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ENGINEERS ESTIMATE AND QUANTITY CALCULATIONS
90% SUBMITTAL

FOR

CONTRACT FCD1999C071
Golden Eagle Park Dam Improvements
Fountain Hills, Arizona

STANTEC CONSULTING, INC.
7776 Pointe Parkway W. Suite 290
Phoenix, Arizona 85044

February 2000

Prepared For

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Registered Professional Engineer (Civil)
CERTIFICATE NO.
28664
CHARLES V.
GOPPERTON
Date Signed 2/17/00
ARIZONA, U.S.A.

(Engineer's Seal)

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Contents

ADWR Permit Fee

Engineers Estimate

Detailed Quantities and Estimate

Sketches and Cross Sections

Electronic Files for Cost Estimate

ADWR PERMIT FEE

P:\28900095\90\costs\GEPD qty calcs cover sheet.doc

Golden Eagle Park Dam
Calculation of ADWR Dam Construction Permit Fee
90% submittal

2-17-00 cvg

	Design		
	Final Design	$	190,903.00
	Pre-Design	$	266,115.00
	Geotechnical Investigation	$	27,119.00
	Construction		
	Estimated Construction Cost	$	927,115.00
	Total	$	1,411,252.00
	Fees Calculation		
2.0%	of 1st $100,000	$	2,000.00
1.5%	of next $400,000	$	6,000.00
1.0%	of next $500,000	$	5,000.00
0.5%	remainder over $1,000,000	$	2,056.26
	Total Permit Fee	$	15,056.26

ENGINEERS ESTIMATE

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ENGINEER'S ESTIMATE (90% Submittal)

PROJECT: GOLDEN EAGLE PARK DAM MODIFICATIONS
PCN 6700331

Item No.	Item Description	Unit	Engineer's Est. Quantity	Unit Price	Amount
105-1	Partnering Allowance	LS	1	$ 10,000.00	$ 10,000.00
107-1	NPDES / SWPPP	LS	1	$ 6,000.00	$ 6,000.00
107-2	Public Information And Notification Allowance	LS	1	$ 10,000.00	$ 10,000.00
107-3	Project Signs Allowance	LS	1	$ 2,000.00	$ 2,000.00
107-4	Diversion and Care of Water	LS	1	$ 10,000.00	$ 10,000.00
107-5	Dewatering	MG	2	$ 700.00	$ 1,400.00
112-1	Mobilization	LS	1	$ 31,000.00	$ 31,000.00
201-1	Clear and Grub	LS	1	$ 4,500.00	$ 4,500.00
203-1	Excavation, Common	CY	14700	$ 5.50	$ 80,850.00
203-2	Excavation, Rock	CY	25	$ 50.00	$ 1,250.00
204-1	Preliminary Cleanup	SY	20	$ 20.00	$ 400.00
204-2	Final Cleanup	SY	20	$ 20.00	$ 400.00
204-3	Foundation Preparation	SY	20	$ 20.00	$ 400.00
204-4	Dental Concrete	CY	5	$ 500.00	$ 2,500.00
204-5	Dental Mortar	CY	1	$ 500.00	$ 500.00
205-1	Compacted Fill, Impervious	CY	7600	$ 17.50	$ 133,000.00
205-2	Compacted Fill, Pervious	CY	7920	$ 17.50	$ 138,600.00
205-3	Compacted Fill, Random	CY	1250	$ 5.25	$ 6,562.50
205-4	Filter, Sand	CY	110	$ 40.00	$ 4,400.00
205-5	Riprap D50 = 12"	CY	830	$ 50.00	$ 41,500.00
205-6	Riprap D50 = 6"	CY	220	$ 50.00	$ 11,000.00
205-7	Fuseplug Fill	CY	175	$ 50.00	$ 8,750.00
205-8	Repair Erosion Damage on Dam	SY	1850	$ 5.00	$ 9,250.00
221-1	Gabions	CY	730	$ 113.00	$ 82,490.00
222-1	Filter Fabric	SY	3700	$ 1.25	$ 4,625.00
223-1	Gravel Mulch	SY	1500	$ 2.25	$ 3,375.00

ENGINEER'S ESTIMATE (90% Submittal)

PROJECT: GOLDEN EAGLE PARK DAM MODIFICATIONS
PCN 6700331

Item No.	Item Description	Unit	Engineer's Est. Quantity	Unit Price	Amount
310-1	Untreated Base	TON	840	$ 15.00	$ 12,600.00
321-1	Asphalt Concrete C-3/4	TON	170	$ 45.00	$ 7,650.00
321-2	Asphalt Concrete D-1/2	TON	170	$ 45.00	$ 7,650.00
340-1	Concrete Sidewalk, MAG 230 modified	SF	810	$ 2.65	$ 2,146.50
340-2	Concrete Curb, MAG 222 Type B	LF	120	$ 10.00	$ 1,200.00
350-1	Remove Existing Retaining Walls	LF	394	$ 2.00	$ 788.00
350-2	Remove Existing Trash Rack	LS	1	$ 300.00	$ 300.00
350-3	Sawcut and Remove Asphalt Concrete Pavement	SY	3100	$ 1.00	$ 3,100.00
350-4	Cut and Remove Concrete Sidewalk	LF	430	$ 1.30	$ 559.00
350-5	Cut and Remove Concrete Curb	LF	188	$ 1.00	$ 188.00
350-6	Cut and Remove Concrete Cutoff Wall	LF	32	$ 12.50	$ 400.00
350-7	Cut and Remove Shotcrete	SY	490	$ 3.00	$ 1,470.00
350-8	Cut and Remove Fence	LF	255	$ 2.00	$ 510.00
350-9	Remove and Salvage Riprap	CY	96	$ 5.00	$ 480.00
420-1	6' Chain Link Fence	LF	667	$ 27.30	$ 18,209.10
420-2	8' Chain Link Fence	LF	76	$ 20.00	$ 1,520.00
420-3	6' Chain Link X 4' Single Leaf Gate	EA	1	$ 120.00	$ 120.00
420-4	6' Chain Link X 12' Double Leaf Gate	EA	1	$ 360.00	$ 360.00
425-1	Topsoil	LS	1	$ 2,000.00	$ 2,000.00
430-1	Type 1 Seeding	AC	2	$ 2,000.00	$ 3,640.00
430-2	Type 2 Seeding	AC	1	$ 2,000.00	$ 1,360.00
430-3	Remove and Replace Turf Lawn	SY	1900	$ 0.50	$ 950.00
430-4	Blue Paloverde, 5 Gal.	EA	5	$ 100.00	$ 500.00
430-5	Freemont Cottonwood, 5 Gal.	EA	30	$ 100.00	$ 3,000.00
430-6	Goodding Willow, 5 Gal.	EA	7	$ 100.00	$ 700.00
440-1	Remove & Replace Turf Irrigation System	LS	1	$ 500.00	$ 500.00

ENGINEER'S ESTIMATE (90% Submittal)

PROJECT: GOLDEN EAGLE PARK DAM MODIFICATIONS
PCN 6700331

Item No.	Item Description	Unit	Engineer's Est. Quantity	Unit Price	Amount
505-1	Concrete, Class AA (F'c = 4,000 Psi)	CY	380	$ 330.00	$ 125,400.00
505-2	Concrete, Class C (F'c = 2,000 Psi)	CY	35	$ 100.00	$ 3,500.00
505-3	10'x 4' Box Culvert (ADOT B-02.10)	LF	117	$ 600.00	$ 70,200.00
505-4	Concrete Steps	LS	1	$ 500.00	$ 500.00
510-1	4 Course Block Wall	LF	54	$ 12.30	$ 664.20
510-2	3 Course Block Wall	LF	6	$ 8.50	$ 51.00
510-3	2 Course Block Wall	LF	108	$ 5.80	$ 626.40
510-4	1 Course Block Wall	LF	32	$ 3.20	$ 102.40
510-5	Masonry Retaining Wall	LF	93	$ 60.00	$ 5,580.00
515-1	Trashrack at Principal Outlet Works	LS	1	$ 6,400.00	$ 6,400.00
515-2	Trashrack at Auxiliary Outlet Works	LS	1	$ 6,500.00	$ 6,500.00
515-3	Steel Handrail	LF	40	$ 30.00	$ 1,200.00
540-1	Desert Varnish	LS	1	$ 1,000.00	$ 1,000.00
605-1	Corrugated Polyethylene Pipe, Perforated, 6 Inch	LF	14	$ 12.00	$ 168.00
605-2	Corrugated Polyethylene Pipe, 6 Inch	LF	244	$ 10.00	$ 2,440.00
610-1	Relocate 2 1/2 Inch Water Service	LS	1	$ 2,400.00	$ 2,400.00
618-1	24" RCP	LF	120	$ 66.00	$ 7,920.00
618-2	60" RCP	LF	20	$ 455.00	$ 9,100.00
618-3	24" Pipe Plug, MAG 427	EA	2	$ 100.00	$ 200.00
618-4	60" Pipe Plug, MAG 427	EA	2	$ 300.00	$ 600.00
632-1	12" Ductile Iron Pipe	LF	56	$ 80.00	$ 4,480.00
632-2	Thrust Blocks	CY	2	$ 150.00	$ 330.00
632-3	12" Gate Valve	EA	1	$ 1,000.00	$ 1,000.00
632-4	Valve Box Per MAG 391-2	EA	1	$ 100.00	$ 100.00
				Base Bid Total Price	$927,115

LS?

