

# CITY OF ALBUQUERQUE



March 30, 2015

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

**Re: Heritage Marketplace  
Drainage Report and Grading and Drainage Plans  
Engineer's Stamp Date 3-25-15 (H09D024)**

Dear Mr. Hernandez,

Based upon the information provided in your submittal received 3-25-15, the above referenced report is approved for Site Plan for Building Permit, Site Plan for Subdivisin, and Building Permit.

Please attach a copy of this approved plan in the construction sets when submitting for a building permit. Prior to Certificate of Occupancy release, Engineer Certification per the DPM checklist will be required.

PO Box 1293 If you have any questions, you can contact me at 924-3695.

Albuquerque

Sincerely,  
  
Rita Harmon, P.E.  
Senior Engineer, Planning Dept.  
Development Review Services

New Mexico 87103

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

Orig: Drainage file  
c.pdf: via Email: Recipient, Monica Ortiz



# City of Albuquerque

Planning Department

Development & Building Services Division

## RAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV 02/2013)

Project Title: Heritage Market Place City Drainage #: K09D026  
DRB#: 1003275 EPC#: \_\_\_\_\_ Work Order#: \_\_\_\_\_  
Legal Description: Bulk Land Plat of Tracts A, B, and C Heritage Market Place (Being a Replat of Tract 1-A-1, El Rancho Atrisco PH III)  
City Address: 1820 Unser Blvd NW Albuquerque, NM 87120

**Engineering Firm:** Tierra West, LLC Contact: Joel Hernandez  
Address: 5571 Midway Park Place NE Albuquerque, NM 87109  
Phone#: 505-858-3100 Fax#: 505-858-1118 E-mail: jdhernandez@tierrawestllc.com

**Owner:** Ted Garrett/ Garrett Development Corporation Contact: Ted Garrett  
Address: 1130 Lanes End NW Albuquerque, NM 87114  
Phone#: 505-897-8599 Fax#: \_\_\_\_\_ E-mail: ggi@swcp.com

**Architect:** GHA Architecture Development Contact: Keilah Brown  
Address: 14110 Dallas Parkway, Suite 100 Dallas, TX 75240  
Phone#: 972-239-8884 Fax#: 972-239-5054 E-mail: kbrown@GHA-Architects.com

**Surveyor:** SURV-TEK, INC. Contact: Russ Hugg  
Address: 9384 Valley View Drive NW, Suite 100 Albuquerque, NM 87114  
Phone#: 505-897-3366 Fax#: 505-897-3377 E-mail: russhugg@survtek.com

**Contractor:** \_\_\_\_\_ Contact: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone#: \_\_\_\_\_ Fax#: \_\_\_\_\_ E-mail: \_\_\_\_\_

### TYPE OF SUBMITTAL:

- ☒ DRAINAGE REPORT  
☐ DRAINAGE PLAN 1st SUBMITTAL  
☒ DRAINAGE PLAN RESUBMITTAL  
☐ CONCEPTUAL G & D PLAN  
☐ GRADING PLAN  
☐ EROSION & SEDIMENT CONTROL PLAN (ESC)  
☐ ENGINEER'S CERT (HYDROLOGY)  
☐ CLOMR/LOMR  
☐ TRAFFIC CIRCULATION LAYOUT (TCL)  
☐ ENGINEER'S CERT (TCL)  
☐ ENGINEER'S CERT (DRB SITE PLAN)  
☐ ENGINEER'S CERT (ESC)  
☐ SO-19  
☐ OTHER (SPECIFY) \_\_\_\_\_

### CHECK TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

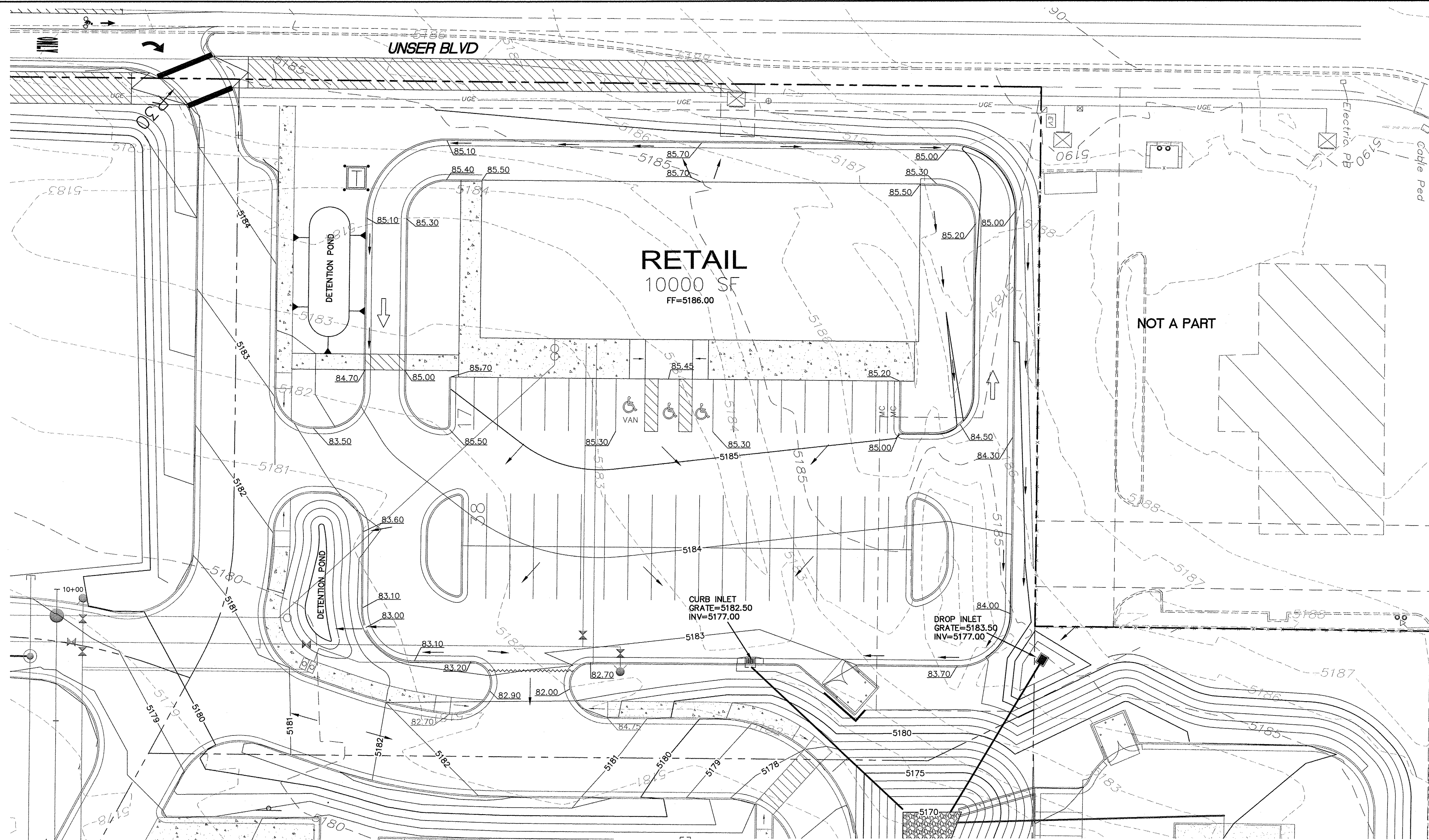
- ☐ SIA/FINANCIAL GUARANTEE RELEASE  
☐ PRELIMINARY PLAT APPROVAL  
☐ S. DEV. PLAN FOR SUB'D APPROVAL  
☒ S. DEV. FOR BLDG. PERMIT APPROVAL  
☐ SECTOR PLAN APPROVAL  
☐ FINAL PLAT APPROVAL  
☐ CERTIFICATE OF OCCUPANCY (PERM)  
☐ CERTIFICATE OF OCCUPANCY (TCL TEMP)  
☐ FOUNDATION PERMIT APPROVAL  
☒ BUILDING PERMIT APPROVAL  
☐ GRADING PERMIT APPROVAL ☐ SO-19 APPROVAL  
☐ PAVING PERMIT APPROVAL ☐ ESC PERMIT APPROVAL  
☐ WORK ORDER APPROVAL ☐ ESC CERT. ACCEPTANCE  
☐ GRADING CERTIFICATION ☐ OTHER (SPECIFY) \_\_\_\_\_

WAS A PRE-DESIGN CONFERENCE ATTENDED: \_\_\_\_\_ Yes \_\_\_\_\_ No \_\_\_\_\_ Copy Provided

DATE SUBMITTED: \_\_\_\_\_ By: \_\_\_\_\_

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

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five (5) acres and Sector Plans
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5) acres
3. **Drainage Report:** Required for subdivision containing more than ten (10) lots or constituting five (5) acres or more
4. **Erosion and Sediment Control Plan:** Required for any new development and redevelopment site with 1-acre or more of land disturbing area, including project less than 1-acre than are part of a larger common plan of development



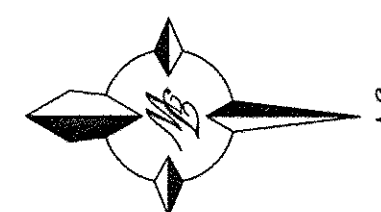
| LEGEND |                             |
|--------|-----------------------------|
|        | CURB & GUTTER               |
|        | BOUNDARY LINE               |
|        | EASEMENT                    |
|        | EXISTING CURB & GUTTER      |
|        | SINGLE CLEAN OUT            |
|        | DOUBLE CLEAN OUT            |
|        | EXISTING SD MANHOLE         |
|        | EXISTING SAS MANHOLE        |
|        | EXISTING FIRE HYDRANT       |
|        | EXISTING WATER METER        |
|        | EXISTING POWER POLE         |
|        | EXISTING GAS VALVE          |
|        | EXISTING OVERHEAD UTILITIES |
|        | EXISTING GAS                |
|        |                             |

#### EROSION CONTROL NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN-OFF ON SITE DURING CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
3. REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
4. ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL ACCEPTANCE OF ANY PROJECT.

#### NOTICE TO CONTRACTORS

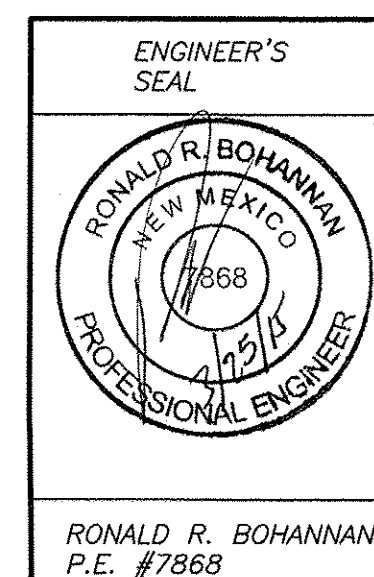
1. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE, 765-1234, FOR LOCATION OF EXISTING UTILITIES.
2. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONNECTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
3. BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC/STREET USE.
4. MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.



GRAPHIC SCALE



( IN FEET )  
1 inch = 20 ft.



HERITAGE MARKET PLACE  
ALBUQUERQUE, NM

GRADING PLAN

**TIERRA WEST, LLC**  
5571 MIDWAY PARK PL. NE  
ALBUQUERQUE, NEW MEXICO 87109  
(505) 858-3100  
www.tierrawestllc.com

DRAWN BY  
pm

DATE  
2-17-15

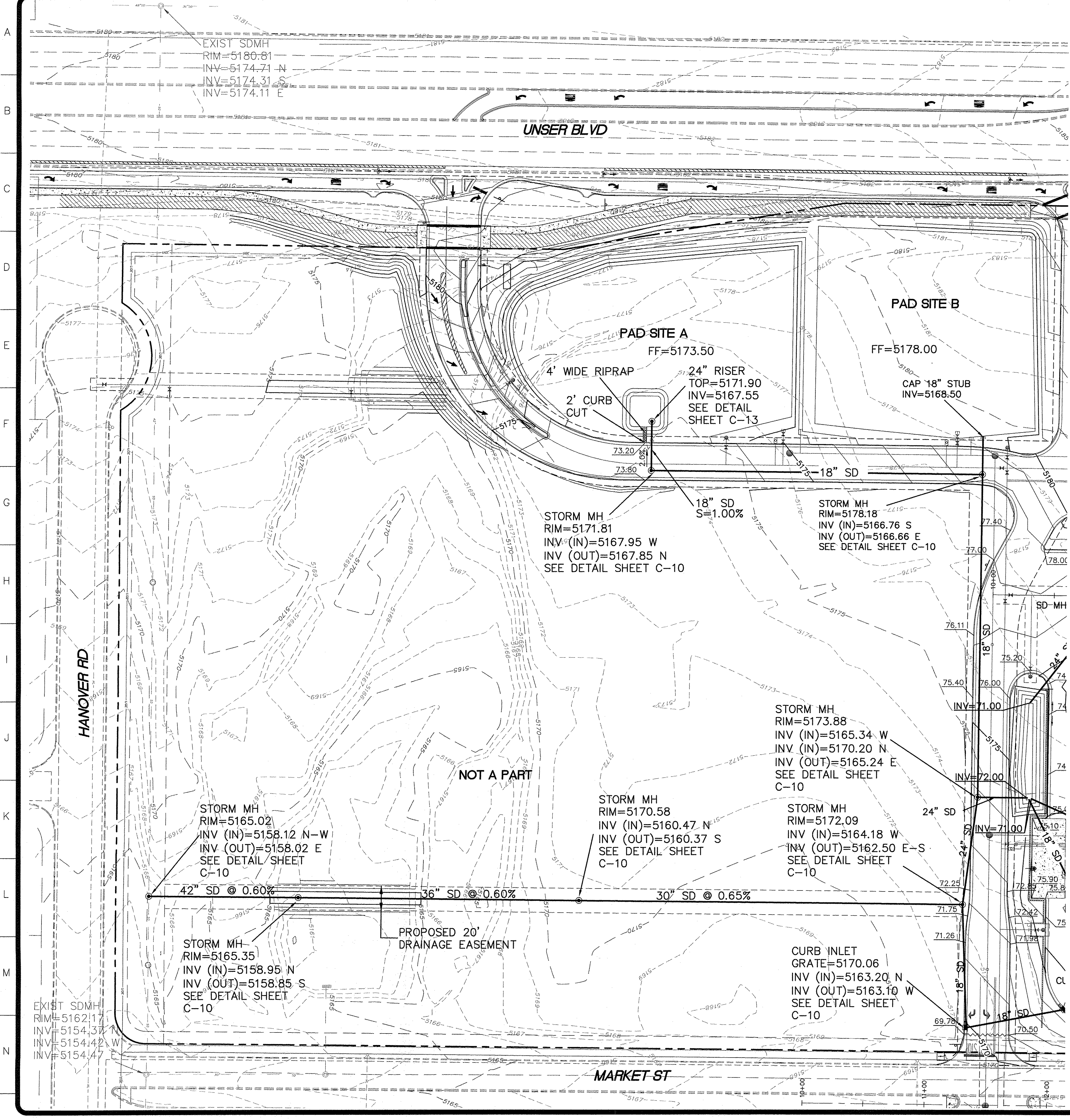
DRAWING  
2014038-SP

SHEET NO

**GR-1**

JOB #  
2014038

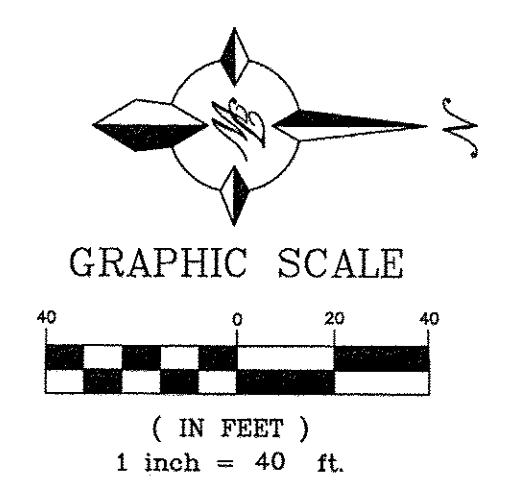




| LEGEND |                              |
|--------|------------------------------|
|        | CURB & GUTTER                |
|        | BOUNDARY LINE                |
|        | EASEMENT                     |
|        | SIDEWALK                     |
|        | EXISTING CURB & GUTTER       |
|        | SINGLE CLEAN OUT             |
|        | DOUBLE CLEAN OUT             |
|        | EXISTING SD MANHOLE          |
|        | EXISTING SAS MANHOLE         |
|        | EXISTING FIRE HYDRANT        |
|        | EXISTING WATER METER         |
|        | EXISTING POWER POLE          |
|        | EXISTING GAS VALVE           |
|        | EXISTING OVERHEAD UTILITIES  |
|        | EXISTING GAS                 |
|        | EXISTING SANITARY SEWER LINE |
|        | EXISTING WATER LINE          |
|        | EXISTING STORM SEWER LINE    |
|        | EXISTING INDEX CONTOUR       |
|        | EXISTING CONTOUR             |
|        | WATER BLOCK                  |

- EROSION CONTROL NOTES:**
- CONTRACTOR IS RESPONSIBLE FOR MAINTAINING RUN-OFF ON SITE DURING CONSTRUCTION.
  - CONTRACTOR IS RESPONSIBLE FOR CLEANING ALL SEDIMENT THAT GETS INTO EXISTING RIGHT-OF-WAY.
  - REPAIR OF DAMAGED FACILITIES AND CLEANUP OF SEDIMENT ACCUMULATIONS ON ADJACENT PROPERTIES AND IN PUBLIC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR.
  - ALL EXPOSED EARTH SURFACES MUST BE PROTECTED FROM WIND AND WATER EROSION PRIOR TO FINAL ACCEPTANCE OF ANY PROJECT.

