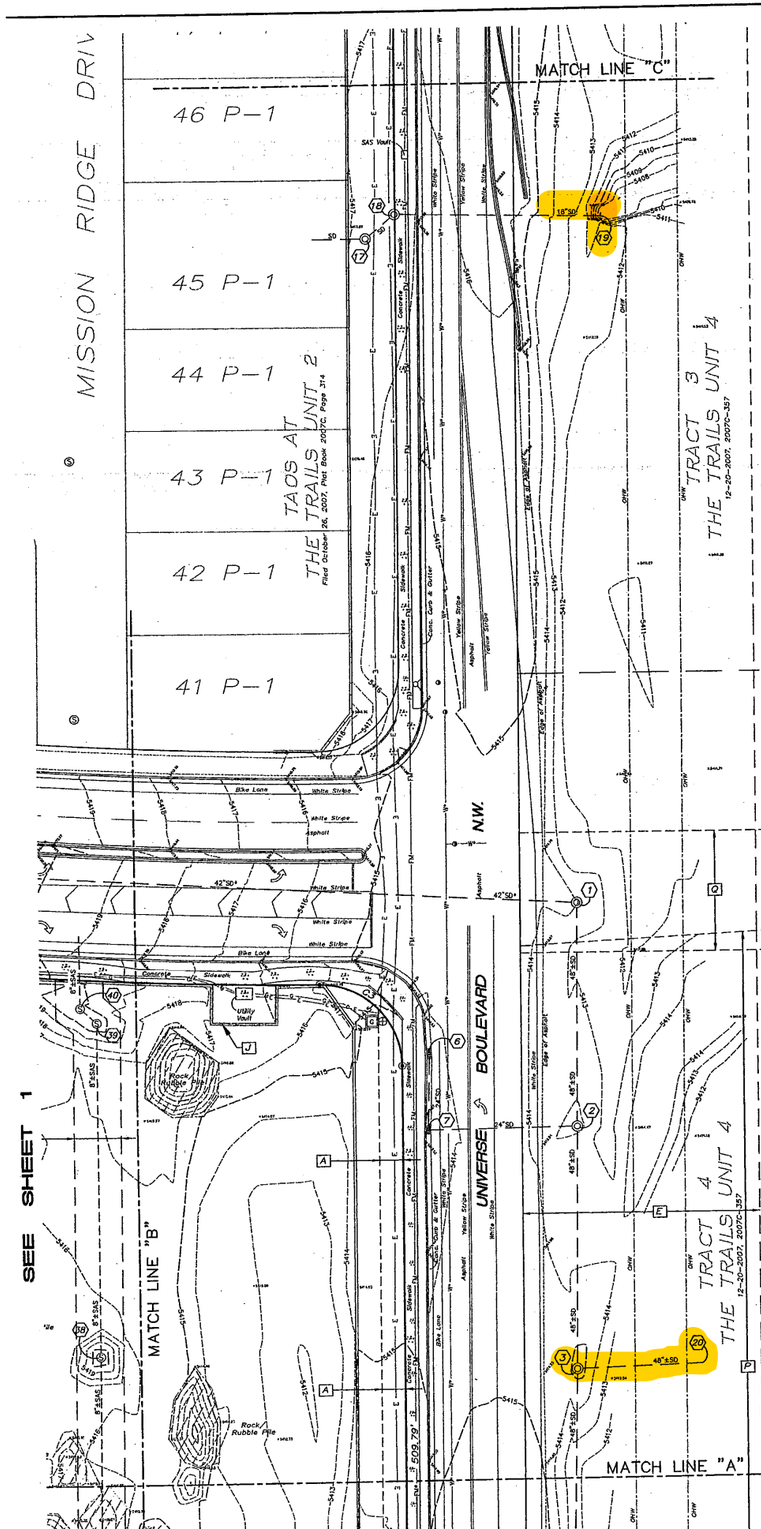
Head Water Depth (h):	0.5	ft

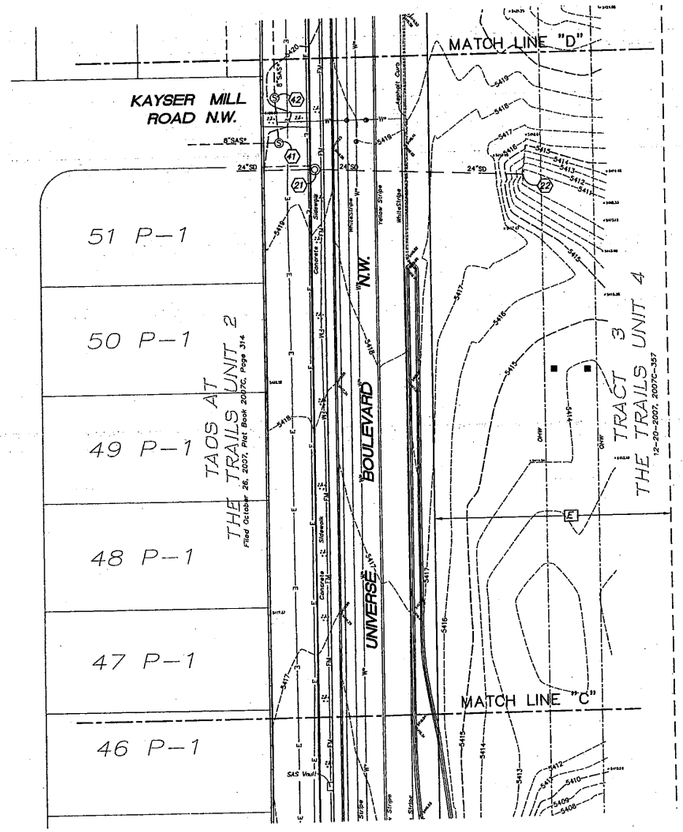
