City of Albuquerque
P.O. BOX 1293 ALBUQUERQUE, NEW MEXICO 87103

January 10, 1994

Jeff Mortensen
Jeff Mortensen & Associates Inc.
6010-B Midway Park Blvd. NE
Albuquerque, NM 87109

RE: REVISED GRADING/PAVING PLAN FOR ONATE ELEMENTARY SCHOOL TRACK (H22-D35) REVISION DATED 1/4/94.

Dear Mr. Mortensen:

Based on the information provided on your January 6, 1994 resubmittal, the above referenced site is approved for Building Permit. Please attach a copy of this approved plan to the construction sets prior to sign-off by Hydrology.

Please be advised that a separate permit is required for construction within City Right-of-Way. A copy of this approval letter must be on hand when applying for the excavation permit.

Also, prior to Certificate of Occupancy release, Engineer Certification per the D.P.M. checklist will be required.

If I can be of further assistance, please feel free to contact me at 768-2667.

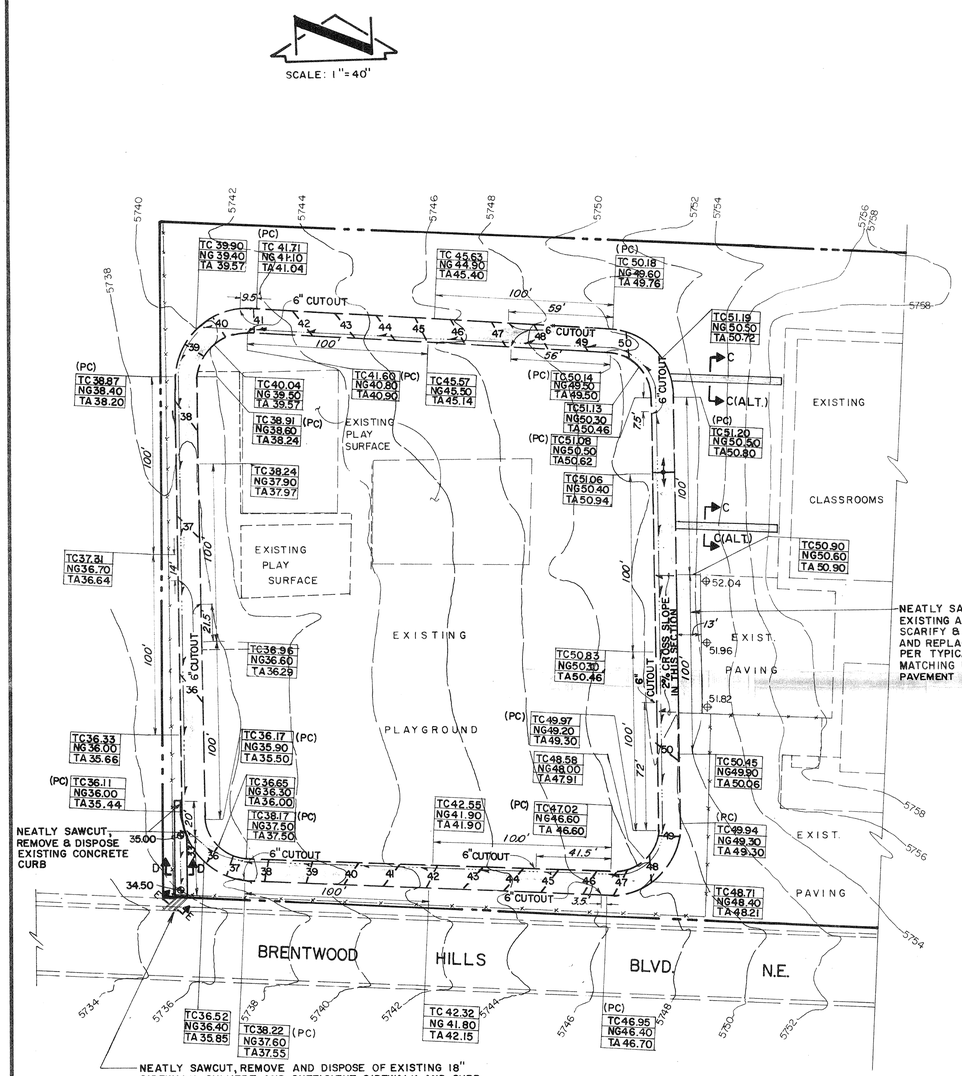
Sincerely,

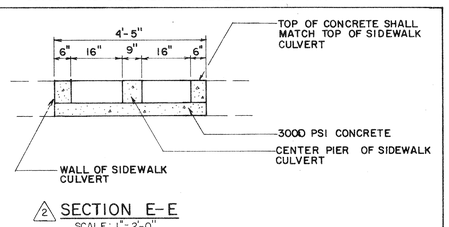
Bernie J. Montoya, CE
Engineering Associate

BJM/dl/WPHYD/8149

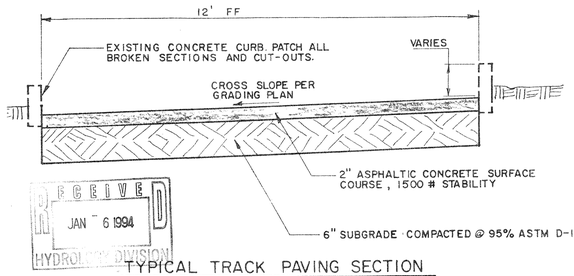
xc: Inspector
Darlene Saavedra
File

159098





(2) SECTION E-E
SCALE: 1"=2'-0"



TYPICAL TRACK PAVING SECTION
SCALE: 1"=2'-0"(HORIZONTAL)
1"=1'-0"(VERTICAL)

RECEIVED
JAN - 6 1994
HYDROLOGY DIVISION

DRAINAGE PLAN

The following items concerning the Onate Elementary School Phase I Site Improvements Drainage Plan are contained herewith:

1. Vicinity Map
2. Grading Plan
3. Calculations

As shown by the Vicinity Map, the site is located on the north side of Brentwood Hills Blvd. N.E. just east of Chelwood Park Blvd. N.E. The site is currently developed as an elementary school and consists of permanent buildings, paved parking, portable buildings, play areas, and a playground surrounded by a running track.

