CITY OF ALBUQUERQUE

Hydrology Section Planning Department
David S. Campbell, Director

Timothy M. Keller, Mayor

May 9, 2019

Joel Hernandez, P.E.
Tierra West, LLC
5571 Midway Park Place, NE
Albuquerque, NM 87109

RE: **Los Pastores Shopping Center & McDonalds**
Montgomery/Wyoming
DMP Addendum 3
Engineers Stamp Date: 5/2/2019,
Hydrology File: F19D013C & F19D013A

Dear Mr. Hernandez,

Based on the information provided in your submittal received on 5/3/2019 the DMP Addendum is approved for use as a guide for subsequent developments in the Los Pastores Shopping Center with the following conditions.

1. Caution, the "Worksheet for broad crested weir", the first sheet in appendix 'B' uses the wrong length of weir (30' should be 10'), but the weir flow rates used in the AHYMO discharge rating table seem reasonable.
2. Please provide an updated Drainage Covenant with notarized owner signature and a $25 check to Bernalillo County for recording prior to approval of any new building permits in the shopping center. Use an 8.5" x 11" copy of the pond, detail, and notes on sheet G-1 to make a new Exhibit 'A'.

If you have any questions, you can contact me at 924-3686 or jhughes@cabq.gov .

Sincerely,

James D. Hughes

James D. Hughes, P.E.
Principal Engineer, Planning Dept.
Development and Review Services

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

DRAINAGE MANAGEMENT PLAN

For

Los Pastores Shopping Center
Addendum 3

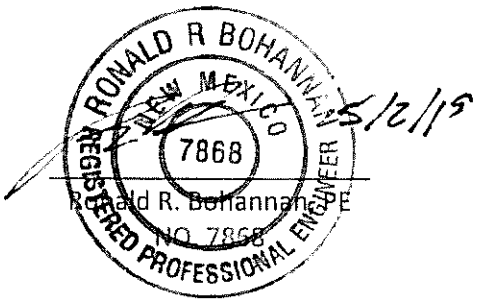
NWC Wyoming and Montgomery
Albuquerque, New Mexico

Prepared by:

Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, New Mexico 87109

May, 2019

I certify that this report was prepared under my supervision, and I am a registered Professional Engineer in the State of New Mexico in good standing.



Ronald R. Bohannan, PE
NO. 7868

TW Job No. 2014052

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DRAINAGE MANAGEMENT PLAN- ADDENDUM 3

Introduction

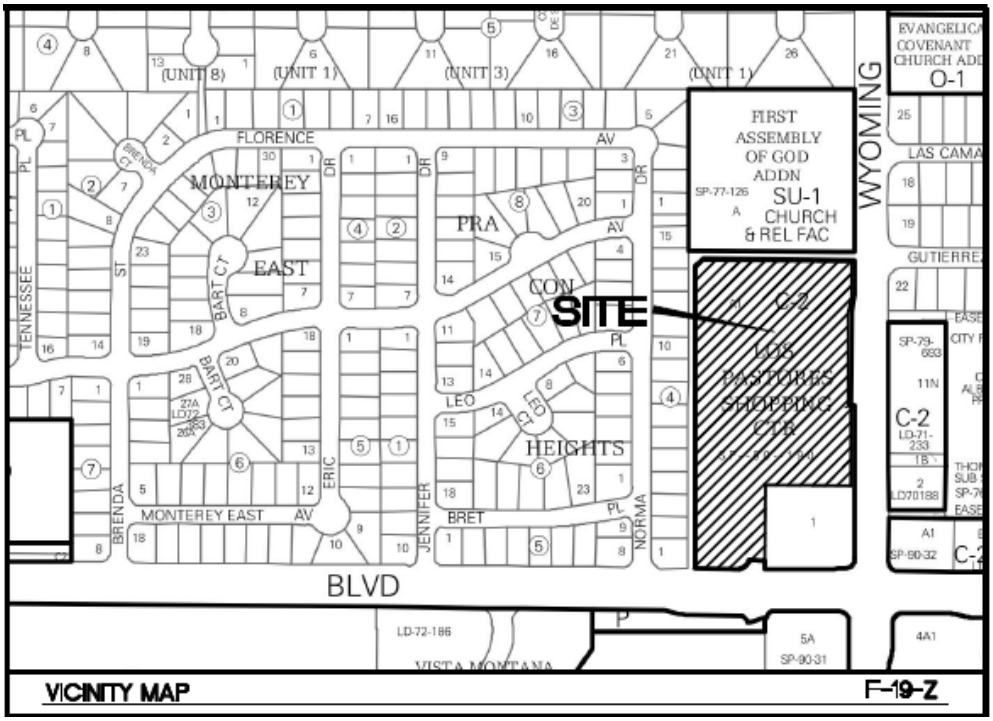
The purpose of this submittal is to provide a Drainage Management Plan for the Los Pastores Shopping Center to guide future development within the Shopping Center, including the proposed McDonald's redevelopment. Tierra West developed the initial Drainage Management Plan, with engineer's stamp date of May 1, 2016, for the Shopping Center Owner (W&M Co.), as well as the first Addendum prepared for the public alley Work Order with engineer's stamp date of June 11, 2018 and the second Addendum to certify the pad-graded site and Shopping Center pond with engineer's stamp date of May 1, 2016 and October 24, 2018, respectively. This Addendum #3 report was prepared for the McDonald's project with the consent of the Shopping Center Owner and replaces the original 2016 report and the second Addendum for the pond certification while conforming to the first Addendum.

The overall project consists of a 6.45-acre site, most of which is undeveloped, with the exception of the McDonald's which existed prior to grading the pad sites. The development consists of five new tracts/pad sites within a shopping center, along with associated parking, amenity areas, and landscaped areas. The existing McDonald's lease parcel is platted as a separate tract, however, the improvements proposed for the redevelopment of that property will require a separate design and analysis consistent with this report. A Site Development Plan for Building Permit for each individual pad site will require subsequent approval along with grading and drainage approval in general conformance with the drainage scheme outlined in this report. Development of each pad site will be limited to a peak flow rate of 3.14 CFS/acre (using Atlas 14 precipitation data), retaining on each individual tract as necessary to provide for water quality volume and attenuate developed peak flows to the allowable rate. Runoff rates in excess of the allowable peak flow rate will require approval from the Shopping Center Owner and analysis of the pond to ensure pre-developed flows are not exceeded.

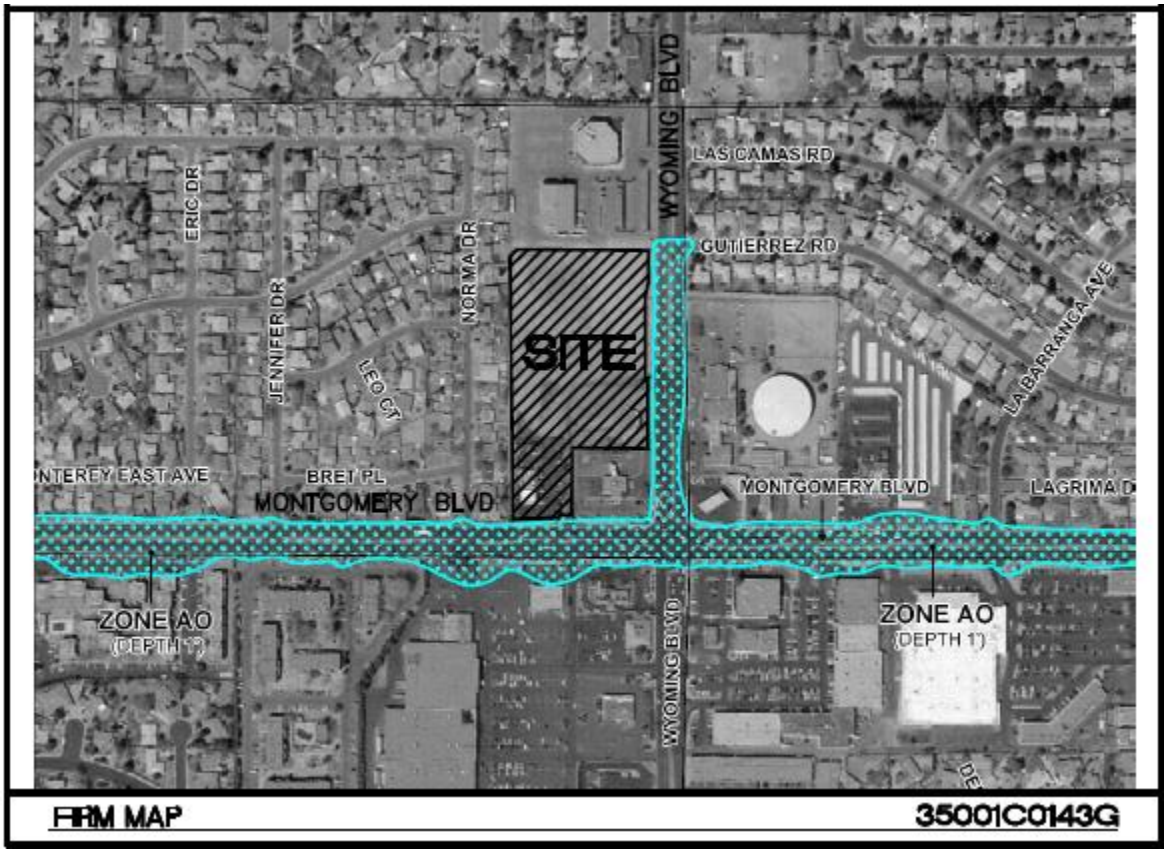
As shown in the vicinity map below, site is located on the northwest corner of Montgomery Boulevard NE and Wyoming Boulevard NE and encompasses Tract A-1, Redivision of Tract "A", Los Pastores Shopping Center. A portion of Tract 1 (corner parcel containing a Wells Fargo Bank building), is not a port of this request. The property is bound on the north by an adjacent public alley and an existing church; on the east by Wyoming Boulevard; on the south by Montgomery Boulevard and an existing Wells Fargo Bank; and on the west by an adjacent public alley and a residential subdivision.

The site lies within Precipitation Zone 3 according to Section 22.2 of the DPM. As shown in the FEMA Flood Map 35001C0143G on page 2, the site lies outside any flood hazard zone.

