# CITY OF ALBUQUERQUE

Timothy M. Keller, Mayor

December 28, 2017

Jonathan Niski, P.E.
Tierra West, LLC
5571 Midway Park Place NE
Albuquerque, NM, 87109

**RE: Wagner Osuna -400 Osuna Rd NE**
**Drainage Report**
**Stamp Date: 12/08/17**
**Hydrology File: E17D022**

Dear Mr. Niski:

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

Based upon the information provided in your submittal received 12/21/2017, the Drainage Report **is not** approved for Grading Permit. The following comments need to be addressed for approval of the above referenced project:

1. A Grading Plan needs to accompany the Drainage Report. This Grading Plan and Drainage Report will then be used for the Grading Permit.
2. Please show 1' contours of the existing property in the area of the proposed retention pond. Topographic survey should include all existing structures and trees.
3. The Grading Plan should show the limits of grading and detail as to how the proposed grading is going to be tied back into the existing grades.
4. The proposed retention pond needs to be tied to the property line and have an overall plan to locate the pond within the property.
5. The Grading Plan should also show how the drainage area is to drain to the retention pond.
6. The Grading Plan should also show a cross section of the retention pond and a detail of the emergency spillway.

Orig: Drainage File

# CITY OF ALBUQUERQUE

Timothy M. Keller, Mayor

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

Sincerely,

Renée C. Brissette

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

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

Orig: Drainage File

# SUPPLEMENTAL DRAINAGE MANAGEMENT PLAN

**for**

# *Wagner Equipment*
# *4000 Osuna Rd. NE*
# *Albuquerque, NM*

Prepared by:

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

Prepared for:

Wagner Equipment
4000 Osuan Rd. NE
Albuquerque, NM 87106

October 2017

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

Ronald R. Bohannan, PE
NO. 7686

Job No. 2017027

# TABLE OF CONTENTS



**APPENDICES**

**Location**

This is a modification to the Rust Tractor Storm Drain Improvement Report prepared by BPLW Architects & Engineers, Inc. stamped July, 2001. This report is being generated to reevaluate land uses on what is formerly known as the Rust Tractor property and now known as the Wagner Equipment property. The property is located at 4000 Osuna Rd. NE which is just west of Jefferson Street. The site contains approximately 40 acres. The purpose of this report is to provide an revised drainage analysis and management plan for the remediation of an existing pond and modify the report completed BPLW which designed a detention pond and replace it with a retention pond.

**Existing Drainage Conditions**

Currently, the proposed site is developed and no offsite flows enter the site. The site drainage patterns are the same as explained in the BPLW report, however the ponds in that report were never constructed. Instead flows from Areas 2 are conveyed to the existing retention pond in the northwest corner of the site along Osuna Road. The flows in Area 3, as shown on that Grading Plan are directed to a retention pond located in the southwest corner of the property. Over the years that pond was filled in and became overgrown. Recently it was discovered there was an amount of contaminated soil in and around the pond that had to be remediated. Thus the pond was to be reconstructed and a plastic barrier was to be installed.

**On-Site Drainage Management Plan**

Basically, everything will remain the same as it currently exists today, however the pond in the southwest corner will now be sized as a retention pond and not discharge any storm water to the south as in the system designed by BPLW. The flows will continue to sheet flow to this location where they will be collected in the proposed lined pond. The estimated flows were reevaluated using the Weighted E method in the DPM and are shown on the next page. The volume was calculated for a 10-day storm since this will be a retention pond.

## Weighted E Method

*Developed On-Site Basins*

| Basin | Area (sf) | Area (acres) | Treatment A % | Treatment A (acres) | Treatment B % | Treatment B (acres) | Treatment C % | Treatment C (acres) | Treatment D % | Treatment D (acres) | 100-Year, 6-Hr Weighted E | 100-Year, 6-Hr Volume (ac-ft) | 100-Year, 6-Hr Flow cfs | 10-Year, 6-Hr Weighted E | 10-Year, 6-Hr Volume (ac-ft) | 10-Year, 6-Hr Flow cfs | 2-Year, 6-Hr Weighted E | 2-Year, 6-Hr Volume (ac-ft) | 2-Year, 6-Hr Flow cfs | 100-Year, 10-Day Weighted E | 100-Year, 10-Day Volume (ac-ft) | 100-Year, 10-Day Flow cfs |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 502,247 | 11.53 | 0% | 0 | 0% | 0.00 | 80% | 9.2240037 | 20% | 2.31 | 1.186 | 1.140 | 36.55 | 0.600 | 0.577 | 20.41 | 0.240 | 0.231 | 8.23 | 1.186 | 1.422 | 36.55 |

**Equations for Weighted E Method:**

Weighted E = Ea*Aa + Eb*Ab + Ec*Ac + Ed*Ad / (Total Area)

Volume = Weighted D * Total Area

Flow = Qa * Aa + Qb * Ab + Qc * Ac + Qd * Ad

Volume (10-day) = $V_{360}$ + Ad * ($P_{10days}$ - $P_{360}$)/ 12 in/ft

| Excess Precipitation, E (inches) | | | |
|---|---|---|---|
| Zone 1 | 100-Year | 10 - Year | 2 - Year |
| $E_a$ | 0.44 | 0.08 | 0.00 |
| $E_b$ | 0.67 | 0.22 | 0.01 |
| $E_c$ | 0.99 | 0.44 | 0.12 |
| $E_d$ | 1.97 | 1.24 | 0.72 |

| Peak Discharge (cfs/acre) | | | |
|---|---|---|---|
| Zone 1 | 100-Year | 10 - Year | 2 - Year |
| $Q_a$ | 1.29 | 0.24 | 0 |
| $Q_b$ | 2.03 | 0.76 | 0.03 |
| $Q_c$ | 2.87 | 1.49 | 0.47 |
| $Q_d$ | 4.37 | 2.89 | 1.69 |

**Criteria**

The site was analyzed using the procedures outlined in the Development Process Manual Volume 2, Chapter 22. The Weighted "E" Method was used to analyze Area 3 and the pond for a 100-year, 6-hour, 10-day rainfall event. The emergency overflow was sized for the 100-year, 6 hour storm as shown below.

**Emergency Overflow Capacity**

Weir Equation:

