City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 25, 2001

Thomas B. Ponder, P.E.
Chavez Grieves Consulting Engr.
5839 Jefferson NE
Albuquerque, NM 87109

RE: **Grading and Drainage Certification**
TVI Workforce Training Center
(C-18/D037A) (Oakland & San Mateo)
Engineer's Stamp dated 5/10/1999
Engineering Certification dated 1/12/2001

Dear Mr. Ponder:

Based upon the information provided in your Engineers Certification submittal dated 1/19/2001, the above referenced site is approved for Certificate of Occupancy.

Since the original engineer (Billy McCarty, P.E.) who stamped the grading & drainage plan approved for building permit is no longer with your company, we accept your engineers certification.

If I can be of further assistance, please contact me at 924-3986.

Sincerely,

Bradley L. Bingham, PE
Senior Civil Engineer, PWD

C: Vickie Chavez, COA
Teresa Martin,COA
file

City of Albuquerque

P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

June 24, 1999

Billy McCarty, P.E.
Chavez-Grieves
5639 Jefferson Street NE
Albuquerque, NM 87109

RE: TVI WORKFORCE TRAINING CENTER (C18-D37A). DRAINAGE REPORT AND GRADING AND DRAINAGE PLAN FOR BUILDING PERMIT APPROVAL. ENGINEER'S STAMP DATED MAY 10, 1999.

Dear Mr. McCarty:

Based on the information provided on your May 10, 1999 submittal, the above referenced project is approved for Building Permit.

***Note well that Transportation requires a Site Plan for the traffic circulation layout -TCL.

Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Prior to Certificate of Occupancy approval, an Engineer's Certification per the DPM will be required.

If I can be of further assistance, please feel free to contact me at 924-3984.

Sincerely,

John P. Murray, P.E.
Hydrology

c: File

DRAINAGE STUDY

FOR

TVI WORKFORCE TRAINING CENTER

Albuquerque, New Mexico

5-10-99

TVI WORKFORCE TRAINING CENTER GRADING AND DRAINAGE

INTRODUCTION

This project is to construct the TVI Workforce Training Center. This report is being submitted for drainage approval.

DRAINAGE HISTORY\EXISTING CONDITIONS

The site is located on Zone Atlas Map C-18 and is zoned SU-2, M-1. See the Appendix for the location. This site has a uniform grade from east to west at approximately a three percent (3%) grade. It is bounded to the east by the Interstate 25 Frontage Road, to the north and west by undeveloped land, and to the south by Oakland Avenue. Oakland Avenue was constructed to one-half its ultimate width by development on the south side of the street. Eagle Rock Avenue, along the north boundary, is not been constructed at this time.

The site was previously in the 100 year floodplain. However, per the FEMA September 11, 1998 letter, the site is no longer in the floodplain. Please see the attached letter in the Appendix.

Bordenave Designs prepared a Master Drainage Plan for this area. The area encompassing Oakland Avenue, Eagle Rock, and the TVI property has an existing discharge of 1.87 cfs/acre for the 100 year storm per the Master Drainage Plan. Under developed conditions, the allowable discharge from the Oakland Avenue, Eagle Rock, and the TVI property is 1.75 cfs/acre for the 100 year storm. The design for this project will meet the criteria established in the Master Drainage Plan.

In addition, Amy Driscoll met with Fred Aguirre on January 28, 1999 to discuss this project. Please see the attached Conference Recap.

PROPOSED CONDITIONS

Overall Summary

This project is to construct the TVI Workforce Training Center. Please see the enclosed plan sheet C2.1. The southeast parking area and most of the roof drains from the building will drain to an 18 inch pipe which will go to the detention pond in the southwest corner. A small northern strip of property will freely discharge to Eagle Rock. The remaining site will drain to an asphalt swale which will also empty into the southeast detention pond. The detention pond will discharge to Oakland Avenue.

Oakland Avenue

Currently, the southern half of Oakland and three storm inlets on the southeast corner of Oakland and San Mateo are constructed. The northern half of Oakland and three Type C and 1 Type A inlets at the northern corner of Oakland and San Mateo will be constructed with the off-site improvements as part of this contract. These inlets will connect to the existing 24" RCP storm drain in Oakland. The inlets are per the Master Drainage Plan.