DETAILED QUANTITIES AND ESTIMATE

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Item	Qty		Unit Cost	Cost
105-1 Partnering Allowance				
estimate 10,000 lump sum	1.00	LS	10000.00	$10,000
107-1 NPDES / SWPPP				
Prepare SWPPP	1	LS	$ 1,000.00	$1,000
Construct erosion control measures	1	LS	$ 2,000.00	$2,000
Maintain erosion control measures — Total Cost $ 6,000	30	WK	$ 100.00	$3,000
107-2 Public Information And Notification Allowance				
estimate 10,000 lump sum	1.00	LS	10000.00	$10,000
107-3 Project Signs Allowance				
estimate 2,000 lump sum	1.00	LS	2000.00	$2,000
107-4 Diversion and Care of Water — construct diversion works upstream of outlets to divert cloudburst and ashbrook wash				
Prepare plan	1	LS	$ 2,000.00	$2,000
Construct diversion measures				
earth berm — length 50.00 ft, height 6.00 ft	440	CY	$ 3.00	$1,320
(2 required) — top width 8.00 ft, bottom width 32.00				
filter fabric	250	SY	$ 1.25	$313
60 inch CMP	40	LF	$ 50.00	$2,000
remove berms and pipe and cleanup	440	CY	$ 2.00	$880
Maintain diversion measures — Total Cost $ 9,313	14	WK	$ 200.00	$2,800
107-5 Dewatering — remove water from the trench				
number of pumps 1 ea 2" diameter				
capacity 10 thousand gallons per hour per pump — 7 horsepower each				
total volume to pump 2.00 mg				
time required to pump 200.0 hours equals 8.33 days				
rental cost $ 50.00 per day including pumps and piping/hoses				
add labor, overhead and profit 200% equals $ 100.00 per day				
unit cost per 1,000,000 gallons is $625 round to $700	2	mg	$ 700.00	$1,400

Item		Qty	Unit Cost	Cost
112-1 Mobilization				
Engineers trailer		9 MO	$ 400.00	$3,600
Contractors trailer		9 MO	$ 400.00	$3,600
utilities		9 MO	$ 200.00	$1,800
fencing		9 MO	$ 150.00	$1,350
mobilize heavy equipment to site		1 LS	$ 2,000.00	$2,000
mobilize work force		1 LS	$ 1,000.00	$1,000
safety plan		1 LS	$ 1,000.00	$1,000
contractor quality control		1 LS	$ 2,500.00	$2,500
insurance		1 LS	$ 5,000.00	$5,000
bonding		1 LS	$ 5,000.00	$5,000
Construction Surveying	**contingent item - include in mobilization**			
assume 10 hour days for survey crew	8 hour days for office staff			
Set control	1.00 day crew	10 HR	$ 100.00	$1,000
	0.50 day office	4 HR	$ 75.00	$300
Verify existing topo	2.00 day crew	20 HR	$ 100.00	$2,000
	1.00 day office	8 HR	$ 75.00	$600

Mobilization cost	$30,750	const subtotal	$895,855
Percent of construction subtotal = 3.43%			
exclusive of mobilization			
per specs, shall not exceed 3% Too High			
contractor can only use $ 27,000			

201-1 Clear and Grub

remove trees, bushes etc over entire construction area

Area downstream of energy dissipater	area 19957.00 sq ft	2217.00	SY	0.25	$554
dam, spillway and cloudburst wash	area 129999.00 sq ft	14444.00	SY	0.25	$3,611
Alternate access road	area 14000.00 sq ft	1556.00	SY	0.25	$389

Total Qty	Total Cost	Cost/sy
18217	$ 4,554	$ 0.25

Item	Qty	Unit Cost	Cost

203-1 Excavation, Common

stripping

STA	Length (ft)	AREA (sq.ft.)	AVG AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
1+25.00		0.0			
	25.00		28.00	700	25.9
1+50.00		56.0			
	25.00		77.00	1925	71.3
1+75.00		98.0			
	25.00		119.00	2975	110.2
2+00.00		140.0			
	25.00		167.00	4175	154.6
2+25.00		194.0			
	25.00		191.50	4788	177.3
2+50.00		189.0			
	25.00		183.50	4588	169.9
2+75.00		178.0			
	25.00		178.00	4450	164.8
3+00.00		178.0			
	25.00		177.50	4438	164.4
3+25.00		177.0			
	25.00		174.50	4363	161.6
3+50.00		172.0			
	25.00		169.00	4225	156.5
3+75.00		166.00			
	25.00		166.00	4150	153.7
4+00.00		166.00			
	25.00		165.00	4125	152.8
4+25.00		164,00			
	25.00		163.50	4088	151.4
4+50.00		163.00			
	25.00		161.00	4025	149.1
4+75.00		159.00			
	25.00		160.50	4013	148.6
5+00.00		162.00			

Item						Qty		Unit Cost	Cost
	25.00		157.50	3938	145.8				
5+25.00		153.00							
	25.00		155.00	3875	143.5				
5+50.00		157.00							
	25.00		155.00	3875	143.5				
5+75.00		153.00							
	25.00		156.00	3900	144.4				
6+00.00		159.00							
	25.00		156.00	3900	144.4				
6+25.00		153.00							
	25.00		153.50	3838	142.1				
6+50.00		154.00							
	25.00		152.00	3800	140.7				
6+75.00		150.00							
	25.00		152.00	3800	140.7				
7+00.00		154.00							
	25.00		153.50	3838	142.1				
7+25.00		153.00							
	25.00		151.00	3775	139.8				
7+50.00		149.00							
	19.00		74.50	1416	52.4				
7+69.00		0.00							
				Total:	3565.9	3566.00	CY	5.00	$17,830

trench excavation for 10' x 4' box culvert through existing dam embankment

STA	Length (ft)	AREA (sq.ft.)	AVG AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
0+90.00		0.0			
	10.00		120.50	1205	44.6
1+00.00		241.0			
	10.00		347.50	3475	128.7
1+10.00		454.0			
	10.00		605.00	6050	224.1
1+20.00		756.0			
	10.00		943.00	9430	349.3

Item						Qty		Unit Cost	Cost
1+30.00		1130.0							
	10.00		1339.50	13395	496.1				
1+40.00		1549.0							
	10.00		1689.00	16890	625.6				
1+50.00		1829.0							
	10.00		1841.00	18410	681.9				
1+60.00		1853.0							
	10.00		1729.50	17295	640.6				
1+70.00		1606.0							
	10.00		1390.50	13905	515.0				
1+80.00		1175.00							
	10.00		972.50	9725	360.2				
1+90.00		770.00							
	10.00		610.50	6105	226.1				
2+00.00		451.00							
	10.00		356.00	3560	131.9				
2+10.00		261.00							
	10.00		130.50	1305	48.3				
2+20.00		0.00							
				Total:	4472.2	4472.00	CY	5.00	$22,360
Excavation To Construct Sand Diaphragm (below culvert subgrade)									
			V=(5*4*(5+13.66+5)*)/27=		17.5 cy	18.00	CY	10.00	$180
Primary Outlet Works			Inlet Headwall						
width at headwall		12.7 ft			length	18.09 ft			
width at end of apron		12.7 ft			bottom elevation 1	1697.33 ft			
width of forms		3.0 ft			bottom elevation 2	1694.00 ft			
average width		15.7 ft			avg bottom elevation	1695.67 ft			
ground elevation 1		1700.50 ft							
ground elevation 2		1701.00 ft							
avg ground elevation		1700.75 ft			average height	5.09 ft			
area		79.94 sq ft			volume	1446.05 cu ft	54.00	CY	10.00	$540
Auxiliary Outlet Works			Inlet Headwall						
width at headwall		12.0 ft			length	14.00 ft			
width at end of apron		29.8 ft			bottom elevation 1	1697.33 ft			

Item						Qty		Unit Cost	Cost
width of forms	3.0 ft		bottom elevation 2	1694.00 ft					
average width	23.9 ft		avg bottom elevation	1695.67 ft					
ground elevation 1	1700.50 ft								
ground elevation 2	1701.00 ft								
avg ground elevation	1700.75 ft		average height	5.09 ft					
area	121.53 sq ft		volume	1701.44 cu ft		63.00	CY	10.00	$630
Auxiliary Outlet Works		Energy Dissipater							
width at headwall	12.0 ft		length	46.50 ft					
width at end sill	28.4 ft		bottom elevation	1690.00 ft					
width of forms	3.0 ft		ground elevation	1701.00 ft					
average width	23.2 ft		average height	11.00 ft					
area	255.20 sq ft		volume	11866.80 cu ft		440.00	CY	10.00	$4,400

Flood Wall
excavate 1'-6" outside of footing, vertical

STA	Length	bottom of footing elev	exist grd elev	width of footing	AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
40+00.00		1711.67	1716	17.00			
	112.00				136.6	15299	566.6
41+12.00		1711.67	1721	17.00			
41+12.00		1715.67	1721	7.00			
	102.00				58.3	5947	220.2
42+14.00		1715.67	1722	7.00			
					Total:	786.9	

						Qty		Unit Cost	Cost
						787.00	CY	10.00	$7,870

Widen and Deepen Emergency Spillway

STA	Length (ft)	AREA (sq.ft.)	AVG AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
7+75.00		0.0			
	25.00		62.50	1563	57.9
8+00.00		125.0			
	25.00		378.00	9450	350.0
8+25.00		631.0			
	25.00		619.00	15475	573.1

Item						Qty		Unit Cost	Cost
8+50.00		607.0							
	25.00		517.00	12925	478.7				
8+75.00		427.0							
	23.00		213.50	4911	181.9				
8+98.00		0.0							
				Total:	1641.6	1642.00	CY	5.00	$8,210