$$Q = CLH^{3/2}$$

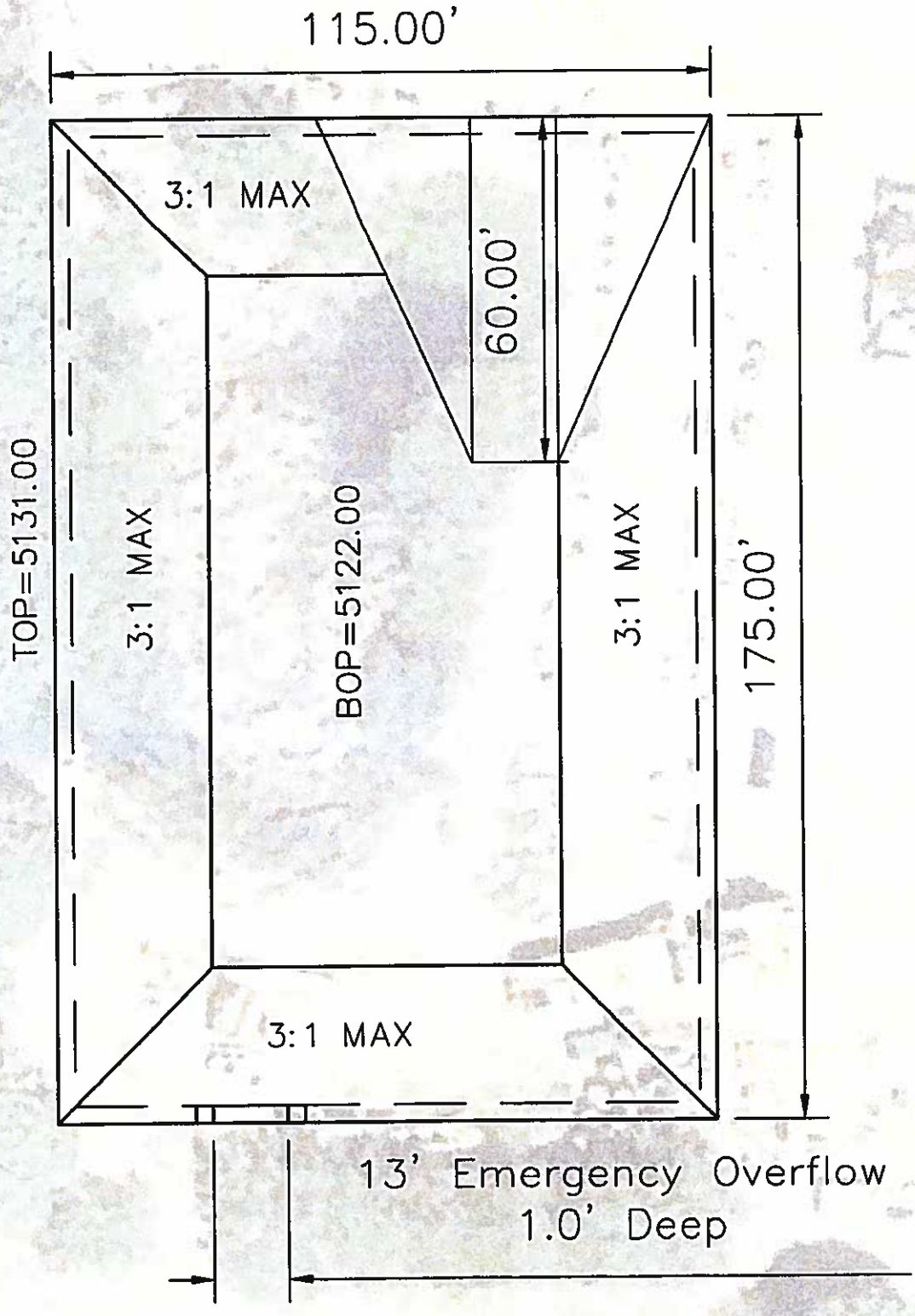
Q= Flow
C = 2.95
L= Length of weir
H = Height of Weir

$$Q = 2.95*13*1.0^{3/2}$$

Q = 38.35 cfs
38.35 cfs > 36.55 cfs
Overflow has capacity

**Summary**

The purpose of this report is to provide an alternative drainage analysis and management plan for the existing Wagner Equipment facility. The property will continue to drain as it does in its current state with 36.55 cfs being discharged to a pond that is being converted from a detention pond to a retention pond. The existing pond will be modified to increase the volume needed for the proposed retention.


115.00'
3:1 MAX
60.00'
TOP=5131.00
3:1 MAX
BOP=5122.00
3:1 MAX
175.00'
3:1 MAX
13' Emergency Overflow
1.0' Deep

# DRAINAGE REPORT

FOR

# RUST TRACTOR STORM DRAIN IMPROVEMENTS
# 4000 OSUNA ROAD NE
# ALBUQUERQUE, NM

July 2001

BPLW ARCHITECTS & ENGINEERS, INC.

# DRAINAGE REPORT

## FOR

## RUST TRACTOR STORM DRAIN IMPROVEMENTS
## 4000 OSUNA ROAD NE
## ALBUQUERQUE, NM

**July 2001**

7-20-01
8-20-01
9-20-01

**BPLW ARCHITECTS & ENGINEERS, INC.**

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The following items pertaining to the Rust Tractor Osuna Road Site Drainage Plan are contained herein: 1) Existing Conditions, 2) Proposed Conditions, 3) Conclusion, 4) Vicinity Map, 5) Flood Hazard Map, 6) Calculations

**Existing Conditions:**

As shown by the Vicinity Map, the site is located at 4000 Osuna Rd. NE between Washington and Jefferson. The sites' legal description is Tract B-1-A-1 Group 9 Industrial Park. Bounded on the north by the Osuna Road and on the south by the BF Goodrich Aerospace and a vacant property owned by Rust Tractor. The western and eastern edges are bounded by Interstate Industrial Tract (Unit 2) respectively. Per the flood insurance rate maps 138 and 139 of 825 for Bernalillo County, dated September 1996, the site is not in a flood hazard zone area. However, the previous design and construction of BF Goodrich Aerospace has provided an outfall from the southwest corner of the site into the adjacent Bear Arroyo Drainage Channel. This outfall was previously approved in 1987, but was not constructed until the BF Goodrich Aerospace Project. From the drainage study for BF Goodrich site, the Bear Canyon Arroyo Channel Improvements for AMFACA -Reach 1 state that the maximum water surface elevation in the arroyo during the 100-year event is 5113.76 at station 15+00. The drainage plan and subsequent site improvements for BF Goodrich site provided a 36" diameter HDPE storm drain line designed to accept 23 cfs (max) from the Rust Tractor site. During a review of the previous drainage study for BF Goodrich site, an error was noticed in the HGL calculations. The previous report gave a conservative HGL. A revised copy of the HGL calculations indicating the corrected value is included in the report.

The grading plan shows existing contours at 1'-0" intervals, limit and character of the proposed improvements and also the existing conditions. As shown by this plan, the proposed construction consists of storm drainage ponds and associated piping, a private sanitary sewer, the widening of the east entrance at Osuna Road and a sidewalk improvements along Osuna Road.

All storm water runoff is presently retained on site. There is an approved Master Drainage Plan, generated by Construction Analysis & Management, Inc. (CAMI) dated June, 2000. All drainage improvements within this report are in compliance with the intent of the Master Drainage Plan.

**Proposed Conditions:**

Proposed improvements at this time are limited to the construction of a sidewalk along Osuna Road, installation of a recycled asphalt base course material in the service yards, and the reshaping/enlarging of the two storm drainage ponds. These Items are identified as Phases I, II & III on the CAMI Master Drainage Plan (MDP) dated June 2000.

The former retention pond located in the northwest corner of the site will be modified to detain the excess discharge of 24,890 cf as indicated on the approved Master Drainage Plan (MDP). This pond receives runoff from Area1 and Area 4 as shown on the MDP. In the existing conditions, there are small storm drainage inlets located in Area 1. These inlets are connected together and discharge into the existing pond through small diameter (12" max) piping. In the analysis of the site, it was assumed that the existing

inlets do not appear to collect any water and that the cattleguard inlet at the entrance will be required to all excess runoff from Area 1. This will provide a conservative design for the cattleguard; see Analysis Point 1 (AP1). The 100 year 6 hour peak discharge of 21.40 cfs from Area 1 at AP1 will be conveyed from the cattleguard to the pond via a 24" HDPE with a velocity of 9.9 fps and a depth of 1.3 feet, see AP2.

Area 4 flows overland (sheet flow) and will also be collected / detained in Pond "A" in the northwest corner of the site. Area 4 generates a peak flow rate of 9.91 cfs, see AP3. Area 4A will continue to drain into Osuna via an existing off-site channel on the adjacent property to the west as identified on the MDP.

Pond "A" will has been sized to hold 24,890 cf with the berm for the pond set at 12" above the MWSEL. Calculations for the MWSEL and the standpipe that will discharge input Osuna Road can all be found for AP4. The standpipe will discharge through an 18 HDPE pipe with a maximum depth of 1.35 feet and a velocity of 10.6 fps. These values are for a free flowing pipe, without outlet control conditions. See AP5. The 18" pipe will connect to a dispersal basin and then through three (3) 24" wide standard COA sidewalk culverts and will discharge into Osuna Road, as shown in the MDP. See AP6 for sidewalk culvert capacity / depth analysis.