- NOTICE TO CONTRACTORS**
- TWO WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATING SERVICE, 765-1234, FOR LOCATION OF EXISTING UTILITIES.
  - PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONNECTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THE CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
  - BACKFILL COMPACTION SHALL BE ACCORDING TO TRAFFIC/STREET USE.
  - MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.

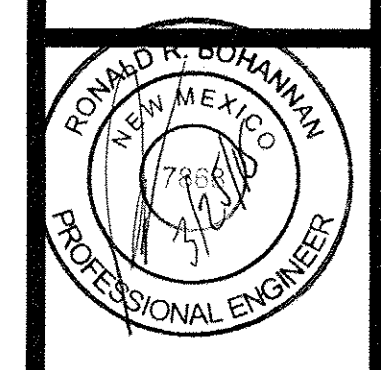


**CAUTION:**  
ALL EXISTING UTILITIES SHOWN WERE OBTAINED FROM RESEARCH, AS-BUILTS, SURVEYS OR INFORMATION PROVIDED BY OTHERS. IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT ALL NECESSARY FIELD INVESTIGATIONS PRIOR TO AND INCLUDING ANY EXCAVATION, TO DETERMINE THE ACTUAL LOCATION OF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

# GRADING AND DRAINAGE PLAN

| REVISIONS | BY |
|-----------|----|
|           |    |
|           |    |
|           |    |
|           |    |

TERRA WEST, LLC  
5571 MIDWAY PARK PL NE  
ALBUQUERQUE, NEW MEXICO 87109  
(505) 885-1100  
www.terrawestllc.com

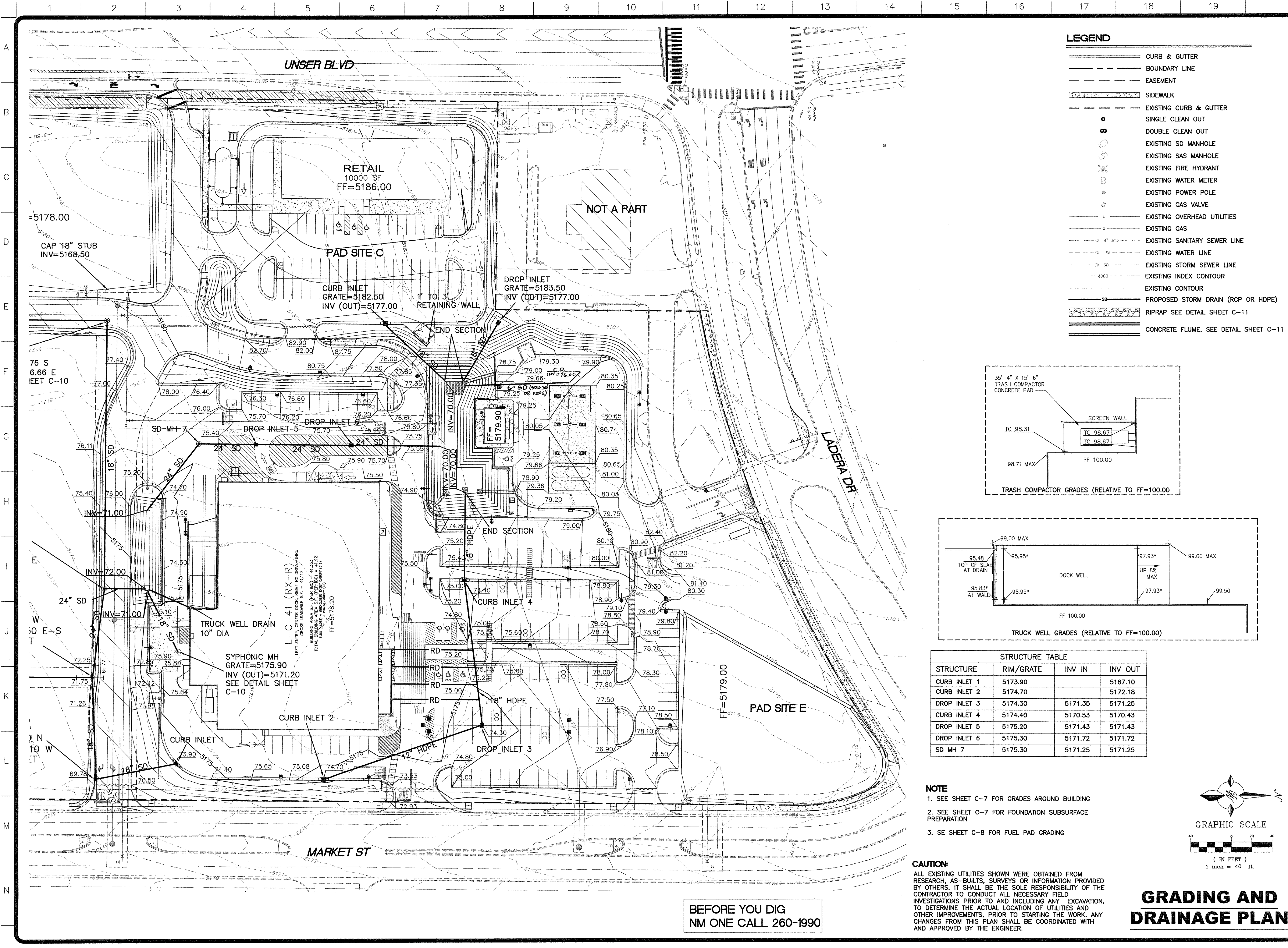


NEIGHBORHOOD MARKET #4676  
ALBUQUERQUE (LADERA), BERNCO, NM  
WAL-MART STORES, INC.  
2001 SE 10TH STREET  
BENTONVILLE, AR 72716

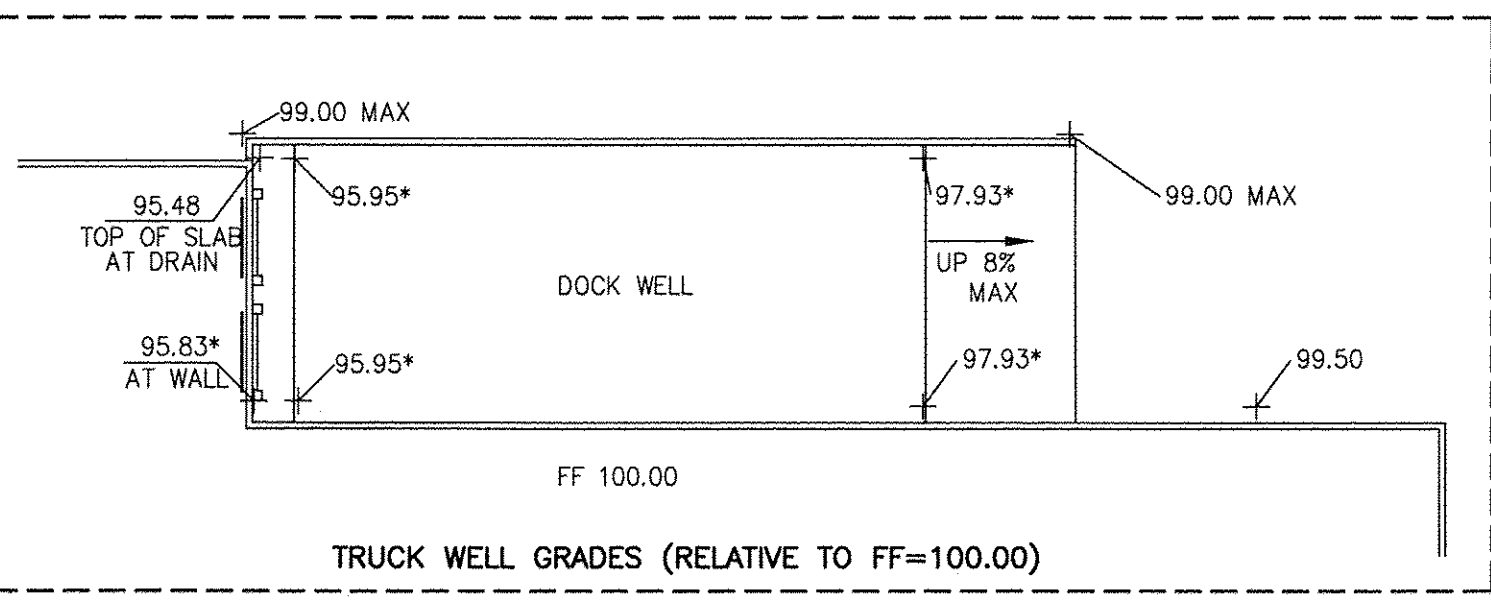
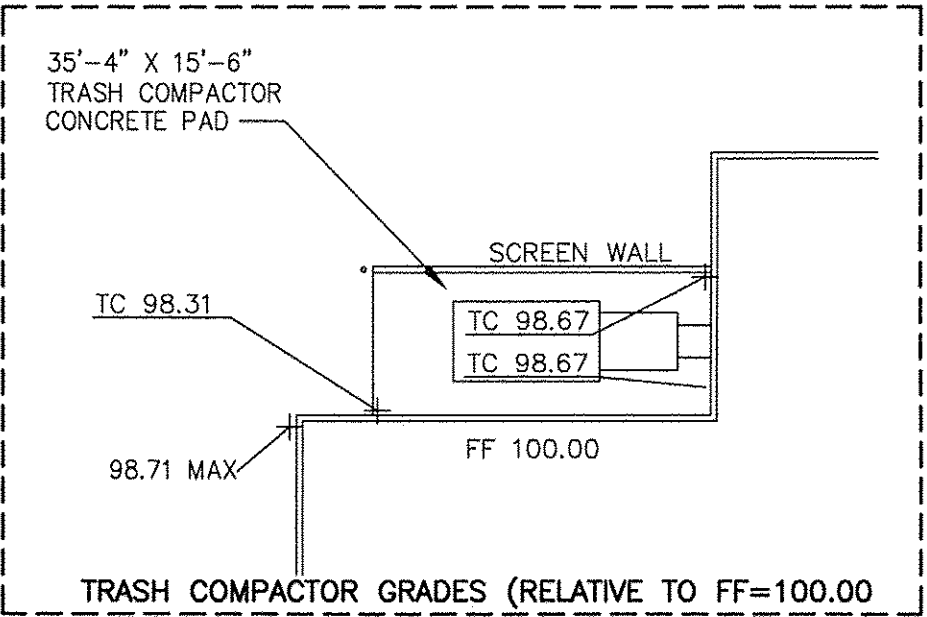


|         |         |
|---------|---------|
| DRAWN   | pm      |
| CHECKED |         |
| DATE    | 2-5-15  |
| SCALE   | 1"=40'  |
| JOB No. | 2014038 |
| SHEET   | C-5     |
| OF      |         |
| SHEETS  |         |





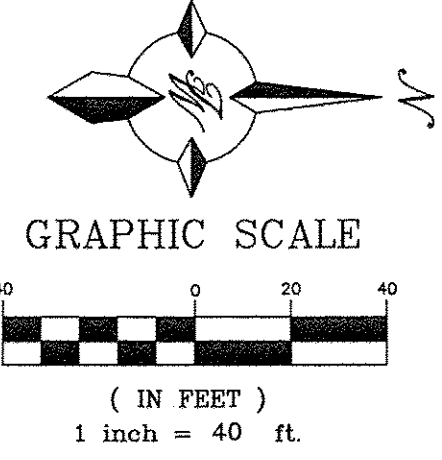
- LEGEND**
- CURB & GUTTER
  - BOUNDARY LINE
  - EASEMENT
  - SIDEWALK
  - EXISTING CURB & GUTTER
  - SINGLE CLEAN OUT
  - DOUBLE CLEAN OUT
  - EXISTING SD MANHOLE
  - EXISTING SAS MANHOLE
  - EXISTING FIRE HYDRANT
  - EXISTING WATER METER
  - EXISTING POWER POLE
  - EXISTING GAS VALVE
  - EXISTING OVERHEAD UTILITIES
  - EXISTING GAS
  - EXISTING SANITARY SEWER LINE
  - EXISTING WATER LINE
  - EXISTING STORM SEWER LINE
  - EXISTING INDEX CONTOUR
  - EXISTING CONTOUR
  - PROPOSED STORM DRAIN (RCP OR HDPE)
  - RIPRAP SEE DETAIL SHEET C-11
  - CONCRETE FLUME, SEE DETAIL SHEET C-11



| STRUCTURE TABLE |           |         |         |
|-----------------|-----------|---------|---------|
| STRUCTURE       | RIM/GRATE | INV IN  | INV OUT |
| CURB INLET 1    | 5173.90   |         | 5167.10 |
| CURB INLET 2    | 5174.70   |         | 5172.18 |
| DROP INLET 3    | 5174.30   | 5171.35 | 5171.25 |
| CURB INLET 4    | 5174.40   | 5170.53 | 5170.43 |
| DROP INLET 5    | 5175.20   | 5171.43 | 5171.43 |
| DROP INLET 6    | 5175.30   | 5171.72 | 5171.72 |
| SD MH 7         | 5175.30   | 5171.25 | 5171.25 |

- NOTE**
- SEE SHEET C-7 FOR GRADES AROUND BUILDING
  - SEE SHEET C-7 FOR FOUNDATION SUBSURFACE PREPARATION
  - SE SHEET C-8 FOR FUEL PAD GRADING

**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.



**GRADING AND DRAINAGE PLAN**

BEFORE YOU DIG  
NM ONE CALL 260-1990

| REVISIONS | BY |
|-----------|----|
|           |    |
|           |    |
|           |    |
|           |    |

**TIERRA WEST, LLC**  
5571 MIDWAY PARK PL NE  
ALBUQUERQUE, NEW MEXICO 87109  
(505) 658-3100  
www.tierrawestllc.com

**PROFESSIONAL ENGINEER**

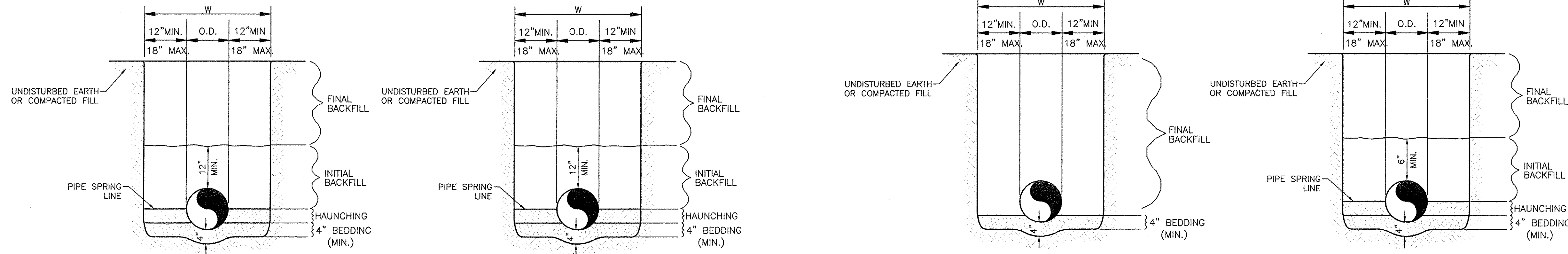
NEIGHBORHOOD MARKET #4676  
ALBUQUERQUE (LADERA), BERNCO, NM  
WAL-MART STORES, INC.  
2001 SE 10TH STREET  
BENTONVILLE, AR 72716



|         |         |
|---------|---------|
| DRAWN   | JMH     |
| CHECKED | JMH     |
| DATE    | 2-5-15  |
| SCALE   | 1"=40'  |
| JOB No. | 2014038 |
| SHEET   | C-6     |
| OF      | SHEETS  |



A  
B  
C  
D  
E  
F  
G  
H  
I  
J  
K  
L  
M  
N



WATER LINE

SANITARY SEWER

REINFORCED CONCRETE PIPE (RCP)  
AND CONTECH SPIRAL RIB PIPE  
SMALLER THAN 60"

ALL OTHER PIPES  
INCLUDING CONTECH SPIRAL RIB  
PIPE 60" AND LARGER

GENERAL NOTES

GENERAL NOTES

- BEDDING SHALL BE CLASS I-A WORKED BY HAND. IF GROUNDWATER IS ANTICIPATED, THEN BEDDING SHALL BE CLASS I-B COMPACTED TO 85% STANDARD PROCTOR. (SEE SPECIFICATIONS FOR GRADATION)
- HAUNCHING SHALL BE WORKED AROUND THE PIPE BY HAND TO ELIMINATE VOIDS AND SHALL BE CLASS I-A OR CLASS I-B OR CLASS II COMPACTED TO 85% PROCTOR.
- INITIAL BACKFILL SHALL BE CLASS I-A WORKED BY HAND, OR CLASS I-B OR CLASS II COMPACTED TO 85% STANDARD PROCTOR.
- INITIAL BACKFILL NOT UNDER PAVED AREAS CAN BE COMPACTED TO 90% STANDARD PROCTOR.
- FINAL BACKFILL SHALL BE CLASS I, OR II COMPACTED AS NOTED IN NOTES 3. AND 4.
- FINAL BACKFILL NOT UNDER PAVED AREAS CAN BE TYPE II COMPACTED TO 95% STANDARD PROCTOR.
- ALL MATERIALS ARE CLASSIFIED IN ACCORDANCE WITH ASTM D 2321-89.
- ALL MATERIALS SHALL BE INSTALLED IN MAXIMUM 8" LOOSE LIFTS IN ACCORDANCE WITH ASTM D 698.
- FILL SALVAGED FROM EXCAVATION SHALL BE FREE OF DEBRIS, ORGANICS AND ROCKS LARGER THAN 3".
- ALL TRENCH EXCAVATIONS SHALL BE SLOPED, SHORED, SHEETED, BRACED, OR OTHERWISE SUPPORTED IN COMPLIANCE WITH OSHA REGULATIONS AND LOCAL ORDINANCES. (SEE SPECIFICATIONS)