Channel Excavation in the Wash Up and Downstream of the Dam

Area Along Upstream Toe of Dam

STA	AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
2+20.00	0.0	-	-
2+40.00	63.5	635	23.5
2+60.00	88.2	1517	56.2
2+80.00	60.0	1482	54.9
3+00.00	69.8	1298	48.1
3+20.00	114.2	1840	68.1
3+40.00	123.8	2380	88.1
3+60.00	162.2	2860	105.9
3+80.00	167.4	3296	122.1
4+00.00	155.6	3230	119.6
4+20.00	121.2	2768	102.5
4+40.00	76.2	1974	73.1
4+60.00	71.5	1477	54.7
4+80.00	45.6	1171	43.4
5+00.00	22.9	685	25.4
5+20.00	37.1	600	22.2
5+40.00	14.4	515	19.1
5+60.00	19.0	334	12.4
5+80.00	19.2	382	14.1
6+00.00	11.6	308	11.4
6+20.00	27.0	386	14.3
6+40.00	17.2	442	16.4
6+60.00	18.8	360	13.3
6+80.00	22.1	409	15.1
7+00.00	2.8	249	9.2

Item	Qty		Unit Cost	Cost
7+20.00 0.0 28 1.0				
Total: 1134.3	1134.00	CY	3.00	$3,402
Area Around Dissipater				
Cut Volume from Inroads Surface Volume Calc = 360.0 cy	360.00	CY	3.00	$1,080
Park Area Upstream of Southwest End of Dam				
Cut Volume from Inroads Surface Volume Calc = 70.0 cy	70.00	CY	3.00	$210
Excavation To Subgrade To Place Gabion and Riprap Erosion Protection				
Gabion Excavation at Emergency Spillway				
total volume of gabions 727.0	727.00	CY	4.00	$2,908
Riprap excavation downstream of auxiliary outlet works dissipater				
area 5241 sq ft thickness 1 ft				
slope factor 1.118 sq ft volume 5859.44 cf	217.00	CY	4.00	$868

Rip Rap Excavation at Upstream Toe of Dam (Cloudburst Wash)

STA	AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
2+00.00	84.9	-	-
2+20.00	68.2	1531	56.7
2+40.00	44.0	1122	41.6
2+60.00	46.6	906	33.6
2+80.00	47.1	937	34.7
3+00.00	48.6	957	35.4
3+20.00	47.9	965	35.7
3+80.00	57.1	3150	116.7
4+00.00	52.7	1098	40.7
4+60.00	52.5	3156	116.9
5+20.00	72.2	3741	138.6
5+80.00	69.6	4254	157.6
6+40.00	40.2	3294	122.0
7+00.00	45.6	2574	95.3
7+60.00	46.5	2763	102.3
7+80.00	46.4	929	34.4
8+00.00	0.0	464	17.2

Item			Qty		Unit Cost	Cost
	Total: 1179.3		1180.00	CY	4.00	$4,720
Construction Surveying	**contingent item - include in earthwork**					
assume 10 hour days for survey crew	8 hour days for office staff					
Set subgrade stakes	3.00 day	crew	30	HR	$ 100.00	$3,000
	1.00	office	8	HR	$ 75.00	$600
Set finish grade stakes	2.00 day	crew	20	HR	$ 100.00	$2,000
	1.00	office	8	HR	$ 75.00	$600

stripping	3566.00	CY	$ 17,830
box culvert trench	4472.00	CY	$ 22,360
sand diaphragm trench	18.00	CY	$ 180
primary inlet struct	54.00	CY	$ 540
auxiliary inlet struct	63.00	CY	$ 630
energy dissipater	440.00	CY	$ 4,400
flood wall	787.00	CY	$ 7,870
spillway	1642.00	CY	$ 8,210
cloudburst	1134.00	CY	$ 3,402
outlet from dissipater	360.00	CY	$ 1,080
upstream of spillway	70.00	CY	$ 210
gabion subgrade	727.00	CY	$ 2,908
riprap subgrade downstream	217.00	CY	$ 868
riprap subgrade upstream	1180.00	CY	$ 4,720
Total excavation qty	14730.00	Cost	$ 75,208
construction staking			$ 6,200
		Total Cost	$ 81,408
Excavation average cost		$5.53	CY

203-2 Excavation, Rock	may be encountered under principal inlet or diaphragm			
Quantity is for estimating purposes only, actual quantiy is unknown, or zero item is contingent based on exposing rock under the structure excavations	25.00	CY	50.00	$1,250
204-1 Preliminary Cleanup	cleanup of rock foundation using air, water and hand tools			
Quantity is for estimating purposes only, actual quantiy is unknown, or zero item is contingent based on exposing rock under the structure excavations	20.00	SY	20.00	$400

Item	Qty		Unit Cost	Cost
204-2 Final Cleanup cleanup of rock foundation using air, water and hand tools Quantity is for estimating purposes only, actual quantiy is unknown, or zero item is contingent based on exposing rock under the structure excavations	20.00	SY	20.00	$400
204-3 Foundation Preparation prepare rock foundation for placement of fill or concrete Quantity is for estimating purposes only, actual quantiy is unknown, or zero item is contingent based on exposing rock under the structure excavations	20.00	SY	20.00	$400
204-4 Dental Concrete place concrete to level subgrade and fill holes Quantity is for estimating purposes only, actual quantiy is unknown, or zero item is contingent based on exposing rock under the structure excavations	5.00	CY	500.00	$2,500
204-5 Dental Mortar place mortar to fill cracks Quantity is for estimating purposes only, actual quantiy is unknown, or zero item is contingent based on exposing rock under the structure excavations	1.00	CY	500.00	$500
205-1 Compacted Fill, Impervious core zone of dam				

Note: All area values taken from Inroads cross sections
fill to raise dam

STA	AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
2+00	273	-	-
2+20	283	5560	205.9
2+40	283	5660	209.6
2+60	283	5660	209.6
2+80	286	5690	210.7
3+00	287	5730	212.2
3+20	289	5760	213.3
3+80	287	17280	640.0
4+00	288	5750	213.0
4+60	289	17310	641.1
5+20	287	17280	640.0
5+80	292	17370	643.3
6+40	294	17580	651.1
7+00	295	17670	654.4
7+60	296	17730	656.7

Item	Qty		Unit Cost	Cost
7+80 296 5920 219.3				
Total: 6220.4	6220.00	CY	5.00	$31,100
Backfill of the Trench Through the Dam to Construct the box culvert				
Volume of Impervious Backfill = 1354.0 cy	1354.00	CY	5.00	$6,770
assume 1/2 of all material will be borrowed	3787.00	CY	25.00	$94,675

Total Qty	Total Cost	Avg Cost/cy
7574	$132,545	$ 17.50

205-2 Compacted Fill, Pervious

shell zone of dam

Compacted Pervious Fill to raise dam

STA	AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
2+00	128	-	-
2+20	457	5850	216.7
2+40	353	8100	300.0
2+60	318	6710	248.5
2+80	286	6040	223.7
3+00	254	5400	200.0
3+20	265	5190	192.2
3+80	233	14940	553.3
4+00	236	4690	173.7
4+60	274	15300	566.7
5+20	231	15150	561.1
5+80	249	14400	533.3
6+40	233	14460	535.6
7+00	219	13560	502.2
7+60	191	12300	455.6
7+80	183	3740	138.5
Total:			5401.1

Item	Qty		Unit Cost	Cost
Total: 5401.1	5401.00	CY	5.00	$27,005
Backfill of the Trench Through the Dam to Construct the box culvert				
Volume of Pervious Backfill = 2515.0 cy	2515.00	CY	5.00	$12,575

Item	Qty		Unit Cost	Cost
assume 1/2 of all material will be borrowed	3958.00	CY	25.00	$98,950

Total Qty	Total Cost	Avg Cost/cy
7916	$138,530	$ 17.50

205-3 Compacted Fill, Random

Backfill Over Gabion and Riprap Erosion Protection

Gabion Backfill

STA	Length (ft)	AREA (sq.ft.)	AVG AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
8+00.00		0.0			
	25.00		23.50	588	21.8
8+25.00		47.0			
	25.00		46.50	1163	43.1
8+50.00		46.0			
	25.00		46.00	1150	42.6
8+75.00		46.0			
	23.00		23.00	529	19.6
8+98.00		0.0			
			Total:	127.0	

Qty		Unit Cost	Cost
127.00	CY	5.00	$635

Riprap Backfill

STA	AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
2+00	73.6	-	-
2+20	53.7	1273	47.1
2+40	32.4	861	31.9
2+60	32.4	648	24.0
2+80	32.4	648	24.0
3+00	32.4	648	24.0
3+20	32.4	648	24.0
3+80	32.4	1944	72.0
4+00	32.4	648	24.0
4+60	32.4	1944	72.0
5+20	44.0	2292	84.9

Item					Qty		Unit Cost	Cost
5+80	45.5	2685	99.4					
6+40	31.3	2304	85.3					
7+00	30.9	1866	69.1					
7+60	32.7	1908	70.7					
7+80	34.9	676	25.0					
8+00	0.0	349	12.9					
		Total:	790.4		790.00	CY	5.00	$3,950
Fill to Construct Dikes and Berms								
Area Around Dissipater								
Volume from Inroads Surface Volume Calc =			276.0	cy	276.00	CY	5.00	$1,380
Backfill sewerline trench near church								
STA	AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)					
1+10.00	0.0	0	0.0					
1+20.00	17.0	85	3.1					
1+40.00	15.1	321	11.9					
1+60.00	15.5	306	11.3					
1+80.00	15.6	311	11.5					
2+00.00	13.8	294	10.9					
2+20.00	8.6	224	8.3					
2+30.00	0.0	0	0.0					
		Total:	53.9		54.00	CY	10.00	$540

Total Qty	Total Cost	Cost/cy
1247	$ 6,505	$ 5.22

205-4	**Filter, Sand**	furnish and place sand filter diaphragm				108.00	CY	40.00	$4,320
upper section	width 36.00	height 18.50	thickness 4.00	volume	98.67			
lower section	width 22.00	height 6.50	thickness 4.00	volume	21.19			
box culvert	width 12.00	height 6.50	thickness 4.00	volume	-11.56			