Weir (Unknown Q):

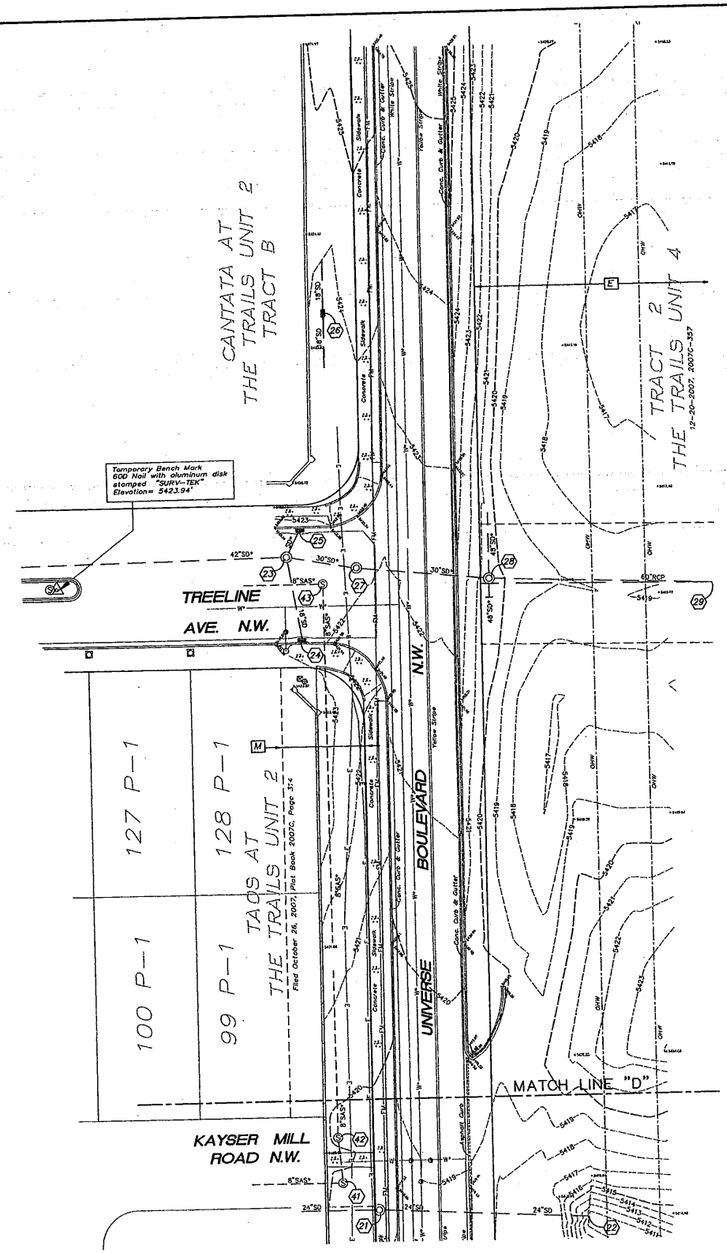
Discharge Coeff. (C_w):	3.33	
Length (L):	24.70	ft