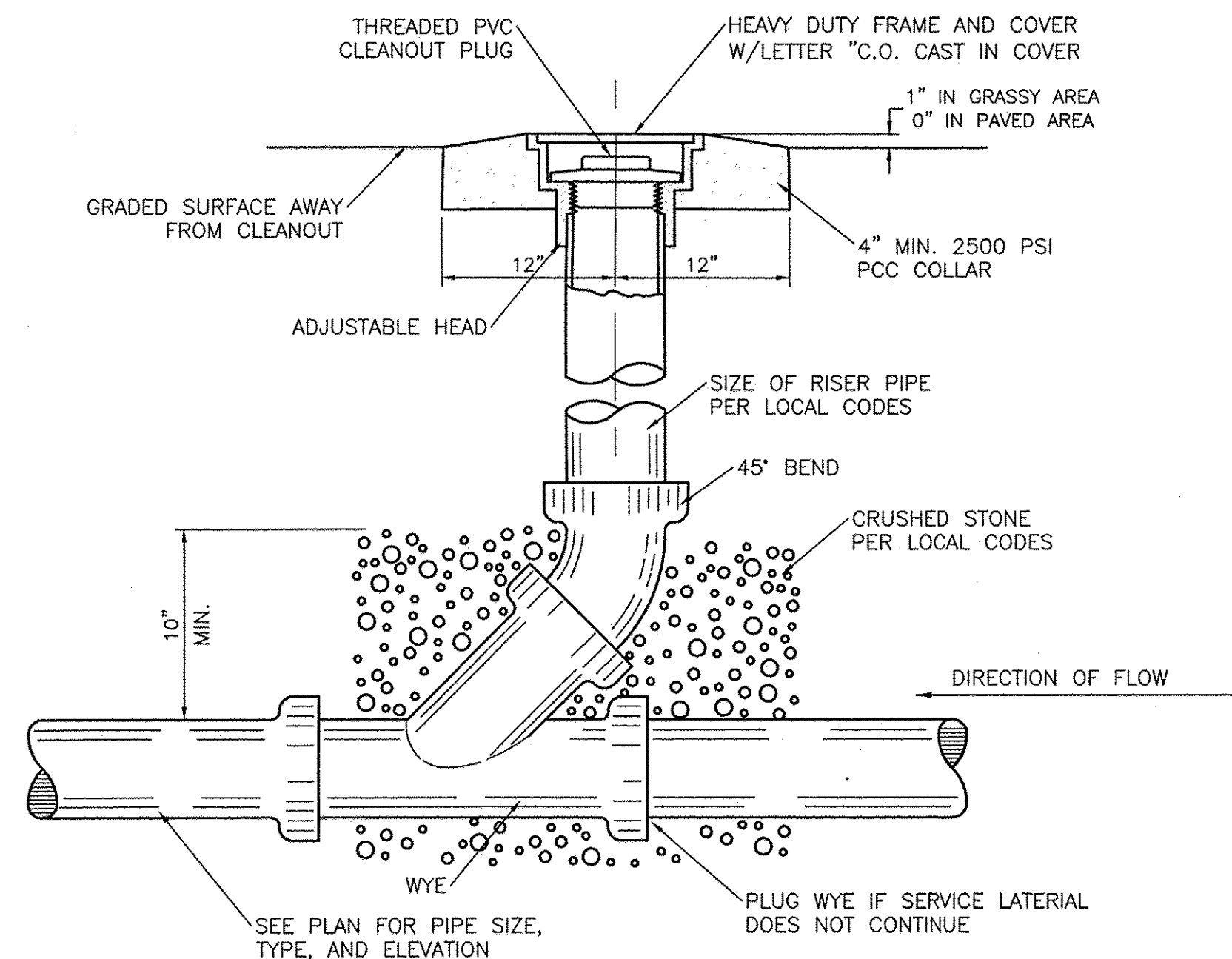
- BEDDING SHALL BE CLASS I-A WORKED BY HAND. IF GROUNDWATER IS ANTICIPATED, THEN BEDDING SHALL BE CLASS I-B COMPACTED TO 85% STANDARD PROCTOR. (SEE SPECIFICATIONS FOR GRADATION)
- HAUNCHING SHALL BE WORKED AROUND THE PIPE BY HAND TO ELIMINATE VOIDS AND SHALL BE CLASS I-A OR CLASS I-B OR CLASS II COMPACTED TO 85% PROCTOR.
- INITIAL BACKFILL SHALL BE CLASS I-A WORKED BY HAND, OR CLASS I-B OR CLASS II COMPACTED TO 85% STANDARD PROCTOR.
- INITIAL BACKFILL NOT UNDER PAVED AREAS CAN BE CLASS III COMPACTED TO 90% STANDARD PROCTOR.
- FINAL BACKFILL SHALL BE CLASS I, II, OR III COMPACTED AS NOTED IN NOTES 3. AND 4.
- FINAL BACKFILL NOT UNDER PAVED AREAS CAN BE CLASS IV-A COMPACTED TO 95% STANDARD PROCTOR.
- ALL MATERIALS ARE CLASSIFIED IN ACCORDANCE WITH ASTM D 2321-LATEST EDITION.
- ALL MATERIALS SHALL BE INSTALLED IN MAXIMUM 8" LOOSE LIFTS IN ACCORDANCE WITH ASTM D 698. CLASS III AND IV-A MATERIALS SHALL BE COMPACTED NEAR OPTIMUM MOISTURE CONTENT.
- FILL SALVAGED FROM EXCAVATION SHALL BE FREE OF DEBRIS, ORGANICS AND ROCKS LARGER THAN 3".
- ALL TRENCH EXCAVATIONS SHALL BE SLOPED, SHORED, SHEETED, BRACED, OR OTHERWISE SUPPORTED IN COMPLIANCE WITH OSHA REGULATIONS AND LOCAL ORDINANCES. (SEE SPECIFICATIONS)

UTILITY TRENCH AND BEDDING DETAIL

NTS

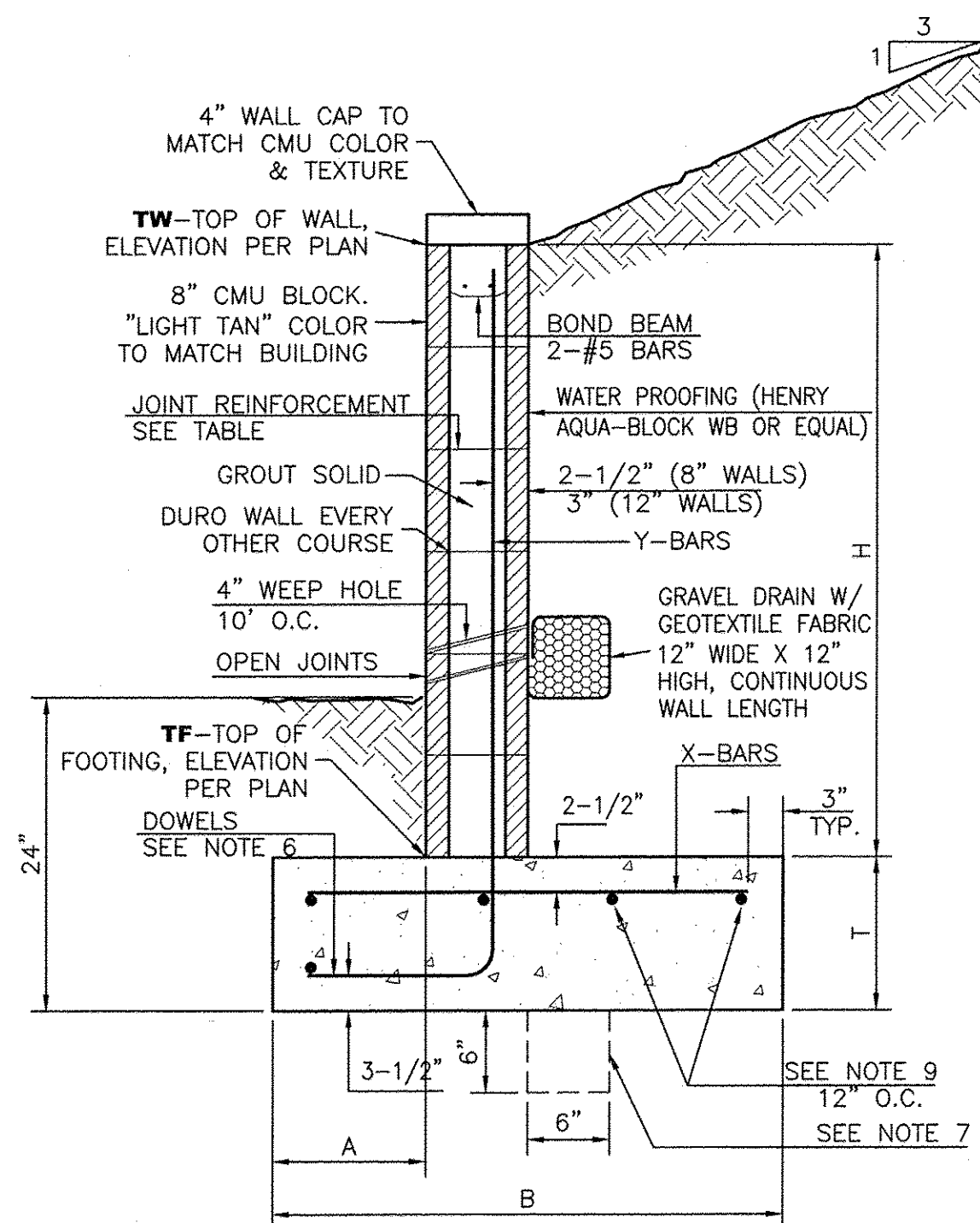
STORM SEWER TRENCH AND BEDDING DETAIL

NTS



SANITARY SEWER CLEAN-OUT

NTS



RETAINING WALL DETAIL

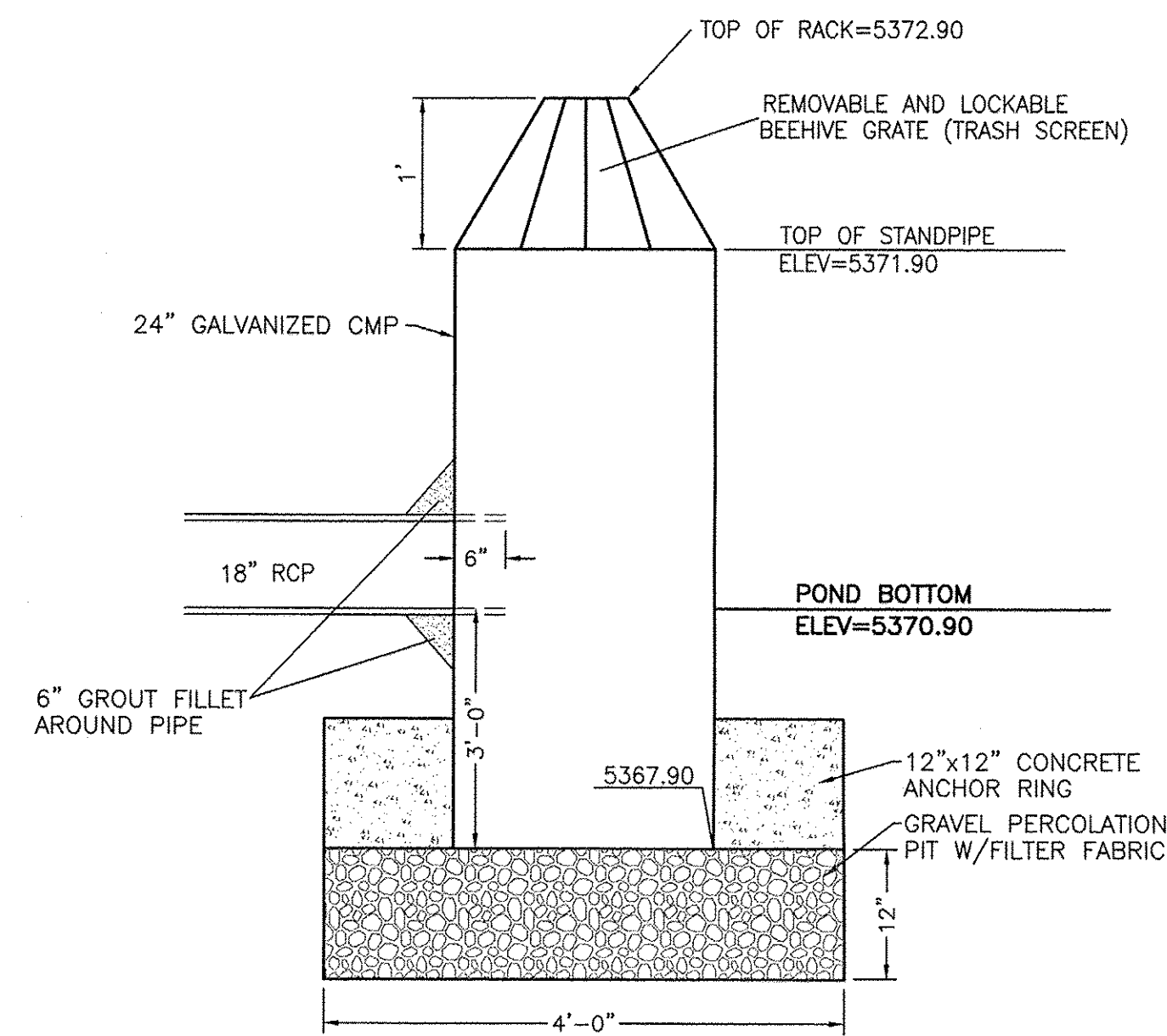
NTS

| 8 INCH REINFORCED CONCRETE MASONRY WALL |     |         |     |              |              |  |
|-----------------------------------------|-----|---------|-----|--------------|--------------|--|
| H                                       | A   | B       | T   | Y-BARS       | X-BARS       |  |
| ft.-in.                                 | in. | ft.-in. | in. |              |              |  |
| 2'-0"                                   | 8"  | 2'-0"   | 9"  | #4 @32" O.C. | #4 @24" O.C. |  |
| 2'-8"                                   | 8"  | 2'-0"   | 9"  | #4 @32" O.C. | #4 @24" O.C. |  |
| 3'-4"                                   | 8"  | 2'-4"   | 9"  | #4 @32" O.C. | #4 @24" O.C. |  |
| 4'-0"                                   | 10" | 2'-8"   | 9"  | #4 @32" O.C. | #4 @24" O.C. |  |
| 4'-8"                                   | 12" | 3'-4"   | 10" | #5 @32" O.C. | #4 @18" O.C. |  |
| 5'-4"                                   | 14" | 3'-10"  | 10" | #6 @16" O.C. | #4 @18" O.C. |  |
| 6'-0"                                   | 16" | 4'-8"   | 12" | #6 @8" O.C.  | #4 @12" O.C. |  |

| 12 INCH REINFORCED CONCRETE MASONRY WALL |     |         |     |              |              |  |
|------------------------------------------|-----|---------|-----|--------------|--------------|--|
| H                                        | A   | B       | T   | Y-BARS       | X-BARS       |  |
| ft.-in.                                  | in. | ft.-in. | in. |              |              |  |
| 5'-4"                                    | 14" | 3'-8"   | 10" | #6 @18" O.C. | #4 @24" O.C. |  |
| 6'-0"                                    | 15" | 4'-2"   | 12" | #4 @16" O.C. | #4 @18" O.C. |  |
| 6'-8"                                    | 16" | 4'-6"   | 12" | #6 @24" O.C. | #5 @18" O.C. |  |
| 7'-4"                                    | 18" | 4'-10"  | 12" | #6 @16" O.C. | #5 @18" O.C. |  |
| 8'-0"                                    | 20" | 5'-4"   | 12" | #7 @18" O.C. | #6 @12" O.C. |  |
| 8'-8"                                    | 20" | 5'-8"   | 12" | #7 @16" O.C. | #6 @12" O.C. |  |