Item							Qty		Unit Cost	Cost
205-5 Riprap D50 = 12"										
area along upstream toe of dam (Cloudburst Wash)	length 600.00		width 18.60							
	area 11160.00		thickness 2.00				827.00	CY	50.00	$41,350
205-6 Riprap D50 = 6"										
area at auxiliary outlet energy dissipater	area 5241.00		thickness 1.00		slope facto	1.118	217.00	CY	50.00	$10,850

205-7 Fuseplug Fill furnish and place uniform small gravel

STA	Length (ft)	AREA (sq.ft.)	AVG AREA (sq.ft.)	Volume (cu.ft.)	Volume (cu.yds.)
8+09.00		0.0			
	1.00		13.50	14	0.5
8+10.00		27.0			
	15.00		27.00	405	15.0
8+25.00		27.0			
	25.00		40.50	1013	37.5
8+50.00		54.0			
	25.00		64.00	1600	59.3
8+75.00		74.0			
	23.00		74.00	1702	63.0
8+98.00		74.0			
	1.00		37.00	37	1.4
8+99.00		0.0			
			Total:	176.7	

177.00	CY	50.00	$8,850

205-8 Repair Erosion Damage on Dam place compacted fill in rills and gullies on downstream face

entire area of downstream face of dam			area	18735.00	sq ft				
adjust for 2:1 slope	slope factor	1.118	adjusted area	20945.73	sq ft				
area to be excavated for construction of box culvert			area	-3838.00	sq ft				
	slope factor	1.118	adjusted area	-4290.88	sq ft				
			total area	16654.85	sq ft	1851.00	SY	5.00	$9,255

Item								Qty		Unit Cost	Cost
221-1 Gabions	furnish and place gabions and anchors										
3' x 3' gabion units	plan area	1589.00	sq ft	thickness	3.00	ft		177.00	CY	100.00	$17,700
mattress units	plan area	14150.00	sq ft	thickness	1.00	ft		524.00	CY	100.00	$52,400
adjust for slope distances	5%	707.50	sq ft	thickness	1.00	ft		26.00	CY	100.00	$2,600
anchors at 3' grid	area	14150.00		number of anchors	1572.00			1572.00	EA	5.00	$7,860
Construction Surveying	**contingent item - include in gabions**										
assume 10 hour days for survey crew	8 hour days for office staff										
Set gabion subgrade stakes	1.00	day	crew					10	HR	$ 100.00	$1,000
	0.50	day	office					4	HR	$ 75.00	$300

Gabions	727.00	CY	$ 72,700
anchors	1572.00	EA	$ 7,860
construction staking	1.00	LS	$ 1,300
		Total Cost	$ 81,860
Gabions Average Unit Cost	$ 112.60	CY	

222-1 Filter Fabric											
under riprap downstream of energy dissipater	area	5241.00	sq ft					582.00	SY	1.25	$728
adjust for slope distances	10%	524.10	sq ft					58.00	SY	1.25	$73
area along upstream toe of dam (Cloudburst Wash)	length	600.00		width	18.60			1240.00	SY	1.25	$1,550
under gabions at emergency spillway											
3' x 3' gabion units				plan area	1589.00	sq ft		177.00	SY	1.25	$221
mattress units				plan area	14150.00	sq ft		1572.00	SY	1.25	$1,965
adjust for slope distances				area	707.50	sq ft		79.00	SY	1.25	$99

Total Qty	Total Cost	Cost/sy
3708	$ 4,635	$ 1.25

223-1 Gravel Mulch											
	area	13644.00	sq ft	thickness	0.17	ft		84.00	CY	40.00	$3,360
	area	1516.00	sq yds								

Total Qty	Total Cost	Cost/sy
1516	$ 3,360	$ 2.22

Item											Qty		Unit Cost	Cost
310-1	**Untreated Base**	may be required during reconstruction of damaged pavement												
	area	27970.00	sq ft	thickness	0.50	ft			120.00	pcf	840.00	TON	15.00	$12,600
321-1	**Asphalt Concrete C-3/4**	may be required during reconstruction of damaged pavement, assume half of each												
321-2	**Asphalt Concrete D-1/2**													
	area	27970.00	sq ft	thickness	0.17	ft			148.00	pcf	340.00	TON	35.00	$11,900
	Tack Coat - Diluted													
	area	27970.00	sq ft	area	3107.78	sq yds	volume	310.78	gal		1.27	TON	200.00	$254
	application rate	0.1	gal/sq yd	weight	245.00	gal/ton								
	Prime Coat - Diluted													
	area	27970.00	sq ft	area	3107.78	sq yds	volume	310.78	gal		1.27	TON	200.00	$254
	application rate	0.1	gal/sq yd	weight	245.00	gal/ton								
	Preservative Seal - Diluted													
	area	27970.00	sq ft	area	3107.78	sq yds	volume	310.78	gal		1.27	TON	400.00	$508
	application rate	0.1	gal/sq yd	weight	245.00	gal/ton								
	Subgrade preparation													
	area	27970.00	sq ft								3108.00	SY	0.75	$2,331

Asphalt Concrete	340.00	TON	$ 11,900
Tack Coat	1.27	TON	$ 254
Prime Coat	1.27	TON	$ 254
Preservative Seal	1.27	TON	$ 508
Subgrade Prep	3108.00	SY	$ 2,331
		Total Cost	$ 15,247
Asphalt Concrete Total Unit Cost	$ 44.84	TON	

Item	Qty		Unit Cost	Cost
340-1 Concrete Sidewalk, MAG 230 (Mod)				
sidewalk - class B conc length 135.00 width 6.00 thickness 0.33	10.00	CY	150.00	$1,500
subgrade preparation area 810.00 sq ft	90.00	SY	0.75	$68
9 brick installed every 6 feet as construction joint 23.00 construction joints	23.00	EA	25.00	$575

Concrete	10.00	CY	$	1,500
Subgrade Prep	90.00	SY	$	68
Brick joints	23.00	EA	$	575
		Total Cost	$	2,143
Sidewalk Total Unit Cost	$ 2.65	SF		

340-2 Concrete Curb, MAG 222 Type B replace landscaping curb	120.00	LF	10.00	$1,200
350-1 Remove Existing Retaining Walls				
amphitheater bottom wall	39.00	LF	2.00	$78
amphitheater bottom wall	87.00	LF	2.00	$174
amphitheater second wall	53.00	LF	2.00	$106
amphitheater third wall	56.00	LF	2.00	$112
amphitheater fourth wall	57.00	LF	2.00	$114
amphitheater side wall and at top	102.00	LF	2.00	$204

Total Qty	Total Cost	Cost/LF
394	$ 788	$ 2.00

350-2 Remove Existing Trash Rack timber trash rack				
knock it down, load and deliver to landfill	1.00	LS	300.00	$300
350-3 Sawcut and Remove Asphalt Concrete Pavement				
may be required during reconstruction of damaged pavement				
assume minimal amount of sawcutting	100.00	LF	2.00	$200
remove pavement and dispose area 27970.00 sq ft area 3107.78 sq yds	3108.00	SY	1.00	$3,108

Sawcut	100.00	LF	$	200
Removal	3108.00	SY	$	3,108
		Total Cost	$	3,308
Asphalt Concrete Total Unit Cost	$ 1.06	SY		

Item									Qty		Unit Cost	Cost
350-4 Cut and Remove Concrete Sidewalk												
sawcut ends									12.00	LF	20.00	$240
remove and dispose	length	430.00	width	6.00	thickness	0.33			32.00	CY	10.00	$320
				sawcut	12.00	LF		$ 240				
			remove and dispose		32.00	CY		$ 320				
						Total Cost		$ 560				
				Total Cost	$ 1.30	LF						
350-5 Cut and Remove Concrete Curb			replace landscaping curb						188.00	LF	1.00	$188
350-6 Cut and Remove Concrete Cutoff Wall												
sawcut end									4.00	LF	50.00	$200
remove and dispose	length	32.00	height	6.00	thickness	0.50			4.00	CY	50.00	$200
				sawcut	4.00	LF		$ 200				
			remove and dispose		4.00	CY		$ 200				
						Total Cost		$ 400				
				Total Cost	$ 12.50	LF						
350-7 Cut and Remove Shotcrete												
near auxiliary outlet energy dissipater												
sawcut end									25.00	LF	5.00	$125
remove and dispose	area	3150.00	slope corr	1.118	thickness	0.33	sq yrds	391.00	43.00	CY	25.00	$1,075
near end of dam at spillway abutment												
sawcut end - not needed									0.00	LF	5.00	$0
remove and dispose	area	813.00	slope corr	1.118	thickness	0.33	sq yrds	101.00	11.00	CY	25.00	$275
				sawcut	25.00	LF		$ 125				
			remove and dispose		54.00	CY		$ 1,350				
						Total Cost		$ 1,475				
			total sq yds	492.00	Total Cost	$ 3.00	SY					
350-8 Cut and Remove Fence												
8' chain link fence near auxiliary outlet works									160.00	LF	2.00	$320
6' chain link fence behind bleachers									95.00	LF	2.00	$190
			total	255.00 LF		$ 510.00						

Item		Qty		Unit Cost	Cost
350-9 Remove and Salvage Riprap					
area 1035 sq ft avg thickness 2.50 ft		96.00	CY	5.00	$480
420-1 6' Chain Link Fence					
fence on auxiliary outlet works energy dissipater	set posts or sleeves in concrete	110.00	LF	35.00	$3,850
fence on auxiliary outlet works inlet structure	set posts or sleeves in concrete	40.00	LF	35.00	$1,400
fence on principal outlet works energy dissipater	drill and set posts in sleeves or concrete	114.00	LF	35.00	$3,990
fence on principal outlet works inlet structure	drill and set posts in sleeves or concrete	46.00	LF	35.00	$1,610
fence across spillway gabions	extra long fence posts to extend through gabions	142.00	LF	20.00	$2,840
fence across amphitheater	normal fence	215.00	LF	15.00	$3,225
Construction Surveying	**contingent item - include in fencing**				
assume 10 hour days for survey crew	8 hour days for office staff				
Set fence stakes	1.00 day crew	10	HR	$ 100.00	$1,000
	0.50 day office	4	HR	$ 75.00	$300

fence across structures	310.00	LF	$ 10,850
fence across gabions	142.00	LF	$ 2,840
fence across amphitheater	215.00	LF	$ 3,225
total fence quantity	667.00		
staking			$ 1,300
		Total cost	$ 18,215
		average unit cost $ 27.31	LF