Flow (Q) = $C_w \cdot L \cdot h \wedge (1.5)$

Flow (Q) = 29.1 cfs







SEE SHEET 5 FOR INVERT DATA AND KEYED EASEMENTS

LEGEND

- Storm Drain Manhole
- Sanitary Sewer Manhole
- Sanitary Sewer Manhole as shown on provided plans — Not Found
- SAS — Sanitary Sewer Line
- SD — Storm Drain Line
- Power Pole
- Guy Wire
- OHW — Overhead Wires
- E — Electric line
- COM — Communications Line
- G — Gas Line
- W — Water Line
- Sanitary Sewer Clean-out
- Water Meter
- Water Valve
- Hydrant
- Cable Pedstal
- Electric Pedstal
- Electric Transformer
- Communications Box
- Traffic Box
- Telephone Pedestal
- Overhead Traffic Light Pole
- Chain Link Fence
- Light Pole
- Bollard
- Concrete Symbol
- G — Gas Line Marker Post
- Sign
- Wall
- W — Water Manhole
- E — Electric Manhole

CURVE TABLE

CURVE	LENGTH	RADIUS	TANGENT	CHORD	CHORD BEARING	DELTA
C1	149.02'	951.00'	74.66'	148.87'	N84°57'35"W	8°58'41"
C2	324.01'	2049.00'	162.34'	323.67'	S85°00'03"E	9°03'37"
C3	54.86'	35.00'	34.88'	49.41'	N44°37'51"W	89°48'02"

UTILITY DISCLAIMER

SOURCE INFORMATION FROM PLANS AND MARKINGS HAVE BEEN BE COMBINED WITH OBSERVED EVIDENCE OF UTILITIES TO DEVELOP A VIEW OF THOSE UNDERGROUND UTILITIES. HOWEVER, LACKING EXCAVATION, THE EXACT LOCATION OF UNDERGROUND FEATURES CANNOT BE ACCURATELY, COMPLETELY AND RELIABLY DEPICTED. WHERE ADDITIONAL OR MORE DETAILED INFORMATION IS REQUIRED, THE CLIENT IS ADVISED THAT EXCAVATION MAY BE NECESSARY.

NEW MEXICO ONE CALL (NM811) LOCATE REQUEST CONFIRMATION LINE-SPOTTING TICKET NO. 2013172912, DATE: 4/25/2013, AND 2013190911, DATE: 5/7/2013.

UTILITIES LABELED WITH AN ASTERISK (*) ARE TRANSCRIBED FROM PROVIDED PLANS AND MUST BE VERIFIED BY LINE-SPOTTING.

THERE MAY PRIVATE UNDERGROUND UTILITY LINES NOT WITHIN DOCUMENTED EASEMENTS THAT WERE NOT MARKED OUT BY UTILITY LINE-SPOTTING COMPANIES NOTIFIED BY NEW MEXICO ONE CALL (NM811).

THIS PROJECT WAS CALLED IN TO NEW MEXICO ONE CALL (NM811) AS A "DESIGN LOCATE". SOME UTILITY LINE-SPOTTING COMPANIES NOTIFIED BY NEW MEXICO ONE CALL (NM811) CONSIDER "DESIGN LOCATE" CALLS AS LOW PRIORITY AND IN SOME CASES DELAY RESPONSE, PARTIALLY COMPLETE OR NOT RESPOND AT ALL.

THE RETAINING OF A PRIVATE UTILITY LINE-SPOTTING COMPANY MAY BE NECESSARY FOR COMPLETE UTILITY LINE-SPOTTING OF A SUBJECT PROPERTY.

