# DRAINAGE REPORT
# FOR
# 16-ACRE SITE - 4400 BROADWAY SE
# BERNALILLO COUNTY, NM

BOHANNAN HUSTON

Courtyard One

7500 JEFFERSON NE

Albuquerque

NEW MEXICO 87109

voice 505.823.1000

fax 505.821.0892

**January 23, 2001**

**PREPARED FOR:**

**INSURANCE AUTO AUCTIONS, INC.**
**c/o AARON CONSTRUCTION**
**7360 WEST 161st STREET**
**STILWELL, KS 66085**

# DRAINAGE REPORT
# FOR
# 16-ACRE SITE - 4400 BROADWAY SE
# BERNALILLO COUNTY, NM

January 23, 2001

Prepared for:

INSURANCE AUTO AUCTIONS, INC.
c/o AARON CONSTRUCTION
7360 WEST 161st STREET
STILWELL, KS 66085

Prepared by:

BOHANNAN HUSTON, INC.
COURTYARD I
7500 JEFFERSON NE
ALBUQUERQUE, NEW MEXICO 87109

JAMES R. TOPMILLER
NEW MEXICO
9354
REGISTERED PROFESSIONAL ENGINEER

PREPARED BY:

Colleen M. Ruiz, E.I. [Date] 1-23-01

UNDER THE SUPERVISION OF:

James R. Topmiller, P.E. [Date] 01/23/01

P:\01297\cdp\reports\01297-drainage rpt.doc

# TABLE OF CONTENTS



## APPENDICES



## PLATES

# I. INTRODUCTION

Insurance Auto Auctions proposes a new auto parts site at 4400 Broadway SE, on approximately 16 acres (currently called Jack's Auto Parts). With change of ownership, the existing auto parts store will undergo minor grading and drainage changes. The changes that will affect drainage include the following:

1. Move ramp road (ramps) from the middle of the site to the northern boundary.
2. Move grouted riprap emergency spillways from the middle of the site to the southern border of Basins A, B, C, and D.
3. Grade a detention pond at the southeast corner of the property that will ensure capacities for both onsite and offsite structures both upstream and downstream of the property

Existing spillways and ponds will also be analyzed for capacity. This report is in compliance with the Bernalillo County standards.

Detailed drainage and grading plans are included in the Plates section of this report.

This site is located on the southeast corner of Broadway Blvd. and Prosperity Ave. east of the South Diversion Channel and West of Sandia Railroad. Please refer to the Location Map enclosed in the Appendices for the specific location.

This report outlines the study methodologies used and summarizes the existing and proposed drainage conditions. Calculations and supporting data are presented in the Appendices. The ALTA, drainage basin map, and a grading plan are included in the pockets of the Plates section at the end of the report.

**The purpose of this report is to obtain approval for the grading plan and associated drainage and site infrastructure of the Insurance Auto Auctions site.**

## II. STUDY METHODOLOGIES

The County of Bernalillo standards for drainage analyses have been incorporated by this report. This drainage report contains all applicable calculations per section 22.2 of the Development Process Manual for deriving the following values using the rational method analysis:

| LAND TREATMENT | PEAK DISCHARGE (CFS/ACRE) | EXCESS PRECIPITATION (INCHES) |
|---|---|---|
| A | 1.56 | 0.53 |
| B | 2.28 | 0.78 |
| C | 3.14 | 1.13 |
| D | 4.70 | 2.12 |

ZONE 2

Flow rate references in this report are 6-hour, 100-year storm event values.

Ponds were designed using Section 22.2 and 22.2.B.2 including Tables A-9, A-8, Figure A-3 from the DPM.

## III. EXISTING CONDITIONS

This site was previously graded for use as an auto parts site. Because the county did not approve the original grading, the site's current developed condition is largely ignored from a hydrologic analysis standpoint and existing conditions are analyzed as 100% type 'A' land treatment for the site. Both of the existing inlet and outlet structures are analyzed in this report. Flows off the site shall remain equal to or less than the calculated existing flows.