Eagle Rock Avenue

Eagle Rock Avenue is not currently constructed. The half-width of Eagle Rock in front of the TVI property (lots 5 through 8) will be constructed with the off-site improvements.

Under existing conditions, the northern half of the TVI property (3.85 acres) discharges at a rate of 1.87 cfs/acre which is a flow of 7.20 cfs. Under Master Plan conditions, the northern half of the TVI property can discharge to Eagle Rock at a rate of 1.75 cfs/acre. This is an allowable discharge of 6.74 cfs.

Only a small portion of the northern parking will freely drain to Eagle Rock (0.63 acres) which will be a total of 3.0 cfs. Because the discharge is less than existing and Master Plan conditions, the only erosion protection will be a 10 foot long section of rip-rap transitioning from the asphalt on Eagle Rock at the western edge of the property to the ground. This will be a temporary condition until Eagle Rock is constructed to San Mateo and the permanent storm drain is constructed. Please see the AHYMO run in the Appendix.

TVI Site

The rest of the TVI site (8.15 acres) will drain to the southwest detention pond. Per the Master Plan, the southern half of the TVI site (4.93 acres) can drain to Oakland Avenue at a rate of 1.75 cfs/acre which is an allowable discharge of 8.63 cfs. The design includes a detention pond that will discharge through an 18 inch pipe into a concrete swale that will go under the sidewalk (sidewalk culvert) and onto Oakland Avenue.

The volume of the pond will be 0.99 acre-ft. Per AHYMO, the peak discharge will be 7.37 cfs through the 18 inch pipe with a maximum water surface elevation of 67.30 and a bottom elevation of 63.00. The maximum storage will be 0.81 acre-ft. This is less than the allowable discharge of 8.63 cfs. Please see the AHYMO run, the calculations for the pond volume, the discharge pipe, and the concrete discharge swale in the attached Appendix.

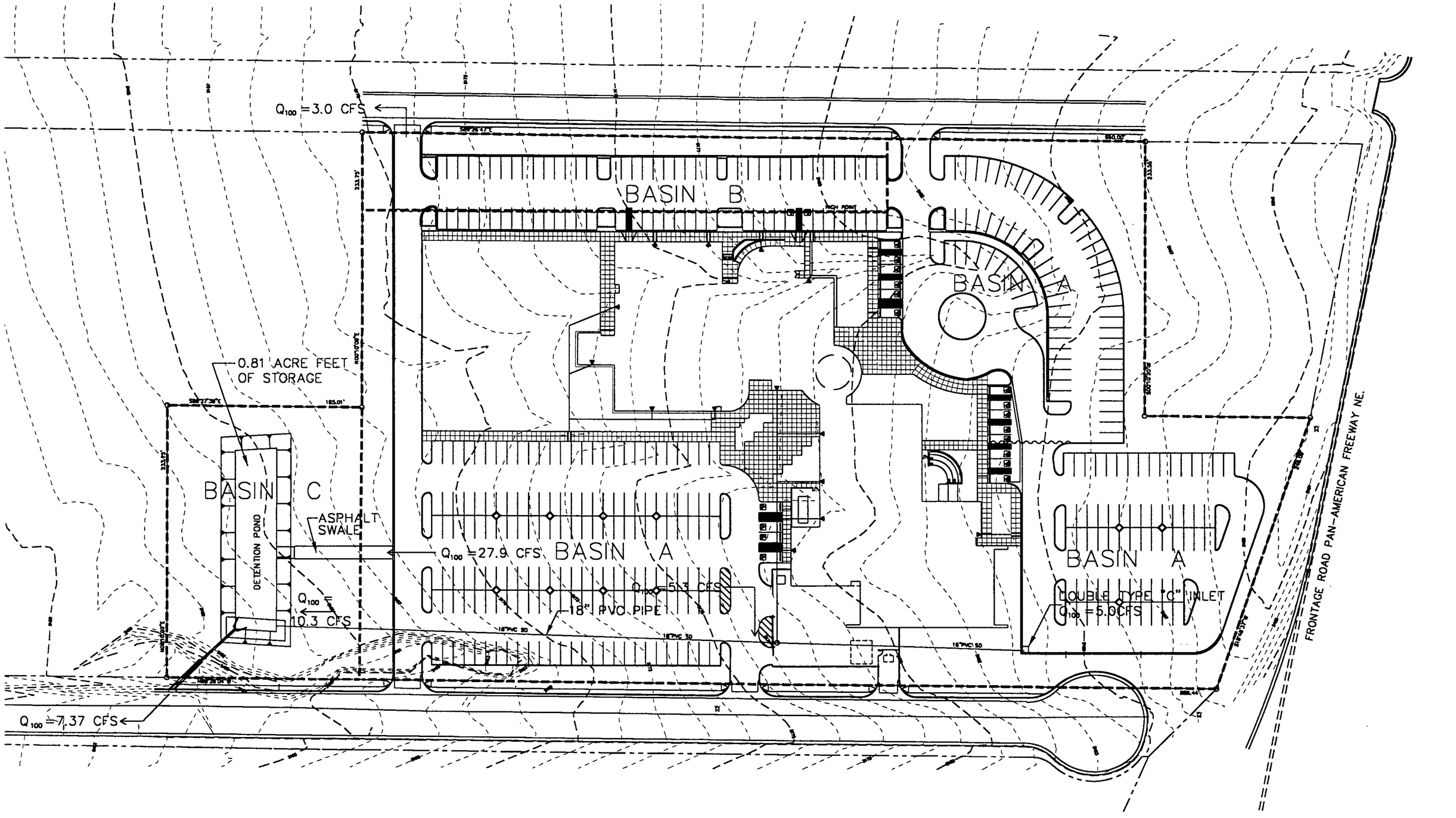
An 18" pipe and an asphalt swale will drain into the detention pond. The 18 inch pipe that will go into the pond will receive water from some of the roof drains and the southeastern parking lot. The design was done conservatively and includes all of the roof drains which contribute 5.0 cfs. The parking lot will contribute 5.3 cfs. The 18 inch pipe will carry 10.3 cfs. A double type C inlet will drain the parking lot into the 18 inch pipe. Please see the Appendix for the sizing of the inlet and the 18 inch pipe.