GRAPHIC SCALE

30 0 15 30 60 120

(IN FEET)
1 inch = 30 ft.

TOPOGRAPHIC AND BOUNDARY SURVEY OF

TRACT 8

THE TRAILS UNIT 2

WITHIN
THE TOWN OF ALAMEDA GRANT
IN
PROJECTED SECTION 16, TOWNSHIP 11 NORTH, RANGE 2 EAST
NEW MEXICO PRINCIPAL MERIDIAN
CITY OF ALBUQUERQUE
BERNALILLO COUNTY, NEW MEXICO
MAY 2013

SHEET 3 OF 5

SURV-TEK, INC.

INVERT DATA

(1) Storm Drain MH
Rim= 5414.06'
Inv.= 5406.03' (N)
Inv.= 5405.54' (S)

(2) Storm Drain MH
Rim= 5414.22'
Inv.= 5405.42' (N)
Inv.= 5405.37' (S)
Inv.= 5405.57' (W)

(3) Storm Drain MH
Rim= 5415.29'
Inv.= 5404.69' (N)
Inv.= 5404.47' (S)
Inv.= 5405.09' (E)

(4) Storm Drain MH
Rim= 5418.09'
Inv.= 5403.93' (N)
Inv.= 5403.54' (S)

(5) Storm Drain MH
Rim= 5418.66'
Inv.= 5402.78' (N)
Inv.= 5402.74' (S)
Inv.= 5402.81 (W)

(6) Storm Drain Inlet
Top of Grate= 5413.53'
Inv.= 5409.77' (S)

(7) Storm Drain Inlet
Top of Grate= 5413.47'
Inv.= 5409.44' (N)
Inv.= 5409.37' (E)

(8) Storm Drain MH
Rim= 5418.06'
Inv.= 5407.46' (SE)
Inv.= 5407.60' (W)

(9) Storm Drain MH
Rim= 5419.26'
Inv.= 5408.41' (E)
Inv.= 5408.51' (W)

(10) Storm Drain MH
Rim= 5420.02'
Inv.= 5409.22' (E)
Inv.= 5409.32' (W)

(11) Storm Drain MH
Rim= 5421.84'
Inv.= 5410.1' (E)
Inv.= 5410.2' (W)

(12) Storm Drain MH
Rim= 5423.89'
Invert Inaccessable
Unable to open

(13) Storm Drain MH
Rim= 5422.67'
Invert Inaccessable
unable to open

(14) Storm Drain Inlet
Top of Grate= 5421.85'
Inv.= 5417.65' (N)

(15) Storm Drain Inlet
Top of Grate= 5421.77'
Inv.= 5417.52' (S)

(16) Storm Drain MH
Rim= 5425.59'
Inv. Inaccessable
Unable to open

(17) Storm Drain MH
Rim= 5416.76'
Inv.= 5411.56' (W)
Inv.= 5411.46' (NE)

(18) Storm Drain MH
Rim= 5416.26'
Inv.= 5409.98' (SW)
Inv.= 5407.86' (E)

(19) Storm Drain Outlet
Inv.= 5407.06'

(20) Storm Drain Outlet
Inv.= 5407.33'

(21) Storm Drain MH
Rim= 5419.35'
Inv.= 5412.55' (W)
Inv.= 5411.95' (E)

(22) Storm Drain Outlet
Inv.= 5410.07'

(23) Storm Drain MH
Rim= 5422.53'

INVERT DATA

(24) Storm Drain Inlet
Top of Grate= 5421.93'
Inv.= 5417.38' (N)

(25) Storm Drain Inlet
Top of Grate= 5422.01'
Inv. Inaccessable
Full of Debris

(26) Storm Drain Inlet
Top of Grate= 5423.55'
Inv.= 5418.85' (N)
Inv.= 5418.70' (S)

(27) Storm Drain MH
Rim=5422.27'
Invert Inaccessable
Unable to open

(28) Storm Drain MH
Rim= 5420.64'
Inv.= 5413.24' (W)
Inv.= 5413.09' (N)
Inv.= 5413.04' (E)
Inv.= 5413.0' (S)

(29) Storm Drain Outlet
Inv.= 5412.78'