The Grading and Paving Plan shows 1) existing top of curb and natural ground elevations and 2) new top of asphalt indicated by spot elevations. Proposed construction for all work in this plan is designated Phase I of the Master Drainage Plan, Engineer's Date April 22, 1992. Phase I improvements consist of the construction of two rundowns to direct roof runoff from the building to the track, construction of an asphalt surface for the running track, and an asphalt rundown at the southwest corner of the site. All of the improvements of Phase I lie in Basin 'A' of the Master Drainage Plan. At present, Basin 'A' drains to the southwest corner of the site, using the natural surface of the track to accept the flow. The flow is intended to discharge from the site via an existing sidewalk culvert onto Brentwood Hills Blvd. N.E. at the southwest corner of the track. Currently, the runoff received by the track creates a muddy nuisance for students, staff and community. It also creates an erosion problem whereby sediment accumulates at the southwest corner of the track and spills over onto the park and Brentwood Hills Blvd. this project will mitigate those problems.

The Calculations which appear hereon analyze both the existing and developed conditions for the 100-year, 6-hour rainfall event. The Procedure for 40-acre and Smaller Basins, as set forth in the Revision of 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. The drainage patterns of Basin 'A' remain unchanged. The basin will continue to drain to the southwest corner of the site, but discharge will be enhanced by the construction of an asphalt rundown leading directly from the track to the existing sidewalk culvert located on Brentwood Hills Blvd. N.E. The runoff from Basin 'A' will increase by 0.5 cfs, which is negligible to the existing runoff of 12.3 cfs. The Phase I improvements are modifications to an existing site within an infill area. Review of the City Storm Drainage Facilities maps indicates the presence of public storm drain improvements downstream from the site. Based upon the proximity of the site within the watershed and the proximity of public storm drain improvements within Chelwood Park Blvd., the negligible increase in runoff, the correction of an existing erosion problem and the modification to an existing site within an infill area, the continued free discharge of runoff from this site is appropriate.