## A. Onsite Drainage Basins

The site consists of four retention ponds in series with overflow spillways at elevations greater than the 100 year storm event depth. The lowest pond currently drains into an existing swale along Broadway and into 2-30" RCP's that direct flows west, under Broadway towards the South Diversion Channel. There is also currently a portion of land (5.21 acres) along the south edge of the property that sheet flows in the westerly direction at about 2.5% slope. These flows pass through a detention pond with an orifice to the existing 30" RCP's at Broadway also.

Plate 3 is a Basins Map exhibit that shows both existing and Proposed Conditions for the Insurance Auto Auction's site.

## B. Offsite Drainage Basin

There is one offsite basin that affects the Insurance Auto Auctions site. It is comprised of approximately 92 acres of undeveloped land. (see Basin Map for exact location.) AHYMO was used to calculate flows from this basin. The dimensions of the basin are approximately 2200' long, 200' wide, 1' deep and a 2.5% grade. AHYMO calculated approximately 116 cfs will reach the proposed site from the offsite basin during the 100 year storm. The existing culverts (2 - 42" CMP's and 1 - 72" CMP) and the existing riprap spillway were then analyzed for capacity. See Appendix 2 for calculations. Both the existing culverts' and spillway's capacities exceeded the existing flows calculated for the Offsite Basin.

## IV. PROPOSED DEVELOPED CONDITIONS

Please refer to the Grading Plan, Basins Map, and ALTA in Plate's pockets at the end of this report for a graphical depiction of the proposed conditions. The Basins Map identifies the individual basins and their respective flow rates resulting from the 6-hour, 100-year storm event. The Grading Plan identifies the extent of construction to be included with the subdivision. The drainage plan is summarized in the following two sections.

## V. SITE DEVELOPMENT

### A. Onsite Drainage Basins

For the purpose of analysis, the Insurance Auto Auction site is subdivided into sub-basins, as shown on the Basin Map (Appendix 2).

Basins A, B, C, and D are an existing series of retention ponds with volume capacities that currently exceed the 100 yr storm (see Appendix 1 & the Basin Map for calculations and locations). Basin E also receives flows from the Offsite Basin and transports the flows at a 2.5% grade to a small detention pond at the east end of the site. This pond also accepts flows in excess of the 100 yr. Strom from Basin A via an emergency spillway. This pond has been designed with the plan to restrict flow to 59 cfs (the capacity for the 2 existing 30" culverts-see Appendix 1).

The flows collected in the pond exit the site via 2 existing 30" RCP culverts that cross Broadway and direct the flows toward the South Diversion Channel.

### B. Offsite Drainage Basin

As stated above the pond in the southwest corner of the property will be designed to detain the offsite flows as calculated in this report.

## VI. CONCLUSION

This report requests approval for the grading/drainage plans herein and building permit. The drainage management plan presented in this report provides a workable solution to the drainage issues created by the development of this property.

# APPENDICES

APPENDIX 1 - HYDROLOGY/FLOWRATE CALCULATIONS (EXISTING AND PROPOSED CONDITIONS)

APPENDIX 2 - EXISTING STORM DRAIN CAPACITY CALCULATIONS

APPENDIX 3 - SPILLWAY CALCULATIONS, RETENTION & DETENTION POND DESIGNS

# APPENDIX 1

HYDROLOGY/FLOWRATE CALCULATIONS
(EXISTING AND PROPOSED CONDITIONS)

## Proposed Conditions Analysis

**Peak Flow per Acre - DPM Section 22.2 Table A-9**

| Zone | A | B | C | D |
|---|---|---|---|---|
| 1 | 1.29 | 2.03 | 2.87 | 4.37 |
| 2 | 1.56 | 2.28 | 3.14 | 4.7 |
| 3 | 1.87 | 2.6 | 3.45 | 5.02 |
| 4 | 2.2 | 2.92 | 3.73 | 5.25 |

Zone 2 (between Rio Grande and San Mateo)