An asphalt swale will convey the rest of the site to the detention pond. The asphalt swale will contribute 27.9 cfs. Please see the Appendix for the sizing of this swale.

SUMMARY

Per Jake Bordenave's Master Plan, the allowable discharge from the site is 1.75 cfs/ acre. Some flow will discharge freely to Eagle Rock Avenue, and the discharge will be less than allowable. The rest of the site will discharge through a detention pond, and the discharge will be less than allowable. Half of Eagle Rock will be constructed in front of the TVI property. The northern half of Oakland Avenue will be constructed along with storm inlets at the corner of San Mateo. This design meets the criteria of the Master Drainage Plan.

G:\C11\120\documents\drainage



GRADING AND DRAINAGE PLAN
SCALE : 1" = 30'

CHAVEZ • GRIEVES CONSULTING ENGINEERS, INC.

PROJECT
TVI
WORKFORCE TRAINING CENTER

ALBUQUERQUE TECHNICAL VOCATIONAL INSTITUTE

ALBUQUERQUE, NM

REVISIONS

SHEET TITLE
BASIN BOUNDARY MAP

CUSTER • BASARICH, LTD.
ARCHITECTS • PLANNERS, AIA

DATE
05/07/99

SHEET NO.

AHYMO 100-YEAR SUMMARY OUTPUT

AHYMO PROGRAM SUMMARY TABLE (AHYMO_97) - - VERSION: 1997.02c RUN DATE (MON/DAY/YR) =05/07/1999
INPUT FILE = G:\C11\120\DOCUMENT\AHYMO2IN.TXT USER NO.= AHYMO-I3Chavez-Grieves-C