CALCULATIONS

Site Characteristics

1. Precipitation Zone 4
2. $P_{6,100} = P_{360} =$ 2.90
3. Total Area (A_T) 134,284.82/3.08 Ac
4. Existing Land Treatment

Treatment	Area (sf/ac)	%
C	109,944.01/2.52	81.8
D	24,340.81/0.56	18.2

5. Developed Land Treatment

Treatment	Area (sf/ac)	%
C	95,274.82/2.19	71.1
D	39,010.00/0.89	28.9

Existing Condition

1. Volume

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = (1.46(2.52) + 2.64(0.56)/3.08 = 1.67$
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.67/12)/(3.08) = 0.4286$ Ac.Ft. = 18,671.3 cf

2. Peak Discharge

$Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$
$Q_p = Q_{100} = (3.73)(2.52) + (5.25)(0.56) = 12.3$ cfs

Developed Condition

1. Volume

$E_W = (E_A A_A + E_B A_B + E_C A_C + E_D A_D)/A_T$
$E_W = (1.46(2.19) + 2.64(0.89)/3.08 = 1.80$
$V_{100} = (E_W/12)A_T$
$V_{100} = (1.80/12)3.08 = 0.4620$ Ac.Ft. = 20,124.8 cf

2. Peak Discharge (100 yr 6 hr)

$Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$
$Q_p = Q_{100} = (3.73)(2.19) + (5.25)(0.89) = 12.8$ cfs

(2) 3. Low Flow Discharge (10 yr 6 hr)

$Q_p = Q_{PA} A_A + Q_{PB} A_B + Q_{PC} A_C + Q_{PD} A_D$
$Q_p = Q_{10} = (2.26)(2.19) + (3.57)(0.89) = 8.1$ cfs

Comparison

1. $\Delta V_{100} =$ 20,124.8 - 18,671.3 = 1,453.5 cf (increase)
2. $\Delta Q_{100} =$ 12.8 - 12.3 = 0.5 cfs (increase)

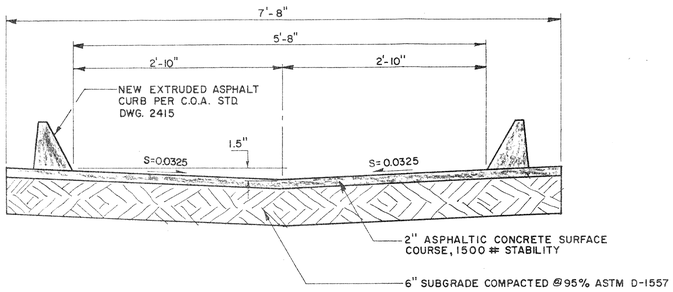
(2) Rundown Capacity

1. Using Haestad Methods computer program for open channel flow
   Assuming Rectangular Channel
   Let S = 0.0152 Ft/Ft
   n = 0.017
   w = 5.7 Ft
   d = 0.67 Ft

   Therefore Q capacity = 35.6 cfs > Q_p = 12.8 cfs

(2) Culvert Requirements

1. $Q_{culvert} = CLH^{1.5}$
   Let: $Q_{culvert} = Q_{10} = 8.1$ cfs
   C = 3.3
   H = 0.67
   Therefore $L_{required} = 4.4$ Ft
2. The culverts shall be aligned 54.25° off center
   $W_{culvert} = L_{req} \cos 54.25° = 4.4(0.58) = 2.6$ Ft = 31.2 in.
   $W_{culvert}/2 = 15.6$ in.
   Therefore Two (2) 16" culverts are required to discharge Q_{10}.