# *Tract J*

***Proposed Conditions Basin Data Table***

**This table is based on the DPM Section 22.2, Zone: 2**

| BASIN | Area (SQ. FT) | Area (AC.) | Land Treatment Percentages A | B | C | D | Q(100) (cfs/ac.) | Q(100) (CFS) |
|---|---|---|---|---|---|---|---|---|
| A | 109335.6 | 2.51 | 0.0% | 0.0% | 100.0% | 0.0% | 3.14 | *7.88* |
| B | 79714.8 | 1.83 | 0.0% | 0.0% | 100.0% | 0.0% | 3.14 | *5.75* |
| C | 97319.29 | 2.72 | 0.0% | 0.0% | 100.0% | 0.0% | 3.14 | *8.54* |
| D | 89125.65 | 1.92 | 0.0% | 0.0% | 100.0% | 0.0% | 3.14 | *6.03* |
| E | 103565.4 | 5.21 | 0.0% | 0.0% | 100.0% | 0.0% | 3.14 | *16.36* |
| OFF-SITE* | 66608.4 | 92.00 | 100.0% | 0.0% | 0.0% | 0.0% | 1.26 | *116.80* |

* CALCULATED W/ AHYMO SEE APPENDIX 1.

INSURANCE AUTO AUCTIONS OFFSITE BASIN ANALYSIS

AHYMO SUMMARY TABLE (AHYMO194) - AMAFCA Hydrologic Model
RUN DATE (MON/DAY/YR) =01/19/2001
INPUT FILE = Offsite-Input.doc

USER NO.= BOHN_HNM.STE



| 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= .00 |
| RAINFALL TYPE= 1 | | | | | | | | | | RAIN6= 2.500 |
| COMPUTE NM HYD | OFFSITE | | - 1 | .14420 | 116.18 | 4.540 | .59035 | 1.600 | 1.259 | PER IMP= .00 |
| FINISH | | | | | | | | | | |

A1-2

```
*
*INSURANCE AUTO AUCTIONS INC.:CONTRIBUTING BASINS
START                 RAINFALL BEGINS AT 0.00 HOURS
*                       100 YEAR RETURN PERIOD
*******************************************************************************
*
*
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
::::::::::::::::::::::::::::
*       ::                          MISC. DATA
       ::
*       ::        RAINFALL RETURN PERIOD_____________  100-YEAR   ::
*       ::        RAINFALL DURATION__________________  6-HOUR           ::
*       ::    ZONE 3                                                ::
*       ::        RAINFALL DEPTHS: 1 HOUR (P60)___  2.05 INCHES          ::
*       ::        (UNADJUSTED)      6 HOUR (P360)__  2.50 INCHES          ::
*       ::                         24 HOUR (P1440)_  2.90 INCHES          ::
*       ::                                                                ::
*       ::        RAINFALL DATA TAKEN FROM NOAA.                          ::
*       ::                                                                ::
*       ::                HYDROGRAPH METHODOLOGY                          ::
*       ::                                                                ::
*       ::        CITY OF ALBQ. DPM VOL. 2, SECTION 22.2 July, 1997       ::
*       ::        INITIAL ABSTRACTION - INFILTRATION METHOD               ::
*       ::        Tc CALCULATIONS PER C.O.A. DPM 22.2-B.4                 ::
*       ::        AMAFCA AHYMO VERSION MARCH 20,1992                      ::
*       ::                                                                ::
*
:::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
:::::::::::::::::::::::::::
*                           BEGIN  ANALYSIS
*******************************************************************************
*
RAINFALL              TYPE=1 RAIN QUARTER=0.0 RAIN ONE=2.05
                      RAIN SIX=2.5 RAIN DAY=2.9 DT=0.05
*
**** COMPUTE AND PRINT NM HYD DATA FOR BASIN E-4 *********
COMPUTE NM HYD        ID=1 HYD=E-4  AREA=0.1442 PER A=1.0 PER B=0
                  PER C=0 PER D=0 TP=0.2  RAINFALL=-1
PRINT HYD        ID=1   CODE=1
*
**** COMPUTE RATING CURVE AND TRAVEL TIME FOR HYDROGRAPH UD3B ****
COMPUTE RATING CURVE  CID=1  VS NO=1  NO SEGS=1
                      MIN ELEV=0 FT  MAX ELEV=55 FT
                      CH SLP=0.025 FP SLP=0.025  N=0.05 DIST=2200 FT
                      DIST  ELEV  DIST   ELEV  DIST    ELEV
                      0     1     100     0     200     1
COMPUTE TRAVEL TIME   ID=2  REACH NO=1  NO VS=1  L=2200 FT
                      SLP=.025
*******************************************************************************
PRINT HYD              ID=50      CODE=1
FINISH
```