Vicinity Map



FEMA FIRMap



Pre-Developed Conditions

For the purposes of analysis, this report refers to and describes the "existing" and "pre-developed" condition as the site existed prior to grading in 2016.

A leased parcel on the southwest portion of the site is developed with a McDonald's Restaurant and parking facilities, while the remaining portion of the property remain undeveloped with the exception of access driveways connecting access from Wyoming Blvd. The site appears to have been previously graded with a moderate to steep slopes on the east, a small slope on the west adjacent to the alley, and a shallow (<3 foot deep) detention/retention pond (existing pond) north of the McDonald's restaurant.

Surface runoff from the site generally flows from the northeast corner of the site toward the existing pond on the southwest portion of the undeveloped area which, in turn, outflows into the unpaved public alley (AP#1 Q=24.16 CFS) draining by surface flow onto Montgomery Boulevard. Offsite flows draining onto the site are limited to surface runoff from the undeveloped alley adjacent to the church on the north as well as from the northerly portion of the existing Wells Fargo Bank building which surface flows over the McDonald's parking lot and drains through a curb cut into the existing pond. The total flows from the site draining into Montgomery Boulevard were calculated at a rate of 26.39 CFS (AP#2). No offsite flows drain onto the site from Wyoming Boulevard as they are contained in the roadway curb and gutter and conveyed into an existing public storm drain system.

Hydrology calculations for the Pre-Development conditions were performed using AHYMO and are included in Appendix A. The hydraulic characteristics of the pond in the pre-development condition were based on topography and field investigation which found a pond outlet opening of approximately 30 feet. This pond outlet opening was assumed to act as a broad crested weir and the outflow calculated using Flowmaster, the worksheet of which is included in Appendix B. Pond volume and stage-discharge calculations are tabulated in Appendix C.

Addendum #3 Revisions note:

The conditions depicted in the *Pre-Development Drainage Basin Map* reflect the site as it existed prior to grading in 2016. Revisions in this Addendum #3 from the originally approved report include the addition of Analysis Point 2 (AP#2) and tributary areas (EX-5 and EX-6) to the basin map to allow for the analysis of the proposed redevelopment of the McDonald's site and its overall effect on flows to Montgomery Boulevard. The AHYMO analysis was updated to incorporate precipitation values from Atlas 2 to Altas 4 since AHYMO S4 is used in this analysis as well as the addition of tributary areas EX-5, EX-6, and AP#2.

Post-Developed Conditions

The drainage intent is to maintain drainage patterns and peak discharge rates not exceeding historic, pre-development flows, which result in the post-developed conditions at Analysis Point (AP) #1 at 15.89 CFS and 18.90 CFS at AP#2. To accomplish this, the existing drainage pond was enlarged and maintained in the same location until such time the pad develops, which will require the pond to be re-analyzed and reconfigured, if necessary. The grading and drainage scheme proposes to provide rough-graded pads within each proposed lot that will enable individual development of each lot, provided individual, privately maintained ponds or underground drainage storage structures are built with the development

of each lot so as to not exceed pre-development peak flow rate of 3.14 CFS/acre (using Atlas 14 precipitation data). Paving improvements for the adjacent public alley and internal private access drives have been constructed with this proposed grading and drainage scheme designed to not exceed historic flows as a result of the detention pond reconstruction completed as of this writing; no pond modifications are proposed.

Per the attached grading and drainage plan and as indicated on the Post-Developed Conditions Basin Map, the majority of site (except for the alley corresponding to Basin PR-2) will be routed through the proposed detention basin along with the existing flows from Basins EX-3 and PR-4 corresponding to the grading and drainage scheme developed for the McDonald's site by Adams Engineering. The detention pond is designed to retain the "first-flush" within the bottom foot of storage, then release flow through a triple-pipe culvert until the pond water elevation reaches the crest elevation (5421.93) of the concrete spillway. The concrete spillway is also designed as an emergency overflow capable of conveying the full 100-year storm (without accounting for pond attenuation), should the pipe culvert become clogged.

Refer to Appendix B (AHYMO Analysis) for pond sizing calculations.

Addendum #3 Revisions note:

The conditions depicted in the *Post-Development Drainage Basin Map* reflect the site as it existed since construction and certification of the Shopping Center in November of 2018 and the proposed McDonald's redevelopment grading scheme. The Starbucks Pad detail is not included in this analysis as it was designed and approved separately by others to maintain historic flow rate by incorporating onsite detention in an underground system. Revisions in this Addendum #3 from the originally approved report include the addition of Analysis Point 2 (AP#2) and tributary areas (PR-5 and EX-6) to the basin map to allow for the analysis of the proposed redevelopment of the McDonald's site and its overall effect on flows to the shopping center pond and, ultimately, Montgomery Boulevard. The AHYMO analysis was updated to incorporate precipitation values from Atlas 2 to Altas 4 since AHYMO S4 is used in this analysis as well as the addition of tributary areas PR-5, EX-6, and AP#2.

Revisions to the AHYMO pond routing analysis between the originally approved report and this report consisted of the following:

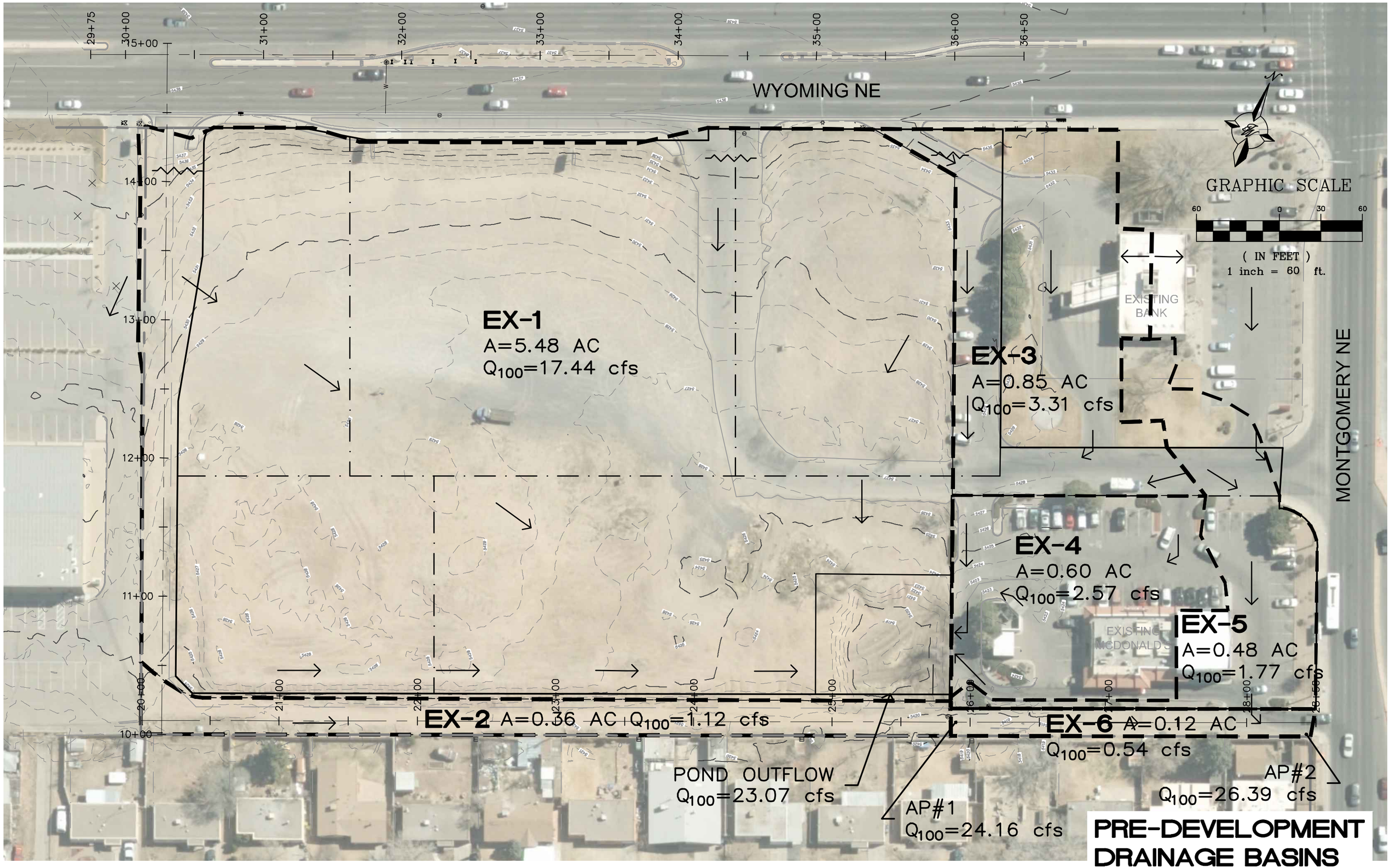
- Used volume calculations derived from as-built survey data vs. design contours. No physical changes to the pond are proposed.
- Flow through the culverts were reduced as a result of methodology change from orifice equation to culvert calculations using CulvertMaster.
- Flow over spillway added by adding stage storage discharge for elevations above spillway.

First-Flush Water Quality Considerations

The pavement anticipated to be constructed in the rough grading phase would require a first-flush retention volume of 2,557 cubic-feet, all of which can be retained within the bottom foot of the detention pond which has a capacity of 3,436 cubic-feet as indicated in the Pond Volume Calculation sheet included in the Appendix.

Conclusion

This Drainage Management Plan provides for grading and drainage elements which are capable of safely conveying the 100-Yr, 6-Hr storm and which meet City DPM requirements. Furthermore, the plan as identified above will not negatively impact the current downstream conditions at Montgomery Boulevard. With this submittal, we request Drainage Report approval for the McDonalds redevelopment plan and future development on the pad sites designed in conformance with this Drainage Management Plan.



PRE-DEVELOPMENT DRAINAGE BASINS

WYOMING NE

MONTGOMERY NE

GRAPHIC SCALE

60 0 30 60

(IN FEET)

1 inch = 60 ft.