SECTION D-D
SCALE: 1"=1'-0" (HORIZONTAL)
1"=1'-0" (VERTICAL)

JEFFREY G. MORTENSEN
NEW MEXICO
8547
REGISTERED PROFESSIONAL ENGINEER

01-04-94

CONSTRUCTION NOTES:

1. Two (2) working days prior to any excavation, contractor must contact New Mexico One Call System 260-1990, for location of existing utilities.
2. Prior to construction, the contractor shall excavate and verify the horizontal and vertical location of all potential obstructions. Should a conflict exist, the contractor shall notify the engineer in writing so that the conflict can be resolved with a minimum amount of delay.
3. All work on this project shall be performed in accordance with applicable federal, state and local laws, rules and regulations concerning construction safety and health.
4. All construction within public right-of-way shall be performed in accordance with applicable City of Albuquerque Standards and Procedures.
5. If any utility lines, pipelines, or underground utility lines are shown on these drawings, they are shown in an approximate manner only, and such lines may exist where none are shown. If any such existing lines are shown, the location is based upon information provided by the owner of said utility, and the information may be incomplete, or may be obsolete by the time construction commences. The engineer has conducted only preliminary investigation of the location, depth, size, or type of existing utility lines, pipelines, or underground utility lines. This investigation is not conclusive, and may not be complete, therefore, makes no representation pertaining thereto, and assumes no responsibility or liability therefor. The contractor shall inform itself of the location of any utility line, pipeline, or underground utility line in or near the area of the work in advance of and during excavation work. The contractor is fully responsible for any and all damage caused by its failure to locate, identify and preserve any and all existing utilities, pipelines, and underground utility lines. In planning and conducting excavation, the contractor shall comply with state statutes, municipal and local ordinances, rules and regulations, if any, pertaining to the location of these lines and facilities.
6. 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.
7. Backfill compaction shall be according to RESIDENTIAL street use.
8. Maintenance of these facilities shall be the responsibility of the owner of the property served.
9. The design of planters and landscaped areas is not part of this plan. All planters and landscaped areas adjacent to the building(s) shall be provided with positive drainage to avoid any ponding adjacent to the structure. For construction details, refer to landscaping plan.

APPROVALS	NAME	DATE
A.C.E. / DESIGN	Barney J. Montoya	11/7/94
INSPECTOR		
A.C.E. / FIELD		

EROSION CONTROL MEASURES

1. The contractor shall ensure that no soil erodes from the site into public right-of-way or onto private property. This can be achieved by constructing temporary berms at the property lines and wetting the soil to keep it from blowing.
2. The contractor shall promptly clean up any material excavated within the public right-of-way so that the excavated material is not susceptible to being washed down the street.
3. The contractor shall secure "Topsoil Disturbance Permit" prior to beginning construction.

JEFF MORTENSEN & ASSOCIATES, INC.
6010-B MIDWAY PARK BLVD. N.E.
ALBUQUERQUE, NEW MEXICO 87109
ENGINEERS & SURVEYORS (505)345-4250

GRADING AND PAVING PLAN

ONATE ELEMENTARY SCHOOL TRACK

DESIGNED BY G.R.B.
DRAWN BY T.P.H.
APPROVED BY J.G.M.

NO.	DATE	BY	REVISIONS
(2)	12/93	G.R.B.	S.W. CULVERT RUNDOWN CAPACITY CALCULATIONS; ADD
			SECTION E-E ; ADD DETAIL (4) ; Q10 CALCULATIONS

JOB NO. 901869
DATE 11/93
SHEET 5 OF 5

142347

DRAINAGE PLAN

Existing Conditions

As shown by the Vicinity Map, the site is located to the east of Chelwood Park Blvd. N.E. and to the north of Brentwood Hills Blvd. N.E. The site is currently developed as an elementary school and consists of permanent buildings, paved parking, portable buildings, play areas, and an athletic field bounded by a running track.