The east and south portions of the site will be collected / detained and finally released at a controlled rate of 23 cfs through the BF Goodrich site to the Bear Canyon Arroyo. Area 2 flows into the east drive access lane and is collected into a small area drain and a large cattleguard inlet in the visitor parking lot. Area 2 generates a peak discharge of 28.25cfs in the final built out configuration (this will capacity for Phase IV shown on the MDP). All flows collected in this area formerly discharged through a 10" pipe to the west and were collected in Pond "A". As part of the improvements of this project, we will be collecting and re-routing all the storm drainage from these existing inlets and piping the runoff to the pond located at the south side of the site. As stated above, provisions are being made to facilitate the Master planned building and parking lot in the northeast corner of the site as shown on as Phase IV of the MDP. This is being accommodated by extending a storm drain line and constructing a manhole in the employee parking lot that can be converted to a catch basin or extended as necessary for the future improvements. The storm drain piping is being sized for a maximum discharge rate of 16 cfs. See AP7. The remainder of Area 2 will be collected in the existing cattleguard or in the new inlet in the visitor parking area. It was assumed that the maximum flow that can reach the cattleguard will be less that 24 cfs due to the fully developed Area 2 generating 28.25cfs. AP8 was analyzed to verify capacity and depth of flow within the underground piping. AP8 gave a velocity of 7.6 fps inside the 24" HDPE pipe.

Analysis point AP9 is shown on the Overall Grading and Drainage Plan in four (4) locations because the pipe flowrate, diameter, material type and slope are all identical. Pond "B" has been sized to contain the 100yr, 6 hour excess runoff as calculated in the MDP. The ponding volume necessary is 85,444 cf. The volume for the 10 year, 6 hour storm was calculated to provide a Maximum Water Surface Elevation to be used in backwater calculations. The MWSEL for the 10 year event was 5119.75 and 5121.11 for the 100 year, 6 hour event. Analysis point AP10 was used to calculate these MWSEL values, and to give a starting point for calculating the discharge through a standpipe located in the southwest corner of the site in Pond "B". AP11 shows the orifice equation

and flowrates that will enter the standpipe when the pond is at full MWSEL. AP12 and AP13 were used to compute the velocity in the 24" and 36" HDPE discharge line at the southwest corner of the site. Velocities were 7.32 and 3.25 fps respectively. AP13 results in the approved controlled release rate of 23cfs into the existing 36 in HDPE pipe through the BF Goodrich Aerospace property and into the Bear Arroyo to the south, per the approved MDP.

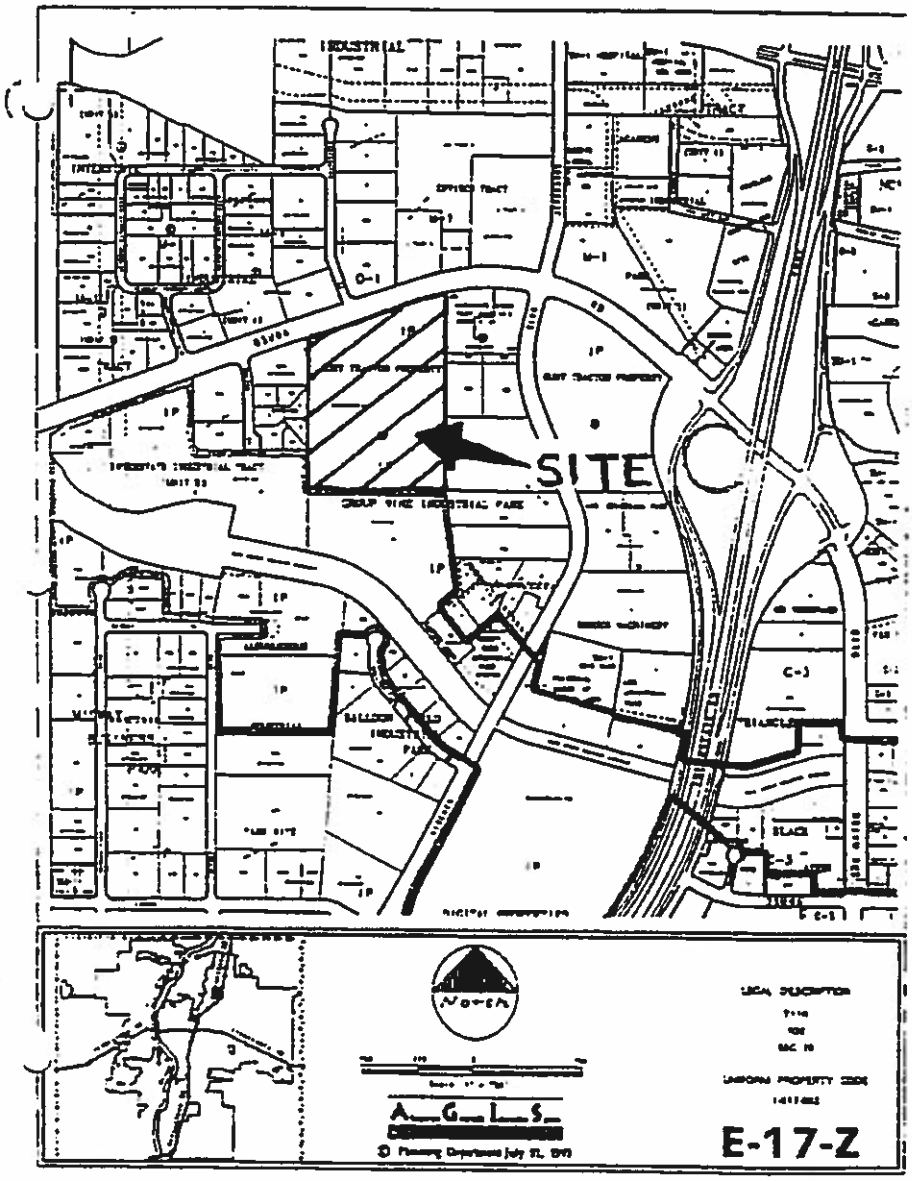
**Conclusions:**

Offsite flows do not enter the site due to the drainage patterns established by the existing paving improvements and constructed perimeter berming and ditches of the adjacent sites.