EXISTING BANK

PR-1
A=5.24 AC
Q_{100}=17.28 cfs

EX-3
A=0.85 AC
Q_{100}=3.31 cfs

PR-4
A=0.22 AC
Q_{100}=0.89 cfs

PR-5
A=0.86 AC
Q_{100}=3.39 cfs

PR-2 A=0.60 AC Q_{100}=2.52 cfs

EX-6 A=0.12 AC
Q_{100}=0.54 cfs

POND OUTFLOW
Q_{100}=14.40 cfs

AP#1
Q_{100}=15.89 cfs

AP#2
Q_{100}=18.90 cfs

POST-DEVELOPMENT DRAINAGE BASINS

APPENDIX A

HYDROLOGY

LOS PASTORES SHOPPING CENTER

Pre-Development Conditions Basin Data Table

This table is based on the DPM Section 22.2, Zone: 3

BASIN	Area (SQ. FT)	Area (AC.)	Land Treatment Percentages A	B	C	D	*Q(100) (CFS)	V(100) (inches)	V(100) (AF)	Area (sq.mi.)
EXISTING CONDITIONS										
EX-1	238763	5.48	0.0%	0.0%	94.0%	6.0%	*17.44*	*1.17*	*0.5377*	*0.00856*
EX-2	15619	0.36	0.0%	0.0%	100.0%	0.0%	*1.12*	*1.08*	*0.0325*	*0.00056*
EX-3	36853	0.85	0.0%	26.0%	0.0%	74.0%	*3.31*	*2.13*	*0.1504*	*0.00132*
EX-4	26012	0.60	0.0%	6.0%	0.0%	94.0%	*2.57*	*2.48*	*0.1231*	*0.00093*
EX-5	20890	0.48	0.0%	38.0%	0.0%	62.0%	*1.77*	*1.92*	*0.0771*	*0.00075*
EX-6	5207	0.12	0.0%	0.0%	5.0%	95.0%	*0.54*	*2.51*	*0.0254*	*0.00019*
TOTAL		**7.88**								

* Peak discharge summary from AHYMO results

Proposed Conditions Basin Data Table with Water Quality Volume Calculations

BASIN	Area (SQ. FT)	Area (AC.)	Land Treatment Percentages A	B	C	D	*Q(100) (CFS)	V(100) (inches)	V(100) (AF)	Area (sq.mi.)	1ST FLUSH
PROPOSED CONDITIONS											
PR-1	228107	5.24	0.0%	0.0%	85.0%	15.0%	*17.28*	*1.31*	*0.1154*	*0.00818*	*969*
PR-2	26150	0.60	0.0%	0.0%	19.0%	81.0%	*2.52*	*2.30*	*0.1154*	*0.00094*	*600*
EX-3	36853	0.85	0.0%	26.0%	0.0%	74.0%	*3.31*	*2.13*	*0.1504*	*0.00132*	*773*
PR-4	9460	0.22	0.0%	20.0%	0.0%	80.0%	*0.89*	*2.24*	*0.0406*	*0.00034*	*214*
PR-5	37452	0.86	0.0%	24.0%	0.0%	76.0%	*3.39*	*2.17*	*0.1551*	*0.00134*	**
EX-6	5207	0.12	0.0%	0.0%	5.0%	95.0%	*0.54*	*2.51*	*0.0254*	*0.00019*	**
TOTAL		**7.88**									***2557***

* Peak discharge summary from AHYMO results

** Area not served by pond

AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4) - Ver. S4.01a, Rel: 01a RUN DATE (MON/DAY/YR) =04/29/2019

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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	PAGE = 1 NOTATION
START										TIME= 0.00
RAINFALL TYPE= 2 NOAA 14										RAIN24= 2.840
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COMPUTE NM HYD	100.20	-	2	0.00056	1.12	0.032	1.08784	1.500	3.126	PER IMP= 0.00
COMPUTE NM HYD	100.30	-	3	0.00132	3.31	0.150	2.13600	1.500	3.913	PER IMP= 74.00
COMPUTE NM HYD	100.40	-	4	0.00093	2.57	0.123	2.48223	1.500	4.317	PER IMP= 94.00
COMPUTE NM HYD	100.50	-	5	0.00075	1.77	0.077	1.92826	1.500	3.692	PER IMP= 62.00
COMPUTE NM HYD	100.60	-	6	0.00019	0.54	0.025	2.51119	1.500	4.426	PER IMP= 95.00
ADD HYD	100.21	1& 3	50	0.00988	20.75	0.688	1.30561	1.500	3.281	
ADD HYD	100.21	50& 4	50	0.01081	23.32	0.811	1.40680	1.500	3.370	
ROUTE RESERVOIR	200.10	50	55	0.01081	23.07	0.897	1.55652	1.550	3.334	AC-FT= 0.128
ADD HYD	100.22	2&55	58	0.01137	24.16	0.930	1.53343	1.550	3.320	
ADD HYD	100.23	5&58	59	0.01212	25.85	1.007	1.55777	1.550	3.333	
ADD HYD	100.23	6&59	59	0.01231	26.36	1.032	1.57227	1.550	3.346	

FINISH

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    AHYMO PROGRAM (AHYMO-S4)                    - Version: S4.01a - Rel: 01a
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         INPUT FILE = C:\Users\Joel\Desktop\AHYMO IN\Los Pastores- Pre ADDENDUM3a.txt

**************************************************************
*             Los Pastores SC @ Wyoming& Mont, ABQ,NM        *
**************************************************************
* 100-YEAR, 24-HR STORM  (UNDER EXIST CONDITIONS) W/ routing  *
**************************************************************
*
START               TIME=0.0
*
*
RAINFALL            TYPE=2 RAIN QUARTER=0.0 IN
                    RAIN ONE=1.84 IN RAIN SIX=2.43 IN
                    RAIN DAY=2.84 IN DT=0.05 HR

                24-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE AREAS (NM & AZ) - D1
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                  0.0350  0.0473  0.0606  0.0742  0.0891  0.1041  0.1196
                  0.1355  0.1517  0.1696  0.1883  0.2083  0.2328  0.2594
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                  2.4277  2.4300  2.4323  2.4345  2.4367  2.4390  2.4412
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2.5451	2.5470	2.5489	2.5508	2.5527	2.5546	2.5565
2.5584	2.5602	2.5621	2.5640	2.5658	2.5677	2.5695
2.5714	2.5732	2.5750	2.5769	2.5787	2.5805	2.5823
2.5841	2.5859	2.5877	2.5894	2.5912	2.5930	2.5947
2.5965	2.5982	2.6000	2.6017	2.6034	2.6052	2.6069
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2.6430	2.6446	2.6462	2.6477	2.6493	2.6508	2.6524
2.6539	2.6554	2.6569	2.6585	2.6600	2.6615	2.6630
2.6645	2.6659	2.6674	2.6689	2.6704	2.6718	2.6733
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2.6847	2.6861	2.6875	2.6888	2.6902	2.6916	2.6930
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2.7379	2.7391	2.7402	2.7413	2.7424	2.7435	2.7446
2.7457	2.7468	2.7479	2.7490	2.7500	2.7511	2.7522
2.7532	2.7542	2.7553	2.7563	2.7573	2.7584	2.7594
2.7604	2.7614	2.7624	2.7634	2.7643	2.7653	2.7663
2.7673	2.7682	2.7692	2.7701	2.7710	2.7720	2.7729
2.7738	2.7747	2.7756	2.7765	2.7774	2.7783	2.7792
2.7801	2.7809	2.7818	2.7827	2.7835	2.7843	2.7852
2.7860	2.7868	2.7877	2.7885	2.7893	2.7901	2.7909
2.7916	2.7924	2.7932	2.7940	2.7947	2.7955	2.7962
2.7970	2.7977	2.7984	2.7992	2.7999	2.8006	2.8013
2.8020	2.8027	2.8034	2.8040	2.8047	2.8054	2.8060
2.8067	2.8073	2.8080	2.8086	2.8092	2.8099	2.8105
2.8111	2.8117	2.8123	2.8129	2.8135	2.8140	2.8146
2.8152	2.8157	2.8163	2.8168	2.8174	2.8179	2.8184
2.8189	2.8195	2.8200	2.8205	2.8210	2.8214	2.8219
2.8224	2.8229	2.8233	2.8238	2.8242	2.8247	2.8251

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                2.8284  2.8288  2.8291  2.8295  2.8299  2.8302  2.8306
                2.8309  2.8313  2.8316  2.8319  2.8322  2.8325  2.8328
                2.8331  2.8334  2.8337  2.8340  2.8343  2.8345  2.8348
                2.8351  2.8353  2.8355  2.8358  2.8360  2.8362  2.8364
                2.8367  2.8369  2.8371  2.8372  2.8374  2.8376  2.8378
                2.8379  2.8381  2.8383  2.8384  2.8385  2.8387  2.8388
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                2.8396  2.8397  2.8397  2.8398  2.8398  2.8399  2.8399
                2.8399  2.8400  2.8400  2.8400  2.8400

*DEVELOPED CONDITIONS
*
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*
COMPUTE NM HYD      ID=1 HYD NO=100.1 AREA=0.00856 SQ MI
                    PER A=0.00 PER B=0.0 PER C=94.0 PER D=6.00
                    TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   2.0277    CFS   UNIT VOLUME =   0.9941       B =   526.28      P60 = 1.8400
     AREA =     0.000514 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000


     K =  0.105528HR    TP =  0.133300HR    K/TP RATIO =  0.791661     SHAPE CONSTANT, N =  4.530856
     UNIT PEAK =   23.489    CFS   UNIT VOLUME =    1.001       B =   389.14      P60 = 1.8400
     AREA =     0.008046 SQ MI    IA =   0.35000 INCHES    INF =   0.83000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=1 CODE=1

                                  PARTIAL HYDROGRAPH   100.10


    RUNOFF VOLUME =     1.17774 INCHES     =       0.5377 ACRE-FEET
    PEAK DISCHARGE RATE =      17.44 CFS  AT   1.500 HOURS   BASIN AREA =  0.0086 SQ. MI.
```

```
*
*
*BASIN EX-2
*
COMPUTE NM HYD      ID=2 HYD NO=100.2 AREA=0.00056 SQ MI
                    PER A=0.00 PER B=0.00 PER C=100.0 PER D=0.00
                    TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.105528HR    TP =  0.133300HR    K/TP RATIO =  0.791661     SHAPE CONSTANT, N =  4.530856
     UNIT PEAK =   1.6348    CFS   UNIT VOLUME =   0.9942       B =   389.14      P60 = 1.8400
     AREA =     0.000560 SQ MI    IA =   0.35000 INCHES    INF =   0.83000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=2 CODE=1

                                  PARTIAL HYDROGRAPH   100.20


    RUNOFF VOLUME =     1.08784 INCHES     =       0.0325 ACRE-FEET
    PEAK DISCHARGE RATE =       1.12 CFS  AT   1.500 HOURS   BASIN AREA =  0.0006 SQ. MI.