# APPENDIX 2

## EXISTING STORM DRAIN CAPACITY CALCULATIONS

Customize

ANALYSIS OF OFFSITE EXISTING CMP'S
(2-42" & 1-72"; $Q_{100}$ = 116.8 CFS)

**Customize for your exact pipe size, manning's n and slope . . .**

Mannings n Analysis of full pipe flow:

Manning's Eqn: Q = 1.49/n x AR^2/3 x S^1/2

| | | |
|---|---|---|
| Pipe Dia | 42 inches | |
| A | 9.6211 | sq. ft |
| WP | 10.9956 | ft. |
| R | 0.875 | ft. |
| Slope | 0.5000% | ← UNKNOWN → MIN SLOPE |
| n | 0.013 | |

Q= 71.333
V= 7.41

**Note: do not modify these cells**

**Customize for your exact pipe size, manning's n and slope . . .**

Analysis of water entrance into end of pipe by orifice equation

Orrifice Eqn: Q = .62*A*(2gH)^.5

| | | |
|---|---|---|
| Head | 4.25 | feet -- to middle of pipe |
| A | 9.6211 | sq. ft |

Q= 98.686

**Note: do not modify these cells**



A2-1

Customize

ANALYSIS OF OFFSITE EXISTING CMPS (2-42" & 1-72"); Q100 = 116.8 CFS

**Customize for your exact pipe size, manning's n and slope . . .**

Mannings n Analysis of full pipe flow:

Manning's Eqn: Q = 1.49/n x AR^2/3 x S^1/2

| | | |
|---|---|---|
| Pipe Dia | 72 inches | |
| A | 28.2743 | sq. ft |
| WP | 18.8496 | ft. |
| R | 1.5 | ft. |
| Slope | 0.5000% | ← UNKNOWN ⇒ MIN. SLOPE |
| n | 0.013 | |

**Q=** 300.272
**V=** 10.62

**Note: do not modify these cells**

**Customize for your exact pipe size, manning's n and slope . . .**

Analysis of water entrance into end of pipe by orifice equation

Orrifice Eqn: Q = .62*A*(2gH)^.5

| | | |
|---|---|---|
| Head | 4.25 | feet -- to middle of pipe |
| A | 28.2743 | sq. ft |

**Q=** 290.016

**Note: do not modify these cells**

CAPACITY = 300.272CFS + 2(98.686 CFS)
CHECK = 497.64 CFS > 116.80 CFS

√ EXISTING SD'S ARE ADEQUATE FOR OFFSITE BASIN.



A2-2

Customize

DESIGN MAX. QOUT FOR BASIN E DETENTION POND. - 2 EXISTING 30" RCP'S

**Customize for your exact pipe size, manning's n and slope . . .**

Mannings n Analysis of full pipe flow:

Manning's Eqn: Q = 1.49/n x AR^2/3 x S^1/2

| | | |
|---|---|---|
| Pipe Dia | 30 | inches |
| A | 4.9087 | sq. ft |
| WP | 7.8540 | ft. |
| R | 0.625 | ft. |
| Slope | 0.5000% | |
| n | 0.013 | |

- UNKNOWN ∴ MIN. SLOPE

Q= 29.082
V= 5.92

Note: do not modify these cells.

**Customize for your exact pipe size, manning's n and slope . . .**

Analysis of water entrance into end of pipe by orifice equation

Orrifice Eqn: Q = .62*A*(2gH)^.5

| | | |
|---|---|---|
| Head | 4.25 | feet -- to middle of pipe |
| A | 4.9087 | sq. ft |

Q= 50.350

Note: do not modify these cells.