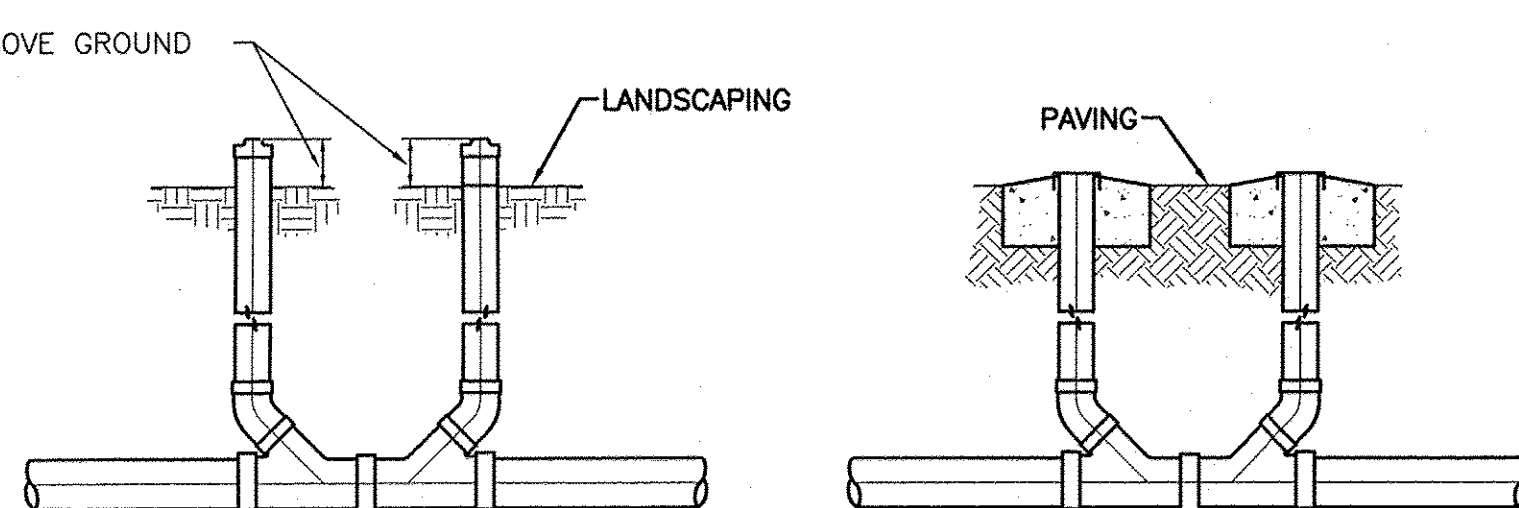
GENERAL NOTES:

- ALL CONCRETE IS TO BE 4000 PSI @ 28 DAYS.
- MINIMUM COMPACTION UNDER FOOTINGS IS TO BE 95% PER ASTM D 1557 FOR A DEPTH OF 12" MOISTURE CONTENT IS TO BE  $\pm$  2.0%.
- BACK FILL AGAINST WALLS IS TO BE HAND-PLACED AND COMPACTED.
- ALL BARS ARE TO BE GRADE 60, ASTM 615.
- TRUSS TYPE DUR-O-WALL EVERY OTHER COURSE.
- DOWELS SHALL BE AT LEAST EQUAL IN SIZE AND SPACING TO Y-BARS. SHALL PROJECT A MINIMUM OF 30 BAR DIA. INTO THE FILLED BLOCK CORES, AND SHALL EXTEND TO THE TOE OF THE FOOTING.
- PROVIDE KEY FOR 8" AND 12" WALLS WHERE H EXCEEDS 6'-0"
- USE EITHER EXPANSION JOINTS ON 20' CENTERS OR PILASTERS EVERY 16'.
- BOND BEAM, 1-#4 BARS FOR WALLS UNDER 3'-4", 2-#4 BARS FOR WALLS UNDER 5'-4", 2-#5 BARS FOR WALLS OVER 5'-4".



RISER DETAIL

NTS



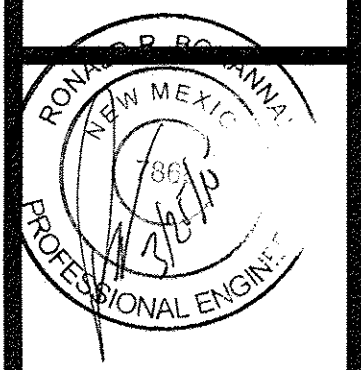
SANITARY SEWER DOUBLE CLEAN-OUTS

NTS

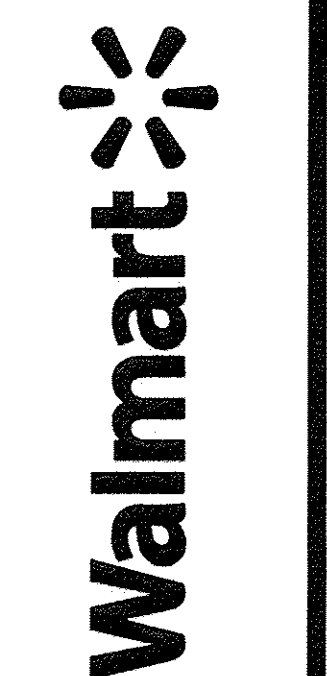
CONSTRUCTION  
DETAILS

| REVISIONS | BY |
|-----------|----|
|           |    |
|           |    |
|           |    |
|           |    |
|           |    |
|           |    |
|           |    |
|           |    |
|           |    |

TERRA WEST, LLC  
5571 MIDWAY PARK PL. NE  
ALBUQUERQUE, NEW MEXICO 87109  
(505) 858-3100  
www.tterrawestllc.com



NEIGHBORHOOD MARKET #4676  
ALBUQUERQUE (LADERA), BERNCO, NM  
WAL-MART STORES, INC.  
2001 SE 10TH STREET  
BENTONVILLE, AR 72716



|                    |
|--------------------|
| DRAWN<br>JH        |
| CHECKED<br>JH      |
| DATE<br>2-5-15     |
| SCALE<br>1"=60'    |
| JOB No.<br>2014038 |
| SHEET<br>C-13      |
| OF<br>SHEETS       |

March 25, 2014

Mr. Curtis Cherne, P.E.  
Planning Department- Hydrology  
City of Albuquerque  
P.O. Box 1293  
Albuquerque, NM 87103

RE: HERITAGE MARKET PLACE (H09D024)

Please find the following responses addressing staff comments listed below:

1. It appears the sump near Pad Site A and the pad grade of Pad Site A is lowering the storm drain profile and making it difficult to drain Basin B3 into Pond 2 to capture the first flush. If the road was straight-graded and Pad Site A raised, this would create enough grade to raise the storm drain profile and drain Basin B3 into Pond 2.

**Response: The grading design was revised to incorporate a water quality basin within Pad Site A to account for Basin B3. We analyzed "straight-grading" the roadway, however, the elevations necessary at the driveway between Pad B and C made this option impractical.**

2. The first flush runoff from the roof of the anchor store should be retained. The finished floor elevation is 76.2 and the pond bottom is at 71 (70 in first flush calcs), so it appears easy to capture this stormwater.

**Response: The roof drain connection was revised to connect to the pond behind the store, as requested.**

3. Hydrology does not agree that comment 3 will create an undue burden to the project as numerous other applicants have built the separators. However, in this case, since the area drains to a first flush pond and is not directly connected to the storm drain system, this comment has been removed.

**Response: Comment noted. Item resolved.**

4. The narrative for pad site C is for a different location.

**Response: An updated grading plan is attached for review with narrative removed (analysis covered by drainage report).**

If you have any questions or need additional information regarding this matter, please do not hesitate to contact me.

Sincerely,

Joel Hernandez, PE

JN: 2014038  
RRB/jh/jg



# **DRAINAGE REPORT**

**for**

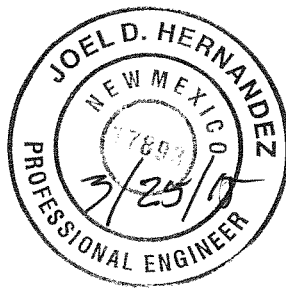
## **Heritage Marketplace Southeast Corner Unser and Ladera Albuquerque, New Mexico**

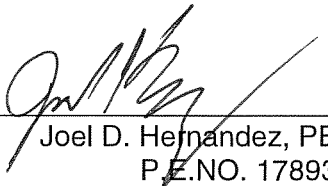
Prepared by:

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

March 2015

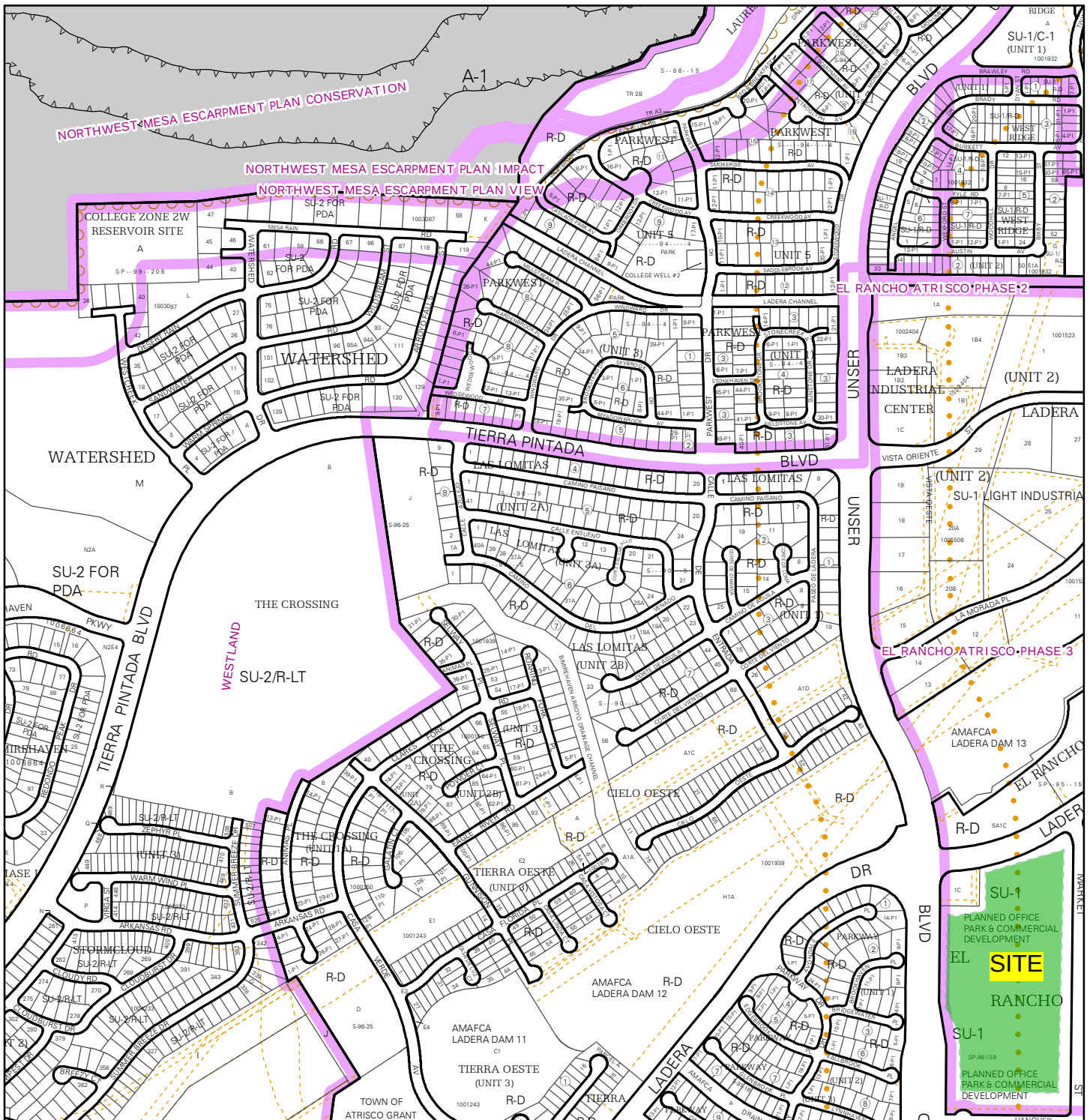
I certify that this report was prepared under my supervision, and I am a registered professional engineer in the State of New Mexico in good standing.



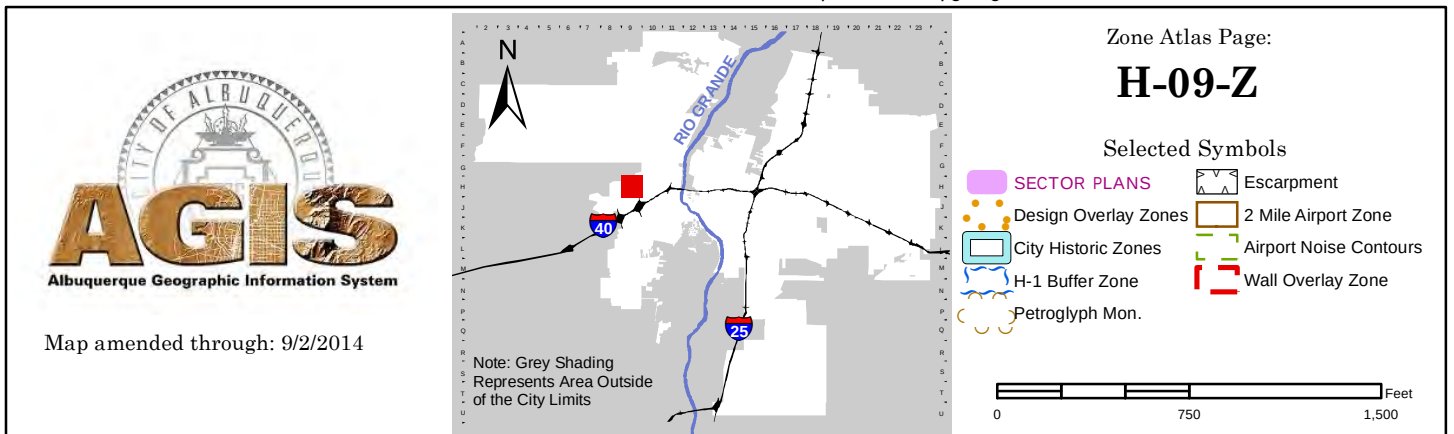
  
Joel D. Hernandez, PE  
P.E.NO. 17893

Job No 2014038

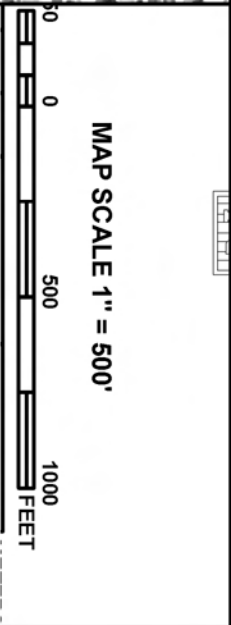
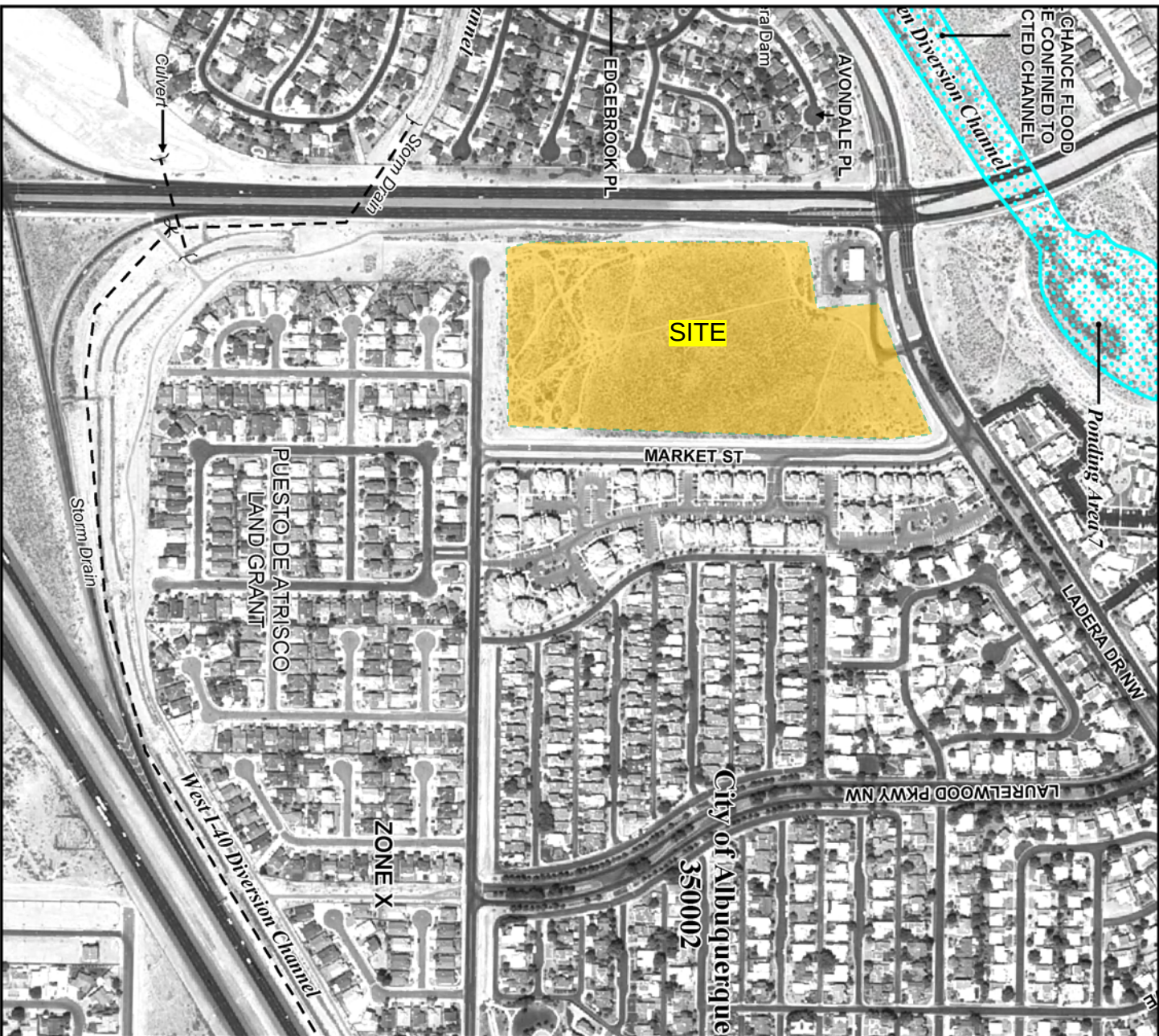
# EXHIBIT A - VICINITY MAP



For more current information and details visit: <http://www.cabq.gov/gis>







**NATIONAL FLOOD INSURANCE PROGRAM**

**FIRM**

**FLOOD INSURANCE RATE MAP**

**BERNALILLO COUNTY,  
NEW MEXICO**

**AND INCORPORATED AREAS**

**PANEL 326 OF 825**

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

**CONTAINS:**

| COMMUNITY                              | NUMBER | PANEL | SUFFIX |
|----------------------------------------|--------|-------|--------|
| ALBUQUERQUE, CITY OF                   | 350002 | 0326  | H      |
| BERNALILLO COUNTY UNINCORPORATED AREAS | 350001 | 0326  | H      |

**PANEL 0326H**

**MAP NUMBER**  
**35001C0326H**

**MAP REVISED**  
**AUGUST 16, 2012**

**Federal Emergency Management Agency**

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at [www.msc.fema.gov](http://www.msc.fema.gov)

EXHIBIT B

## **PURPOSE**

The purpose of this report is to demonstrate the proposed grading and drainage scheme is consistent with the capacity assumptions of existing infrastructure constructed with SAD 212 (Hanover Storm Sewer) and to determine the required pond volumes and storm drain sizing necessary to connect to this existing infrastructure. The as-built drawing for the portion of the Hanover Storm Sewer to which this project connects is included in Appendix B of this report.