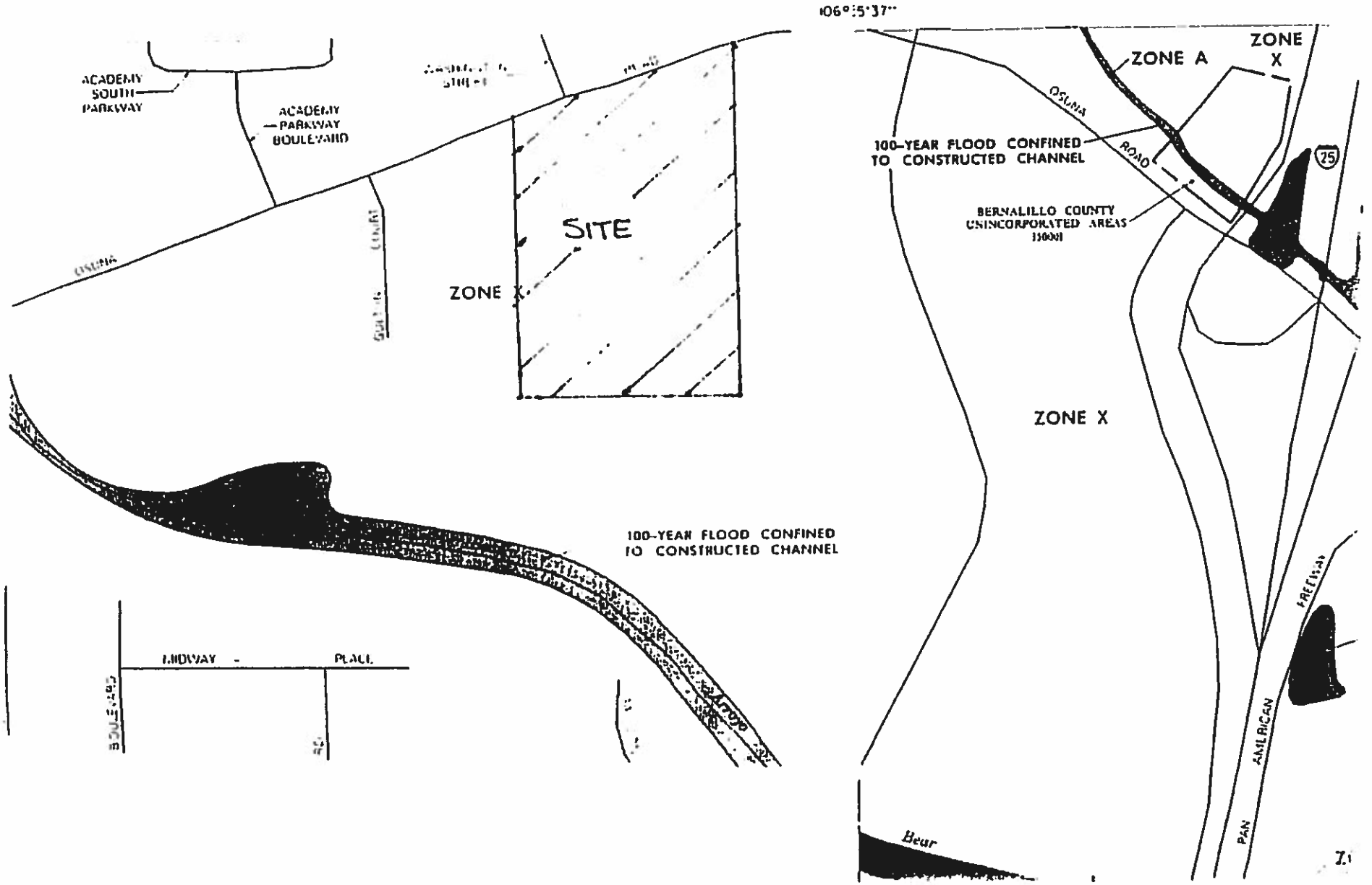
The calculations contained in this report analyze the developed conditions for the 10 and 100-year 6-hour rainfall event. The procedure for 40 acre or smaller basins set by section 22.2 Hydrology of the Development Process Manual, Volume 2, Design Criteria, dated January 1993, has been used to quantify the peak rate of discharge and volume of runoff generated.

All basins and flowrates are in compliance with the approved Master Drainage Plan dated June, 2000. Improvements will convert the existing drainage system from complete retention to a detention configuration while limiting peak runoff rates to those previously approved.

Backwater calculations have been performed to verify that the hydraulic grade line remains below the finished grade.




VICINITY MAP


106°35'37"
ACADEMY SOUTH PARKWAY
ACADEMY PARKWAY BOULEVARD
OSUNA
SITE
ZONE X
100-YEAR FLOOD CONFINED TO CONSTRUCTED CHANNEL
MIDWAY
PLACE
ZONE A
ZONE X
OSUNA
ROAD
100-YEAR FLOOD CONFINED TO CONSTRUCTED CHANNEL
BERNALILLO COUNTY UNINCORPORATED AREAS
ZONE X
25
PAN AMERICAN
FREEWAY
Bear

# APPENDIX A

**Calculations**

ide pipe e outfall
ipe end
nd of manhole

ide pipe e outfall
ipe end
nd of manhole

MANHOLE LOSSES
JUNCTION LOSSES CALCULATED WITH THE THOMPSON EQUATION (DPH SEC. 22.8)
BEND LOSSES CALCULATED WITH EQUATION FROM DPH SEC. 22.3, P.32

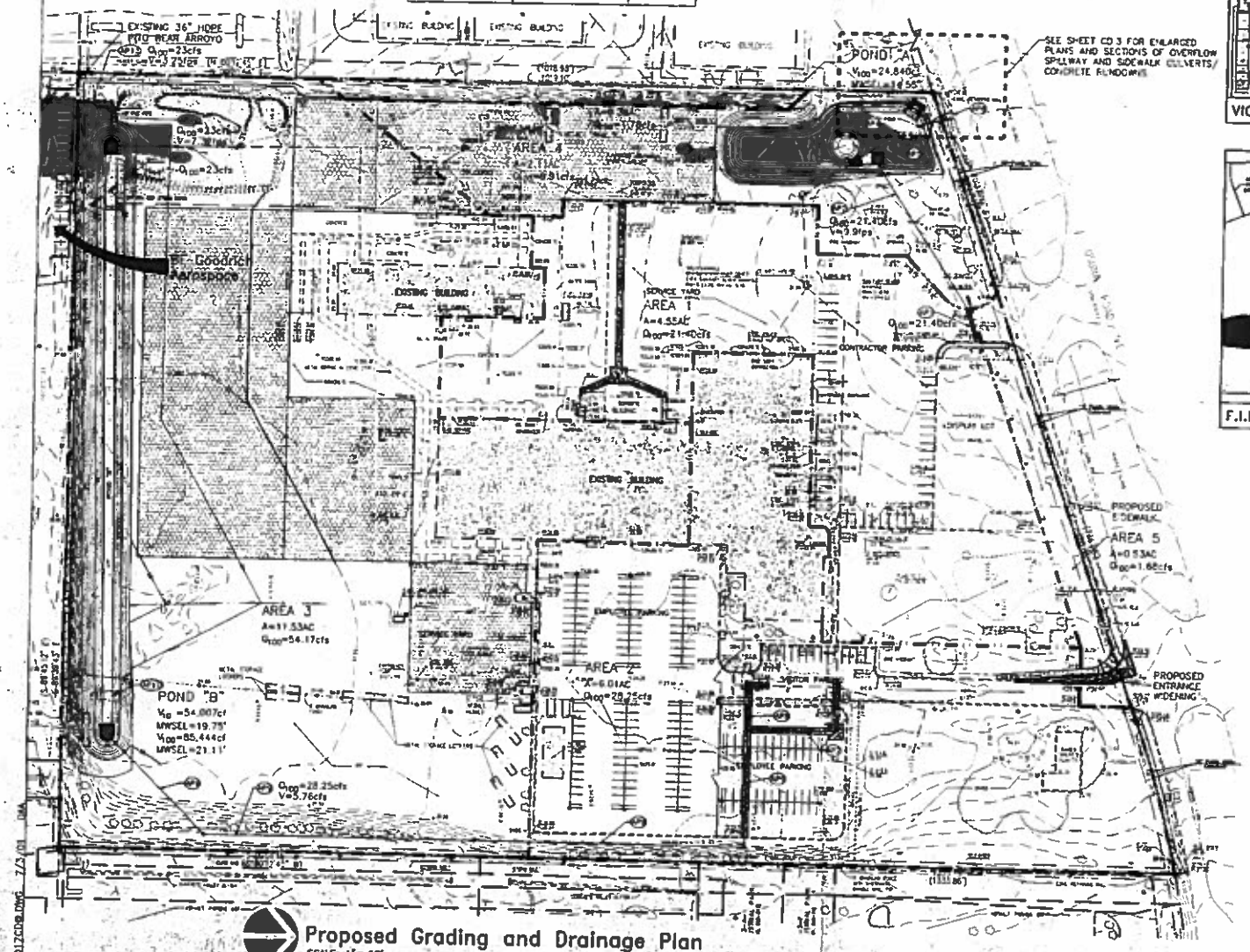
| M H ID # | UPSTREAM Q1 (CFS) | D1 (FT) | A1 (SQ FT | V1 (FT/S) | DOWNSTREAM Q2 (CFS) | D2 (FT) | A2 (SQ FT | V2 (FT/S) | LATERAL Q3 (CFS) | D3 (FT) | A3 (SQ FT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| P5 | 24.0 | 2.0 | 3.1 | 7.6 | 28.3 | 2.5 | 4.9 | 5.8 | 4.3 | 2.0 | 3.1 |
| P4 | 28.3 | 2.5 | 4.9 | 5.8 | 28.3 | 2.5 | 4.9 | 5.8 | 0.0 | 2.0 | 3.1 |
| P3 | 28.3 | 2.5 | 4.9 | 5.8 | 28.3 | 8.8 | 50.3 | 0.6 | 0.0 | 2.0 | 3.1 |
| P2 | 28.3 | 2.5 | 4.9 | 5.8 | 28.3 | 8.8 | 50.3 | 0.6 | 0.0 | 2.0 | 3.1 |
| POND | | | | | | | | | | | |
| Inlet | 23.0 | 2.0 | 3.1 | 7.3 | 23.0 | 3.0 | 7.1 | 3.3 | 0.0 | 2.0 | 3.1 |
| P1 | 23.0 | 3.0 | 7.1 | 3.3 | 23.0 | 8.0 | 50.3 | 0.5 | 0.0 | 2.8 | 3.1 |
| OUTLET | | | | | | | | | | | |