420-2 8' Chain Link Fence					
fence along top of bank near auxiliary outlet works energy dissipater		76.00	LF	20.00	$1,520
420-3 6' Chain Link X 4' Single Leaf Gate		1.00	EA	120.00	$120
near steps at north end of amphitheater					
420-4 6' Chain Link X 12' Double Leaf Gate		1.00	EA	360.00	$360
near south end of amphitheater					
425-1 Topsoil		1.00	LS	2000.00	$2,000

Item							Qty		Unit Cost	Cost
430-1 Type 1 Seeding										
top of dam		68787.00 sq ft					1.58	AC	2000.00	$3,160
staging area near auxiliary outlet works		10609.00 sq ft					0.24	AC	2000.00	$480

Total Qty	Total Cost	Cost/AC
1.82	$ 3,640	$ 2,000.00

430-2 Type 2 Seeding	mitigation area									
Ashbrook wash downstream of outlet works		10972.00 sq ft					0.25	AC	2000.00	$500
Cloudburst and Ashbrook wash upstream of dam		18777.00 sq ft					0.43	AC	2000.00	$860
Alternate access road		12000.00 sq ft					0.28	AC	2000.00	$560

Total Qty	Total Cost	Cost/AC
0.96	$ 1,920	$ 2,000.00

430-3 Remove and Replace Turf Lawn										
upstream of emergency spillway		17198.00 sq ft					1911.00	SY	0.50	$956
430-4 Blue Paloverde, 5 Gal.										
mitigation area - nursery stock							5.00	EA	100.00	$500
430-5 Freemont Cottonwood, 5 Gal.										
mitigation area - nursery stock							30.00	EA	100.00	$3,000
430-6 Goodding Willow, 5 Gal.										
mitigation area - nursery stock							7.00	EA	100.00	$700
440-1 Remove & Replace Turf Irrigation System										
upstream of emergency spillway							1.00	LS	500.00	$500
505-1 Concrete, Class AA (F'c = 4,000 Psi)										
Spillway cutoff wall										
concrete										
stem	length	90.00	height	4.00	thickness	0.50	6.7	CY	250.00	$1,675
thickened top section	length	90.00	height	0.50	thickness	1.00	1.7	CY	250.00	$425
steel										

Item									Qty		Unit Cost	Cost
4 - #4 bars - continuous			length	90.00	LB/LF	0.668	no. bars	4	240	LB	0.50	$120
vertical #4 @ 18"			length	4.50	LB/LF	0.668	no. bars	60	180	LB	0.50	$90

Item	Qty		Cost
concrete	8.40	$	2,100
steel	420.00	$	210
	total cost	$	2,310.00
	cost per cy concrete	$	275.00

6.5' high Floodwall												
concrete												
wall	length	102.00										
stem	height	6.50	avg thick	1.00					24.6	CY	250.00	$6,150
footing slab	width	7.00	thickness	1.33					35.3	CY	250.00	$8,825
key	width	1.50	height	1.25					7.1	CY	250.00	$1,775
steel												
#7@12" vert bars			length	6.50	LB/LF	2.044	no. bars	102	1355	LB	0.50	$678
#7@12" vert bent bars			length	8.50	LB/LF	2.044	no. bars	102	1772	LB	0.50	$886
#4@12" vert dowels in wall			length	2.00	LB/LF	0.668	no. bars	102	136	LB	0.50	$68
#4@12" stirrups in key			length	3.67	LB/LF	0.668	no. bars	102	250	LB	0.50	$125
#6 cont @ top of wall			length	102.00	LB/LF	1.502	no. bars	2	306	LB	0.50	$153
#4 cont @ 18" in wall			length	102.00	LB/LF	0.668	no. bars	6	409	LB	0.50	$205
#4 cont in key			length	102.00	LB/LF	0.668	no. bars	2	136	LB	0.50	$68
#7@12" horiz bars in footing			length	7.00	LB/LF	2.044	no. bars	102	1459	LB	0.50	$730
#10@6" horiz bars in footing			length	7.00	LB/LF	4.303	no. bars	204	6145	LB	0.50	$3,073
#4 cont @ 18" in footing			length	102.00	LB/LF	0.668	no. bars	10	681	LB	0.50	$341

Item	Qty		Cost
concrete	67.00	$	16,750
steel	12649.00	$	6,325
	total cost	$	23,074.50
	cost per cy concrete	$	344.40

10.5' high Floodwall												
concrete												
wall	length	112.00										
stem	height	10.50	avg thick	1.00					43.6	CY	250.00	$10,900
footing slab	width	17.00	thickness	1.33					94	CY	250.00	$23,500
key	width	1.50	height	1.25					7.8	CY	250.00	$1,950
steel												
#7@12" vert bars			length	10.50	LB/LF	2.044	no. bars	112	2404	LB	0.50	$1,202

Item									Qty		Unit Cost	Cost
#7@12" vert bent bars		length	12.50	LB/LF	2.044	no. bars	112		2862	LB	0.50	$1,431
#4@12" vert dowels in wall		length	2.00	LB/LF	0.668	no. bars	112		150	LB	0.50	$75
#4@12" stirrups in key		length	3.67	LB/LF	0.668	no. bars	112		275	LB	0.50	$138
#6 cont @ top of wall		length	112.00	LB/LF	1.502	no. bars	2		336	LB	0.50	$168
#4 cont @ 18" in wall		length	112.00	LB/LF	0.668	no. bars	12		898	LB	0.50	$449
#4 cont in key		length	112.00	LB/LF	0.668	no. bars	2		150	LB	0.50	$75
#7@12" horiz bars in footing		length	17.00	LB/LF	2.044	no. bars	112		3892	LB	0.50	$1,946
#10@6" horiz bars in footing		length	17.00	LB/LF	4.303	no. bars	224		16386	LB	0.50	$8,193
#4 cont @ 18" in footing		length	112.00	LB/LF	0.668	no. bars	24		1796	LB	0.50	$898

Item	Qty	Cost
concrete	145.40	$ 36,350
steel	29149.00	$ 14,575
	total cost	$ 50,924.50
cost per cy concrete		$ 350.24

Box Culvert Foundation Slab

length	117.00	width	12.83	thickness	0.50				27.8	CY	250.00	$6,950

Principal Outlet Works Inlet Structure

concrete												
north wingwall	length	14.03	height 1	11.21	height 2	5.65	thickness	1.00	4.4	CY	250.00	$1,100
	length	5.31	height 1	3.65	height 2	1.00	thickness	1.00	0.5	CY	250.00	$125
south wingwall	length	1.86	height 1	11.21	height 2	10.50	thickness	1.00	0.7	CY	250.00	$175
	length	14.56	height 1	8.50	height 2	1.00	thickness	1.00	2.6	CY	250.00	$650
headwall	width	12.72	height	14.21	thickness	1.00			6.7	CY	250.00	$1,675
subtract area of pipe	pi	3.1416	major axis	4.11	minor axis	3.00	area	38.74	-1.4	CY	250.00	-$350
apron	width	12.72	length	18.09	thickness	1.00			8.5	CY	250.00	$2,125
subtract area of sewer encasemen		width	2.00	length	17.00	thickness	1.00		-1.3	CY	250.00	-$325
cutoff wall	height	3.00	length	12.72	thickness	1.00			1.4	CY	250.00	$350
steel												
headwall												
#7@12" vert bars		length	14.21	LB/LF	2.044	no. bars	26		755	LB	0.50	$378
#4@18" horiz bars		length	12.72	LB/LF	0.668	no. bars	20		170	LB	0.50	$85
#5x3' hinge anchor reinforcement		length	3.00	LB/LF	1.043	no. bars	8		25	LB	0.50	$13
apron												
#4@12" bars top mat		length	12.72	LB/LF	0.668	no. bars	9		76	LB	0.50	$38
#4@12" bars top mat		length	8.54	LB/LF	0.668	no. bars	13		74	LB	0.50	$37
#4@18" bars bottom mat		length	12.72	LB/LF	0.668	no. bars	6		51	LB	0.50	$26

Item									Qty		Unit Cost	Cost
#4@18" bars bottom mat		length	8.54	LB/LF	0.668	no. bars	8		46	LB	0.50	$23
#4@12" bars top mat		length	12.72	LB/LF	0.668	no. bars	6		51	LB	0.50	$26
#4@12" bars top mat		length	6.23	LB/LF	0.668	no. bars	13		54	LB	0.50	$27
north wingwall	height 1	11.21	height 2	5.650	avg height	8.43	length 14.03					
#7@6" vert bars		length	8.43	LB/LF	2.044	no. bars	28		482	LB	0.50	$241
#4@18" vert bars		length	8.43	LB/LF	0.668	no. bars	9		53	LB	0.50	$27
#4@18" horiz bars		length	14.03	LB/LF	0.668	no. bars	6		56	LB	0.50	$28
	height 3	3.65	height 4	1.000	avg height	2.33	length 5.31					
#7@6" vert bars		length	2.33	LB/LF	2.044	no. bars	11		52	LB	0.50	$26
#4@18" vert bars		length	2.33	LB/LF	0.668	no. bars	4		6	LB	0.50	$3
#4@18" horiz bars		length	5.31	LB/LF	0.668	no. bars	2		7	LB	0.50	$4
south wingwall	height 1	11.21	height 2	10.500	avg height	10.86	length 1.86					
#7@6" vert bars		length	10.86	LB/LF	2.044	no. bars	4		89	LB	0.50	$45
#4@18" vert bars		length	10.86	LB/LF	0.668	no. bars	1		10	LB	0.50	$5
#4@18" horiz bars		length	1.86	LB/LF	0.668	no. bars	7		9	LB	0.50	$5
	height 3	8.50	height 4	1.000	avg height	4.75	length 14.56					
#7@6" vert bars		length	4.75	LB/LF	2.044	no. bars	29		282	LB	0.50	$141
#4@18" vert bars		length	4.75	LB/LF	0.668	no. bars	10		31	LB	0.50	$16
#4@18" horiz bars		length	14.56	LB/LF	0.668	no. bars	3		29	LB	0.50	$15
cutoff wall												
#4@18" vert bars		length	7.00	LB/LF	0.668	no. bars	8		37	LB	0.50	$19
#4 horiz bars		length	12.72	LB/LF	0.668	no. bars	2		17	LB	0.50	$9