## **FLOOD PLAIN**

The site is not within a floodplain as shown on FIRM Map 35001c0326H. See Exhibit B for location of site.

## **EXISTING CONDITIONS**

The property over which the shopping center project will be constructed is currently undeveloped, with the exception of the existing Valero service station at the southeast corner of Unser Boulevard and Ladera Drive. An existing 42 inch RCP storm drain pipe anticipated to accept runoff from the site was constructed with SAD 212 and runs within a drainage easement along the north side of Hanover Road which borders the southerly portion of the site. The property generally drains from the northwest to the southeast into an existing inlet connected to the Hanover Road Storm Sewer.

The site is bordered by Unser Boulevard to the west, which conveys flows within the curbed roadway to the south; on the north by Ladera Drive which conveys flows within the curbed roadway to the east; Market Street to the east which conveys flows within the curbed roadway to Hanover Road to the south, which in turn flows to the east. There are no offsite basins draining onto the site other than the existing Valero service station.

The SAD 212 improvements are configured to accept 50 CFS of runoff from the project property of approximately 20.8 acres (average rate of 2.4 CFS/acre). Flows from Market Street



are contained within the public right-of-way and do not drain into this segment of the SAD 212 storm sewer.

## **PROPOSED CONDITIONS**

The initial phase of the project anticipates onsite grading and drainage improvements necessary to grade the commercial tract pads (all tracts with the exception of Basin B4), two interconnected detention ponds, and internal driveways. Offsite improvements are proposed on Unser Boulevard for a deceleration and right-turn lane, median left-turn lane, and right-in driveway; a right-turn lane on Ladera Drive at the southwest portion of the intersection with Unser Boulevard; and median driveway cuts on Market Street.

Onsite drainage improvements are configured to not exceed the 50 SFS allowable flow into the SAD 212 storm sewer. The commercial northerly/upstream basins (Basin A1-A5, inclusive) are configured to be routed through two interconnected detention ponds and generate a peak flow of 20.37 CFS as calculated using AHYMO. Basin A6, downstream of the ponds, enters the proposed storm drain through a curb inlet. The total flow from the northerly commercial pads routed through the basins and the addition of Basin A6 produce a total of 21.53 CFS which equates to an average rate of 2.39 CFS/acre.

The southerly commercial pads corresponding to basins B1 and B2 will each be limited to 2.1 CFS when they develop in the future. Flows from these commercial pads combined with the 2.3 developed flow from the portion of the driveway encompassed by Basin B3 will not exceed 6.5 CFS, which also corresponds to an average rate of 2.4 CFS/acre.

The total flows (28.1 CFS) from all onsite “commercial” drainage basins (excluding Basin B4) will be conveyed in a proposed private storm drain connecting to the SAD 212 storm sewer in Hanover Road. Basin B4, slated for future residential or office development, will be limited to 21.7 CFS (2.4 CFS/acre) so as not to exceed the total allowable 50 CFS.

A hydrologic analysis was run using AHYMO to demonstrate the proposed pond volumes are adequate to restrict the flows as discussed above. A hydraulic analysis to size the major pipe network was run using Flowmaster. A section of 24-inch and 30-inch RCP will be required to convey flows through the future residential parcel to the existing 42-inch RCP. Downstream sections of the storm drain running through the future residential tract were upsized to 36-inch and 42-inch RCP to provide additional capacity for the future development. Calculations are included in Appendix A of this report.

## **STORMWATER CONTROL MEASURES**

Stormwater Control Measures are incorporated in the design to the extent practicable and will provide management of the 90<sup>th</sup> Percentile Storm. The primary design measure is the retention/detention pond which will serve to retain the 90<sup>th</sup> Percentile Storm which was quantified per the Drainage Ordinance requirement of 0.44 inches and reduced by 0.1 inch to account for the initial impervious abstraction as listed in Table A-6 of Section 22 of the DPM. Detailed pond volume design tabulations are included in Appendix A.

## **SUMMARY**

Following a detailed analysis of existing and proposed drainage conditions guided by DPM Section 22 – Weighted E Method, storm water discharge resulting from the 100-year, 6-hr storm event indicates that the proposed redevelopment and corresponding grading and drainage design will accommodate the proposed development, and correspondingly not increase run-off volumes or alter historic discharge locations. It is therefore recommended that this plan be approved for Site Development Plan for Building Permit and Site Development Plan for Subdivision based upon these findings.



## DPM Weighted E Method

### Heritage Plaza - Precipitation Zone 1- Proposed Basins

**Northerly Deveveloped Basins** (Routed Through Grocery Store Ponds)

| Basin          | Area<br>(sf)   | Area<br>(acres) | Area<br>(sq miles) | Basin Descriptions |         |             |         |             |          |             |         | 100-Year, 6-Hr        |                   |              | 10-Year, 6-Hr         |                   |             | 2-Year, 6-Hr          |                   |             |
|----------------|----------------|-----------------|--------------------|--------------------|---------|-------------|---------|-------------|----------|-------------|---------|-----------------------|-------------------|--------------|-----------------------|-------------------|-------------|-----------------------|-------------------|-------------|
|                |                |                 |                    | Treatment A        |         | Treatment B |         | Treatment C |          | Treatment D |         | Weighted E<br>(ac-ft) | Volume<br>(ac-ft) | Flow<br>cfs  | Weighted E<br>(ac-ft) | Volume<br>(ac-ft) | Flow<br>cfs | Weighted E<br>(ac-ft) | Volume<br>(ac-ft) | Flow<br>cfs |
|                |                |                 |                    | %                  | (acres) | %           | (acres) | %           | (acres)  | %           | (acres) |                       |                   |              |                       |                   |             |                       |                   |             |
| A1 Store       | 217,349        | 4.990           | 0.00780            | 0%                 | 0       | 0%          | 0.000   | 29%         | 1.427732 | 71%         | 3.562   | 1.690                 | 0.703             |              | 1.011                 | 0.420             | 12.42       | 0.548                 | 0.228             | 6.69        |
| A2-A Pad C     | 36,334         | 0.834           | 0.00130            | 0%                 | 0       | 0%          | 0.000   | 20%         | 0.163453 | 80%         | 0.671   | 1.778                 | 0.124             |              | 1.083                 | 0.075             | 2.18        | 0.602                 | 0.042             | 1.21        |
| A2-B Pad C     | 25,004         | 0.574           | 0.00090            | 0%                 | 0       | 0%          | 0.000   | 39%         | 0.223209 | 61%         | 0.351   | 1.589                 | 0.076             |              | 0.929                 | 0.044             | 1.35        |                       |                   |             |
| A3 Valero      | 37,460         | 0.860           | 0.00134            | 0%                 | 0       | 0%          | 0.000   | 22%         | 0.187052 | 78%         | 0.673   | 1.757                 | 0.126             |              | 1.066                 | 0.076             | 2.22        | 0.589                 | 0.042             | 1.23        |
| A4 Pad E       | 39,708         | 0.912           | 0.00142            | 0%                 | 0       | 0%          | 0.000   | 20%         | 0.182277 | 80%         | 0.729   | 1.774                 | 0.135             |              | 1.080                 | 0.082             | 2.38        | 0.600                 | 0.046             | 1.32        |
| A5 Roof        | 40,601         | 0.932           | 0.00146            | 0%                 | 0       | 0%          | 0.000   | 0%          | 0        | 100%        | 0.932   | 1.970                 | 0.153             |              | 1.240                 | 0.096             | 2.69        | 0.720                 | 0.056             | 1.58        |
| A6 Drive*      | 19,719         | 0.453           | 0.00071            | 0%                 | 0       | 0%          | 0.000   | 17%         | 0.076957 | 83%         | 0.376   | 1.803                 | 0.068             | 1.86         | 1.104                 | 0.042             | 1.20        |                       |                   |             |
| <b>Total**</b> | <b>396,456</b> | <b>9.101</b>    | <b>0.01422</b>     |                    |         |             |         |             |          |             |         |                       |                   | <b>21.53</b> |                       |                   |             |                       |                   |             |

\*Notes: Basin not routed through ponds.

\*\* AHYMO peak total runoff

**SOUTHERLY Developed Basins**

| Basin        | Area<br>(sf)   | Area<br>(acres) | Area<br>(sq miles) | Basin Descriptions |         |             |         |             |          |             |         | 100-Year, 6-Hr        |                   |              | 10-Year, 6-Hr         |                   |              | 2-Year, 6-Hr          |                   |             |
|--------------|----------------|-----------------|--------------------|--------------------|---------|-------------|---------|-------------|----------|-------------|---------|-----------------------|-------------------|--------------|-----------------------|-------------------|--------------|-----------------------|-------------------|-------------|
|              |                |                 |                    | Treatment A        |         | Treatment B |         | Treatment C |          | Treatment D |         | Weighted E<br>(ac-ft) | Volume<br>(ac-ft) | Flow<br>cfs  | Weighted E<br>(ac-ft) | Volume<br>(ac-ft) | Flow<br>cfs  | Weighted E<br>(ac-ft) | Volume<br>(ac-ft) | Flow<br>cfs |
|              |                |                 |                    | %                  | (acres) | %           | (acres) | %           | (acres)  | %           | (acres) |                       |                   |              |                       |                   |              |                       |                   |             |
| B1 Pad A     | 48,870         | 1.122           | 0.00175            | 0%                 | 0       | 0%          | 0.000   | 100%        | 1.121901 | 0%          | 0.000   | 0.990                 | 0.093             | 2.1*         | 0.440                 | 0.041             | 1.67         | 0.120                 | 0.011             | 0.53        |
| B2 Pad B     | 46,933         | 1.077           | 0.00168            | 0%                 | 0       | 0%          | 0.000   | 100%        | 1.077433 | 0%          | 0.000   | 0.990                 | 0.089             | 2.1*         | 0.440                 | 0.040             | 1.61         | 0.120                 | 0.011             | 0.51        |
| B3 Drive     | 23,035         | 0.529           | 0.00083            | 0%                 | 0       | 0%          | 0.000   | 0%          | 0        | 100%        | 0.529   | 1.970                 | 0.087             | 2.31         | 1.240                 | 0.055             | 1.53         | 0.720                 | 0.032             | 0.89        |
| B4 Res       | 394,392        | 9.054           | 0.01415            | 0%                 | 0       | 98%         | 8.873   | 2%          | 0.18108  | 0%          | 0.000   | 0.676                 | 0.510             | 21.7*        | 0.224                 | 0.169             | 7.01         |                       |                   |             |
|              |                |                 |                    |                    |         |             |         |             |          |             |         |                       |                   |              |                       |                   |              |                       |                   |             |
| <b>Total</b> | <b>513,230</b> | <b>11.782</b>   | <b>0.01841</b>     |                    |         |             |         |             |          |             |         |                       | <b>0.779</b>      | <b>28.20</b> |                       | <b>0.305</b>      | <b>11.82</b> |                       | <b>0.054</b>      | <b>1.93</b> |

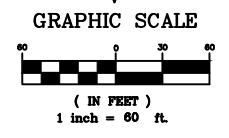
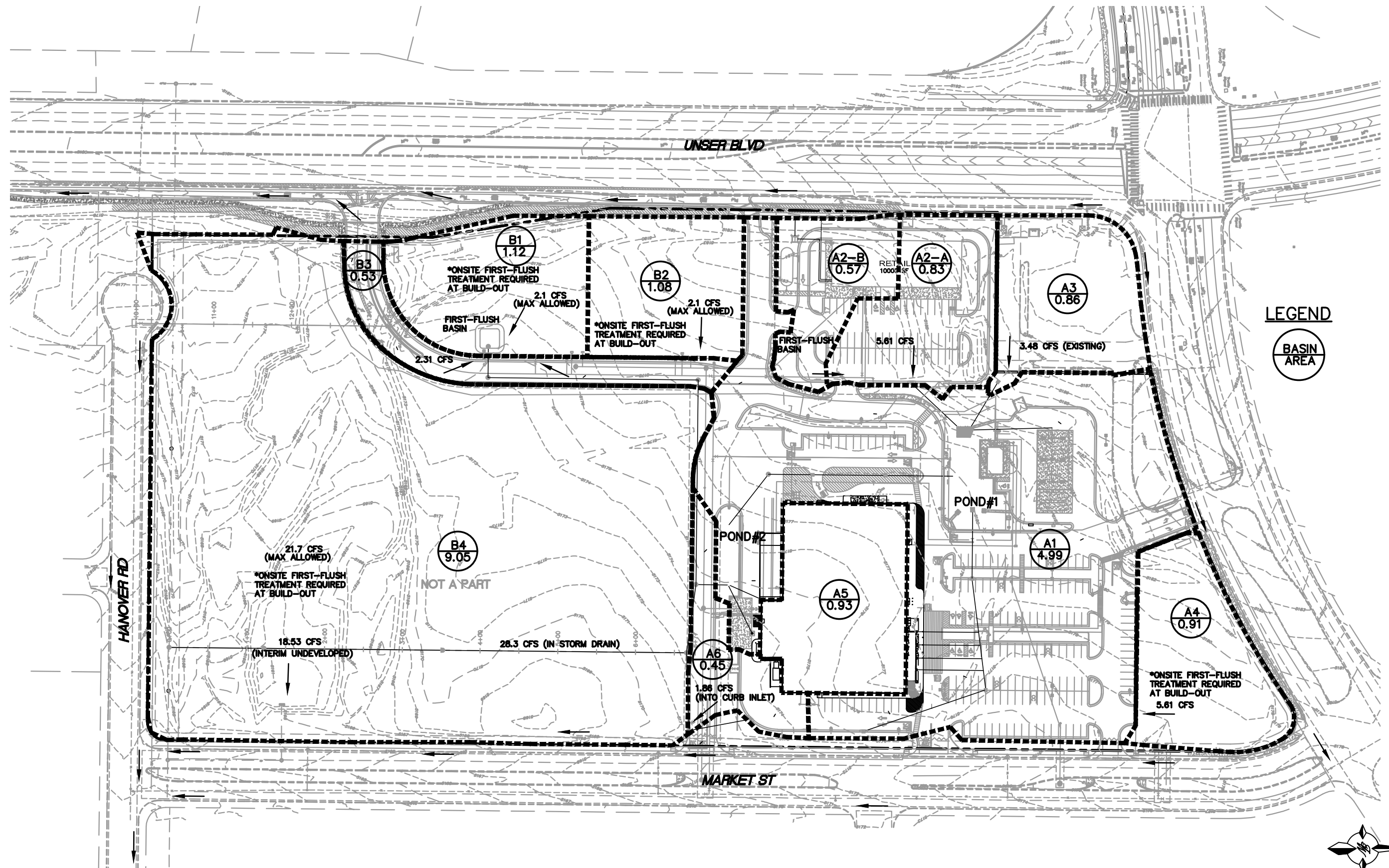
\*Notes: Max allowable Q100.