| VJ (FT/S) | A AVG | LATERAL ANGLE (DEG) | JUNC. LOSS (FT) | CENTRAL BEND ANG (DEG) | V MAX (FT/S) | Kb | BEND LOSS (FT) | H.H. LOSS ONLY (FT) | TOTAL LOSS (FT) |
|---|---|---|---|---|---|---|---|---|---|
| 7.8 | 4.0 | 90 | -0.16 | 0 | 7.64 | 0.00 | 0.00 | 0.05 | 0.05 |
| 0.0 | 4.9 | 45 | 0.00 | 90 | 5.76 | 0.20 | 0.10 | 0.03 | 0.13 |
| 0.0 | 27.6 | 45 | -0.17 | 0 | 5.76 | 0.00 | 0.00 | 0.03 | 0.03 |
| 0.0 | 27.6 | 45 | -0.17 | 45 | 5.76 | 0.14 | 0.07 | 0.03 | 0.10 |
| 0.0 | 5.1 | 90 | -0.57 | 90 | 7.32 | 0.20 | 0.17 | 0.04 | 0.21 |
| 0.0 | 38.7 | 0 | -0.07 | 90 | 3.25 | 0.20 | 0.03 | 0.01 | 0.04 |

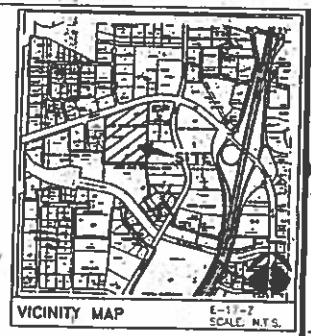
## NOTICE TO CONTRACTOR

1. AN EXCAVATION / CONSTRUCTION PERMIT WILL BE REQUIRED BEFORE BEGINNING ANY WORK WITHIN CITY RIGHT-OF-WAY. AN APPROVED COPY OF THESE PLANS MUST BE SUBMITTED AT THE TIME OF APPLICATION FOR THIS PERMIT.
2. ALL WORK DETAILED ON THESE PLANS TO BE PERFORMED, EXCEPT AS OTHERWISE STATED OR PROVIDED HEREON, SHALL BE CONSTRUCTED IN ACCORDANCE WITH CITY OF ALBUQUERQUE INTERIM STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, 1986, UPDATE 6.
3. TWO WORKING DAYS PRIOR TO ANY EXCAVATION, CONTRACTOR MUST CONTACT LINE LOCATION SERVICE, 765-1234, FOR LOCATION OF EXISTING UTILITIES.
4. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXCAVATE AND VERIFY THE HORIZONTAL AND VERTICAL LOCATIONS OF ALL CONSTRUCTIONS. SHOULD A CONFLICT EXIST, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT THEY CONFLICT CAN BE RESOLVED WITH A MINIMUM AMOUNT OF DELAY.
5. BACKFILL COMPACTION SHALL BE ACCORDING TO ARTERIAL STREET USE.
6. MAINTENANCE OF THESE FACILITIES SHALL BE THE RESPONSIBILITY OF THE OWNER OF THE PROPERTY SERVED.
7. WORK ON ARTERIAL STREETS SHALL BE PERFORMED ON A 24-HOUR BASIS.

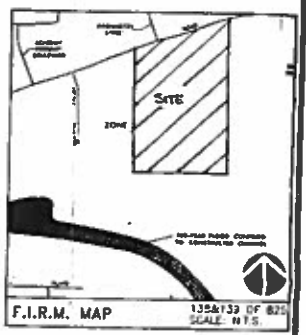
| APPROVALS | NAME | DATE |
|---|---|---|
| INSPECTOR | | |




Proposed Grading and Drainage Plan
SCALE: 1" = 60'




VICINITY MAP E-17-Z SCALE: N.T.S.




F.I.R.M. MAP 35A of 825 SCALE: N.T.S.

**BPLW**
Architects & Engineers, Inc.
Designing to Shape the Future

## LEGEND:

Area/Basin Boundary:
Analysis Point: AP
Proposed 24" Recycled Asphalt Installation

## LEGAL DESCRIPTION:

Block B, Group Nine Industrial Park

## BENCHMARK:

New Mexico Central Zone-NAD 1927
K.P.E. STA. "NOC 12-102"
X=393 530.75
Y=1 510 490.98
COMBINED FACTOR=0.99966921
DELTA ALPHA= -0°12'15"

| REV. | DESCRIPTION | DATE |
|---|---|---|

GUY C. JACKSON NEW MEXICO 12106 REGISTERED PROFESSIONAL ENGINEER

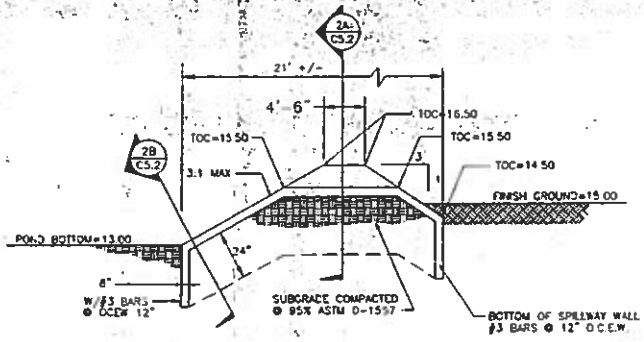
ENGINEER ARCHITECT

RUST RUST TRACTOR CO.
Storm Drainage Improvements

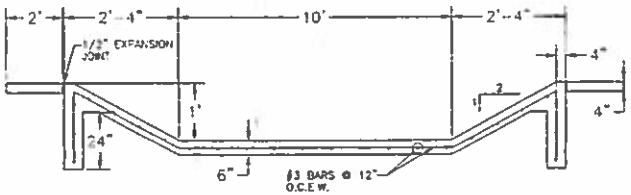
| PROJECT NO. | DATE |
|---|---|
| 99017 | Sept, 2001 |