Item	Qty		Cost
concrete	22.10	$	5,525
steel	2462.00	$	1,231
	total cost	$	6,756.00
	cost per cy concrete	$	305.70

Auxiliary Outlet Works Inlet Structure

concrete													
wingwalls	2	length	12.00	height 1	8.23	height 2	1.00	thickness	0.75	3.1	CY	250.00	$775
headwall		width	12.40	height	3.90	thickness	0.75			1.3	CY	250.00	$325
apron		width 1	12.40	width 2	27.80	length	8.80	thickness	0.50	3.3	CY	250.00	$825
cutoff wall 1		height	2.67	length	12.40	thickness	1.00			1.2	CY	250.00	$300
cutoff wall 2		height	4.50	length	27.80	thickness	1.00			4.6	CY	250.00	$1,150
steel													
headwall													

Item							Qty		Unit Cost	Cost
#4@18" vert stirrups	length	10.67	LB/LF	0.668	no. bars	8	57	LB	0.50	$29
#4@18" horiz bars	length	12.40	LB/LF	0.668	no. bars	4	33	LB	0.50	$17
#6 horiz bars	length	12.40	LB/LF	1.502	no. bars	4	74	LB	0.50	$37
#5x3' hinge anchor reinforcement	length	3.00	LB/LF	1.043	no. bars	8	25	LB	0.50	$13
apron										
#4@12" bars top mat	avg length	20.10	LB/LF	0.668	no. bars	9	121	LB	0.50	$61
#4@12" bars top mat	length	8.80	LB/LF	0.668	no. bars	20	118	LB	0.50	$59
#4@12" bent dowel	length	4.00	LB/LF	0.668	no. bars	12	32	LB	0.50	$16
wingwalls										
#6 horiz bars	length	12.00	LB/LF	1.502	no. bars	4	72	LB	0.50	$36
#4@18" horiz bars	length	12.00	LB/LF	0.668	no. bars	14	112	LB	0.50	$56
#4@18" vert bars	length	4.62	LB/LF	0.668	no. bars	16	49	LB	0.50	$25
#5@12" vert bent dowel	length	5.72	LB/LF	1.043	no. bars	24	143	LB	0.50	$72
cutoff wall 1										
#4@18" vert bent dowels	length	6.00	LB/LF	0.668	no. bars	8	32	LB	0.50	$16
#4@18" horiz bars	length	12.40	LB/LF	0.668	no. bars	3	25	LB	0.50	$13
cutoff wall 2										
#4@18" vert bent dowels	length	6.00	LB/LF	0.668	no. bars	19	76	LB	0.50	$38
#4@18" vert bent dowels	length	7.00	LB/LF	0.668	no. bars	19	89	LB	0.50	$45
#4@18" horiz bars	length	27.80	LB/LF	0.668	no. bars	6	111	LB	0.50	$56

Item	Qty		Cost
concrete	13.50	$	3,375
steel	1169.00	$	585
	total cost	$	3,959.50
	cost per cy concrete	$	293.30

Auxiliary Outlet Works Outlet Structure (Energy Dissipater)

concrete													
wingwalls	2	length	48.40	height 1	9.50	height 2	7.20	thickness	0.75	22.5	CY	250.00	$5,625
headwall		width	12.17	height	4.00	thickness	0.75			1.4	CY	250.00	$350
apron		width 1	11.50	width 2	27.90	length	46.50	thickness	2.00	67.9	CY	250.00	$16,975
end sill		height	0.50	length	26.40	thickness	1.00			0.5	CY	250.00	$125
end cutoff		height	2.00	length	27.90	thickness	1.00			2.1	CY	250.00	$525
cutoff wall		height	4.00	length	12.17	thickness	1.00			1.8	CY	250.00	$450
steel													
headwall													
#4@18" vert stirrups		length	10.67	LB/LF	0.668	no. bars	8			57	LB	0.50	$29

Item							Qty		Unit Cost	Cost
#4@18" horiz bars	length	12.17	LB/LF	0.668	no. bars	4	33	LB	0.50	$17
#6 horiz bars	length	12.17	LB/LF	1.502	no. bars	4	73	LB	0.50	$37
apron										
#4@12" bars top mat	avg length	19.70	LB/LF	0.668	no. bars	47	619	LB	0.50	$310
#4@12" bars top mat	length	46.50	LB/LF	0.668	no. bars	20	621	LB	0.50	$311
#4@18" bars bottom mat	length	19.70	LB/LF	0.668	no. bars	31	408	LB	0.50	$204
#4@18" bars bottom mat	length	46.50	LB/LF	0.668	no. bars	13	404	LB	0.50	$202
#4@18" bent dowel	length	3.50	LB/LF	0.668	no. bars	12	28	LB	0.50	$14
wingwalls										
#6 horiz bars	length	48.40	LB/LF	1.502	no. bars	4	291	LB	0.50	$146
#4@18" horiz bars	length	48.40	LB/LF	0.668	no. bars	24	776	LB	0.50	$388
#4@18" vert bars	length	8.35	LB/LF	0.668	no. bars	16	89	LB	0.50	$45
#5@12" vert bent dowel	length	11.45	LB/LF	1.043	no. bars	98	1170	LB	0.50	$585
cutoff wall / end sill										
#4@12" vert bars	length	4.50	LB/LF	0.668	no. bars	28	84	LB	0.50	$42
#4@18" horiz bars	length	27.90	LB/LF	0.668	no. bars	4	75	LB	0.50	$38
cutoff wall										
#4@12" vert bent dowels	length	8.00	LB/LF	0.668	no. bars	28	150	LB	0.50	$75
#4 horiz bars	length	12.17	LB/LF	0.668	no. bars	3	24	LB	0.50	$12

Item	Qty	Cost
concrete	96.20	$ 24,050
steel	4902.00	$ 2,451
total cost		$ 26,501.00
cost per cy concrete		$ 275.48

Construction Surveying — **contingent item - include in concrete**

assume 10 hour days for survey crew — 8 hour days for office staff

Set structure stakes

5.00 day	crew	50 HR	$ 100.00	$5,000
1.00 day	office	8 HR	$ 75.00	$600

Total Quantities				
	concrete	380.40	CY	$ 95,100
	steel	50751.00	LB	$ 25,376
	staking	1.00	LS	$ 5,600
			Total cost	$126,076
	concrete average unit cost	$ 331.43	CY	

Item	Qty		Unit Cost	Cost
505-2 Concrete, Class C (F'c = 2,000 Psi)				
encasement around 24" RCP in exist 60" RCP princ outlet area 9.00 length 105.00	35.00	CY	100.00	$3,500
505-3 10'x 4' Box Culvert (ADOT B-02.10) pre-cast box culvert				
starting station +93.00 ending station 2+10.00 length 117.00	117.00	LF	598.00	$69,966
use table V for maximum fill				

item	qty	unit	unit price	price/lf	total qty
concrete	1.565	CY/LF	$250.00	$391.25	183.10
steel	238.6	LB/LF	$0.50	$119.30	27916.00
delivery	1	LS	$10.00	$10.00	
subtotal				$520.55	
10% markup	1	LS		$52.06	
installation	1	LS	$25.00	$25.00	
total				$597.61	

505-4 Concrete Steps	1.00	EA	500.00	$500

510-1 4 Course Block Wall

8" masonry block	base cost for block	3.50	sq ft	steel cost	0.50	lf
color to match existing	colored block	0.25	sq ft	footing cost	2.00	lf
	textured block	0.25	sq ft			
	total masonry cost	4.00	sq ft			

4 course wall w/new ftg	30.00	LF	13.20	$396
4 course wall on exist ftg	24.00	LF	11.20	$269

4 course wall with new footing	30.00	LF		$	396
4 course wall on existing footing	24.00	LF		$	269
total qty 54.00	total cost			$	665
	average unit cost	$	12.31	LF	

510-2 3 Course Block Wall

8" masonry block	base cost for block	3.50	sq ft	steel cost	0.50	lf	6.00	LF	8.50	$51
	colored block	0.25	sq ft							
	textured block	0.25	sq ft							
	total masonry cost	4.00	sq ft							