COMMAND	HYDROGRAPH IDENTIFICATION	FROM ID NO.	TO ID NO.	AREA (SQ MI)	PEAK DISCHARGE (CFS)	RUNOFF VOLUME (AC-FT)	RUNOFF (INCHES)	TIME TO PEAK (HOURS)	CFS PER ACRE	NOTATION
*S**********										
*S********** CHAVEZ-GRIEVES CONSULTING ENGINEERS, INC. **********										
*S********** TVI **********										
*S**********										
S FILENAME: G:\C11\120\DOCUMENT\AHYMO2IN										
*S**********										
*S******* 100 YEAR, 6 HOUR STORM (Section 22.2 Hydrology)										
START									TIME=	.00
RAINFALL TYPE= 1									RAIN6=	2.600
*S**********										
*S**********DEVELOPED CONDITIONS**********										
*S**********										
COMPUTE NM HYD	BASINA	-	1	.01137	34.33	1.313	2.16558	1.500	4.719 PER IMP=	85.00
COMPUTE NM HYD	BASINB	-	2	.00098	2.99	.114	2.16558	1.500	4.748 PER IMP=	85.00
COMPUTE NM HYD	BASINC	-	3	.00138	2.67	.080	1.09062	1.500	3.024 PER IMP=	.00
ADD HYD	SUMINTOPOND	1& 3	4	.01275	37.00	1.393	2.04924	1.500	4.536	
ROUTE RESERVOIR	PONDOUT1	4	5	.01275	7.37	1.393	2.04924	2.066	.903 AC-FT=	.808
FINISH										

CALCULATED 02-03-1999 23:57:47
DISK FILE : C:ACOMA .VOL

Planimeter scale: 1 inch = 1 ft.

Elevation (ft)	Planimeter (sq.in.)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	* Volume (acre-ft)	Volume Sum (acre-ft)
63.00	5,445.00	0.13	0.00	0.00	0.00
64.00	6,625.00	0.15	0.41	0.14	0.14
65.00	7,876.00	0.18	0.50	0.17	0.30
66.00	9,200.00	0.21	0.59	0.20	0.50
67.00	10,597.00	0.24	0.68	0.23	0.73
68.00	12,065.00	0.28	0.78	0.26	0.99

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

Worksheet
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\project2.fm2
Worksheet	Pipe from Pond
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Diameter

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.008600	ft/ft
Discharge	7.37	cfs

Results		
Depth	16.2	in
Diameter	16.21	in → USE 18"
Flow Area	1.43	ft²
Wetted Perimeter	4.24	ft
Top Width	0.00	ft
Critical Depth	1.08	ft
Percent Full	100.00	
Critical Slope	0.009077	ft/ft
Velocity	5.14	ft/s
Velocity Head	0.41	ft
Specific Energy	FULL	ft
Froude Number	FULL	
Maximum Discharge	7.93	cfs
Full Flow Capacity	7.37	cfs
Full Flow Slope	0.008600	ft/ft

POND OUTLET
Worksheet for Irregular Channel

Project Description	
Project File	g:\c11\120\calcs\tvi.fm2
Worksheet	POND OUTLET
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data		
Channel Slope	0.009000 ft/ft	
Elevation range: 0.00 ft to 0.67 ft.		

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	0.67	0.00	2.00	0.013
0.00	0.04			
1.00	0.00			
2.00	0.04			
2.00	0.67			

Discharge	7.37	cfs

Results		
Wtd. Mannings Coefficient	0.013	
Water Surface Elevation	0.65	ft
Flow Area	1.27	ft²
Wetted Perimeter	3.23	ft
Top Width	2.00	ft
Height	0.65	ft
Critical Depth	0.77	ft
Critical Slope	0.005633	ft/ft
Velocity	5.81	ft/s
Velocity Head	0.53	ft
Specific Energy	1.18	ft
Froude Number	1.29	
Flow is supercritical.		

CHAVEZ · GRIEVES
CONSULTING ENGINEERS, INC.
5639 JEFFERSON STREET NE • ALBUQUERQUE, NEW MEXICO 87109
PHONE (505) 344-4080 • FAX (505) 343-8759