#### Equations:

Weighted E =  $E_a \cdot A_a + E_b \cdot A_b + E_c \cdot A_c + E_d \cdot A_d$  / (Total Area)

Volume = Weighted D \* Total Area

Flow =  $Q_a \cdot A_a + Q_b \cdot A_b + Q_c \cdot A_c + Q_d \cdot A_d$



**BASIN MAP  
DRAINAGE PLAN**

## Pond Discharge-Orifice Calculations

### POND 1 VOLUME CALCULATIONS

| ELEVATION (ft) | AREA (sf) | VOLUME<br>(cf) | CUMULATIVE<br>VOLUME (cf) |
|----------------|-----------|----------------|---------------------------|
| 5170           | 2213      | 0              | 0                         |
| 5171           | 3173      | 2693           | 2693                      |
| 5172           | 4197      | 3685           | 6378                      |
| 5173           | 5295      | 4746           | 11124                     |
| 5174           | 6410      | 5852.5         | 16977                     |
| 5175           | 7568      | 6989           | 23966                     |
|                |           |                | 23966                     |
|                |           |                | 23966                     |
|                |           |                | <b>23966</b>              |

### POND 2 VOLUME CALCULATIONS

| ELEVATION (ft) | AREA (sf) | VOLUME<br>(cf) | CUMULATIVE<br>VOLUME (cf) |
|----------------|-----------|----------------|---------------------------|
| 5170           | 0         | 0              | 0                         |
| 5171           | 399       | 199.5          | 199.5                     |
| 5172           | 933       | 666            | 865.5                     |
| 5173           | 1539      | 1236           | 2101.5                    |
| 5174           | 2217      | 1878           | 3979.5                    |
| 5175           | 2967      | 2592           | 6571.5                    |
|                |           |                | <b>6571.5</b>             |

### TOTAL POND VOLUME

**30537**

| ACTUAL<br>ELEV. | DEPTH<br>(FT) | VOLUME<br>(CF) | Q<br>(CFS) | VOLUME<br>(AC-FT) |
|-----------------|---------------|----------------|------------|-------------------|
| 70.00           | 0             | 0              | 0.00       |                   |
| 71.00           | 0.00          | 2893           | 0.00       | 0.06640266        |
| 72.00           | 0.00          | 7244           | 0.00       | 0.16628788        |
| 73.00           | 1.00          | 13226          | 10.69      | 0.3036157         |
| 74.00           | 2.00          | 20956          | 18.52      | 0.48108356        |
| 75.00           | 3.00          | 30537          | 23.91      | 0.70103306        |

### Orifice Equation

$$Q = CA \text{ SQRT}(2gH)$$

C = 0.6

Diameter (in) 24

Area (ft<sup>2</sup>)= 3.142

g = 32.2

H (Ft) = Depth of water above center of orifice

Q (CFS)= Flow



## First Flush and Pond Volume Calculations

### POND 1 VOLUME CALCULATIONS

| ELEVATION<br>(ft) | AREA (sf) | VOLUME (cf) | CUMULATIVE<br>VOLUME (cf) | RETAINED<br>1st FLUSH<br>VOL (cf) |
|-------------------|-----------|-------------|---------------------------|-----------------------------------|
| 5170              | 2213      | 0           | 0                         |                                   |
| 5171              | 3173      | 2693        | 2693                      |                                   |
| 5172              | 4197      | 3685        | 6378                      | 6378                              |
| 5173              | 5295      | 4746        | 11124                     |                                   |
| 5174              | 6410      | 5852.5      | 16977                     |                                   |
| 5175              | 7568      | 6989        | 23966                     |                                   |
|                   |           |             | 23966                     |                                   |
|                   |           |             | 23966                     |                                   |
|                   |           |             | 23966                     |                                   |

### POND 2 VOLUME CALCULATIONS

| ELEVATION<br>(ft) | AREA (sf) | VOLUME (cf) | CUMULATIVE<br>VOLUME (cf) |     |
|-------------------|-----------|-------------|---------------------------|-----|
| 5170              | 0         | 0           | 0                         |     |
| 5171              | 399       | 199.5       | 199.5                     |     |
| 5172              | 933       | 666         | 865.5                     | 866 |
| 5173              | 1539      | 1236        | 2101.5                    |     |
| 5174              | 2217      | 1878        | 3979.5                    |     |
| 5175              | 2967      | 2592        | 6571.5                    |     |
|                   |           |             | 6571.5                    |     |

**TOTAL DETENTION POND VOLUME** 30537

### WATER QUALITY BASIN A2 VOLUME CALCULATIONS

| ELEVATION<br>(ft) | AREA (sf) | VOLUME (cf) | CUMULATIVE<br>VOLUME (cf) |      |
|-------------------|-----------|-------------|---------------------------|------|
| 5080              | 221       | 0           | 0                         |      |
| 5181              | 528       | 374.5       | 374.5                     |      |
| 5182              | 930       | 729         | 1103.5                    | 1104 |

### WATER QUALITY BASIN B3 VOLUME CALCULATIONS

| ELEVATION<br>(ft) | AREA (sf) | VOLUME (cf) | CUMULATIVE<br>VOLUME (cf) |     |
|-------------------|-----------|-------------|---------------------------|-----|
| 5070.9            | 589       | 0           | 0                         |     |
| 5071.9            | 896       | 742.5       | 742.5                     | 743 |

**TOTAL RETENTION VOLUME** 9090

### FIRST FLUSH CALCULATIONS

Total Retention Vol Provided= **9090** cubic feet (ELEV 5170 TO 5172 IN PONDS 1&2)

$$A_d = \text{Sum (BASIN A1)+(BASIN A2-A)+(BASIN A2-B)+(BASIN A5)+(BASIN A6)+(BASIN B3)} = 6.42 \text{ A}$$

$$A_d = 6.42 \text{ acres} = 279655 \text{ SQ FT}$$

$$\text{Volume Required} = A_d * (0.44\text{in}-0.1\text{in})$$

$$\text{Vol Req'd} = 7924 \text{ CUBIC FEET} < \text{RETENTION VOLUME PROVIDED, THEREFORE OK}$$

## Worksheet for 30" RCP Capacity Check

### Project Description

|                 |                 |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For       | Normal Depth    |

### Input Data

|                       |         |                    |
|-----------------------|---------|--------------------|
| Roughness Coefficient | 0.013   |                    |
| Channel Slope         | 0.00600 | ft/ft              |
| Diameter              | 2.50    | ft                 |
| Discharge             | 28.53   | ft <sup>3</sup> /s |

### Results

|                   |             |                    |
|-------------------|-------------|--------------------|
| Normal Depth      | 1.85        | ft                 |
| Flow Area         | 3.90        | ft <sup>2</sup>    |
| Wetted Perimeter  | 5.18        | ft                 |
| Hydraulic Radius  | 0.75        | ft                 |
| Top Width         | 2.19        | ft                 |
| Critical Depth    | 1.82        | ft                 |
| Percent Full      | 74.0        | %                  |
| Critical Slope    | 0.00624     | ft/ft              |
| Velocity          | 7.32        | ft/s               |
| Velocity Head     | 0.83        | ft                 |
| Specific Energy   | 2.68        | ft                 |
| Froude Number     | 0.97        |                    |
| Maximum Discharge | 34.18       | ft <sup>3</sup> /s |
| Discharge Full    | 31.77       | ft <sup>3</sup> /s |
| Slope Full        | 0.00484     | ft/ft              |
| Flow Type         | SubCritical |                    |

### GVF Input Data

|                  |      |    |
|------------------|------|----|
| Downstream Depth | 0.00 | ft |
| Length           | 0.00 | ft |
| Number Of Steps  | 0    |    |

### GVF Output Data

|                             |          |      |
|-----------------------------|----------|------|
| Upstream Depth              | 0.00     | ft   |
| Profile Description         |          |      |
| Profile Headloss            | 0.00     | ft   |
| Average End Depth Over Rise | 0.00     | %    |
| Normal Depth Over Rise      | 74.03    | %    |
| Downstream Velocity         | Infinity | ft/s |

## Worksheet for 24" RCP Capacity Check

### Project Description

|                 |                 |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For       | Normal Depth    |

### Input Data

|                       |         |                    |
|-----------------------|---------|--------------------|
| Roughness Coefficient | 0.013   |                    |
| Channel Slope         | 0.01710 | ft/ft              |
| Diameter              | 2.00    | ft                 |
| Discharge             | 28.93   | ft <sup>3</sup> /s |

### Results

|                   |               |                    |
|-------------------|---------------|--------------------|
| Normal Depth      | 1.60          | ft                 |
| Flow Area         | 2.70          | ft <sup>2</sup>    |
| Wetted Perimeter  | 4.43          | ft                 |
| Hydraulic Radius  | 0.61          | ft                 |
| Top Width         | 1.60          | ft                 |
| Critical Depth    | 1.85          | ft                 |
| Percent Full      | 80.0          | %                  |
| Critical Slope    | 0.01418       | ft/ft              |
| Velocity          | 10.73         | ft/s               |
| Velocity Head     | 1.79          | ft                 |
| Specific Energy   | 3.39          | ft                 |
| Froude Number     | 1.46          |                    |
| Maximum Discharge | 31.82         | ft <sup>3</sup> /s |
| Discharge Full    | 29.58         | ft <sup>3</sup> /s |
| Slope Full        | 0.01636       | ft/ft              |
| Flow Type         | SuperCritical |                    |

### GVF Input Data

|                  |      |    |
|------------------|------|----|
| Downstream Depth | 0.00 | ft |
| Length           | 0.00 | ft |
| Number Of Steps  | 0    |    |

### GVF Output Data

|                             |          |      |
|-----------------------------|----------|------|
| Upstream Depth              | 0.00     | ft   |
| Profile Description         |          |      |
| Profile Headloss            | 0.00     | ft   |
| Average End Depth Over Rise | 0.00     | %    |
| Normal Depth Over Rise      | 80.04    | %    |
| Downstream Velocity         | Infinity | ft/s |



## Worksheet for 24" RCP at 1.29%

### Project Description

|                 |                 |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For       | Normal Depth    |

### Input Data

|                       |         |                    |
|-----------------------|---------|--------------------|
| Roughness Coefficient | 0.013   |                    |
| Channel Slope         | 0.01290 | ft/ft              |
| Diameter              | 2.00    | ft                 |
| Discharge             | 26.90   | ft <sup>3</sup> /s |

### Results

|                   |               |                    |
|-------------------|---------------|--------------------|
| Normal Depth      | 1.74          | ft                 |
| Flow Area         | 2.90          | ft <sup>2</sup>    |
| Wetted Perimeter  | 4.81          | ft                 |
| Hydraulic Radius  | 0.60          | ft                 |
| Top Width         | 1.35          | ft                 |
| Critical Depth    | 1.81          | ft                 |
| Percent Full      | 87.0          | %                  |
| Critical Slope    | 0.01241       | ft/ft              |
| Velocity          | 9.27          | ft/s               |
| Velocity Head     | 1.34          | ft                 |
| Specific Energy   | 3.08          | ft                 |
| Froude Number     | 1.11          |                    |
| Maximum Discharge | 27.64         | ft <sup>3</sup> /s |
| Discharge Full    | 25.69         | ft <sup>3</sup> /s |
| Slope Full        | 0.01414       | ft/ft              |
| Flow Type         | SuperCritical |                    |

### GVF Input Data

|                  |      |    |
|------------------|------|----|
| Downstream Depth | 0.00 | ft |
| Length           | 0.00 | ft |
| Number Of Steps  | 0    |    |

### GVF Output Data

|                             |          |      |
|-----------------------------|----------|------|
| Upstream Depth              | 0.00     | ft   |
| Profile Description         |          |      |
| Profile Headloss            | 0.00     | ft   |
| Average End Depth Over Rise | 0.00     | %    |
| Normal Depth Over Rise      | 86.98    | %    |
| Downstream Velocity         | Infinity | ft/s |

## Worksheet for 18" RCP 0.4% Capacity Check

### Project Description

|                 |                 |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For       | Normal Depth    |

### Input Data

|                       |         |                    |
|-----------------------|---------|--------------------|
| Roughness Coefficient | 0.013   |                    |
| Channel Slope         | 0.00400 | ft/ft              |
| Diameter              | 1.50    | ft                 |
| Discharge             | 5.53    | ft <sup>3</sup> /s |

### Results

|                   |             |                    |
|-------------------|-------------|--------------------|
| Normal Depth      | 1.05        | ft                 |
| Flow Area         | 1.31        | ft <sup>2</sup>    |
| Wetted Perimeter  | 2.96        | ft                 |
| Hydraulic Radius  | 0.44        | ft                 |
| Top Width         | 1.38        | ft                 |
| Critical Depth    | 0.91        | ft                 |
| Percent Full      | 69.7        | %                  |
| Critical Slope    | 0.00600     | ft/ft              |
| Velocity          | 4.21        | ft/s               |
| Velocity Head     | 0.27        | ft                 |
| Specific Energy   | 1.32        | ft                 |
| Froude Number     | 0.76        |                    |
| Maximum Discharge | 7.15        | ft <sup>3</sup> /s |
| Discharge Full    | 6.64        | ft <sup>3</sup> /s |
| Slope Full        | 0.00277     | ft/ft              |
| Flow Type         | SubCritical |                    |

### GVF Input Data

|                  |      |    |
|------------------|------|----|
| Downstream Depth | 0.00 | ft |
| Length           | 0.00 | ft |
| Number Of Steps  | 0    |    |

### GVF Output Data

|                             |          |      |
|-----------------------------|----------|------|
| Upstream Depth              | 0.00     | ft   |
| Profile Description         |          |      |
| Profile Headloss            | 0.00     | ft   |
| Average End Depth Over Rise | 0.00     | %    |
| Normal Depth Over Rise      | 69.68    | %    |
| Downstream Velocity         | Infinity | ft/s |

## Worksheet for 18" RCP 0.6% Capacity Check

### Project Description

|                 |                 |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For       | Normal Depth    |

### Input Data

|                       |         |                    |
|-----------------------|---------|--------------------|
| Roughness Coefficient | 0.013   |                    |
| Channel Slope         | 0.00600 | ft/ft              |
| Diameter              | 1.50    | ft                 |
| Discharge             | 8.62    | ft <sup>3</sup> /s |

### Results

|                   |             |                    |
|-------------------|-------------|--------------------|
| Normal Depth      | 1.33        | ft                 |
| Flow Area         | 1.66        | ft <sup>2</sup>    |
| Wetted Perimeter  | 3.69        | ft                 |
| Hydraulic Radius  | 0.45        | ft                 |
| Top Width         | 0.95        | ft                 |
| Critical Depth    | 1.14        | ft                 |
| Percent Full      | 88.8        | %                  |
| Critical Slope    | 0.00791     | ft/ft              |
| Velocity          | 5.20        | ft/s               |
| Velocity Head     | 0.42        | ft                 |
| Specific Energy   | 1.75        | ft                 |
| Froude Number     | 0.69        |                    |
| Maximum Discharge | 8.75        | ft <sup>3</sup> /s |
| Discharge Full    | 8.14        | ft <sup>3</sup> /s |
| Slope Full        | 0.00673     | ft/ft              |
| Flow Type         | SubCritical |                    |

### GVF Input Data

|                  |      |    |
|------------------|------|----|
| Downstream Depth | 0.00 | ft |
| Length           | 0.00 | ft |
| Number Of Steps  | 0    |    |

### GVF Output Data

|                             |          |      |
|-----------------------------|----------|------|
| Upstream Depth              | 0.00     | ft   |
| Profile Description         |          |      |
| Profile Headloss            | 0.00     | ft   |
| Average End Depth Over Rise | 0.00     | %    |
| Normal Depth Over Rise      | 88.83    | %    |
| Downstream Velocity         | Infinity | ft/s |

## Worksheet for 18" RCP Roof Drain Capacity Check

### Project Description

|                 |                 |
|-----------------|-----------------|
| Friction Method | Manning Formula |
| Solve For       | Normal Depth    |

### Input Data

|                       |         |                    |
|-----------------------|---------|--------------------|
| Roughness Coefficient | 0.013   |                    |
| Channel Slope         | 0.00290 | ft/ft              |
| Diameter              | 1.50    | ft                 |
| Discharge             | 4.19    | ft <sup>3</sup> /s |

### Results

|                   |             |                    |
|-------------------|-------------|--------------------|
| Normal Depth      | 0.96        | ft                 |
| Flow Area         | 1.20        | ft <sup>2</sup>    |
| Wetted Perimeter  | 2.78        | ft                 |
| Hydraulic Radius  | 0.43        | ft                 |
| Top Width         | 1.44        | ft                 |
| Critical Depth    | 0.78        | ft                 |
| Percent Full      | 64.0        | %                  |
| Critical Slope    | 0.00548     | ft/ft              |
| Velocity          | 3.51        | ft/s               |
| Velocity Head     | 0.19        | ft                 |
| Specific Energy   | 1.15        | ft                 |
| Froude Number     | 0.68        |                    |
| Maximum Discharge | 6.08        | ft <sup>3</sup> /s |
| Discharge Full    | 5.66        | ft <sup>3</sup> /s |
| Slope Full        | 0.00159     | ft/ft              |
| Flow Type         | SubCritical |                    |

### GVF Input Data

|                  |      |    |
|------------------|------|----|
| Downstream Depth | 0.00 | ft |
| Length           | 0.00 | ft |
| Number Of Steps  | 0    |    |