*
*
*BASIN EX-3
*
COMPUTE NM HYD      ID=3 HYD NO=100.3 AREA=0.00132 SQ MI
                    PER A=0.00 PER B=26.0 PER C=0.0 PER D=74.00
                    TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   3.8565    CFS   UNIT VOLUME =   0.9966       B =   526.28      P60 = 1.8400
     AREA =     0.000977 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000


     K =  0.131520HR    TP =  0.133300HR    K/TP RATIO =  0.986645     SHAPE CONSTANT, N =  3.578611
     UNIT PEAK =  0.83941    CFS   UNIT VOLUME =   0.9845       B =   326.03      P60 = 1.8400
     AREA =     0.000343 SQ MI    IA =   0.50000 INCHES    INF =   1.25000 INCHES PER HOUR
```

```
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=3 CODE=1

                                    PARTIAL HYDROGRAPH   100.30


    RUNOFF VOLUME =     2.13600 INCHES     =       0.1504 ACRE-FEET
    PEAK DISCHARGE RATE =       3.31 CFS  AT   1.500 HOURS   BASIN AREA =  0.0013 SQ. MI.



*
*
*BASIN EX-4
*
COMPUTE NM HYD      ID=4 HYD NO=100.4 AREA=0.00093 SQ MI
                    PER A=0.00 PER B=6.00 PER C=00.0 PER D=94.0
                    TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   3.4514    CFS   UNIT VOLUME =   0.9959       B =   526.28      P60 = 1.8400
     AREA =     0.000874 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000


     K =  0.131520HR    TP =  0.133300HR    K/TP RATIO =  0.986645     SHAPE CONSTANT, N =  3.578611
     UNIT PEAK =  0.13648    CFS   UNIT VOLUME =   0.9033       B =   326.03      P60 = 1.8400
     AREA =     0.000056 SQ MI    IA =   0.50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=4 CODE=1

                                    PARTIAL HYDROGRAPH   100.40


    RUNOFF VOLUME =     2.48223 INCHES     =       0.1231 ACRE-FEET
    PEAK DISCHARGE RATE =       2.57 CFS  AT   1.500 HOURS   BASIN AREA =  0.0009 SQ. MI.
```

```
*
*BASIN EX-5
*
COMPUTE NM HYD      ID=5 HYD NO=100.5 AREA=0.00075 SQ MI
                    PER A=0.00 PER B=38.0 PER C=00.0 PER D=62.0
                    TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   1.8358    CFS   UNIT VOLUME =   0.9928       B =   526.28      P60 = 1.8400
     AREA =     0.000465 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000


     K =  0.131520HR    TP =  0.133300HR    K/TP RATIO =  0.986645     SHAPE CONSTANT, N =  3.578610
     UNIT PEAK =  0.69706    CFS   UNIT VOLUME =   0.9823       B =   326.03      P60 = 1.8400
     AREA =     0.000285 SQ MI    IA =   0.50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=5 CODE=1

                                  PARTIAL HYDROGRAPH   100.50


    RUNOFF VOLUME =     1.92826 INCHES     =       0.0771 ACRE-FEET
    PEAK DISCHARGE RATE =       1.77 CFS  AT   1.500 HOURS   BASIN AREA =  0.0008 SQ. MI.



*
*BASIN EX-6
*
COMPUTE NM HYD      ID=6 HYD NO=100.6 AREA=0.00019 SQ MI
                    PER A=0.00 PER B=0.00 PER C=5.0 PER D=95.0
                    TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =  0.71262    CFS   UNIT VOLUME =   0.9832       B =   526.28      P60 = 1.8400
     AREA =     0.000181 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000
```

```
     K =  0.105528HR    TP =  0.133300HR    K/TP RATIO =  0.791661     SHAPE CONSTANT, N =  4.530856
     UNIT PEAK =  0.27733E-01CFS   UNIT VOLUME =   0.8912       B =   389.14      P60 = 1.8400
     AREA =     0.000010 SQ MI    IA =   0.35000 INCHES    INF =   0.83000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=6 CODE=1

                                    PARTIAL HYDROGRAPH   100.60


    RUNOFF VOLUME =     2.51119 INCHES     =       0.0254 ACRE-FEET
    PEAK DISCHARGE RATE =       0.54 CFS  AT   1.500 HOURS   BASIN AREA =  0.0002 SQ. MI.



**
*
*COMBINE EX-1, EX-3, AND EX-4
*
ADD HYD                         ID=50 HYD NO=100.21 ID=1 ID=3
ADD HYD                         ID=50 HYD NO=100.21 ID=50 ID=4
*
PRINT HYD           ID=50 CODE=1

                                    PARTIAL HYDROGRAPH   100.21


    RUNOFF VOLUME =     1.40680 INCHES     =       0.8111 ACRE-FEET
    PEAK DISCHARGE RATE =      23.32 CFS  AT   1.500 HOURS   BASIN AREA =  0.0108 SQ. MI.



**
*ROUTE BASINS EX-1, EX-3, AND EX-4 THROUGH EXIST DETENTION POND
ROUTE RESERVOIR     ID=55 HYD NO=200.1 INFLOW ID=50 CODE=24
                        OUTFLOW (CFS) STORAGE(AC-FT) ELEVATION(FT)
                                0.0100         0.0                 19.00
                                0.0100         0.0573              20.00
```

0.1000	0.0914	20.50
28.570	0.1366	21.00

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

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
0.00	0.00	-Infinity	-Infinity	0.00
1.20	1.38	20.00	0.057	0.01
2.40	0.76	20.51	0.093	0.81
3.60	0.07	20.49	0.091	0.10
4.80	0.06	20.44	0.087	0.09
6.00	0.07	20.41	0.085	0.08
7.20	0.07	20.39	0.084	0.08
8.40	0.06	20.37	0.082	0.08
9.60	0.06	20.34	0.081	0.07
10.80	0.05	20.32	0.079	0.07
12.00	0.05	20.30	0.078	0.06
13.20	0.04	20.27	0.076	0.06
14.40	0.04	20.25	0.074	0.05
15.60	0.03	20.22	0.073	0.05
16.80	0.03	20.20	0.071	0.05
18.00	0.02	20.17	0.069	0.04
19.20	0.02	20.15	0.067	0.04
20.40	0.01	20.12	0.066	0.03
21.60	0.01	20.10	0.064	0.03
22.80	0.01	20.07	0.062	0.02
24.00	0.00	20.05	0.060	0.02
25.20	0.00	20.02	0.059	0.01
26.40	0.00	20.00	0.058	0.01
27.60	0.00	20.00	0.057	0.01
28.80	0.00	20.00	0.057	0.01
30.00	0.00	20.00	0.057	0.01
31.20	0.00	20.00	0.057	0.01
32.40	0.00	20.00	0.057	0.01
33.60	0.00	20.00	0.057	0.01
34.80	0.00	20.00	0.057	0.01
36.00	0.00	20.00	0.057	0.01
37.20	0.00	20.00	0.057	0.01

38.40	0.00	20.00	0.057	0.01
39.60	0.00	20.00	0.057	0.01
40.80	0.00	20.00	0.057	0.01
42.00	0.00	20.00	0.057	0.01
43.20	0.00	20.00	0.057	0.01
44.40	0.00	20.00	0.057	0.01
45.60	0.00	20.00	0.057	0.01
46.80	0.00	20.00	0.057	0.01
48.00	0.00	20.00	0.057	0.01
49.20	0.00	20.00	0.057	0.01
50.40	0.00	20.00	0.057	0.01
51.60	0.00	20.00	0.057	0.01
52.80	0.00	20.00	0.057	0.01
54.00	0.00	20.00	0.057	0.01
55.20	0.00	20.00	0.057	0.01
56.40	0.00	20.00	0.057	0.01
57.60	0.00	20.00	0.057	0.01
58.80	0.00	20.00	0.057	0.01
60.00	0.00	20.00	0.057	0.01
61.20	0.00	20.00	0.057	0.01
62.40	0.00	20.00	0.057	0.01
63.60	0.00	20.00	0.057	0.01
64.80	0.00	20.00	0.057	0.01
66.00	0.00	20.00	0.057	0.01

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
67.20	0.00	20.00	0.057	0.01
68.40	0.00	20.00	0.057	0.01
69.60	0.00	20.00	0.057	0.01
70.80	0.00	20.00	0.057	0.01
72.00	0.00	20.00	0.057	0.01
73.20	0.00	20.00	0.057	0.01
74.40	0.00	20.00	0.057	0.01
75.60	0.00	20.00	0.057	0.01
76.80	0.00	20.00	0.057	0.01
78.00	0.00	20.00	0.057	0.01
79.20	0.00	20.00	0.057	0.01
80.40	0.00	20.00	0.057	0.01

81.60	0.00	20.00	0.057	0.01
82.80	0.00	20.00	0.057	0.01
84.00	0.00	20.00	0.057	0.01
85.20	0.00	20.00	0.057	0.01
86.40	0.00	20.00	0.057	0.01
87.60	0.00	20.00	0.057	0.01
88.80	0.00	20.00	0.057	0.01
90.00	0.00	20.00	0.057	0.01
91.20	0.00	20.00	0.057	0.01
92.40	0.00	20.00	0.057	0.01
93.60	0.00	20.00	0.057	0.01
94.80	0.00	20.00	0.057	0.01
96.00	0.00	20.00	0.057	0.01
97.20	0.00	20.00	0.057	0.01
98.40	0.00	20.00	0.057	0.01
99.60	0.00	20.00	0.057	0.01
100.80	0.00	20.00	0.057	0.01
102.00	0.00	20.00	0.057	0.01
103.20	0.00	20.00	0.057	0.01
104.40	0.00	20.00	0.057	0.01
105.60	0.00	20.00	0.057	0.01
106.80	0.00	20.00	0.057	0.01
108.00	0.00	20.00	0.057	0.01
109.20	0.00	20.00	0.057	0.01
110.40	0.00	20.00	0.057	0.01
111.60	0.00	20.00	0.057	0.01
112.80	0.00	20.00	0.057	0.01
114.00	0.00	20.00	0.057	0.01
115.20	0.00	20.00	0.057	0.01
116.40	0.00	20.00	0.057	0.01
117.60	0.00	20.00	0.057	0.01
118.80	0.00	20.00	0.057	0.01
120.00	0.00	20.00	0.057	0.01
121.20	0.00	20.00	0.057	0.01
122.40	0.00	20.00	0.057	0.01
123.60	0.00	20.00	0.057	0.01
124.80	0.00	20.00	0.057	0.01
126.00	0.00	20.00	0.057	0.01
127.20	0.00	20.00	0.057	0.01
128.40	0.00	20.00	0.057	0.01

129.60	0.00	20.00	0.057	0.01
130.80	0.00	20.00	0.057	0.01
132.00	0.00	20.00	0.057	0.01
133.20	0.00	20.00	0.057	0.01

TIME (HRS)	INFLOW (CFS)	ELEV (FEET)	VOLUME (AC-FT)	OUTFLOW (CFS)
134.40	0.00	20.00	0.057	0.01
135.60	0.00	20.00	0.057	0.01
136.80	0.00	20.00	0.057	0.01
138.00	0.00	20.00	0.057	0.01
139.20	0.00	20.00	0.057	0.01
140.40	0.00	20.00	0.057	0.01
141.60	0.00	20.00	0.057	0.01
142.80	0.00	20.00	0.057	0.01
144.00	0.00	20.00	0.057	0.01
145.20	0.00	20.00	0.057	0.01
146.40	0.00	20.00	0.057	0.01
147.60	0.00	20.00	0.057	0.01
148.80	0.00	20.00	0.057	0.01
150.00	0.00	20.00	0.057	0.01
151.20	0.00	20.00	0.057	0.01
152.40	0.00	20.00	0.057	0.01
153.60	0.00	20.00	0.057	0.01
154.80	0.00	20.00	0.057	0.01
156.00	0.00	20.00	0.057	0.01
157.20	0.00	20.00	0.057	0.01
158.40	0.00	20.00	0.057	0.01
159.60	0.00	20.00	0.057	0.01
160.80	0.00	20.00	0.057	0.01
162.00	0.00	20.00	0.057	0.01
163.20	0.00	20.00	0.057	0.01
164.40	0.00	20.00	0.057	0.01
165.60	0.00	20.00	0.057	0.01
166.80	0.00	20.00	0.057	0.01
168.00	0.00	20.00	0.057	0.01
169.20	0.00	20.00	0.057	0.01
170.40	0.00	20.00	0.057	0.01
171.60	0.00	20.00	0.057	0.01