PROPOSED GRADING & DRAINAGE PLAN

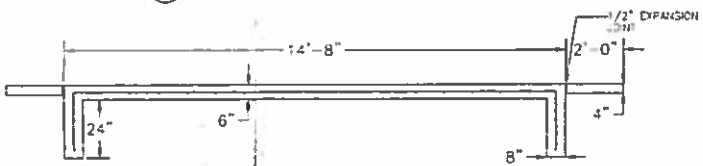
DRAWING NO.
CD.2



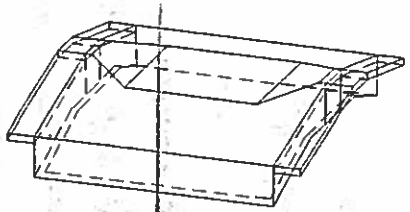

4 OVERFLOW SPILLWAY DETAILS
NOT TO SCALE



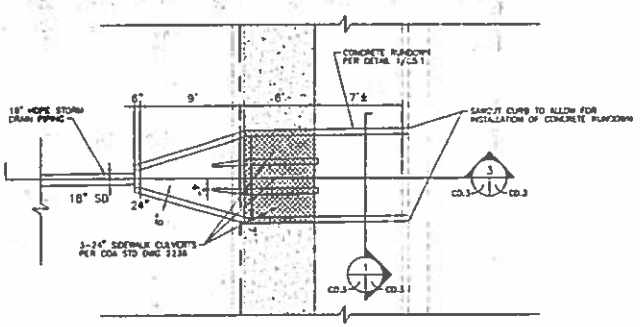

4A SECTION AT ℄ WEIR



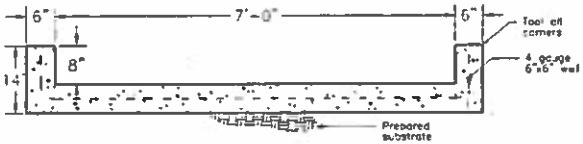

4B TYPICAL SECTION
NOT TO SCALE



4C ISOMETRIC VIEW OF SPILLWAY
NOT TO SCALE

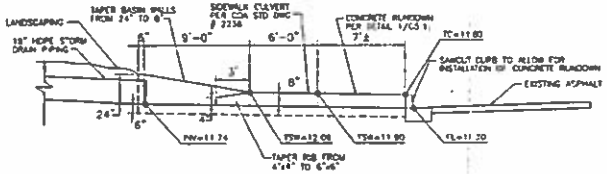



1 SIDEWALK CULVERT PLAN




NOTE: See plan for elevations @ weir opening & sidewalk culvert (top of wall, invert, top of concrete, top of curb, etc.)

2 7'-0" CONCRETE WEIR/RUNDOWN
SCALE: 1" = 1'-0"




3 SIDEWALK CULVERT SECTION

BPLW
Architects & Engineers, Inc.
Designing To Shape The Future

| REV. | DESCRIPTION | DATE |
|---|---|---|

RUST C. JACKSON
NEW MEXICO
ARCHITECT

RUST RUST TRACTOR CO.
Storm Drainage Improvements

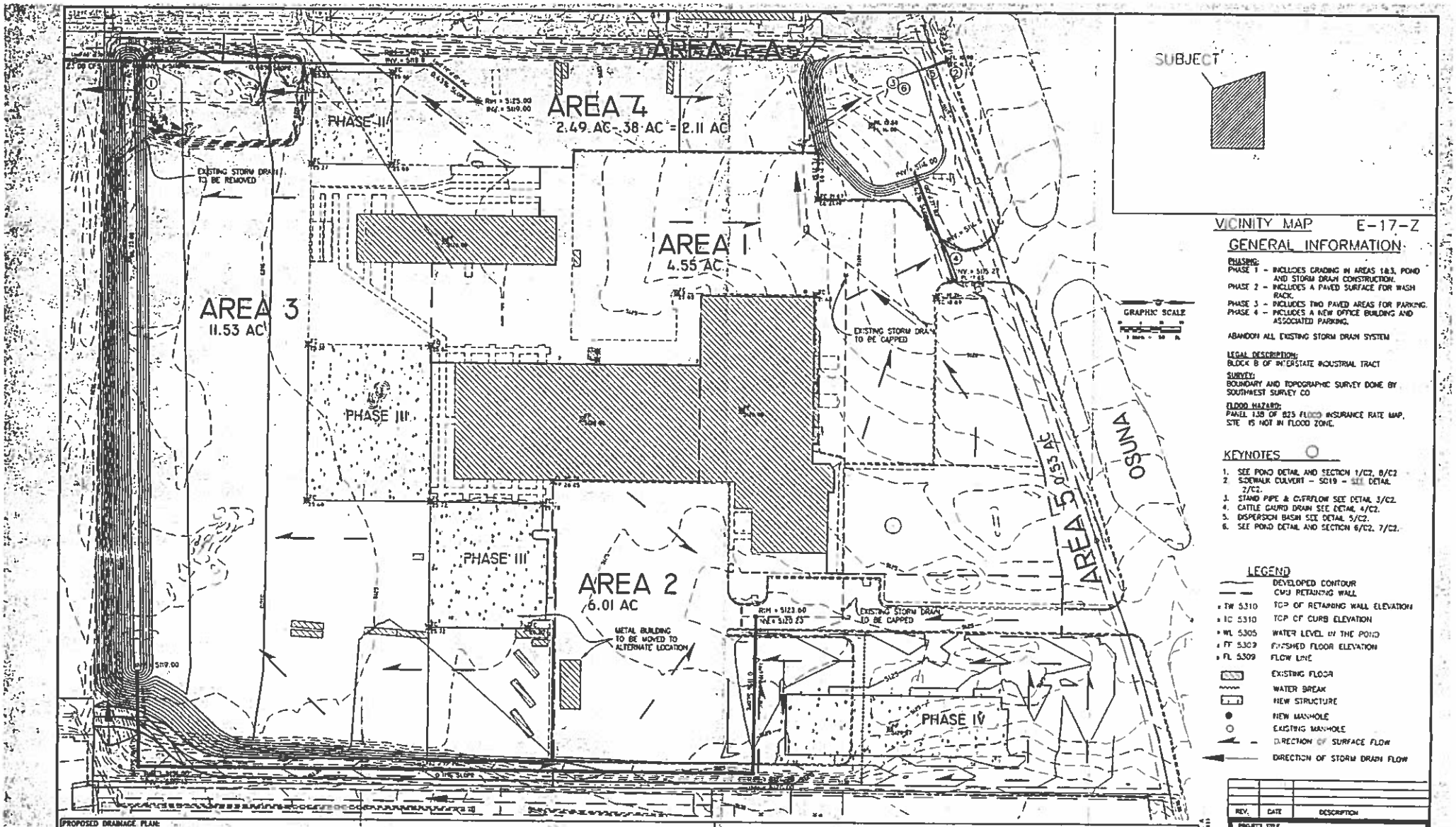
| PROJECT NO. | DATE |
|---|---|
| 99017 | Sept, 2001 |

STORM DRAINAGE, DETAILS

DRAWING NO.
CD.3

99017CD3

| | |
|---|---|
| **D1** | **Copy of Master Drainage Plan by CAMI** |
| **C2** | **Copy of Master Drainage Plan Details by CAMI** |




VICINITY MAP E-17-Z

## GENERAL INFORMATION

PHASING:
PHASE 1 - INCLUDES GRADING IN AREAS 1&3, POND AND STORM DRAIN CONSTRUCTION.
PHASE 2 - INCLUDES A PAVED SURFACE FOR WASH RACK.
PHASE 3 - INCLUDES TWO PAVED AREAS FOR PARKING.
PHASE 4 - INCLUDES A NEW OFFICE BUILDING AND ASSOCIATED PARKING.

ABANDON ALL EXISTING STORM DRAIN SYSTEM

LEGAL DESCRIPTION:
BLOCK B OF INTERSTATE INDUSTRIAL TRACT

SURVEY:
BOUNDARY AND TOPOGRAPHIC SURVEY DONE BY SOUTHWEST SURVEY CO

FLOOD HAZARD:
PANEL 135 OF 825 FLOOD INSURANCE RATE MAP. SITE IS NOT IN FLOOD ZONE.

## KEYNOTES

1. SEE POND DETAIL AND SECTION 1/C2, 8/C2
2. SIDEWALK CULVERT - SD19 - SEE DETAIL 2/C2.
3. STAND PIPE & OVERFLOW SEE DETAIL 3/C2.
4. CATTLE GAURD DRAIN SEE DETAIL 4/C2.
5. DISPERSION BASIN SEE DETAIL 5/C2.
6. SEE POND DETAIL AND SECTION 6/C2, 7/C2.