2 PIPES (29.082 CFS) = 58.16 CFS ALLOWABLE



A2-3/3

# APPENDIX 3

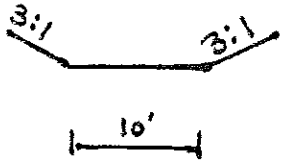
SPILLWAY CALCULATIONS, RETENTION &
DETENTION POND DESIGNS

Insurance Auto Auctions Inc.
Grouted Riprap Spillways Analysis – BETWEEN DETENTION PONDS

MANNING'S N= .04 SLOPE= .3

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 1.00 | 3 | 13.00 | 0.00 | | | |
| 2 | 3.00 | 0.00 | 4 | 16.00 | 1.00 | | | |

| WSEL (FT) | DEPTH INC (FT) | FLOW AREA SQ.FT. | FLOW RATE (CFS) | WETTED PER (FT) | FLOW VEL (FPS) | TOPWID (FT) | VEL HEAD (FT) | ENERGY HEAD (FT) |
|---|---|---|---|---|---|---|---|---|
| 0.10 | 0.10 | 1.03 | 4.4 | 10.63 | 4.29 | 10.60 | 0.29 | 0.39 |
| 0.20 | 0.20 | 2.12 | 14.2 | 11.26 | 6.68 | 11.20 | 0.69 | 0.89 |
| 0.30 | 0.30 | 3.27 | 28.1 | 11.90 | 8.60 | 11.80 | 1.15 | 1.45 |
| 0.40 | 0.40 | 4.48 | 45.9 | 12.53 | 10.25 | 12.40 | 1.63 | 2.03 |
| 0.50 | 0.50 | 5.75 | 67.4 | 13.16 | 11.72 | 13.00 | 2.13 | 2.63 |
| 0.60 | 0.60 | 7.08 | 92.3 | 13.79 | 13.04 | 13.60 | 2.64 | 3.24 |
| 0.70 | 0.70 | 8.47 | 120.8 | 14.43 | 14.27 | 14.20 | 3.16 | 3.86 |
| 0.80 | 0.80 | 9.92 | 152.8 | 15.06 | 15.40 | 14.80 | 3.68 | 4.48 |
| 0.90 | 0.90 | 11.43 | 188.3 | 15.69 | 16.47 | 15.40 | 4.21 | 5.11 |
| 1.00 | 1.00 | 13.00 | 227.3 | 16.32 | 17.48 | 16.00 | 4.75 | 5.75 |




1.0'

$Q_{CAP}$ = 45.9 CFS

45.9 CFS > 7.88 (BASIN A) ✓ OK.
5.75 (BASIN B)
8.54 (BASIN C)
6.03 (BASIN D)

OFFSITE BASIN
SPILLWAY TO BASIN E (EAST SIDE OF BASIN E)
EXISTING RIP RAP SPILLWAY
Q100 OFFSITE = 116 CFS (FROM AHYMO)

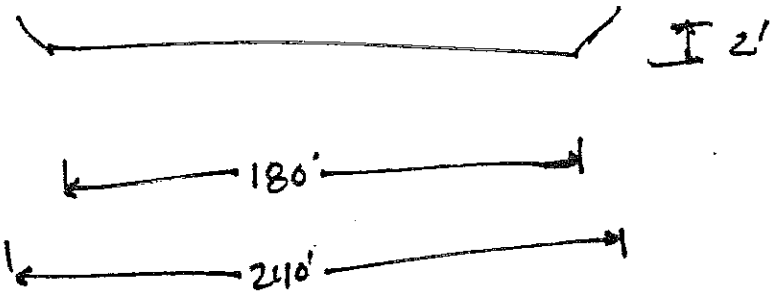
MANNING'S N= .03 SLOPE= .025

| POINT | DIST | ELEV | POINT | DIST | ELEV | POINT | DIST | ELEV |
|---|---|---|---|---|---|---|---|---|
| 1 | 0.00 | 2.00 | 3 | 210.00 | 0.00 | | | |
| 2 | 30.00 | 0.00 | 4 | 280.00 | 2.00 | | | |