```
   172.80       0.00     20.00      0.057      0.01
   174.00       0.00     20.00      0.057      0.01
   175.20       0.00     20.00      0.057      0.01
   176.40       0.00     20.00      0.057      0.01
   177.60       0.00     20.00      0.057      0.01
   178.80       0.00     20.00      0.057      0.01
   180.00       0.00     20.00      0.057      0.01
   181.20       0.00     20.00      0.057      0.01
   182.40       0.00     20.00      0.057      0.01
   183.60       0.00     20.00      0.057      0.01
   184.80       0.00     20.00      0.057      0.01
   186.00       0.00     20.00      0.057      0.01
   187.20       0.00     20.00      0.057      0.01
   188.40       0.00     20.00      0.057      0.01
   189.60       0.00     20.00      0.057      0.01
   190.80       0.00     20.00      0.057      0.01
   192.00       0.00     20.00      0.057      0.01
   193.20       0.00     20.00      0.057      0.01
   194.40       0.00     20.00      0.057      0.01
   195.60       0.00     20.00      0.057      0.01
   196.80       0.00     20.00      0.057      0.01
   198.00       0.00     20.00      0.057      0.01
   199.20       0.00     20.00      0.057      0.01
 PEAK DISCHARGE =       23.066 CFS - PEAK OCCURS AT HOUR    1.55
 MAXIMUM WATER SURFACE ELEVATION =       20.903
 MAXIMUM STORAGE =        0.1279 AC-FT      INCREMENTAL TIME=    0.050000HRS

*
*
PRINT HYD           ID=55  CODE=1

                                  PARTIAL HYDROGRAPH   200.10


    RUNOFF VOLUME =     1.55652 INCHES     =       0.8974 ACRE-FEET
    PEAK DISCHARGE RATE =      23.07 CFS  AT   1.550 HOURS   BASIN AREA =  0.0108 SQ. MI.



*
```

```
*
*COMBINE POND OUTFLOW WITH EX-2 FOR TOTAL AT AP#1
*
ADD HYD                          ID=58 HYD NO=100.22 ID=2 ID=55
*
PRINT HYD           ID=58 CODE=1

                                    PARTIAL HYDROGRAPH   100.22


    RUNOFF VOLUME =     1.53343 INCHES     =       0.9299 ACRE-FEET
    PEAK DISCHARGE RATE =      24.16 CFS  AT   1.550 HOURS   BASIN AREA =  0.0114 SQ. MI.



*
*COMBINE ALLEY FLOWS AP#1 WITH EX-5 AND EX-6 FOR TOTAL AT AP#2
*
ADD HYD                          ID=59 HYD NO=100.23 ID=5 ID=58
ADD HYD                          ID=59 HYD NO=100.23 ID=6 ID=59
*
PRINT HYD           ID=59 CODE=1

                                    PARTIAL HYDROGRAPH   100.23


    RUNOFF VOLUME =     1.57227 INCHES     =       1.0322 ACRE-FEET
    PEAK DISCHARGE RATE =      26.36 CFS  AT   1.550 HOURS   BASIN AREA =  0.0123 SQ. MI.



*
FINISH

    NORMAL PROGRAM FINISH          END TIME (HR:MIN:SEC) = 13:47:58
```

AHYMO PROGRAM SUMMARY TABLE (AHYMO-S4) - Ver. S4.01a, Rel: 01a RUN DATE (MON/DAY/YR) =04/29/2019

INPUT FILE = C:\Users\Joel\Desktop\AHYMO IN\Los Pastores Post Addendum3a.txt USER NO.= AHYMO_Temp_User:20122010

PAGE = 1

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
START										TIME= 0.00
RAINFALL TYPE= 2 NOAA 14										RAIN24= 2.840
COMPUTE NM HYD	100.10	-	1	0.00818	17.28	0.573	1.31258	1.500	3.301	PER IMP= 15.00
COMPUTE NM HYD	100.20	-	2	0.00094	2.52	0.115	2.30143	1.500	4.184	PER IMP= 81.00
COMPUTE NM HYD	100.30	-	3	0.00132	3.31	0.150	2.13600	1.500	3.913	PER IMP= 74.00
COMPUTE NM HYD	100.40	-	4	0.00034	0.89	0.041	2.23987	1.500	4.087	PER IMP= 80.00
COMPUTE NM HYD	100.50	-	5	0.00134	3.39	0.155	2.17062	1.500	3.952	PER IMP= 76.00
COMPUTE NM HYD	100.60	-	6	0.00019	0.54	0.025	2.51119	1.500	4.426	PER IMP= 95.00
ADD HYD	100.21	1& 3	50	0.00950	20.59	0.723	1.42689	1.500	3.386	
ADD HYD	100.21	50& 4	50	0.00984	21.48	0.763	1.45481	1.500	3.410	
ROUTE RESERVOIR	200.10	50	55	0.00984	14.40	0.763	1.45481	1.650	2.286	AC-FT= 0.348
ADD HYD	100.22	2&55	58	0.01078	15.89	0.879	1.52854	1.650	2.304	
ADD HYD	100.23	5&58	59	0.01212	18.48	1.034	1.59949	1.600	2.383	
ADD HYD	100.23	6&59	59	0.01231	18.90	1.059	1.61335	1.600	2.399	

FINISH

```
    AHYMO PROGRAM (AHYMO-S4)                    - Version: S4.01a - Rel: 01a
         RUN DATE (MON/DAY/YR) = 04/29/2019
         START TIME (HR:MIN:SEC) = 13:53:14     USER NO.= AHYMO_Temp_User:20122010
         INPUT FILE = C:\Users\Joel\Desktop\AHYMO IN\Los Pastores Post Addendum3a.txt

************************************************************
*             Los Pastores SC @ Wyoming& Mont, ABQ,NM          *
************************************************************
* 100-YEAR, 24-HR STORM  (UNDER PROPOSED CONDITIONS) W/ MCD'S   *
************************************************************
*
START               TIME=0.0
*
*
RAINFALL            TYPE=2 RAIN QUARTER=0.0 IN
                    RAIN ONE=1.84 IN RAIN SIX=2.43 IN
                    RAIN DAY=2.84 IN DT=0.05 HR