The northeastern portion of the site (Basin "C") drains satisfactorily to the west by means of a shallow valley lying just inside and parallel to the northern site boundary. The native vegetation plays a significant role in containing erosion, both in this area and in the area surrounding the portable classrooms at the east end of the site. The southeastern portion of the site (Basin "B") drains into Brentwood Hills Blvd. Aside from a small "closed basin" (Basin "D") near the center the site, the remaining runoff is associated with Basin "A", which includes the athletic field and running track.

Through review of the site topography and observation of site conditions, various problem areas have been identified. These are illustrated on Sheet 1 of 4 entitled "Existing Conditions Map". Photographs of certain problem areas are presented on Sheet 2 of 4 entitled "Existing Conditions Photographs". Many of the problems relate to areas of heavy pedestrian use, and their correction will improve the general safety, durability and appearance of these areas. The functionality of the running track is currently severely impaired by lack of positive drainage. Significant remedial measures are necessary to restore it to usable condition.

Recommendations

Sheet 3 of 4 illustrates recommended improvements to correct and/or alleviate the problems noted on Sheet 1 of 4. The single most significant area of concern lies in Basin "A". It is proposed to construct an asphalt surface for the running track, and through judicious grading of the new surface create a positive drainage pattern towards the southwest corner of the track. Runoff is then to be discharged via an open channel and new sidewalk culvert onto Brentwood Hills Blvd. N.E.

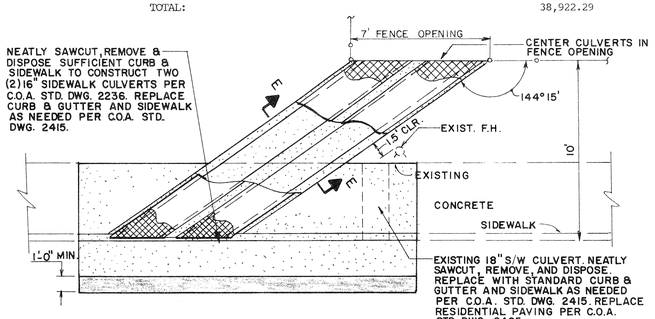
Calculations

The drainage calculations which appear hereon analyze both the existing and developed conditions for the 100-year, 6-hour rainfall event. These calculations have been prepared in accordance with the City of Albuquerque Development Process Manual, Volume II, coupled with the Mayor's Emergency Rule dated January 14, 1986. As shown by these calculations, the proposed improvements will be accompanied by an overall increase in site discharge of 1.3 cfs with an associated increase in runoff volume of 2170 cf.

Engineer's Estimate

Included with this submittal is a preliminary engineers estimate for the drainage improvements recommended above. This estimate is based upon City of Albuquerque Standard Unit Prices which are representative of the local market. Due to design variables, contingencies have been added.

ITEM NO.	ITEM DESCRIPTION	UNIT PRICE	QUANTITY	AMOUNT
0341.01	AC CURB, M EXTD, LF	2.30	220	506.00
0510.10	CUT OFF WALL, PCC, CY	190.00	4.4	836.00
0410.01	CHAIN LINK FNC, SF	4.40	270	1,188.00
0340.03	VLY GUT, PCC, SF	3.80	1125	4,275.00
XXXX.XX	SPLASH PAD W/TURNED-DOWN EDGE, EA	500.00	2	1,000.00
0915.05	CIH BSN, D, SG, EA	1,900.00	1	1,900.00
0308.01	NAT GRVL SF, 6", SY	2.70	110	297.00
0343.02	AC PVMT < OR = TO 4", SAW, REM, & DISP, SY	2.40	20	48.00
0343.09	SDWK, SAW, REM & DISP, SY	4.30	44.4	190.92
0701.01	TRCHG, BF & COMP, 4-15" SD, < 8', LF	8.20	140	1,148.00
0301.03	SUBGRADE PREP, RES 6", SY	1.15	1806	2,076.90
0336.15	2" AC SFC, 1500, M, SY	4.00	1806	7,224.00
0340.01	SDWK, 4", PCC, SF	2.60	400	1,040.00
0901.03	8" PVC SDR 35 PIPE, SD, LF	5.90	140	826.00
1010.01	SOD, REM & REPL, SF	2.38	3410	8,115.80
	SUBTOTAL:			30,671.62
	CONTINGENCIES @ 20%:			6,134.32
	SUBTOTAL:			36,805.94
	N.M.G.R.T. @ 5.75%			2,116.34
	TOTAL:			38,922.29