| WSEL (FT) | DEPTH INC (FT) | FLOW AREA SQ.FT. | FLOW RATE (CFS) | WETTED PER (FT) | FLOW VEL (FPS) | TOPWID (FT) | VEL HEAD (FT) | ENERGY HEAD (FT) | |
|---|---|---|---|---|---|---|---|---|---|
| 0.10 | 0.10 | 18.25 | 30.5 | 185.00 | 1.67 | 185.00 | 0.04 | 0.14 | |
| 0.20 | 0.20 | 37.00 | 97.4 | 190.01 | 2.63 | 190.00 | 0.11 | 0.31 | OK |
| 0.30 | 0.30 | 56.25 | 192.3 | 195.01 | 3.42 | 195.00 | 0.18 | 0.48 | |
| 0.40 | 0.40 | 76.00 | 312.3 | 200.02 | 4.11 | 200.00 | 0.26 | 0.66 | |
| 0.50 | 0.50 | 96.25 | 455.3 | 205.02 | 4.73 | 205.00 | 0.35 | 0.85 | |
| 0.60 | 0.60 | 117.00 | 620.4 | 210.03 | 5.30 | 210.00 | 0.44 | 1.04 | |
| 0.70 | 0.70 | 138.25 | 806.6 | 215.03 | 5.83 | 215.00 | 0.53 | 1.23 | |
| 0.80 | 0.80 | 160.00 | 1013.3 | 220.04 | 6.33 | 220.00 | 0.62 | 1.42 | |
| 0.90 | 0.90 | 182.25 | 1240.1 | 225.04 | 6.80 | 225.00 | 0.72 | 1.62 | |
| 1.00 | 1.00 | 205.00 | 1486.8 | 230.05 | 7.25 | 230.00 | 0.82 | 1.82 | |
| 1.10 | 1.10 | 228.25 | 1753.0 | 235.05 | 7.68 | 235.00 | 0.92 | 2.02 | |
| 1.20 | 1.20 | 252.00 | 2038.6 | 240.06 | 8.09 | 240.00 | 1.02 | 2.22 | |
| 1.30 | 1.30 | 276.25 | 2343.4 | 245.06 | 8.48 | 245.00 | 1.12 | 2.42 | |
| 1.40 | 1.40 | 301.00 | 2667.5 | 250.07 | 8.86 | 250.00 | 1.22 | 2.62 | |
| 1.50 | 1.50 | 326.25 | 3010.8 | 255.07 | 9.23 | 255.00 | 1.32 | 2.82 | |
| 1.60 | 1.60 | 352.00 | 3373.2 | 260.08 | 9.58 | 260.00 | 1.43 | 3.03 | |
| 1.70 | 1.70 | 378.25 | 3754.7 | 265.08 | 9.93 | 265.00 | 1.53 | 3.23 | |
| 1.80 | 1.80 | 405.00 | 4155.5 | 270.09 | 10.26 | 270.00 | 1.63 | 3.43 | |
| 1.90 | 1.90 | 432.25 | 4575.5 | 275.09 | 10.59 | 275.00 | 1.74 | 3.64 | |
| 2.00 | 2.00 | 460.00 | 5014.9 | 280.10 | 10.90 | 280.00 | 1.85 | 3.85 | |

CAPACITY = 5014.9 CFS > 116 CFS
✓ OK

EXISTING SPILLWAY DIMENSIONS:



**INSURANCE AUTO AUCTIONS INC.**
**Required Detention Pond Volumes Calculations:**
1/22/2001

**For 10-day storms:**
**Section 22-15 of the DPM**

**Equations:** V(10 days) = V(360) + A(D)*(P (10days) - P (360))/12 in/ft (acre-ft)

V(360) = E (weighted) * Area /12 (acre-ft)

P(10 days) = 3.14 in.
P(360) = 2.2 in.