## LEGEND

- DEVELOPED CONTOUR
- CMU RETAINING WALL
- TW 5310 TOP OF RETAINING WALL ELEVATION
- TC 5310 TOP OF CURB ELEVATION
- WL 5305 WATER LEVEL IN THE POND
- FF 5309 FINISHED FLOOR ELEVATION
- FL 5309 FLOW LINE
- EXISTING FLOOR
- WATER BREAK
- NEW STRUCTURE
- NEW MANHOLE
- EXISTING MANHOLE
- DIRECTION OF SURFACE FLOW
- DIRECTION OF STORM DRAIN FLOW

PROPOSED DRAINAGE PLAN:
THE SITE IS LOCATED ON THE SOUTH SIDE OF OSUNA BETWEEN JEFFERSON AND WASHINGTON. THE DISCHARGE FROM THE SITE EXCLUDING AREA 5 WILL BE CONTAINED IN TWO PONDS, AS SHOWN ABOVE, AND THEN GRADUALLY DISCHARGED TO OSUNA AND THE BEAR CANYON ARROYO. POND 1 WILL HAVE A RESTRICTOR AT ITS OUTLET WHICH WILL BE DISCHARGED TO OSUNA AT 17.7 CFS. IN ADDITION TO AREA 5 DISCHARGE OF 4.8 CFS FOR A TOTAL OF 18.18 CFS TO OSUNA. HISTORIC UNDEVELOPED FLOW ONTO OSUNA WOULD BE 30.97 CFS. POND 2 WILL HAVE A RESTRICTOR AT ITS OUTLET, WHICH WILL BE DISCHARGED TO BEAR CANYON AT 23.0 CFS. HISTORIC UNDEVELOPED FLOW WOULD BE 26.28 CFS. POND VOLUMES ARE: POND 1=24,890 CF AND POND 2=85,444 CF

DESIGN CRITERIA:
THE DESIGN CRITERIA WAS BASED ON SECTION 22.2 HYDROLOGY, OF THE DEVELOPMENT PROCESS MANUAL, JANUARY 1993.

EXISTING DRAINAGE CONDITION:
THE SITE IS LOCATED WITHIN PRECIPITATION ZONE 2. THE SITE HAS AN APPROVED DRAINAGE PLAN DATED JULY 1987 WHICH DELINEATES A DIVISION OF FLOW BETWEEN OSUNA AND THE BEAR CANYON ARROYO. THE FLOW TO OSUNA IS UNRESTRICTED AT 37.2 CFS. THE FLOW TO BEAR CANYON ARROYO IS THROUGH A POND WITH PUMPING OF 1 CFS TO A SURFACE CHANNEL WHICH DRAINS INTO BEAR CANYON. THE POND VOLUME INDICATED IS 55,368 CF. E = 2.20 I 100 = 79.3 CFS I V = 84606 CF (1.94 ac.ft.)

PROPOSED DRAINAGE CONDITION:

| AREA | ACRES | DEVELOPED CONDITION | UNDEVELOPED EXISTING | DEVELOPED EXISTING | UNDEVELOPED PEAK | DEVELOPED PEAK | PEAK IMPERVIOUS | EXCESS UNDERGROUND | PROVIDED DETENTION |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.55 | D | 12,692.94 cf | 35,042.09 cf | 10.38 cfs | 21.60 cfs | 33.02 cfs | .5085 ac.ft. | 1.85 ac.ft |
| 2 | 6.01 | D | 16,761.53 cf | 46,267.78 cf | 13.70 cfs | 28.52 cfs | 43.58 cfs | .6711 ac.ft. | 4.16 ac.ft |
| 3 | 11.53 | D | 32,435.82 cf | 89,544.38 cf | 26.28 cfs | 54.71 cfs | 83.69 cfs | .1810 ac.ft. | 3.2810 ac.ft |
| 4 | 2.49 | D | 7,040.85 cf | 19,434.49 cf | 5.67 cfs | 11.80 cfs | 18.04 cfs | .1779 ac.ft. | .0179 ac.ft. |
| 5 | 0.53 | C | 1,337.19 cf | 2,337.19 cf | 1.22 cfs | 1.68 cfs | 2.46 cfs | .0114 ac.ft. | - 0 - |

A = Aa + Ab + Ac + Ad = 0 + 0 + .53 + 24.58 = 25.01 (FROM TABLE A-9)
C = 2.12 (FROM TABLE A-9)
Q100 = C1 * A1/12 = 4.39 ac.ft. = 191,318 CF
Q100 = 4.70 * AL = 117.18 CFS

Note: Area 4-1 drains to Osuna via off-site channel on adjoining property

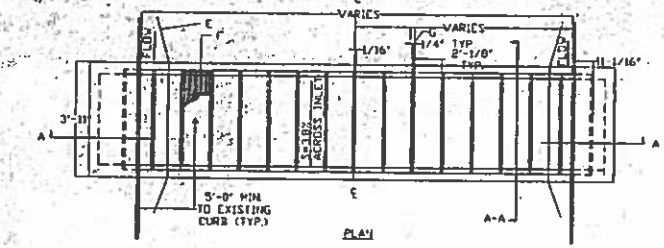
| REV. | DATE | DESCRIPTION |
|---|---|---|
| | | |

PROJECT TITLE
Rust Tractor
4000 Osuna Rd.
Albuquerque, NM

SHEET TITLE
Master Drainage Plan

CAMI CONSTRUCTION ANALYSIS & MANAGEMENT, INC.
4001 JOHN ROAD NE - SUITE A
ALBUQUERQUE, NEW MEXICO 87111
(505)298-3477

DRAWN BY: BDL
CHK'D BY: MJH
DATE: 02/17/93
D1

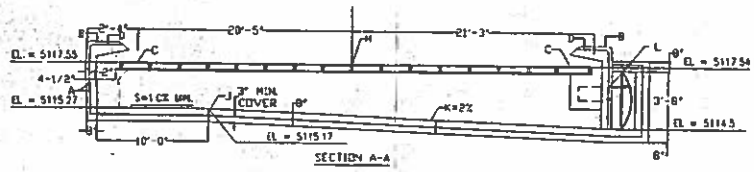



GENERAL NOTES

1. ALL EXPOSED METAL PARTS SHALL BE PAINTED PRIOR TO ASSEMBLY.
2. WELDING, MACHINING AND DRILLING SHALL BE DONE PRIOR TO PAINTING.
3. ALL DIMENSIONS ARE FINISH DIMENSIONS.
4. ALL PARTS SHALL BE OF STRUCTURAL STEEL, GRADE 36, ...
5. AFTER CLEANING SURFACE OF SCALE, RUST, ETC., GRATING, FRAMING, AND CENTER SUPPORT SHALL BE PAINTED WITH ONE SHOP COAT RED OXIDE, TWO FINISH COATS ALUMINUM PAINT GASPRITE # 699.
6. FRAME MAY BE WELDED OR RIVETED.