BRENTWOOD HILLS BLVD. N.E.

2 DETAIL 1/5

SCALE: 1"=4'-0"

NOTE: REMOVAL OF SIDEWALK AND CURB & GUTTER SHALL EXTEND TO THE NEAREST CONTRACTION JOINT.

CALCULATIONS

Ground Cover Information

From SCS Bernalillo County Soil Survey,
Plate 32: EtC - Embudo Tijeras Complex,
TgB - Tijeras gravelly fine sandy loam
Hydrologic Soil Group: B
Pervious Curve Number (DPM Plate 22.2 C-2):

Basin:	A	B	C	D
Existing PCN:	82	61	61	61

Basin:	A	B	C
Developed PCN:	82	61	61

Time of Concentration/Time to Peak

$T_c = 0.0078\ L^{0.77}/S^{0.385}$ (Kirpich Equation)

$T_p = T_c = 10$ min.

Point Rainfall

$P_6 = 2.51$ in. (DPM Plate 22.2 D-1)

Rational Method

Discharge: Q = CiA

where C varies
$i = P_6\ (6.84)\ T_c^{-0.51} = 5.31$ in/hr
$P_6 = 2.51$ in (DPM Plate 22.2D-1)
$T_c = 10$ min (minimum)
A = area, acres

SCS Method

Volume: V = 3630(DRO) A

Where DRO = Direct runoff in inches
A = area, acres

Existing Condition

1. Basin "A"
A_{total} = 130,260 sf = 3.00 Ac
Roof area = 13,350 sf (0.10)
Paved area = 23,710 sf (0.18)
Landscaped area = 240 sf (<0.01)
Undeveloped area = 92,960 sf (0.72)
C = 0.55 (Weighted average per Emergency Rule, 1/14/86)
Q_{100} = CiA = 0.55(5.31)(3.00) = 8.8 cfs
A_{imp} = 37,060 sf; % impervious = 28 %
Composite CN = 86.5 (DPM Plate 22.2 C-3)
DRO = 1.3 in (DPM Plate 22.2 C-4)
V_{100} = 3630 (DRO)A = 14,160 cf

2. Basin "B"
A_{total} = 69,760 sf = 1.60 Ac
Roof area = 16,400 sf (0.24)
Paved area = 37,380 sf (0.54)
Landscaped area = 12,140 sf (0.17)
Undeveloped area = 3,840 sf (0.05)
C = 0.76 (Weighted average per Emergency Rule, 1/14/86)
Q_{100} = CiA = 0.76(5.31)(1.60) = 6.5 cfs
A_{imp} = 53,780 sf; % impervious = 77 %
Composite CN = 89 (DPM Plate 22.2 C-3)
DRO = 1.5 in (DPM Plate 22.2 C-4)
V_{100} = 3630 (DRO)A = 8,710 cf