E for Zone 2, 100 yr, 100% C = 1.13
E for Zone 2, 100 yr, 100% A = 0.53

**Detention Pond Basin A**
Proposed Land Treatment = 100% C

V (360) = 1.13*(2.51 acres) / 12 = 0.24 acre-ft

V (10 days) = 0.24 acre-ft + 0 * (3.14-2.2)/12 = **0.24 acre-ft**

**Detention Pond Basin B**
Proposed Land Treatment = 100% C

V (360) = 1.13*(1.83 acres) / 12 = 0.18 acre-ft

V (10 days) = 0.18 acre-ft + 0 * (3.14-2.2)/12 = **0.18 acre-ft**

**Detention Pond Basin C**
Proposed Land Treatment = 100% C

V (360) = 1.13*(2.72 acres) / 12 = 0.26 acre-ft

V (10 days) = 0.26 acre-ft + 0 * (3.14-2.2)/12 = **0.26 acre-ft**

**Detention Pond Basin D**
Proposed Land Treatment = 100% C

V (360) = 1.13*(1.92 acres) / 12 = 0.18 acre-ft

V (10 days) = 0.18 acre-ft + 0 * (3.14-2.2)/12 = **0.18 acre-ft**

**See next sheet for Basin E detention pond sizing using AHYMO results.**

# Detention Pond Volume Calculations

NOTE: Blue shaded cells require user input, all other cells should not be edited.
ASSUMPTIONS:
1. Area less than 40 acres (simplified hydrograph method).
2. 100-year, 6-hour storm event

**Peak Flow per Acre - DPM Section 22.2 Table A-9**

| Zone | A | B | C | D |
|---|---|---|---|---|
| 1 | 1.29 | 2.03 | 2.87 | 4.37 |
| 2 | 1.56 | 2.28 | 3.14 | 4.7 |
| 3 | 1.87 | 2.6 | 3.45 | 5.02 |
| 4 | 2.2 | 2.92 | 3.73 | 5.25 |

Basin Name : Insurance Auto Auction Basin E / OFFSITE BASIN (6.21 + 91 ACRES = 97.21 ACRES)
Choose Zone (1 - 4) 2
Basin Area = (acres) 97.21

| Exist Conditions | | | | Proposed Conditions | | | |
|---|---|---|---|---|---|---|---|
| Treatment | Percentage | Area | Q (cfs) | Treatment | Percentage | Area | Q (cfs) |
| A | 100.0% | 97.21 | 151.65 | A | 95.0% | 92.35 | 144.07 |
| B | 0.0% | 0.00 | 0.00 | B | 0.0% | 0.00 | 0.00 |
| C | 0.0% | 0.00 | 0.00 | C | 5.0% | 4.86 | 15.26 |
| D | 0.0% | 0.00 | 0.00 | D | 0.0% | 0.00 | 0.00 |
| | | Q Peak - exist.= | 151.65 | | | Peak Q Developed= | 116.80 |

* per AHYMO results

Use my calculated exist cond. flow as the peak controlled discharge (1 = yes, or N) ?? N
If No, what is the maximum allowable discharge ? 59 (Q MAX FOR 2-30" RCP @ 0.5% (MINIMAL SLOPE))

**Excess Precipitation - DPM Section 22.2 Table A-8**

| Zone | A | B | C | D |
|---|---|---|---|---|
| 1 | 0.44 | 0.67 | 0.99 | 1.97 |
| 2 | 0.53 | 0.78 | 1.13 | 2.12 |
| 3 | 0.66 | 0.92 | 1.29 | 2.36 |
| 4 | 0.8 | 1.08 | 1.46 | 2.64 |

**Determine Developed E (avg excess precipitation for the developed basin)**

%A x E = 0.50
%B x E = 0.00
%C x E = 0.06
%D x E = 0.00
Avg E(in) = 0.56

**Determine Tb (hours)**

Tb = 0.982

**Determine Tc (Note: Tc is assumed to be 0.2 hours, this should be checked using DPM 22.2.B.2)**

Tc = 0.2

**Determine Tp and Duration of Peak (hours)**

Tp = 0.273333
Peak Duration = 0

**Compute the required retention volume using the simple hydrograph, Figure A-3 in DPM Section 22.2**

Time to Control Q (hrs) = 0.136
Time to end of Control Q (hrs)= 0.630104
Duration of Control Q (hrs)= 0.494

**Required Detention Volume (CF) = 52324** = 160' x 110' x 3' are required pond dimensions.

or 1.20 Acre-ft.

A3-4/4

# PLATES

PLATE 1 - PROPOSED GRADING PLAN

PLATE 2 - ALTA

PLATE 3 - BASINS MAP

# PLATE 1

PROPOSED GRADING PLAN

# PLATE 2

ALTA

# PLATE 3

BASINS MAP