### GVF Output Data

|                             |          |      |
|-----------------------------|----------|------|
| Upstream Depth              | 0.00     | ft   |
| Profile Description         |          |      |
| Profile Headloss            | 0.00     | ft   |
| Average End Depth Over Rise | 0.00     | %    |
| Normal Depth Over Rise      | 64.05    | %    |
| Downstream Velocity         | Infinity | ft/s |



```

Heritage North Basins
*****
* Heritage Plaza, ALBUQUERQUE, NM *
*****
* 100-YEAR, 24-HR STORM (UNDER PROPOSED CONDITIONS) w/ routing *
*****
*
START                TIME=0.0
*
*
RAINFALL              TYPE=2 RAIN QUARTER=0.0 IN
                      RAIN ONE=1.87 IN RAIN SIX=2.20 IN
                      RAIN DAY=2.66 IN DT=0.05 HR
*DEVELOPED CONDITIONS
*
*BASIN A1
*
COMPUTE NM HYD        ID=1 HYD NO=100.1 AREA=0.00780 SQ MI
                      PER A=0.00 PER B=0.00 PER C=28.0 PER D=72.00
                      TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=1 CODE=1
*
*
*BASIN A2
*
COMPUTE NM HYD        ID=2 HYD NO=100.2 AREA=0.00220 SQ MI
                      PER A=0.00 PER B=0.00 PER C=26.0 PER D=74.00
                      TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=2 CODE=1
*
*
*BASIN A3
*
COMPUTE NM HYD        ID=3 HYD NO=100.3 AREA=0.00134 SQ MI
                      PER A=0.00 PER B=0.00 PER C=22.0 PER D=78.00
                      TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=3 CODE=1
*
*
*BASIN A4
*
COMPUTE NM HYD        ID=4 HYD NO=100.4 AREA=0.00142 SQ MI
                      PER A=0.00 PER B=0.00 PER C=20.0 PER D=80.00
                      TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=4 CODE=1
*
*
*BASIN A5 - ROOF
*
COMPUTE NM HYD        ID=5 HYD NO=100.5 AREA=0.00146 SQ MI
                      PER A=0.00 PER B=0.00 PER C=0.0 PER D=100.00
                      TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=5 CODE=1
*
*
*BASIN A6 - DRIVE
*
COMPUTE NM HYD        ID=6 HYD NO=100.6 AREA=0.00071 SQ MI
                      PER A=0.00 PER B=0.00 PER C=17.0 PER D=83.00
                      TP=-0.1333 HR MASS RAINFALL=-1
PRINT HYD             ID=6 CODE=1
*
*
ADD HYD               ID=50 HYD NO=100.21 ID=1 ID=2
ADD HYD               ID=50 HYD NO=100.21 ID=50 ID=3
ADD HYD               ID=50 HYD NO=100.21 ID=50 ID=4
ADD HYD               ID=50 HYD NO=100.21 ID=50 ID=5

```

# Heritage North Basins

\*

PRINT HYD ID=50 CODE=1

\*

\*

\*ROUTE BASIN 1,2,3,4 & 5 THROUGH DETENTION PONDS

|                 |               |                |               |         |
|-----------------|---------------|----------------|---------------|---------|
| ROUTE RESERVOIR | ID=55         | HYD NO=200.1   | INFLOW ID=50  | CODE=24 |
|                 | OUTFLOW (CFS) | STORAGE(AC-FT) | ELEVATION(FT) |         |
|                 | 0.0           | 0.0            | 70.00         |         |
|                 | 0.010         | 0.0664         | 71.00         |         |
|                 | 0.0100        | 0.1662         | 72.00         |         |
|                 | 10.690        | 0.3036         | 73.00         |         |
|                 | 18.520        | 0.4810         | 74.00         |         |
|                 | 23.913        | 0.7010         | 75.00         |         |

\*

PRINT HYD ID=55 CODE=1

\*

\*

ADD HYD ID=56 HYD NO=100.22 ID=55 ID=6

PRINT HYD ID=56 CODE=1

\*

\*

FINISH

# AHYMO

01a AHYMO PROGRAM (AHYMO-S4) - Version: S4.01a - Rel:  
 RUN DATE (MON/DAY/YR) = 03/25/2015  
 START TIME (HR:MIN:SEC) = 11:55:30 USER NO.=  
 TierraWest-SiteA99368577  
 INPUT FILE = C:\Users\Joel\Desktop\Heritage North Basins.txt

\*\*\*\*\*

\* Heritage Plaza, ALBUQUERQUE, NM \*

\*\*\*\*\*

\* 100-YEAR, 24-HR STORM (UNDER PROPOSED CONDITIONS) w/ routing \*

\*\*\*\*\*

\*

START TIME=0.0

\*

\*

RAINFALL TYPE=2 RAIN QUARTER=0.0 IN

RAIN ONE=1.87 IN RAIN SIX=2.20 IN

RAIN DAY=2.66 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 | 0.0022 | 0.0045 | 0.0069 | 0.0096 | 0.0123 | 0.0154 |
| 0.0197 | 0.0264 | 0.0336 | 0.0412 | 0.0494 | 0.0578 | 0.0664 |
| 0.0753 | 0.0844 | 0.0946 | 0.1052 | 0.1168 | 0.1387 | 0.1657 |
| 0.2020 | 0.2430 | 0.2937 | 0.3614 | 0.4375 | 0.5689 | 0.7733 |
| 1.1234 | 1.3695 | 1.5635 | 1.6610 | 1.7465 | 1.8079 | 1.8568 |
| 1.8994 | 1.9306 | 1.9592 | 1.9828 | 1.9979 | 2.0087 | 2.0183 |
| 2.0273 | 2.0352 | 2.0426 | 2.0499 | 2.0568 | 2.0625 | 2.0659 |
| 2.0692 | 2.0724 | 2.0754 | 2.0784 | 2.0813 | 2.0842 | 2.0870 |
| 2.0896 | 2.0923 | 2.0949 | 2.0974 | 2.0999 | 2.1023 | 2.1046 |
| 2.1069 | 2.1092 | 2.1115 | 2.1136 | 2.1158 | 2.1179 | 2.1199 |
| 2.1220 | 2.1240 | 2.1260 | 2.1280 | 2.1299 | 2.1318 | 2.1337 |
| 2.1356 | 2.1374 | 2.1392 | 2.1411 | 2.1428 | 2.1446 | 2.1463 |
| 2.1481 | 2.1498 | 2.1514 | 2.1531 | 2.1548 | 2.1564 | 2.1580 |
| 2.1596 | 2.1612 | 2.1628 | 2.1643 | 2.1658 | 2.1674 | 2.1689 |
| 2.1704 | 2.1718 | 2.1733 | 2.1747 | 2.1762 | 2.1776 | 2.1790 |
| 2.1804 | 2.1818 | 2.1832 | 2.1845 | 2.1859 | 2.1872 | 2.1885 |
| 2.1899 | 2.1912 | 2.1925 | 2.1937 | 2.1950 | 2.1963 | 2.1975 |
| 2.1988 | 2.2000 | 2.2013 | 2.2026 | 2.2038 | 2.2051 | 2.2064 |
| 2.2077 | 2.2089 | 2.2102 | 2.2115 | 2.2128 | 2.2141 | 2.2153 |
| 2.2166 | 2.2179 | 2.2192 | 2.2204 | 2.2217 | 2.2230 | 2.2243 |
| 2.2256 | 2.2268 | 2.2281 | 2.2294 | 2.2307 | 2.2319 | 2.2332 |
| 2.2345 | 2.2358 | 2.2371 | 2.2383 | 2.2396 | 2.2409 | 2.2422 |
| 2.2434 | 2.2447 | 2.2460 | 2.2473 | 2.2486 | 2.2498 | 2.2511 |
| 2.2524 | 2.2537 | 2.2549 | 2.2562 | 2.2575 | 2.2588 | 2.2601 |
| 2.2613 | 2.2626 | 2.2639 | 2.2652 | 2.2664 | 2.2677 | 2.2690 |
| 2.2703 | 2.2716 | 2.2728 | 2.2741 | 2.2754 | 2.2767 | 2.2779 |
| 2.2792 | 2.2805 | 2.2818 | 2.2831 | 2.2843 | 2.2856 | 2.2869 |
| 2.2882 | 2.2894 | 2.2907 | 2.2920 | 2.2933 | 2.2946 | 2.2958 |
| 2.2971 | 2.2984 | 2.2997 | 2.3009 | 2.3022 | 2.3035 | 2.3048 |

| AHYMO  |        |        |        |        |        |        |  |
|--------|--------|--------|--------|--------|--------|--------|--|
| 2.3061 | 2.3073 | 2.3086 | 2.3099 | 2.3112 | 2.3124 | 2.3137 |  |
| 2.3150 | 2.3163 | 2.3176 | 2.3188 | 2.3201 | 2.3214 | 2.3227 |  |
| 2.3239 | 2.3252 | 2.3265 | 2.3278 | 2.3291 | 2.3303 | 2.3316 |  |
| 2.3329 | 2.3342 | 2.3354 | 2.3367 | 2.3380 | 2.3393 | 2.3406 |  |
| 2.3418 | 2.3431 | 2.3444 | 2.3457 | 2.3469 | 2.3482 | 2.3495 |  |
| 2.3508 | 2.3521 | 2.3533 | 2.3546 | 2.3559 | 2.3572 | 2.3584 |  |
| 2.3597 | 2.3610 | 2.3623 | 2.3636 | 2.3648 | 2.3661 | 2.3674 |  |
| 2.3687 | 2.3699 | 2.3712 | 2.3725 | 2.3738 | 2.3750 | 2.3763 |  |
| 2.3776 | 2.3789 | 2.3802 | 2.3814 | 2.3827 | 2.3840 | 2.3853 |  |
| 2.3865 | 2.3878 | 2.3891 | 2.3904 | 2.3917 | 2.3929 | 2.3942 |  |
| 2.3955 | 2.3968 | 2.3980 | 2.3993 | 2.4006 | 2.4019 | 2.4032 |  |
| 2.4044 | 2.4057 | 2.4070 | 2.4083 | 2.4095 | 2.4108 | 2.4121 |  |
| 2.4134 | 2.4147 | 2.4159 | 2.4172 | 2.4185 | 2.4198 | 2.4210 |  |
| 2.4223 | 2.4236 | 2.4249 | 2.4262 | 2.4274 | 2.4287 | 2.4300 |  |
| 2.4313 | 2.4325 | 2.4338 | 2.4351 | 2.4364 | 2.4377 | 2.4389 |  |
| 2.4402 | 2.4415 | 2.4428 | 2.4440 | 2.4453 | 2.4466 | 2.4479 |  |
| 2.4492 | 2.4504 | 2.4517 | 2.4530 | 2.4543 | 2.4555 | 2.4568 |  |
| 2.4581 | 2.4594 | 2.4607 | 2.4619 | 2.4632 | 2.4645 | 2.4658 |  |
| 2.4670 | 2.4683 | 2.4696 | 2.4709 | 2.4722 | 2.4734 | 2.4747 |  |
| 2.4760 | 2.4773 | 2.4785 | 2.4798 | 2.4811 | 2.4824 | 2.4837 |  |
| 2.4849 | 2.4862 | 2.4875 | 2.4888 | 2.4900 | 2.4913 | 2.4926 |  |
| 2.4939 | 2.4952 | 2.4964 | 2.4977 | 2.4990 | 2.5003 | 2.5015 |  |
| 2.5028 | 2.5041 | 2.5054 | 2.5067 | 2.5079 | 2.5092 | 2.5105 |  |
| 2.5118 | 2.5130 | 2.5143 | 2.5156 | 2.5169 | 2.5182 | 2.5194 |  |
| 2.5207 | 2.5220 | 2.5233 | 2.5245 | 2.5258 | 2.5271 | 2.5284 |  |
| 2.5297 | 2.5309 | 2.5322 | 2.5335 | 2.5348 | 2.5360 | 2.5373 |  |
| 2.5386 | 2.5399 | 2.5412 | 2.5424 | 2.5437 | 2.5450 | 2.5463 |  |
| 2.5475 | 2.5488 | 2.5501 | 2.5514 | 2.5527 | 2.5539 | 2.5552 |  |
| 2.5565 | 2.5578 | 2.5590 | 2.5603 | 2.5616 | 2.5629 | 2.5642 |  |
| 2.5654 | 2.5667 | 2.5680 | 2.5693 | 2.5705 | 2.5718 | 2.5731 |  |
| 2.5744 | 2.5757 | 2.5769 | 2.5782 | 2.5795 | 2.5808 | 2.5820 |  |
| 2.5833 | 2.5846 | 2.5859 | 2.5872 | 2.5884 | 2.5897 | 2.5910 |  |
| 2.5923 | 2.5935 | 2.5948 | 2.5961 | 2.5974 | 2.5987 | 2.5999 |  |
| 2.6012 | 2.6025 | 2.6038 | 2.6050 | 2.6063 | 2.6076 | 2.6089 |  |
| 2.6102 | 2.6114 | 2.6127 | 2.6140 | 2.6153 | 2.6165 | 2.6178 |  |
| 2.6191 | 2.6204 | 2.6217 | 2.6229 | 2.6242 | 2.6255 | 2.6268 |  |
| 2.6280 | 2.6293 | 2.6306 | 2.6319 | 2.6332 | 2.6344 | 2.6357 |  |
| 2.6370 | 2.6383 | 2.6395 | 2.6408 | 2.6421 | 2.6434 | 2.6447 |  |
| 2.6459 | 2.6472 | 2.6485 | 2.6498 | 2.6510 | 2.6523 | 2.6536 |  |
| 2.6549 | 2.6562 | 2.6574 | 2.6587 | 2.6600 |        |        |  |

\*DEVELOPED CONDITIONS

\*

\*BASIN A1

\*

COMPUTE NM HYD ID=1 HYD NO=100.1 AREA=0.00780 SQ MI

PER A=0.00 PER B=0.00 PER C=28.0 PER D=72.00

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 = 22.172 CFS UNIT VOLUME = 0.9986 B =  
 526.28 P60 = 1.8700  
 AREA = 0.005616 SQ MI IA = 0.10000 INCHES INF = 0.04000  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = 0.050000



K = 0.105867HR TP = 0.133300HR K/TP RATIO = 0.794199  
 SHAPE CONSTANT, N = 4.514592  
 UNIT PEAK = 6.3592 CFS UNIT VOLUME = 0.9999 B =  
 388.14 P60 = 1.8700  
 AREA = 0.002184 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 = 2.04333 INCHES = 0.8500 ACRE-Feet  
 PEAK DISCHARGE RATE = 20.48 CFS AT 1.500 HOURS BASIN AREA =  
 0.0078 SQ. MI.

\*

\*

\*BASIN A2

\*

COMPUTE NM HYD ID=2 HYD NO=100.2 AREA=0.00220 SQ MI

PER A=0.00 PER B=0.00 PER C=26.0 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 = 6.4274 CFS UNIT VOLUME = 0.9975 B =  
 526.28 P60 = 1.8700  
 AREA = 0.001628 SQ MI IA = 0.10000 INCHES INF = 0.04000  
 INCHES PER HOUR  
 RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
 DT = 0.050000

K = 0.105867HR TP = 0.133300HR K/TP RATIO = 0.794199  
 SHAPE CONSTANT, N = 4.514592  
 UNIT PEAK = 1.6655 CFS UNIT VOLUME = 0.9941 B =  
 388.14 P60 = 1.8700  
 AREA = 0.000572 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 = 2.06992 INCHES = 0.2429 ACRE-Feet  
 PEAK DISCHARGE RATE = 5.83 CFS AT 1.500 HOURS BASIN AREA =  
 0.0022 SQ. MI.

# AHYMO

\*

\*

\*BASIN A3

\*

COMPUTE NM HYD ID=3 HYD NO=100.3 AREA=0.00134 SQ MI  
PER A=0.00 PER B=0.00 PER C=22.0 PER D=78.00  
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 = 4.1265 CFS UNIT VOLUME = 0.9966 B =  
526.28 P60 = 1.8700  
AREA = 0.001045 SQ MI IA = 0.10000 INCHES INF = 0.04000  
INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
DT = 0.050000

K = 0.105867HR TP = 0.133300HR K/TP RATIO = 0.794199  
SHAPE CONSTANT, N = 4.514592  
UNIT PEAK = 0.85838 CFS UNIT VOLUME = 0.9874 B =  
388.14 P60 = 1.8700  
AREA = 0.000295 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=3 CODE=1

PARTIAL HYDROGRAPH 100.30

RUNOFF VOLUME = 2.12311 INCHES = 0.1517 ACRE-FEET  
PEAK DISCHARGE RATE = 3.60 CFS AT 1.500 HOURS BASIN AREA =  
0.0013 SQ. MI.

\*

\*

\*BASIN A4

\*

COMPUTE NM HYD ID=4 HYD NO=100.4 AREA=0.00142 SQ MI  
PER A=0.00 PER B=0.00 PER C=20.0 PER D=80.00  
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 = 4.4850 CFS UNIT VOLUME = 0.9966 B =  
526.28 P60 = 1.8700

AREA = 0.001136 SQ MI AHYMO  
INCHES PER HOUR IA = 0.10000 INCHES INF = 0.04000  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
DT = 0.050000

K = 0.105867HR TP = 0.133300HR K/TP RATIO = 0.794199  
SHAPE CONSTANT, N = 4.514592  
UNIT PEAK = 0.82693 CFS UNIT VOLUME = 0.9874 B =  
388.14 P60 = 1.8700  
AREA = 0.000284 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=4 CODE=1

PARTIAL HYDROGRAPH 100.40

RUNOFF VOLUME = 2.14971 INCHES = 0.1628 ACRE-Feet  
PEAK DISCHARGE RATE = 3.84 CFS AT 1.500 HOURS BASIN AREA =  
0.0014 SQ. MI.

\*

\*

\*BASIN A5 - ROOF

\*

COMPUTE NM HYD ID=5 HYD NO=100.5 AREA=0.00146 SQ MI  
PER A=0.00 PER B=0.00 PER C=0.0 PER D=100.00  
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 = 5.7642 CFS UNIT VOLUME = 0.9971 B =  
526.28 P60 = 1.8700  
AREA = 0.001460 SQ MI IA = 0.10000 INCHES INF = 0.04000  
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 = 2.41566 INCHES = 0.1881 ACRE-Feet  
PEAK DISCHARGE RATE = 4.19 CFS AT 1.500 HOURS BASIN AREA =  
0.0015 SQ. MI.