SHEET NO. 11 OF
JOB
SUBJECT IVI
CLIENT JOB NO.
BY AMY DATE 5/7/99
CHECKED BY DATE

WEIR EQUATION FOR TYPE C INLET TO 18" PIPE THAT GOES TO POND

SEE COA DRAWING 2320

$L = \frac{40}{10} + \frac{25}{12} = 2.1'$

H = .5 FOR CURB

$Q = 2.7 LH^{1.5} = 2.7(2.1)(.5)^{1.5} = 2.0 CFS < 5.3 CFS$

BASIN E DRAINS TO INLET WHICH IS 5.3 CFS

TRY DOUBLE INLET

$L = \frac{40 + 40 + 25}{12} = 8.75'$

H = .5

$Q = 2.7(8.75)(.5)^{1.5} = 8.4 CFS > 5.3 CFS$ ✓

ORIFICE EQUATION FOR TYPE C INLET TO 18" PIPE TO POND

FOR 2 TYPE C COA GRATE $A = 2 \times 4.15 SF = 8.2 SF$

$Q = 0.6 A \sqrt{2gh}$

h = .5 FOR CURB

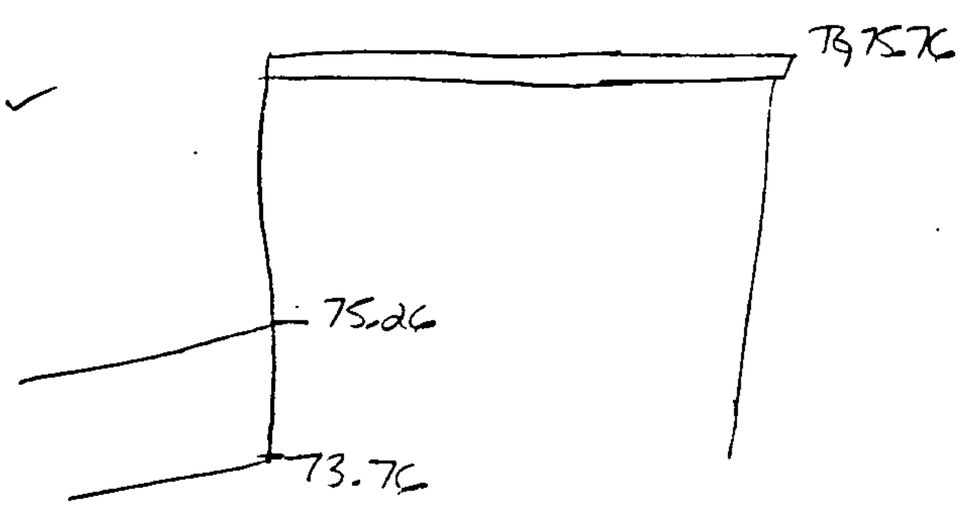
$Q = 0.6(8.2)\sqrt{2(32.2)(.5)} = 27.9 > 5.3 CFS$ ✓

HEAD LOSS TO 18 INCH PIPE WHICH GOES TO POND

HEAD LOSS INTO PIPE

$h_1 = 0.2\frac{V^2}{2g} = \frac{.2(7.28)^2}{2(32.2)} = 0.16$ ✓

V = 7.28



Worksheet
Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\project2.fm2
Worksheet	From Small Parking Lot & Rf Drns to Pond
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Full Flow Diameter

Input Data		
Mannings Coefficient	0.013	
Channel Slope	0.017400	ft/ft
Discharge	10.30	cfs

Results			
Depth	16.1	in	
Diameter	16.11	in	→ use 18"
Flow Area	1.41	ft²	
Wetted Perimeter	4.22	ft	
Top Width	0.00	ft	
Critical Depth	1.23	ft	
Percent Full	100.00		
Critical Slope	0.015160	ft/ft	
Velocity	7.28	ft/s	
Velocity Head	0.82	ft	
Specific Energy	FULL	ft	
Froude Number	FULL		
Maximum Discharge	11.08	cfs	
Full Flow Capacity	10.30	cfs	
Full Flow Slope	0.017400	ft/ft	

Worksheet
Worksheet for Rectangular Channel

Project Description	
Project File	c:\haestad\fmw\project2.fm2
Worksheet	Asphalt Swale from Large Parking to Pond
Flow Element	Rectangular Channel
Method	Manning's Formula
Solve For	Bottom Width

Input Data		
Mannings Coefficient	0.017	
Channel Slope	0.010000	ft/ft
Depth	0.50	ft
Discharge	27.90	cfs

Results		
Bottom Width	10.75	ft
Flow Area	5.38	ft²
Wetted Perimeter	11.75	ft
Top Width	10.75	ft
Critical Depth	0.59	ft
Critical Slope	0.005762	ft/ft
Velocity	5.19	ft/s
Velocity Head	0.42	ft
Specific Energy	0.92	ft
Froude Number	0.00	