Item									Qty		Unit Cost	Cost
510-3 2 Course Block Wall												
8" masonry block	base cost for block	3.50	sq ft		steel cost	0.50	lf		108.00	LF	5.80	$626
	colored block	0.25	sq ft									
	textured block	0.25	sq ft									
	total masonry cost	4.00	sq ft									
510-4 1 Course Block Wall												
8" masonry block	base cost for block	3.50	sq ft		steel cost	0.50	lf		32.00	LF	3.20	$102
	colored block	0.25	sq ft									
	textured block	0.25	sq ft									
	total masonry cost	4.00	sq ft									
510-5 Masonry Retaining Wall												
	base cost for block	3.50	sq ft									
8" masonry block	colored block	0.25	sq ft									
	textured block	0.25	sq ft									
	total masonry cost	4.00	sq ft									
masonry												
wall height	3.67 ft		length	20.00 ft		area	73.40 sf ft					
wall height	4.67 ft		length	30.00 ft		area	140.10 sf ft					
wall height	5.33 ft		length	10.00 ft		area	53.30 sf ft					
wall height	4.33 ft		length	10.00 ft		area	43.30 sf ft					
wall height	3.00 ft		length	10.00 ft		area	30.00 sf ft					
wall height	2.67 ft		length	13.00 ft		area	34.71 sf ft					
average height	3.95 ft		total length	93.00 ft		total area	374.81 sf ft		375.00	SF	4.00	$1,500
concrete	concrete cost	200.00 cy										
footer	width	3.33 ft		thickness	0.83 ft		area	2.78 sf ft				
key	width	0.50 ft		thickness	0.50 ft		area	0.25 sf ft				
							total area	3.03 sf ft				
							volume	10.43 cy	10.40	CY	200.00	$2,080
steel												
vertical #5 @ 16"		length	5.33	LB/LF	1.043	no. bars	70		389	LB	0.50	$195
footing #4 @ 16"		length	3.33	LB/LF	0.668	no. bars	70		156	LB	0.50	$78
footing #4, 4 - continuous		length	93.00	LB/LF	0.668	no. bars	4		248	LB	0.50	$124

Item							Qty		Unit Cost	Cost
wall #5, 2 - continuous	length	93.00	LB/LF	1.043	no. bars	2	194	LB	0.50	$97
weepholes							1.00	LS	300.00	$300
caulking							1.00	LS	300.00	$300
excavation/backfill							1.00	LS	500.00	$500
remove interfering portions of adjacent walls							1.00	LS	500.00	$500

block	375.00	SF	$ 1,500
concrete	10.40	CY	$ 2,080
steel	987.00	LB	$ 494
weepholes	1.00	LS	$ 250
caulking	1.00	LS	$ 250
excavation/backfill	1.00	LS	$ 500
remove interfering adjacent walls	1.00	LS	$ 500
Total length	93.00	Total cost	$ 5,574
average unit cost	$ 59.93	LF	

515-1 Trashrack at Principal Outlet Works

10.7' wide by 19.34' long rectangular

vertical bars	4.5" x .5"	number of bars	15.00	length	19.30	weight/lf 7.66	2218.00	LB	2.00	$4,436
side members	C7x12.25	number	2.00	length	19.30	weight/lf 12.25	473.00	LB	2.00	$946
top member	C7x12.25	number	1.00	length	10.70	weight/lf 12.25	131.00	LB	2.00	$262
bottom member	TS 5x5x0.25	number	1.00	length	10.70	weight/lf 15.62	167.00	LB	2.00	$334
mid members	L3x3x3/8	number	3.00	length	10.70	weight/lf 7.20	231.00	LB	2.00	$462

Total Cost
$ 6,440

515-2 Trashrack at Auxiliary Outlet Works

middle section	8' wide by 8.75' long rectangular								
vertical bars	4.5" x .5"	number of bars	11.00	length	8.80	weight/lf 7.66	741.00	LB	2.00	$1,482
side members	C7x12.25	number	2.00	length	8.80	weight/lf 12.25	216.00	LB	2.00	$432
top member	C7x12.25	number	1.00	length	8.00	weight/lf 12.25	98.00	LB	2.00	$196
bottom member	TS 5x5x0.25	number	1.00	length	8.00	weight/lf 15.62	125.00	LB	2.00	$250
mid members	L3x3x3/8	number	1.00	length	8.00	weight/lf 7.20	58.00	LB	2.00	$116
side sections	10.5' wide by 8.75' long, triangular								
vertical bars	4.5" x .5"	number of bars	28.00	avg length	5.40	weight/lf 7.66	1158.00	LB	2.00	$2,316
side members	C7x12.25	number	2.00	length	10.00	weight/lf 12.25	245.00	LB	2.00	$490
side bar	4.5" x .5"	number	2.00	length	12.00	weight/lf 7.66	184.00	LB	2.00	$368

Item					Qty		Unit Cost	Cost
top bar	4.5" x .5"	number 2.00	length 2.20	weight/lf 7.66	34.00	LB	2.00	$68
bottom member	4.5" x .5"	number 2.00	length 9.10	weight/lf 7.66	139.00	LB	2.00	$278
mid members	L3x3x3/8	number 2.00	length 5.70	weight/lf 7.20	82.00	LB	2.00	$164
anchors		number 12.00			12.00	EA	25.00	$300

Total Cost
$ 6,460

515-3 Steel Handrail 40.00 LF

fabrication								
2" horiz pipes		number 2.00		length 40.00	weight/lf 3.65	292.00	LB	2.00	$584
2" vert pipes @ 6' - 8' oc max		number	8.00	length 6.00	weight/lf 3.65	175.00	LB	2.00	$350
installation - including concrete						1.00	LS	250.00	$250

fabrication			$	934
installation		CY	$	250
Total length	40.00	Total cost	$	1,184
	average unit cost	$ 29.60	LF	

540-1 Desert Varnish	1.00	LS	1000.00	$1,000
605-1 Corrugated Polyethylene Pipe, Perforated, 6 Inch cap the ends	14.00	LF	12.00	$168
605-2 Corrugated Polyethylene Pipe, 6 Inch	244.00	LF	10.00	$2,440

610-1 Relocate 2 1/2 Inch Water Service

remove existing service line and plug	1.00	EA	200.00	$200
remove existing pressure regulator	1.00	EA	200.00	$200
remove existing meter and vault	1.00	EA	200.00	$200
tap and install new service line	1.00	EA	400.00	$400
install new pressure regulator	1.00	EA	400.00	$400
install new meter and box	1.00	EA	500.00	$500
chlorinate and test	1.00	EA	100.00	$500

Total Cost
$ 2,400

Item					Qty		Unit Cost	Cost
618-1 24" RCP	CLASS V				120.00	LF	55.00	$6,600
miter cut one end					1.00	EA	300.00	$300
blocking					1.00	EA	1000.00	$1,000
	Total Qty	Total Cost	Cost/LF					
	120.00	$ 7,900	$ 65.83					
618-2 60" RCP	CLASS IV				20.00	LF	400.00	$8,000
connect to existing pipe/headwall					1.00	EA	500.00	$500
miter cut one end					1.00	EA	600.00	$600
	Total Qty	Total Cost	Cost/LF					
	20.00	$ 9,100	$ 455.00					
618-3 24" Pipe Plug, MAG 427					2.00	EA	100.00	$200
618-4 60" Pipe Plug, MAG 427					2.00	EA	300.00	$600
632-1 12" Ductile Iron Pipe								
cut and plug existing line					1.00	EA	200.00	$200
install tee on existing line					2.00	EA	500.00	$1,000
install 12" pipe and fittings					56.00	LF	60.00	$3,360
	Total Qty	Total Cost	Cost/LF					
	56.00	$ 4,560	$ 81.43					
632-2 Thrust Blocks	3 blocks on 12" line							
number of blocks 3	width 2.00	height 1.50		length 6.50	2.20	CY	150.00	$330
632-3 12" Gate Valve					1.00	EA	1000.00	$1,000
632-4 Valve Box Per MAG 391-2					1.00	EA	100.00	$100
							Total	**$926,605**

SKETCHES AND CROSS SECTIONS

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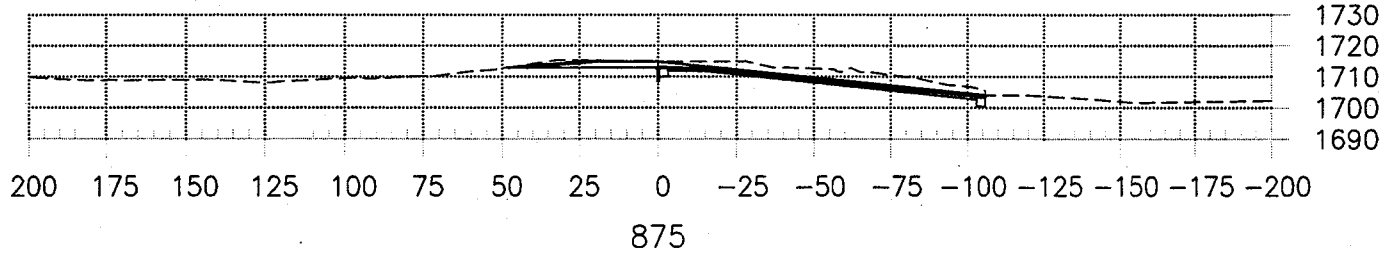
CROSS SECTIONS AT SPILLWAY



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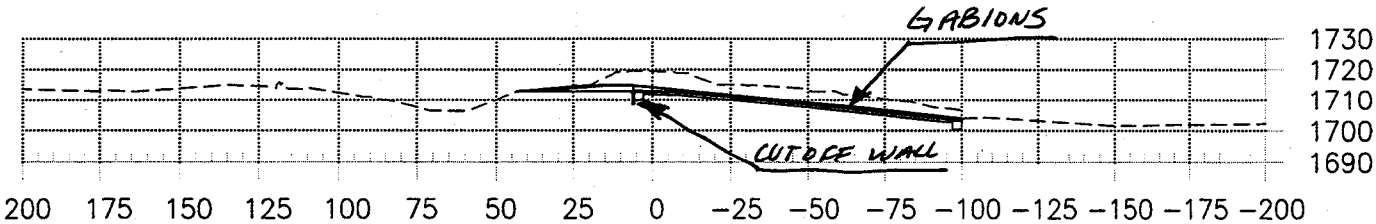