                24-HOUR RAINFALL DIST. - BASED ON NOAA ATLAS 14 FOR CONVECTIVE AREAS (NM & AZ) - D1
                DT =   0.050000 HOURS       END TIME =    24.000002 HOURS
                  0.0000  0.0039  0.0080  0.0123  0.0170  0.0218  0.0273
                  0.0350  0.0473  0.0606  0.0742  0.0891  0.1041  0.1196
                  0.1355  0.1517  0.1696  0.1883  0.2083  0.2328  0.2594
                  0.2950  0.3354  0.3853  0.4519  0.5268  0.6561  0.8571
                  1.2016  1.4438  1.6347  1.7307  1.8148  1.8752  1.9233
                  1.9652  1.9959  2.0241  2.0473  2.0677  2.0866  2.1036
                  2.1196  2.1339  2.1474  2.1606  2.1733  2.1838  2.1896
                  2.1954  2.2010  2.2063  2.2116  2.2167  2.2217  2.2267
                  2.2314  2.2360  2.2406  2.2451  2.2495  2.2537  2.2579
                  2.2620  2.2661  2.2701  2.2739  2.2777  2.2815  2.2852
                  2.2888  2.2924  2.2960  2.2995  2.3030  2.3064  2.3098
                  2.3132  2.3165  2.3198  2.3230  2.3262  2.3294  2.3325
                  2.3356  2.3387  2.3417  2.3448  2.3477  2.3507  2.3536
                  2.3565  2.3593  2.3622  2.3650  2.3678  2.3705  2.3733
                  2.3760  2.3786  2.3813  2.3839  2.3865  2.3891  2.3917
                  2.3942  2.3967  2.3993  2.4017  2.4042  2.4066  2.4090
                  2.4115  2.4138  2.4162  2.4185  2.4209  2.4232  2.4255
                  2.4277  2.4300  2.4323  2.4345  2.4367  2.4390  2.4412
                  2.4434  2.4457  2.4479  2.4501  2.4523  2.4545  2.4567
```

2.4589	2.4610	2.4632	2.4654	2.4675	2.4697	2.4718
2.4740	2.4761	2.4782	2.4804	2.4825	2.4846	2.4867
2.4888	2.4909	2.4930	2.4951	2.4971	2.4992	2.5013
2.5033	2.5054	2.5074	2.5094	2.5115	2.5135	2.5155
2.5175	2.5195	2.5215	2.5235	2.5255	2.5275	2.5295
2.5314	2.5334	2.5354	2.5373	2.5393	2.5412	2.5431
2.5451	2.5470	2.5489	2.5508	2.5527	2.5546	2.5565
2.5584	2.5602	2.5621	2.5640	2.5658	2.5677	2.5695
2.5714	2.5732	2.5750	2.5769	2.5787	2.5805	2.5823
2.5841	2.5859	2.5877	2.5894	2.5912	2.5930	2.5947
2.5965	2.5982	2.6000	2.6017	2.6034	2.6052	2.6069
2.6086	2.6103	2.6120	2.6137	2.6153	2.6170	2.6187
2.6204	2.6220	2.6237	2.6253	2.6270	2.6286	2.6302
2.6318	2.6335	2.6351	2.6367	2.6383	2.6399	2.6414
2.6430	2.6446	2.6462	2.6477	2.6493	2.6508	2.6524
2.6539	2.6554	2.6569	2.6585	2.6600	2.6615	2.6630
2.6645	2.6659	2.6674	2.6689	2.6704	2.6718	2.6733
2.6747	2.6762	2.6776	2.6790	2.6804	2.6819	2.6833
2.6847	2.6861	2.6875	2.6888	2.6902	2.6916	2.6930
2.6943	2.6957	2.6970	2.6984	2.6997	2.7010	2.7023
2.7037	2.7050	2.7063	2.7076	2.7088	2.7101	2.7114
2.7127	2.7139	2.7152	2.7165	2.7177	2.7189	2.7202
2.7214	2.7226	2.7238	2.7250	2.7262	2.7274	2.7286
2.7298	2.7310	2.7322	2.7333	2.7345	2.7356	2.7368
2.7379	2.7391	2.7402	2.7413	2.7424	2.7435	2.7446
2.7457	2.7468	2.7479	2.7490	2.7500	2.7511	2.7522
2.7532	2.7542	2.7553	2.7563	2.7573	2.7584	2.7594
2.7604	2.7614	2.7624	2.7634	2.7643	2.7653	2.7663
2.7673	2.7682	2.7692	2.7701	2.7710	2.7720	2.7729
2.7738	2.7747	2.7756	2.7765	2.7774	2.7783	2.7792
2.7801	2.7809	2.7818	2.7827	2.7835	2.7843	2.7852
2.7860	2.7868	2.7877	2.7885	2.7893	2.7901	2.7909
2.7916	2.7924	2.7932	2.7940	2.7947	2.7955	2.7962
2.7970	2.7977	2.7984	2.7992	2.7999	2.8006	2.8013
2.8020	2.8027	2.8034	2.8040	2.8047	2.8054	2.8060
2.8067	2.8073	2.8080	2.8086	2.8092	2.8099	2.8105
2.8111	2.8117	2.8123	2.8129	2.8135	2.8140	2.8146
2.8152	2.8157	2.8163	2.8168	2.8174	2.8179	2.8184
2.8189	2.8195	2.8200	2.8205	2.8210	2.8214	2.8219
2.8224	2.8229	2.8233	2.8238	2.8242	2.8247	2.8251

```
                2.8256  2.8260  2.8264  2.8268  2.8272  2.8276  2.8280
                2.8284  2.8288  2.8291  2.8295  2.8299  2.8302  2.8306
                2.8309  2.8313  2.8316  2.8319  2.8322  2.8325  2.8328
                2.8331  2.8334  2.8337  2.8340  2.8343  2.8345  2.8348
                2.8351  2.8353  2.8355  2.8358  2.8360  2.8362  2.8364
                2.8367  2.8369  2.8371  2.8372  2.8374  2.8376  2.8378
                2.8379  2.8381  2.8383  2.8384  2.8385  2.8387  2.8388
                2.8389  2.8390  2.8391  2.8392  2.8393  2.8394  2.8395
                2.8396  2.8397  2.8397  2.8398  2.8398  2.8399  2.8399
                2.8399  2.8400  2.8400  2.8400  2.8400

*DEVELOPED CONDITIONS
*
*BASIN PR-1
*
COMPUTE NM HYD      ID=1 HYD NO=100.1 AREA=0.00818 SQ MI
                    PER A=0.00 PER B=0.0 PER C=85.0 PER D=15.0
                    TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   4.8443    CFS   UNIT VOLUME =   0.9971       B =   526.28      P60 = 1.8400
     AREA =     0.001227 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000


     K =  0.105528HR    TP =  0.133300HR    K/TP RATIO =  0.791661     SHAPE CONSTANT, N =  4.530856
     UNIT PEAK =   20.298    CFS   UNIT VOLUME =    1.001       B =   389.14      P60 = 1.8400
     AREA =     0.006953 SQ MI    IA =   0.35000 INCHES    INF =   0.83000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=1 CODE=1

                                  PARTIAL HYDROGRAPH   100.10


    RUNOFF VOLUME =     1.31258 INCHES     =       0.5726 ACRE-FEET
    PEAK DISCHARGE RATE =      17.28 CFS  AT   1.500 HOURS   BASIN AREA =  0.0082 SQ. MI.
```

```
*
*
*BASIN PR-2
*
COMPUTE NM HYD       ID=2 HYD NO=100.2 AREA=0.00094 SQ MI
                     PER A=0.00 PER B=0.0 PER C=19.0 PER D=81.00
                     TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   3.0060    CFS   UNIT VOLUME =   0.9959       B =   526.28      P60 = 1.8400
     AREA =     0.000761 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000


     K =  0.105528HR    TP =  0.133300HR    K/TP RATIO =  0.791661     SHAPE CONSTANT, N =  4.530856
     UNIT PEAK =  0.52138    CFS   UNIT VOLUME =   0.9789       B =   389.14      P60 = 1.8400
     AREA =     0.000179 SQ MI    IA =   0.35000 INCHES    INF =   0.83000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD            ID=2 CODE=1

                                  PARTIAL HYDROGRAPH   100.20


    RUNOFF VOLUME =     2.30143 INCHES     =       0.1154 ACRE-FEET
    PEAK DISCHARGE RATE =       2.52 CFS  AT   1.500 HOURS   BASIN AREA =  0.0009 SQ. MI.



*
*
*BASIN EX-3 (MC D'S 0-1,0-2,0-4)
*
COMPUTE NM HYD       ID=3 HYD NO=100.3 AREA=0.00132 SQ MI
                     PER A=0.00 PER B=26.0 PER C=0.00 PER D=74.00
                     TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   3.8565    CFS   UNIT VOLUME =   0.9966       B =   526.28      P60 = 1.8400
     AREA =     0.000977 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
```

```
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000


     K =  0.131520HR    TP =  0.133300HR    K/TP RATIO =  0.986645     SHAPE CONSTANT, N =  3.578611
     UNIT PEAK =  0.83941    CFS   UNIT VOLUME =   0.9845       B =   326.03      P60 = 1.8400
     AREA =     0.000343 SQ MI    IA =   0.50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=3 CODE=1

                                    PARTIAL HYDROGRAPH   100.30


    RUNOFF VOLUME =     2.13600 INCHES     =       0.1504 ACRE-FEET
    PEAK DISCHARGE RATE =       3.31 CFS  AT   1.500 HOURS   BASIN AREA =  0.0013 SQ. MI.



*
*
*BASIN PR-4 (MC D'S A-2)
*
COMPUTE NM HYD      ID=4 HYD NO=100.4 AREA=0.00034 SQ MI
                    PER A=0.00 PER B=20.0 PER C=0.00 PER D=80.0
                    TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   1.0739    CFS   UNIT VOLUME =   0.9891       B =   526.28      P60 = 1.8400
     AREA =     0.000272 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000


     K =  0.131520HR    TP =  0.133300HR    K/TP RATIO =  0.986645     SHAPE CONSTANT, N =  3.578611
     UNIT PEAK =  0.16632    CFS   UNIT VOLUME =   0.9252       B =   326.03      P60 = 1.8400
     AREA =     0.000068 SQ MI    IA =   0.50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=4 CODE=1

                                    PARTIAL HYDROGRAPH   100.40
```

```
    RUNOFF VOLUME =     2.23987 INCHES     =       0.0406 ACRE-FEET
    PEAK DISCHARGE RATE =       0.89 CFS  AT   1.500 HOURS   BASIN AREA =  0.0003 SQ. MI.