3. Basin "C"
A_{total} = 82,080 sf = 1.88 Ac
Roof area = 12,550 sf (0.15)
Paved area = 4,840 sf (0.06)
Landscaped area = 5,230 sf (0.07)
Undeveloped area = 59,460 sf (0.72)
C = 0.50 (Weighted average per Emergency Rule, 1/14/86)
Q_{100} = CiA = 0.50(5.31)(1.88) = 5.0 cfs
A_{imp} = 17,390 sf; % impervious = 21 %
Composite CN = 69 (DPM Plate 22.2 C-3)
DRO = 0.5 in (DPM Plate 22.2 C-4)
V_{100} = 3630 (DRO)A = 3,410 cf

4. Basin "D"
A_{total} = 4,520 sf = 0.10 Ac
Roof area = 1,620 sf (0.36)
Paved area = 2,780 sf (0.62)
Landscaped area = 120 sf (0.02)
Undeveloped area = -0- sf (-0-)
C = 0.92 (Weighted average per Emergency Rule, 1/14/86)
Q_{100} = CiA = 0.92(5.31)(0.10) = 0.50 cfs
A_{imp} = 4,400 sf; % impervious = 97 %
Composite CN = 96.5 (DPM Plate 22.2 C-3)
DRO = 2.1 in (DPM Plate 22.2 C-4)
V_{100} = 3630 (DRO)A = 760 cf

Developed Condition

1. Basin "A"
A_{total} = 129,070 sf = 2.96 Ac
Roof area = 13,020 sf (0.10)
Paved area = 39,390 sf (0.31)
Landscaped area = 3,770 sf (0.03)
Undeveloped area = 72,890 sf (0.56)
C = 0.62 (Weighted average per Emergency Rule, 1/14/86)
Q_{100} = CiA = 0.62(5.31)(2.96) = 9.7 cfs
A_{imp} = 52,410 sf; % impervious = 41 %
Composite CN = 89 (DPM Plate 22.2 C-3)
DRO = 1.5 in (DPM Plate 22.2 C-4)
V_{100} = 3630 (DRO)A = 16,120 cf

2. Basin "B"
A_{total} = 78,210 sf = 1.80 Ac
Roof area = 21,560 sf (0.28)
Paved area = 41,740 sf (0.53)
Landscaped area = 12,140 sf (0.16)
Undeveloped area = 2,680 sf (0.03)
C = 0.81 (Weighted average per Emergency Rule, 1/14/86)
Q_{100} = CiA = 0.81(5.31)(1.80) = 7.7 cfs
A_{imp} = 63,330 sf; % impervious = 81 %
Composite CN = 91 (DPM Plate 22.2 C-3)
DRO = 1.6 in (DPM Plate 22.2 C-4)
V_{100} = 3630 (DRO)A = 10,450 cf

3. Basin "C"
A_{total} = 79,080 sf = 1.82 Ac
Roof area = 9,250 sf (0.12)
Paved area = 5,590 sf (0.07)
Landscaped area = 5,230 sf (0.07)
Undeveloped area = 59,010 sf (0.74)
C = 0.49 (Weighted average per Emergency Rule, 1/14/86)
Q_{100} = CiA = 0.49(5.31)(1.82) = 4.7 cfs
A_{imp} = 14,840 sf; % impervious = 19 %
Composite CN = 68 (DPM Plate 22.2 C-3)
DRO = 0.4 in (DPM Plate 22.2 C-4)
V_{100} = 3630 (DRO)A = 2,640 cf

4. Basin "D" - Absorbed into Basin "A" upon development
Q_{100} = 0
V_{100} = 0

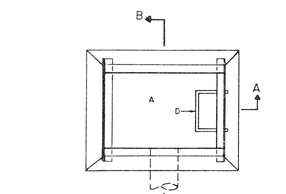
Comparison

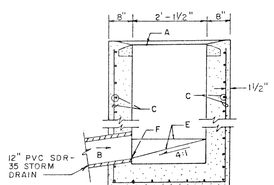
1. Basin "A"
$\triangle Q_{100}$ = 9.7 - 8.8 = 0.9 cfs (increase)
$\triangle V_{100}$ = 16,120 - 14,160 = 1,960 cf (increase)