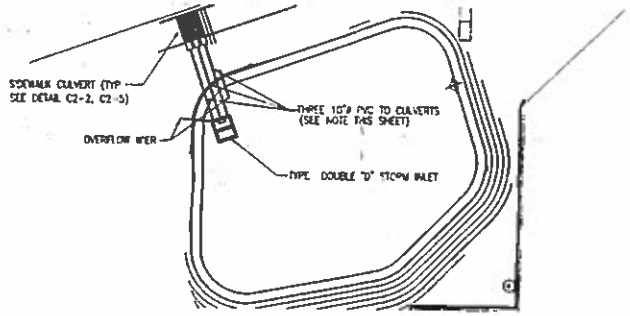
CONSTRUCTION NOTES

A. NO 4 BARS AT 6" O.C. EACH WAY
B. TOP OF CURB
C. CURB FLOWLINE
D. ANGLE ANCHOR DETAIL.
E. STORM INLET GUTTER TRANSITION
F. TYPICAL GRADE IS TOTAL HORIZ
G. WITH 1" CAP COVER PLATE PER DETAIL THIS SHEET.
H. 1/4" SPACE BETWEEN GRATES(TYP.)
I. OUTLET STORM DRAINAGE HORIZONTAL AND VERTICAL LOCATION MAY VARY PER SPECIFIC PROJECT.
J. GRADE BREAK.
K. GRADE BREAK LOCATIONS AND SLOPE MAY VARY DEPENDING ON LOCATION OF OUTLET.
L. CONCRETE FILL MINIMUM LONGITUDINAL SLOPE 4%
M. WATER ELEVATION OF EXISTING PAVEMENT.



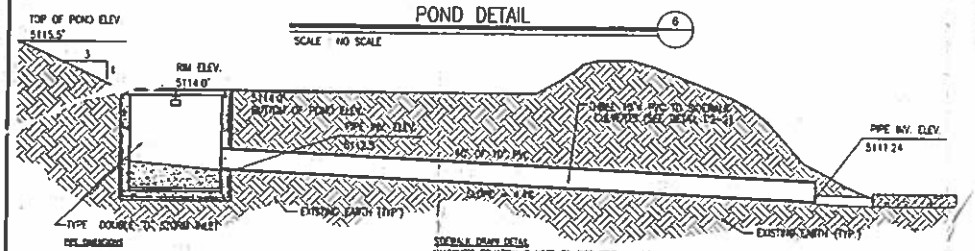

## CATTLE GUARD INLET (4)

SCALE : NO SCALE




## POND DETAIL (6)

SCALE : NO SCALE




DET. DIMENSIONS

FOR A PVC PIPE OF 10 IN. DIAMETER

FROM THE MANNING'S EQUATION

WHERE,

n = MANNING'S ROUGHNESS COEFFICIENT = 0.009 ( FOR PVC PIPE)

A = CROSS SECTIONAL AREA OF THE PIPE = 0.5 FT²

R= HYDRAULIC RADIUS = AREA / WETTED PERIMETER = 0.199

S = SLOPE OF THE PIPE = 2/95 = 0.044 FT/FT

THEREFORE THE DISCHARGE Q = 1.9 CFS.

SINCE THE DISCHARGE FROM THE POND IS 1.7 CFS THEN THREE 10 INCH DIAMETER PVC PIPES WILL BE REQUIRED TO DISCHARGE TO CDSWA

SIDEWALK DRAIN DETAIL

MANNING'S EQUATION IS USED TO SIZE SIDEWALK DRAIN FOR A DISCHARGE OF 17.7 CFS AS FOLLOWS

FOR A STANDARD SIDEWALK DRAIN WITH A DEPTH OF 0.5 FT AND A WIDTH OF 2 FT.

WHERE:

n = MANNING'S ROUGHNESS COEFFICIENT = 0.013 ( FOR CONCRETE)

A = CROSS SECTIONAL AREA OF RECTANGULAR CHANNEL = .833 FT²

R= HYDRAULIC RADIUS = AREA / WETTED PERIMETER = 0.312

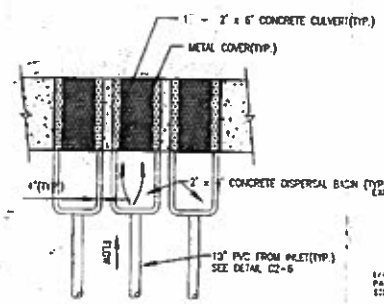
S = SLOPE OF THE SIDEWALK = 0.02 FT/FT

THEREFORE THE DISCHARGE Q = 8.2 CFS

SINCE THE DISCHARGE FROM THE POND IS 1.7 CFS THEN THREE SIDEWALK DRAINS WILL BE ADEQUATE TO DISCHARGE 17.7 CFS.

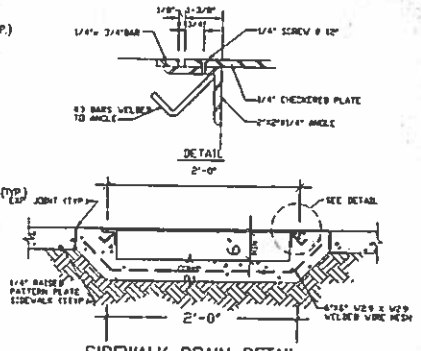
## POND SECTION (7)

SCALE : NO SCALE

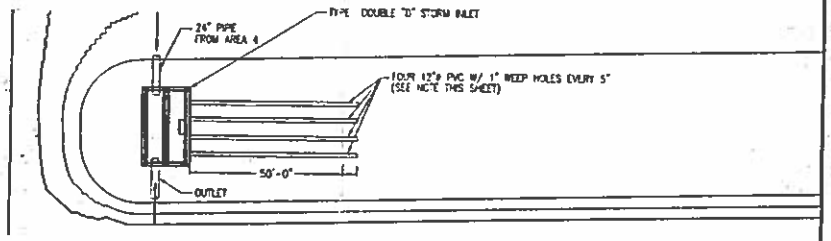



## DISPERSAL BASIN DETAIL (5)

SCALE : NO SCALE

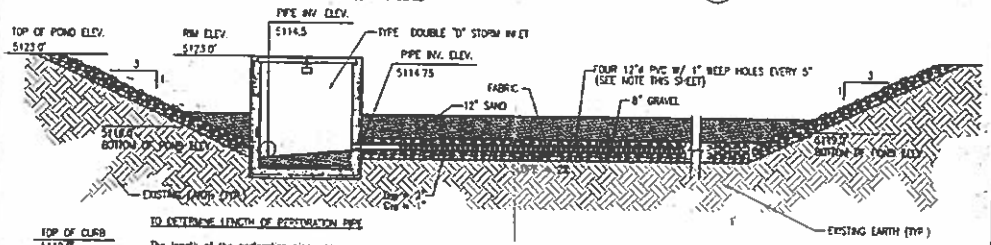



## SIDEWALK DRAIN DETAIL (2)




## POND DETAIL (1)

SCALE : NO SCALE




TO DETERMINE LENGTH OF PERFORATION PIPE

The length of the perforation pipe was determined from Handbook of Hydraulics by Brater and King, 6th Edition, 1982

The discharge through orifice is determined by the equation

$Q = C_d a \sqrt{2gh}$ – (Eqn 4-21, Page 4-9)

Where Q = Discharge
a = Cross sectional area for orifice
$C_d$ = Coefficient of Discharge = 0.6 (Table 4-6 page 4-32)
h = Vertical Height = 3 ft.
g = Acceleration due to gravity = 32.2 ft/second²

For 1 in (2.083ft) Hole

Q = 0.6 * $\frac{\pi}{4}$ (0.083)² √(2*32.2*3)
Q = 0.045 cfs.

For a total discharge of 2.5 cfs, the number of holes required will be 2.3/0.045 = 510 holes.

For 2 @ 1" ø holes every 5 in., a total of 100 ft. long pipe would be required.

Four (4) 27 foot long perforated pipes will be required. Use four 50ft long pipes for sand filter maintenance.

## POND SECTION (8)

SCALE : NO SCALE

| REV. | DATE | DESCRIPTION |
|---|---|---|
| | | |

PROJECT TITLE
Rust Tractor
4000 Osuna Rd.
Albuquerque, NM

SHEET TITLE
DETAIL SHEET


CAMI
CONSTRUCTION ANALYSIS & MANAGEMENT, INC.
6001 JIMMY HEID NE., SUITE A
ALBUQUERQUE, NEW MEXICO 87111
(505)298-3477


DRAWN BY
CHK'D BY
DATE: 05/07/08

C2