*
*
*BASIN PR-5 (MC D'S A-1,3,4,5,6,7,R-1,O-3)
*
COMPUTE NM HYD      ID=5 HYD NO=100.5 AREA=0.00134 SQ MI
                    PER A=0.00 PER B=24.00 PER C=0.0 PER D=76.0
                    TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =   4.0207    CFS   UNIT VOLUME =   0.9966       B =   526.28      P60 = 1.8400
     AREA =     0.001018 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000


     K =  0.131520HR    TP =  0.133300HR    K/TP RATIO =  0.986645     SHAPE CONSTANT, N =  3.578611
     UNIT PEAK =  0.78658    CFS   UNIT VOLUME =   0.9845       B =   326.03      P60 = 1.8400
     AREA =     0.000322 SQ MI    IA =   0.50000 INCHES    INF =   1.25000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=5 CODE=1

                                  PARTIAL HYDROGRAPH   100.50


    RUNOFF VOLUME =     2.17062 INCHES     =       0.1551 ACRE-FEET
    PEAK DISCHARGE RATE =       3.39 CFS  AT   1.500 HOURS   BASIN AREA =  0.0013 SQ. MI.



**
*BASIN EX-6 (ALLEY)
*
COMPUTE NM HYD      ID=6 HYD NO=100.6 AREA=0.00019 SQ MI
```

```
                    PER A=0.00 PER B=0.00 PER C=5.0 PER D=95.0
                    TP=-0.1333 HR MASS RAINFALL=-1

     K =  0.072649HR    TP =  0.133300HR    K/TP RATIO =  0.545000     SHAPE CONSTANT, N =  7.106428
     UNIT PEAK =  0.71262    CFS   UNIT VOLUME =   0.9832       B =   526.28      P60 = 1.8400
     AREA =     0.000181 SQ MI    IA =   0.10000 INCHES    INF =   0.04000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000


     K =  0.105528HR    TP =  0.133300HR    K/TP RATIO =  0.791661     SHAPE CONSTANT, N =  4.530856
     UNIT PEAK =  0.27733E-01CFS   UNIT VOLUME =   0.8912       B =   389.14      P60 = 1.8400
     AREA =     0.000010 SQ MI    IA =   0.35000 INCHES    INF =   0.83000 INCHES PER HOUR
     RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD - DT =  0.050000

PRINT HYD           ID=6 CODE=1

                                    PARTIAL HYDROGRAPH   100.60


    RUNOFF VOLUME =     2.51119 INCHES     =       0.0254 ACRE-FEET
    PEAK DISCHARGE RATE =       0.54 CFS  AT   1.500 HOURS   BASIN AREA =  0.0002 SQ. MI.



**
*
*COMBINE PR-1, EX-3, AND PR-4
*
ADD HYD                         ID=50 HYD NO=100.21 ID=1 ID=3
ADD HYD                         ID=50 HYD NO=100.21 ID=50 ID=4
*
PRINT HYD           ID=50 CODE=1

                                    PARTIAL HYDROGRAPH   100.21


    RUNOFF VOLUME =     1.45481 INCHES     =       0.7635 ACRE-FEET
    PEAK DISCHARGE RATE =      21.48 CFS  AT   1.500 HOURS   BASIN AREA =  0.0098 SQ. MI.
```

```
**
*ROUTE BASINS PR-1, EX-3, AND PR-4 THROUGH PROPOSED DETENTION POND
ROUTE RESERVOIR     ID=55 HYD NO=200.1 INFLOW ID=50 CODE=24
                        OUTFLOW (CFS) STORAGE(AC-FT) ELEVATION(FT)
                               0.0000         0.1244              20.00
                               1.8200         0.1741              20.50
                               6.1700         0.2280              21.00
                               10.780         0.2858              21.50
                               13.270         0.3391              21.93
                               16.750         0.3652              22.13
                               19.320         0.3785              22.23
                               25.570         0.4057              22.43

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

    TIME      INFLOW    ELEV      VOLUME    OUTFLOW
    (HRS)     (CFS)     (FEET)    (AC-FT)   (CFS)

     0.00       0.00     20.00      0.124      0.00
     1.20       1.39     20.15      0.139      0.53
     2.40       0.73     20.43      0.167      1.57
     3.60       0.07     20.04      0.128      0.15
     4.80       0.06     20.02      0.126      0.06
     6.00       0.07     20.02      0.126      0.07
     7.20       0.07     20.02      0.126      0.07
     8.40       0.06     20.02      0.126      0.06
     9.60       0.06     20.02      0.126      0.06
    10.80       0.05     20.02      0.126      0.06
    12.00       0.05     20.01      0.126      0.05
    13.20       0.04     20.01      0.126      0.05
    14.40       0.04     20.01      0.126      0.04
    15.60       0.04     20.01      0.125      0.04
    16.80       0.03     20.01      0.125      0.03
    18.00       0.03     20.01      0.125      0.03
    19.20       0.02     20.01      0.125      0.02
    20.40       0.02     20.00      0.125      0.02
    21.60       0.01     20.00      0.125      0.01
    22.80       0.00     20.00      0.125      0.01
    24.00       0.00     20.00      0.124      0.00
```

```
 PEAK DISCHARGE =       14.398 CFS - PEAK OCCURS AT HOUR    1.65
 MAXIMUM WATER SURFACE ELEVATION =       21.995   <22.92 OK
 MAXIMUM STORAGE =        0.3476 AC-FT      INCREMENTAL TIME=    0.050000HRS

*
*
PRINT HYD           ID=55  CODE=1

                                  PARTIAL HYDROGRAPH   200.10


    RUNOFF VOLUME =     1.45481 INCHES     =       0.7635 ACRE-FEET
    PEAK DISCHARGE RATE =      14.40 CFS  AT   1.650 HOURS   BASIN AREA =  0.0098 SQ. MI.



*
*
*COMBINE POND OUTFLOW WITH PR-2 FOR TOTAL AT AP#1
*
ADD HYD                         ID=58 HYD NO=100.22 ID=2 ID=55
*
PRINT HYD           ID=58 CODE=1

                                  PARTIAL HYDROGRAPH   100.22


    RUNOFF VOLUME =     1.52854 INCHES     =       0.8788 ACRE-FEET
    PEAK DISCHARGE RATE =      15.89 CFS  AT   1.650 HOURS   BASIN AREA =  0.0108 SQ. MI.