2. Basin "B"
$\triangle Q_{100}$ = 7.7 - 6.5 = 1.2 cfs (increase)
$\triangle V_{100}$ = 10,450 - 8,710 = 1,740 cf (increase)

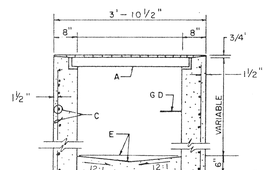
3. Basin "C"
$\triangle Q_{100}$ = 4.7 - 5.0 = -0.3 cfs (decrease)
$\triangle V_{100}$ = 2,640 - 3,410 = -770 cf (decrease)

4. Basin "D"
$\triangle Q_{100}$ = 0 - 0.5 = -0.5 cfs (decrease)
$\triangle V_{100}$ = 0 - 760 = -760 cf (decrease)





SECTION B-B



SECTION A-A

CONSTRUCTION NOTES:

A. FRAME & GRATE, SEE C.O.A. STD. DWG. 2216 & 2220.

B. CUT ONE HORIZONTAL AND ONE VERTICAL BAR MAXIMUM AT PIPE OPENING.

C. NO. 4 BARS A 6" O.C. EACH WAY.

D. USE STANDARD STEPS, SEE C.O.A. STD. DWG. 2229.

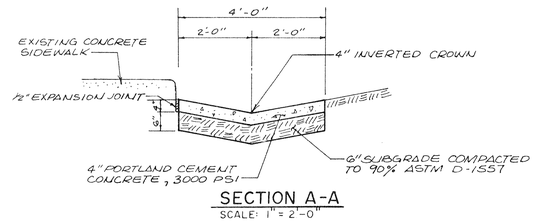
E. CONCRETE FILL.

F. INVERT PER FINAL PLAN.

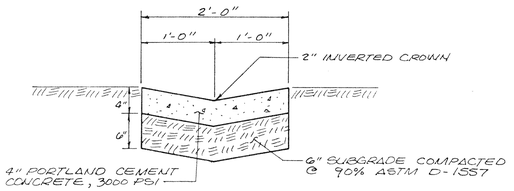
G. INSTALL STEPS ON UPSTREAM FACE.

TYPE "D" STORM INLET

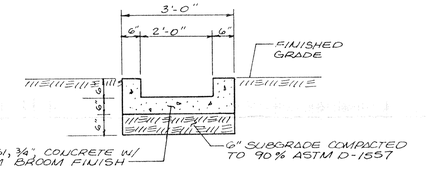
BASED ON C.O.A. STD. DWG. 2206 NOT TO SCALE



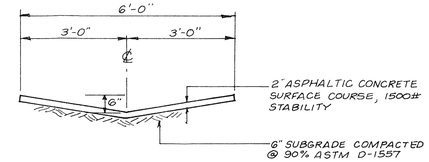
SECTION A-A
SCALE: 1" = 2'-0"



SECTION B-B
SCALE: 1" = 1'-0"



SECTION C-C
SCALE: 1" = 2'-0"



⚠ SECTION C-C (ALTERNATE)
SCALE: 1" = 2'-0"

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JEFFREY G. MORTENSEN NEW MEXICO 8547 REGISTERED PROFESSIONAL ENGINEER
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JEFF MORTENSEN & ASSOCIATES, INC.
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TEXT, CALCULATIONS, DETAILS, & SECTIONS

ONATE ELEMENTARY SCHOOL DRAINAGE STUDY

DESIGNED BY J.G.M. / J.M.L.
DRAWN BY C.L.B.
APPROVED BY J.G.M.

NO.	DATE	BY	REVISIONS
1	11/93	J.G.M.	PHASING; ADD ALT. SECTION C-C
2	12/93	G.R.B.	ADD DETAIL 2

JOB NO. 901869
DATE 04/92
SHEET 4 OF 5