(30) Sanitary Sewer MH
Rim= 5417.93'
Inv.= 5404.33' (E)
Inv.= 5404.48' (S)
Inv.= 5404.48' (W)

(31) Sanitary Sewer MH
Rim= 5418.92'
Inv.= 5404.37' (E)
Inv.= 5404.6' (W)
Inv.= 5404.72' (N)

(32) Sanitary Sewer MH
Rim= 5419.42'
Inv.= 5405.77' (E)
Inv.= 5405.87' (W)

(33) Sanitary Sewer MH
Rim= 5419.84'
Inv.= 5406.69' (E)
Inv.= 5406.84' (W)

(34) Sanitary Sewer MH
Rim= 5422.14'
Inv.= 5407.29' (E)
Inv.= 5407.39' (W)
Inv.= 5408.04' (N)

(35) Sanitary Sewer MH
As shown on provided
plans -- Not Found

(36) Sanitary Sewer MH
Rim= 5424.42'
Inv.= 5409.67' (S)
Inv.= 5409.77' (N)

(37) Sanitary Sewer MH
Rim= 5425.86'
Inv.= 5410.56' (S)
Inv.= 5410.66' (W)

(38) Sanitary Sewer MH
Rim= 5420.41'
Inv.= 5405.56' (S)
Inv.= 5405.66' (N)

(39) Sanitary Sewer MH
Rim= 5420.37'
Inv.= 5406.17' (S)
Inv.= 5406.27' (NW)

(40) Sanitary Sewer MH
Rim= 5420.42'
Inv.= 5406.12' (SE)
Inv.= 5406.27' (N)

(41) Sanitary Sewer MH
Rim= 5419.66'
Inv.= 5411.41' (N)
Inv.= 5411.21' (W)

(42) Sanitary Sewer MH
Rim= 5419.83'
Inv.= 5411.83' (N)
Inv.= 5411.73' (S)

(43) Sanitary Sewer MH
Rim= 5422.34'

KEYED EASEMENTS

[A] 10' Public Service Company Easement granted by document filed August 27, 2004, Book A83, Page 1518, Document #2004121843

[B] 20' X 23' PNM Switchgear Easement granted by document filed August 27, 2005, Book A83, Page 1517.

[C] 80'X 64' Sanitary Sewer Easement granted by plat filed October 18, 2004, Plat Book 2004C, Page 332

[D] 20' Public Sanitary Sewer Easement granted by plat filed October 18, 2004, Plat Book 2004C, Page 332.

[E] Existing 100' Plains Electric Easement

[F] Proposed 20' Public Waterline Easement

[G] Proposed 20' Public Drainage Easement

[H] Proposed 20' Sanitary Sewer Easement

[J] Proposed 27'x16.5' Public Utility Easement

[K] Proposed 38'x18' Public Utility Easement

[L] 20' Public Drainage Easement granted by plat filed March 7, 2006, Plat Book 2006C, Page 75.

[M] Public Waterline and Sanitary Sewer Easement granted to New Mexico Utilities, Inc (NMUI) by document filed September 12, 2007, Document No. 2007171218.

[N] 20' Public Utility Easement granted to New Mexico Utilities, Inc. by plat filed december 28, 2007, Plat Book 2007C, Page 357.

[P] Temporary Drainage Easement filed 8-31-05 Book A102, Pg. 7014

[Q] 50' Public Roadway Easement granted by plat filed december 28, 2007, Plat Book 2007C, Page 357.

[R] 20' Public Sanitary Sewer Easement granted by plat filed December 19, 2012, Plat Book 2012C, Page 144

[S] 20' Waterline Easement granted by plat filed December 19, 2012, Plat Book 2012C, Page 144

TOPOGRAPHIC AND BOUNDARY SURVEY OF

TRACT 8

THE TRAILS UNIT 2

WITHIN
THE TOWN OF ALAMEDA GRANT
IN
PROJECTED SECTION 16, TOWNSHIP 11 NORTH, RANGE 2 EAST
NEW MEXICO PRINCIPAL MERIDIAN
CITY OF ALBUQUERQUE
BERNALILLO COUNTY, NEW MEXICO
MAY 2013

SURVTEK, INC.