*
*COMBINE ALLEY FLOWS AP#1 WITH EX-5 AND EX-6 FOR TOTAL AT AP#2
*
ADD HYD                         ID=59 HYD NO=100.23 ID=5 ID=58
ADD HYD                         ID=59 HYD NO=100.23 ID=6 ID=59
*
PRINT HYD           ID=59 CODE=1
```

RUNOFF VOLUME = 1.61335 INCHES = 1.0592 ACRE-FEET
PEAK DISCHARGE RATE = 18.90 CFS AT 1.600 HOURS BASIN AREA = 0.0123 SQ. MI.

*
FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 13:53:14

APPENDIX B

HYDRAULICS

Worksheet for Broad Crested Weir - Existing Pond

Project Description

Solve For	Discharge

Input Data

Headwater Elevation		5421.00	ft
Crest Elevation		5420.50	ft
Tailwater Elevation		5420.00	ft
Crest Surface Type	Gravel		
Crest Breadth		5.00	ft
Crest Length		30.00	ft

Results

Discharge	28.57	ft^3/s
Headwater Height Above Crest	0.50	ft
Tailwater Height Above Crest	-0.50	ft
Weir Coefficient	2.69	US
Submergence Factor	1.00	
Adjusted Weir Coefficient	2.69	US
Flow Area	15.00	ft^2
Velocity	1.90	ft/s
Wetted Perimeter	31.00	ft
Top Width	30.00	ft

Culvert Calculator Report
Developed Pond Outflow 1

Solve For: Discharge

Culvert Summary					
Allowable HW Elevation	22.93	ft	Headwater Depth/Height	2.93	
Computed Headwater Elev	22.93	ft	Discharge	17.77	cfs
Inlet Control HW Elev.	22.93	ft	Tailwater Elevation	19.90	ft
Outlet Control HW Elev.	22.61	ft	Control Type	Inlet Control	

Grades					
Upstream Invert	20.00	ft	Downstream Invert	19.90	ft
Length	17.00	ft	Constructed Slope	0.005882	ft/ft

Hydraulic Profile					
Profile	CompositeM2PressureProfile		Depth, Downstream	0.95	ft
Slope Type	Mild		Normal Depth	N/A	ft
Flow Regime	Subcritical		Critical Depth	0.95	ft
Velocity Downstream	7.67	ft/s	Critical Slope	0.020420	ft/ft

Section					
Section Shape	Circular		Mannings Coefficient	0.012	
Section Material	HDPE (Smooth Interior)		Span	1.00	ft
Section Size	12 inch		Rise	1.00	ft
Number Sections	3				

Outlet Control Properties					
Outlet Control HW Elev.	22.61	ft	Upstream Velocity Head	0.88	ft
Ke	0.50		Entrance Loss	0.44	ft

Inlet Control Properties					
Inlet Control HW Elev.	22.93	ft	Flow Control	Submerged	
Inlet Type	Square edge w/headwall		Area Full	2.4	ft²
K	0.00980		HDS 5 Chart	1	
M	2.00000		HDS 5 Scale	1	
C	0.03980		Equation Form	1	
Y	0.67000				

Rating Table Report
Developed Pond Outflow 1

Range Data:			
	Minimum	Maximum	Increment
Allowable HW E	20.00	21.50	0.50 ft

HW Elev. (ft)	Discharge (cfs)
20.00	0.00
20.50	1.82
21.00	6.17
21.50	10.78

Rating Table Report
Developed Pond Outflow 1

Range Data:			
	Minimum	Maximum	Increment
Allowable HW E	21.93	22.93	0.10 ft

HW Elev. (ft)	Discharge (cfs)
21.93	13.27
22.03	13.79
22.13	14.29
22.23	14.77
22.33	15.23
22.43	15.68
22.53	16.12
22.63	16.55
22.73	16.96
22.83	17.37
22.93	17.77

APPENDIX C

POND VOLUME CALCULATIONS

POND VOLUME CALCULATIONS

PRE-DEVELOPED POND VOLUME CALCULATION AND STAGE-DISCHARGE					
ELEVATION (ft)	AREA (sf)	VOLUME (cf)	CUMULATIVE VOLUME (cf)	CUMULATIVE VOLUME (ac-ft)	Q out
5419.0	1575	0	0		0
5420.0	3106	2341	2341	0.0537	0
5420.5	3462	1642	3983	0.0914	0
5421.0	4411	1968	5951	0.1366	28.57 *

*SEE WEIR CALCULATION, FLOWMASTER WORKSHEET

POST-DEVELOPMENT VOLUME CALCULATION (WATER QUALITY VOLUME PROVIDED)				
ELEVATION (ft)	AREA (sf)	VOLUME (cf)	CUMULATIVE VOLUME (cf)	
5418.5	3081	0	0	
5419.5	3790	3436	**3436**	Volume Provided>Volume Required=2557 CF, **OK**

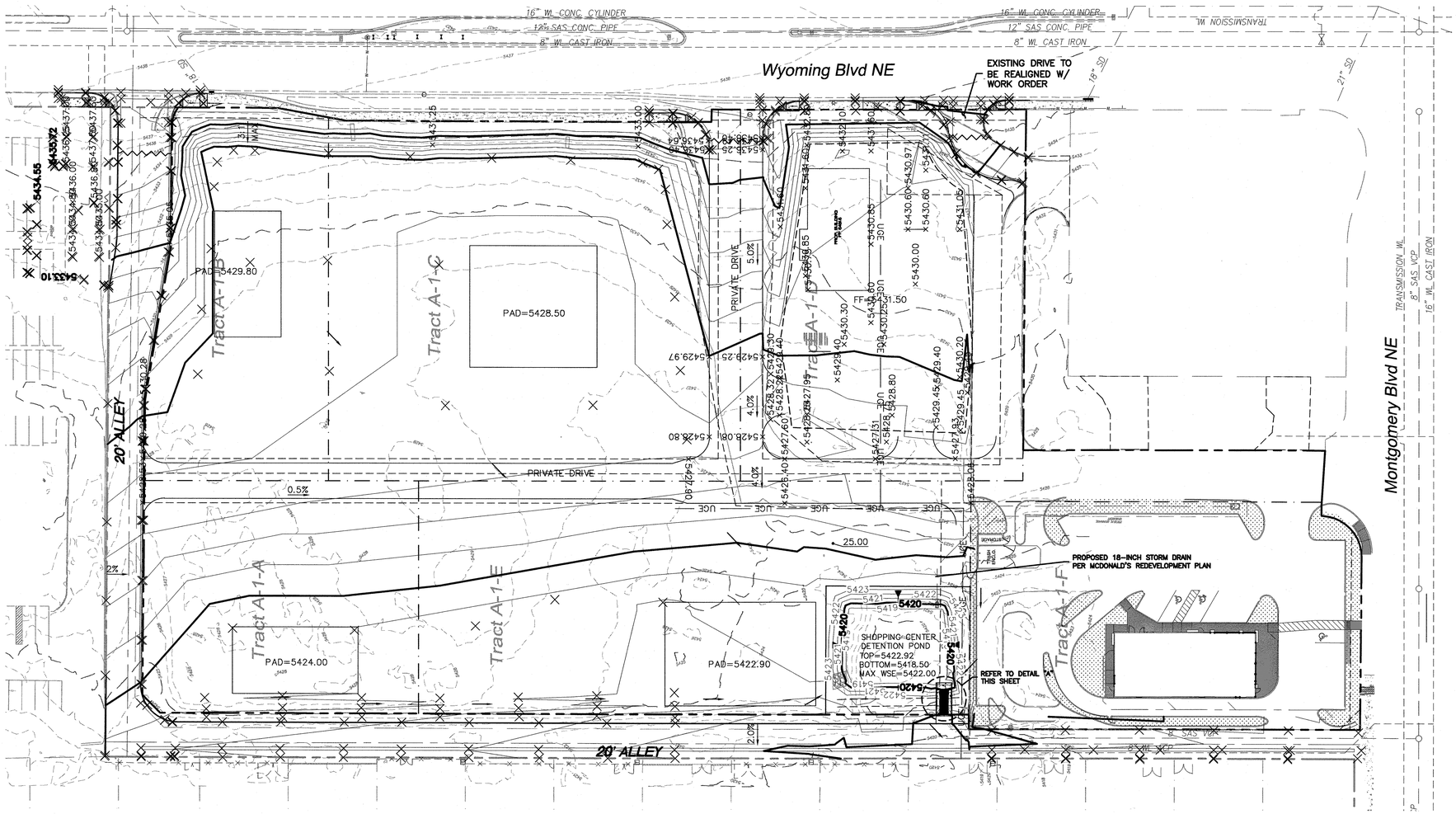
POST-DEVELOPMENT POND VOLUME CALCULATION				
ELEVATION (ft)	AREA (sf)	VOLUME (cf)	CUMULATIVE VOLUME (cf)	CUMULATIVE VOLUME (ac-ft)
5418.50	3081			
5419.50	3790	3436	3436	
5420.00	4138	1982	5418	0.1244
5420.50	4520	2165	7582	0.1741
5421.00	4871	2348	9930	0.2280
5421.50	5216	2522	12452	0.2858
5421.93	5581	2321	14773	0.3391
5422.13	5755	1134	15906	0.3652
5422.23	5843	580	16486	0.3785
5422.43	6020	1186	17673	0.4057
5422.93	6475	3124	20796	0.4774

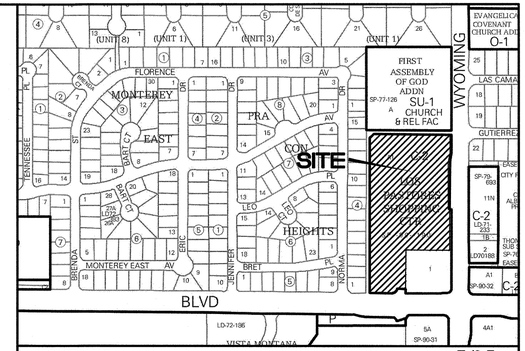
STAGE-DISCHARGE CALCULATIONS

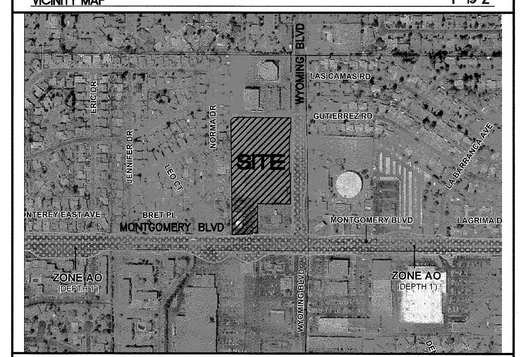
STAGE, VOLUME, DISCHARGE

Culvert Inv: 5420.00
Weir Crest: 5421.93

WATER ELEV.	VOLUME (AC-FT)	Q culvert (CFS)	Q weir (CFS)	Q_{TOTAL} (CFS)
5418.50	0.0000			
5419.50	0.0000			
5420.00	0.1244	0.00	0.00	0.00
5420.50	0.1741	1.82	0.00	1.82
5421.00	0.2280	6.17	0.00	6.17
5421.50	0.2858	10.78	0.00	10.78
5421.93	0.3391	13.27	0.00	13.27
5422.13	0.3652	14.29	2.46	16.75
5422.23	0.3785	14.77	4.55	19.32
5422.43	0.4057	15.68	9.89	25.57
5422.93	0.4774	17.77	28.5	46.27







LEGEND

- CURB & GUTTER
- BOUNDARY LINE
- EASEMENT
- SIDEWALK
- EXISTING CURB & GUTTER
- SINGLE CLEAN OUT
- DOUBLE CLEAN OUT
- EXISTING SD MANHOLE
- EXISTING SAS MANHOLE
- EXISTING FIRE HYDRANT
- EXISTING WATER METER
- EXISTING POWER POLE
- EXISTING GAS VALVE
- U — EXISTING OVERHEAD UTILITIES
- G — EXISTING GAS
- EX. 8" SAS — EXISTING SANITARY SEWER LINE
- EX. WL — EXISTING WATER LINE
- EX. RCP — EXISTING STORM SEWER LINE
- 4900 — EXISTING INDEX CONTOUR
- EXISTING CONTOUR

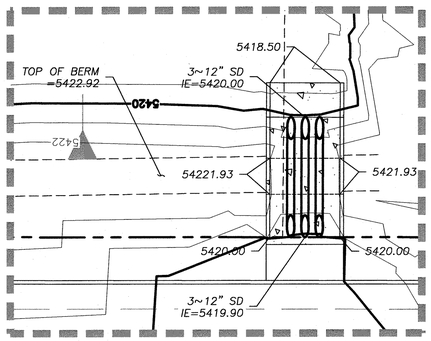
NOTE:

PLAN DEPICTS AS-BUILT CONDITIONS FOR POND ALREADY CONSTRUCTED. NO NEW POND CONSTRUCTION OR MODIFICATIONS ARE PROPOSED.

STORMWATER QUALITY NOTES:

POND IS DESIGNED TO SERVE DRAINAGE BASIN AREAS PR-1, EX-3, AND PR-4

WATER QUALITY VOL REQUIRED: 2557 CF
PROVIDED: 3436 CF



DETAIL "A"
SC:1"=10'

GRAPHIC SCALE
40 0 20 40
(IN FEET)
1 inch = 40 ft.

CAUTION:

ALL EXISTING UTILITIES SHOWN WERE OBTAINED FROM RESEARCH, AS-BUILTS, SURVEYS OR INFORMATION PROVIDED BY OTHERS. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT ALL NECESSARY FIELD INVESTIGATIONS PRIOR TO AND INCLUDING ANY EXCAVATION, TO DETERMINE THE ACTUAL LOCATION OF UTILITIES AND OTHER IMPROVEMENTS, PRIOR TO STARTING THE WORK. ANY CHANGES FROM THIS PLAN SHALL BE COORDINATED WITH AND APPROVED BY THE ENGINEER.

ENGINEER'S SEAL

RONALD R. BOHANNAN NEW MEXICO 7868 REGISTERED PROFESSIONAL ENGINEER

RONALD R. BOHANNAN
P.E. #7868

LOS PASTORES SHOPPING CENTER

GRADING + DRAINAGE PLAN WITH MCDONALDS EXHIBIT

TIERRA WEST, LLC
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