\*

\*

# AHYMO

\*BASIN A6 - DRIVE

\*

COMPUTE NM HYD ID=6 HYD NO=100.6 AREA=0.00071 SQ MI  
PER A=0.00 PER B=0.00 PER C=17.0 PER D=83.00  
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 = 2.3266 CFS UNIT VOLUME = 0.9941 B =  
526.28 P60 = 1.8700  
AREA = 0.000589 SQ MI IA = 0.10000 INCHES INF = 0.04000  
INCHES PER HOUR  
RUNOFF COMPUTED BY INITIAL ABSTRACTION/INFILTRATION NUMBER METHOD -  
DT = 0.050000

K = 0.105867HR TP = 0.133300HR K/TP RATIO = 0.794199  
SHAPE CONSTANT, N = 4.514592  
UNIT PEAK = 0.35145 CFS UNIT VOLUME = 0.9649 B =  
388.14 P60 = 1.8700  
AREA = 0.000121 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 = 2.18960 INCHES = 0.0829 ACRE-Feet  
PEAK DISCHARGE RATE = 1.95 CFS AT 1.500 HOURS BASIN AREA =  
0.0007 SQ. MI.

\*

\*

ADD HYD ID=50 HYD NO=100.21 ID=1 ID=2  
ADD HYD ID=50 HYD NO=100.21 ID=50 ID=3  
ADD HYD ID=50 HYD NO=100.21 ID=50 ID=4  
ADD HYD ID=50 HYD NO=100.21 ID=50 ID=5

\*

PRINT HYD ID=50 CODE=1

PARTIAL HYDROGRAPH 100.21

RUNOFF VOLUME = 2.10371 INCHES = 1.5954 ACRE-Feet  
PEAK DISCHARGE RATE = 37.93 CFS AT 1.500 HOURS BASIN AREA =  
0.0142 SQ. MI.

AHYMO

\*

\*

\*ROUTE BASIN 1,2,3,4 & 5 THROUGH DETENTION PONDS

ROUTE RESERVOIR ID=55 HYD NO=200.1 INFLOW ID=50 CODE=24

OUTFLOW (CFS) STORAGE(AC-FT) ELEVATION(FT)

|        |        |       |
|--------|--------|-------|
| 0.0    | 0.0    | 70.00 |
| 0.010  | 0.0664 | 71.00 |
| 0.0100 | 0.1662 | 72.00 |
| 10.690 | 0.3036 | 73.00 |
| 18.520 | 0.4810 | 74.00 |
| 23.913 | 0.7010 | 75.00 |

\* \* \* \* \*

| TIME<br>(HRS) | INFLOW<br>(CFS) | ELEV<br>(FEET) | VOLUME<br>(AC-FT) | OUTFLOW<br>(CFS) |
|---------------|-----------------|----------------|-------------------|------------------|
| 0.00          | 0.00            | 70.00          | 0.000             | 0.00             |
| 1.20          | 4.92            | 70.85          | 0.056             | 0.01             |
| 2.40          | 1.22            | 72.28          | 0.204             | 2.97             |
| 3.60          | 0.06            | 72.01          | 0.167             | 0.07             |
| 4.80          | 0.10            | 72.01          | 0.167             | 0.09             |
| 6.00          | 0.17            | 72.01          | 0.168             | 0.16             |
| 7.20          | 0.18            | 72.02          | 0.168             | 0.18             |
| 8.40          | 0.18            | 72.02          | 0.168             | 0.18             |
| 9.60          | 0.18            | 72.02          | 0.168             | 0.18             |
| 10.80         | 0.18            | 72.02          | 0.168             | 0.18             |
| 12.00         | 0.18            | 72.02          | 0.168             | 0.18             |
| 13.20         | 0.18            | 72.02          | 0.168             | 0.18             |
| 14.40         | 0.18            | 72.02          | 0.168             | 0.18             |
| 15.60         | 0.18            | 72.02          | 0.168             | 0.18             |
| 16.80         | 0.18            | 72.02          | 0.168             | 0.18             |
| 18.00         | 0.18            | 72.02          | 0.168             | 0.18             |
| 19.20         | 0.18            | 72.02          | 0.168             | 0.18             |
| 20.40         | 0.18            | 72.02          | 0.168             | 0.18             |
| 21.60         | 0.18            | 72.02          | 0.168             | 0.18             |
| 22.80         | 0.18            | 72.02          | 0.168             | 0.18             |
| 24.00         | 0.18            | 72.02          | 0.168             | 0.18             |
| 25.20         | 0.00            | 72.00          | 0.166             | 0.01             |
| 26.40         | 0.00            | 72.00          | 0.166             | 0.01             |
| 27.60         | 0.00            | 72.00          | 0.166             | 0.01             |
| 28.80         | 0.00            | 72.00          | 0.166             | 0.01             |
| 30.00         | 0.00            | 72.00          | 0.166             | 0.01             |
| 31.20         | 0.00            | 72.00          | 0.166             | 0.01             |
| 32.40         | 0.00            | 72.00          | 0.166             | 0.01             |
| 33.60         | 0.00            | 72.00          | 0.166             | 0.01             |
| 34.80         | 0.00            | 72.00          | 0.166             | 0.01             |
| 36.00         | 0.00            | 72.00          | 0.166             | 0.01             |
| 37.20         | 0.00            | 72.00          | 0.166             | 0.01             |
| 38.40         | 0.00            | 72.00          | 0.166             | 0.01             |
| 39.60         | 0.00            | 72.00          | 0.166             | 0.01             |
| 40.80         | 0.00            | 72.00          | 0.166             | 0.01             |



|       |      |       |       |      |
|-------|------|-------|-------|------|
|       |      |       | AHYMO |      |
| 42.00 | 0.00 | 72.00 | 0.166 | 0.01 |
| 43.20 | 0.00 | 72.00 | 0.166 | 0.01 |
| 44.40 | 0.00 | 72.00 | 0.166 | 0.01 |
| 45.60 | 0.00 | 72.00 | 0.166 | 0.01 |
| 46.80 | 0.00 | 72.00 | 0.166 | 0.01 |
| 48.00 | 0.00 | 72.00 | 0.166 | 0.01 |
| 49.20 | 0.00 | 72.00 | 0.166 | 0.01 |
| 50.40 | 0.00 | 72.00 | 0.166 | 0.01 |
| 51.60 | 0.00 | 72.00 | 0.166 | 0.01 |
| 52.80 | 0.00 | 72.00 | 0.166 | 0.01 |
| 54.00 | 0.00 | 72.00 | 0.166 | 0.01 |
| 55.20 | 0.00 | 72.00 | 0.166 | 0.01 |
| 56.40 | 0.00 | 72.00 | 0.166 | 0.01 |
| 57.60 | 0.00 | 72.00 | 0.166 | 0.01 |
| 58.80 | 0.00 | 72.00 | 0.166 | 0.01 |
| 60.00 | 0.00 | 72.00 | 0.166 | 0.01 |
| 61.20 | 0.00 | 72.00 | 0.166 | 0.01 |
| 62.40 | 0.00 | 72.00 | 0.166 | 0.01 |
| 63.60 | 0.00 | 72.00 | 0.166 | 0.01 |
| 64.80 | 0.00 | 72.00 | 0.166 | 0.01 |
| 66.00 | 0.00 | 72.00 | 0.166 | 0.01 |

| TIME<br>(HRS) | INFLOW<br>(CFS) | ELEV<br>(FEET) | VOLUME<br>(AC-FT) | OUTFLOW<br>(CFS) |
|---------------|-----------------|----------------|-------------------|------------------|
| 67.20         | 0.00            | 72.00          | 0.166             | 0.01             |
| 68.40         | 0.00            | 72.00          | 0.166             | 0.01             |
| 69.60         | 0.00            | 72.00          | 0.166             | 0.01             |
| 70.80         | 0.00            | 72.00          | 0.166             | 0.01             |
| 72.00         | 0.00            | 72.00          | 0.166             | 0.01             |
| 73.20         | 0.00            | 72.00          | 0.166             | 0.01             |
| 74.40         | 0.00            | 72.00          | 0.166             | 0.01             |
| 75.60         | 0.00            | 72.00          | 0.166             | 0.01             |
| 76.80         | 0.00            | 72.00          | 0.166             | 0.01             |
| 78.00         | 0.00            | 72.00          | 0.166             | 0.01             |
| 79.20         | 0.00            | 72.00          | 0.166             | 0.01             |
| 80.40         | 0.00            | 72.00          | 0.166             | 0.01             |
| 81.60         | 0.00            | 72.00          | 0.166             | 0.01             |
| 82.80         | 0.00            | 72.00          | 0.166             | 0.01             |
| 84.00         | 0.00            | 72.00          | 0.166             | 0.01             |
| 85.20         | 0.00            | 72.00          | 0.166             | 0.01             |
| 86.40         | 0.00            | 72.00          | 0.166             | 0.01             |
| 87.60         | 0.00            | 72.00          | 0.166             | 0.01             |
| 88.80         | 0.00            | 72.00          | 0.166             | 0.01             |
| 90.00         | 0.00            | 72.00          | 0.166             | 0.01             |
| 91.20         | 0.00            | 72.00          | 0.166             | 0.01             |
| 92.40         | 0.00            | 72.00          | 0.166             | 0.01             |
| 93.60         | 0.00            | 72.00          | 0.166             | 0.01             |
| 94.80         | 0.00            | 72.00          | 0.166             | 0.01             |
| 96.00         | 0.00            | 72.00          | 0.166             | 0.01             |
| 97.20         | 0.00            | 72.00          | 0.166             | 0.01             |
| 98.40         | 0.00            | 72.00          | 0.166             | 0.01             |
| 99.60         | 0.00            | 72.00          | 0.166             | 0.01             |
| 100.80        | 0.00            | 72.00          | 0.166             | 0.01             |
| 102.00        | 0.00            | 72.00          | 0.166             | 0.01             |
| 103.20        | 0.00            | 72.00          | 0.166             | 0.01             |
| 104.40        | 0.00            | 72.00          | 0.166             | 0.01             |
| 105.60        | 0.00            | 72.00          | 0.166             | 0.01             |
| 106.80        | 0.00            | 72.00          | 0.166             | 0.01             |
| 108.00        | 0.00            | 72.00          | 0.166             | 0.01             |
| 109.20        | 0.00            | 72.00          | 0.166             | 0.01             |
| 110.40        | 0.00            | 72.00          | 0.166             | 0.01             |
| 111.60        | 0.00            | 72.00          | 0.166             | 0.01             |
| 112.80        | 0.00            | 72.00          | 0.166             | 0.01             |
| 114.00        | 0.00            | 72.00          | 0.166             | 0.01             |
| 115.20        | 0.00            | 72.00          | 0.166             | 0.01             |

|        |      |       |       |      |
|--------|------|-------|-------|------|
|        |      |       | AHYMO |      |
| 116.40 | 0.00 | 72.00 | 0.166 | 0.01 |
| 117.60 | 0.00 | 72.00 | 0.166 | 0.01 |
| 118.80 | 0.00 | 72.00 | 0.166 | 0.01 |
| 120.00 | 0.00 | 72.00 | 0.166 | 0.01 |
| 121.20 | 0.00 | 72.00 | 0.166 | 0.01 |
| 122.40 | 0.00 | 72.00 | 0.166 | 0.01 |
| 123.60 | 0.00 | 72.00 | 0.166 | 0.01 |
| 124.80 | 0.00 | 72.00 | 0.166 | 0.01 |
| 126.00 | 0.00 | 72.00 | 0.166 | 0.01 |
| 127.20 | 0.00 | 72.00 | 0.166 | 0.01 |
| 128.40 | 0.00 | 72.00 | 0.166 | 0.01 |
| 129.60 | 0.00 | 72.00 | 0.166 | 0.01 |
| 130.80 | 0.00 | 72.00 | 0.166 | 0.01 |
| 132.00 | 0.00 | 72.00 | 0.166 | 0.01 |
| 133.20 | 0.00 | 72.00 | 0.166 | 0.01 |

| TIME<br>(HRS) | INFLOW<br>(CFS) | ELEV<br>(FEET) | VOLUME<br>(AC-FT) | OUTFLOW<br>(CFS) |
|---------------|-----------------|----------------|-------------------|------------------|
| 134.40        | 0.00            | 72.00          | 0.166             | 0.01             |
| 135.60        | 0.00            | 72.00          | 0.166             | 0.01             |
| 136.80        | 0.00            | 72.00          | 0.166             | 0.01             |
| 138.00        | 0.00            | 72.00          | 0.166             | 0.01             |
| 139.20        | 0.00            | 72.00          | 0.166             | 0.01             |
| 140.40        | 0.00            | 72.00          | 0.166             | 0.01             |
| 141.60        | 0.00            | 72.00          | 0.166             | 0.01             |
| 142.80        | 0.00            | 72.00          | 0.166             | 0.01             |
| 144.00        | 0.00            | 72.00          | 0.166             | 0.01             |
| 145.20        | 0.00            | 72.00          | 0.166             | 0.01             |
| 146.40        | 0.00            | 70.99          | 0.066             | 0.01             |
| 147.60        | 0.00            | 70.97          | 0.065             | 0.01             |
| 148.80        | 0.00            | 70.96          | 0.064             | 0.01             |
| 150.00        | 0.00            | 70.95          | 0.063             | 0.01             |
| 151.20        | 0.00            | 70.93          | 0.062             | 0.01             |
| 152.40        | 0.00            | 70.92          | 0.061             | 0.01             |
| 153.60        | 0.00            | 70.90          | 0.060             | 0.01             |
| 154.80        | 0.00            | 70.89          | 0.059             | 0.01             |
| 156.00        | 0.00            | 70.88          | 0.058             | 0.01             |
| 157.20        | 0.00            | 70.86          | 0.057             | 0.01             |
| 158.40        | 0.00            | 70.85          | 0.057             | 0.01             |
| 159.60        | 0.00            | 70.84          | 0.056             | 0.01             |
| 160.80        | 0.00            | 70.83          | 0.055             | 0.01             |
| 162.00        | 0.00            | 70.81          | 0.054             | 0.01             |
| 163.20        | 0.00            | 70.80          | 0.053             | 0.01             |
| 164.40        | 0.00            | 70.79          | 0.052             | 0.01             |
| 165.60        | 0.00            | 70.78          | 0.052             | 0.01             |
| 166.80        | 0.00            | 70.77          | 0.051             | 0.01             |
| 168.00        | 0.00            | 70.76          | 0.050             | 0.01             |
| 169.20        | 0.00            | 70.74          | 0.049             | 0.01             |
| 170.40        | 0.00            | 70.73          | 0.049             | 0.01             |
| 171.60        | 0.00            | 70.72          | 0.048             | 0.01             |
| 172.80        | 0.00            | 70.71          | 0.047             | 0.01             |
| 174.00        | 0.00            | 70.70          | 0.047             | 0.01             |
| 175.20        | 0.00            | 70.69          | 0.046             | 0.01             |
| 176.40        | 0.00            | 70.68          | 0.045             | 0.01             |
| 177.60        | 0.00            | 70.67          | 0.045             | 0.01             |
| 178.80        | 0.00            | 70.66          | 0.044             | 0.01             |
| 180.00        | 0.00            | 70.65          | 0.043             | 0.01             |
| 181.20        | 0.00            | 70.64          | 0.043             | 0.01             |
| 182.40        | 0.00            | 70.63          | 0.042             | 0.01             |
| 183.60        | 0.00            | 70.62          | 0.041             | 0.01             |
| 184.80        | 0.00            | 70.61          | 0.041             | 0.01             |
| 186.00        | 0.00            | 70.60          | 0.040             | 0.01             |
| 187.20        | 0.00            | 70.60          | 0.040             | 0.01             |
| 188.40        | 0.00            | 70.59          | 0.039             | 0.01             |
| 189.60        | 0.00            | 70.58          | 0.038             | 0.01             |

| AHYMO  |      |       |       |      |
|--------|------|-------|-------|------|
| 190.80 | 0.00 | 70.57 | 0.038 | 0.01 |
| 192.00 | 0.00 | 70.56 | 0.037 | 0.01 |
| 193.20 | 0.00 | 70.55 | 0.037 | 0.01 |
| 194.40 | 0.00 | 70.54 | 0.036 | 0.01 |
| 195.60 | 0.00 | 70.54 | 0.036 | 0.01 |
| 196.80 | 0.00 | 70.53 | 0.035 | 0.01 |
| 198.00 | 0.00 | 70.52 | 0.035 | 0.01 |
| 199.20 | 0.00 | 70.51 | 0.034 | 0.01 |

PEAK DISCHARGE = 20.369 CFS - PEAK OCCURS AT HOUR 1.65  
 MAXIMUM WATER SURFACE ELEVATION = 74.343 <75.0, therefore OK  
 MAXIMUM STORAGE = 0.5564 AC-FT INCREMENTAL TIME= 0.050000HRS

\*

PRINT HYD ID=55 CODE=1

PARTIAL HYDROGRAPH 200.10

RUNOFF VOLUME = 2.05926 INCHES = 1.5617 ACRE-FEET  
 PEAK DISCHARGE RATE = 20.37 CFS AT 1.650 HOURS BASIN AREA = 0.0142 SQ. MI.

\*

\*

ADD HYD ID=56 HYD NO=100.22 ID=55 ID=6

PRINT HYD ID=56 CODE=1

PARTIAL HYDROGRAPH 100.22

RUNOFF VOLUME = 2.06544 INCHES = 1.6446 ACRE-FEET  
 PEAK DISCHARGE RATE = 21.53 CFS AT 1.650 HOURS BASIN AREA = 0.0149 SQ. MI.

\*

\*

FINISH

NORMAL PROGRAM FINISH END TIME (HR:MIN:SEC) = 11:55:30