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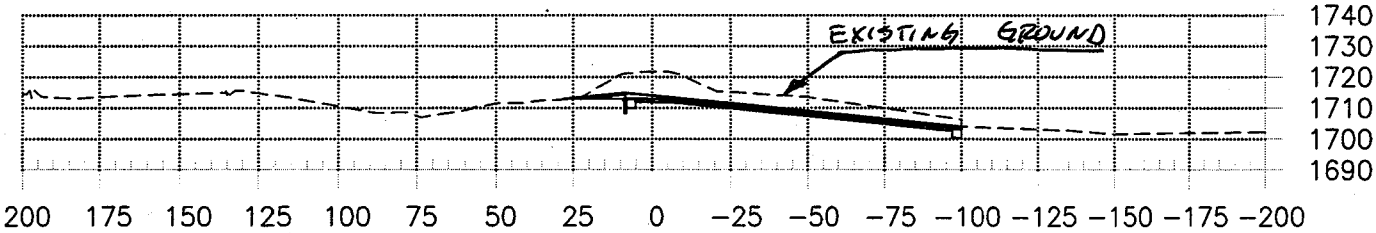

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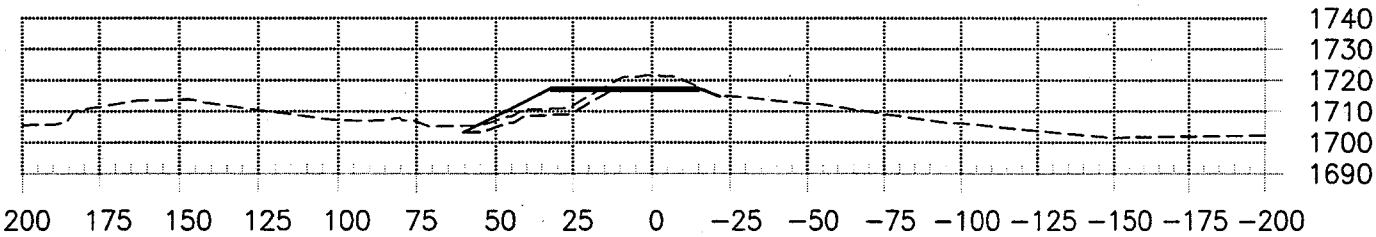

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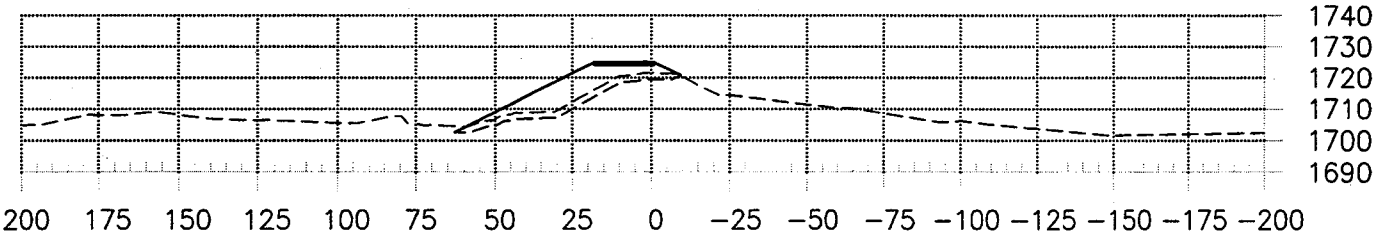

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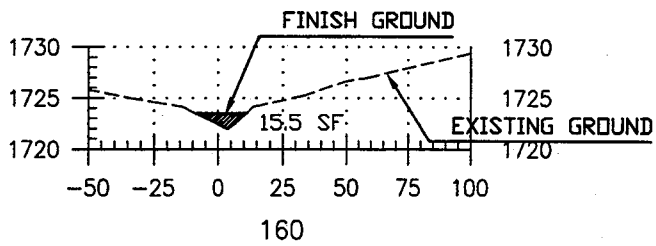

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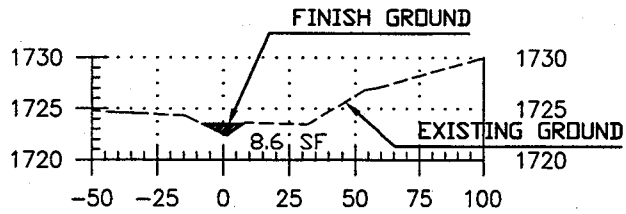

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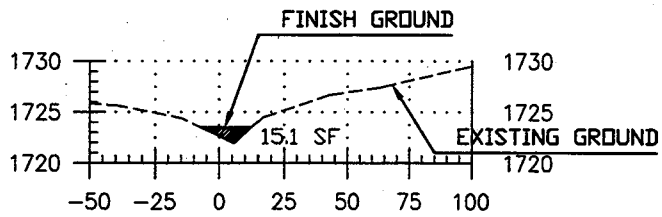

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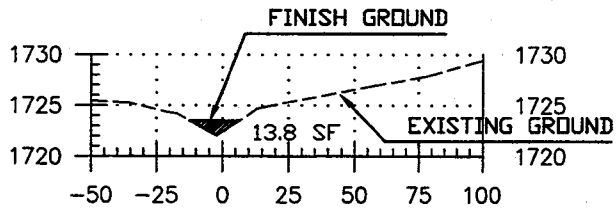

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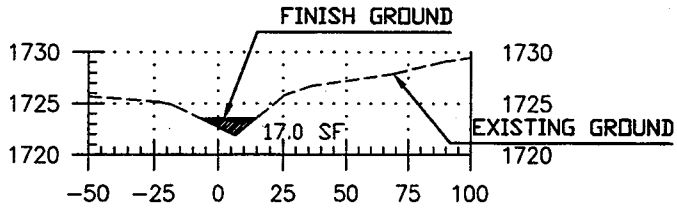

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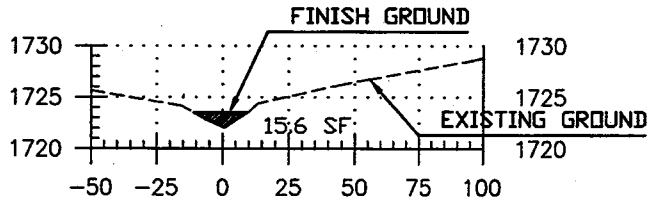

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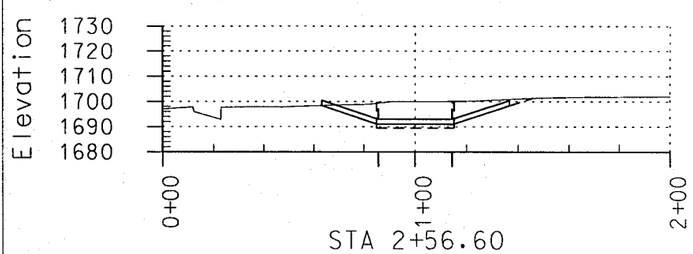
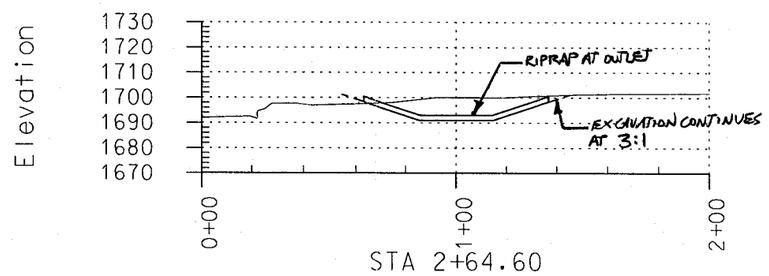
CROSS SECTIONS - SEWERLINE TRENCH BACKFILL

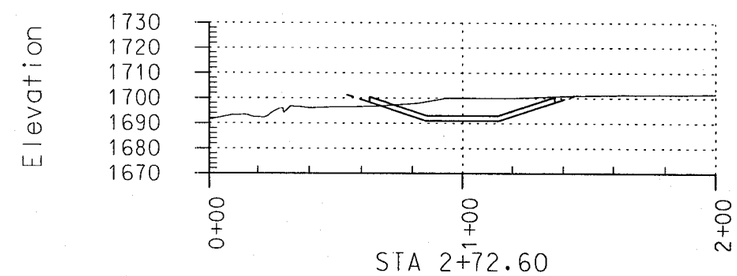
Auxiliary Outlet
Works - RipRap Exc.



Auxiliary Outlet
Works - RipRap Exc.



Auxiliary Outlet
Works - RipRap Exc.



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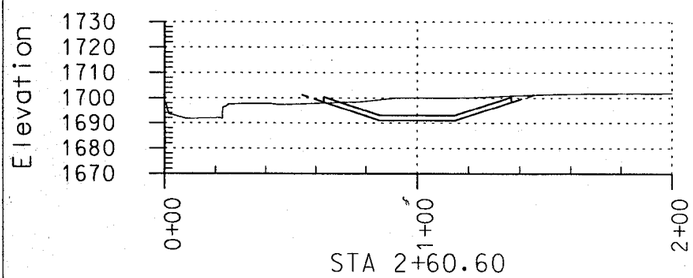

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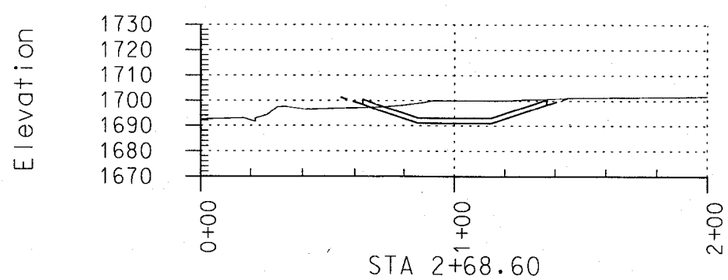

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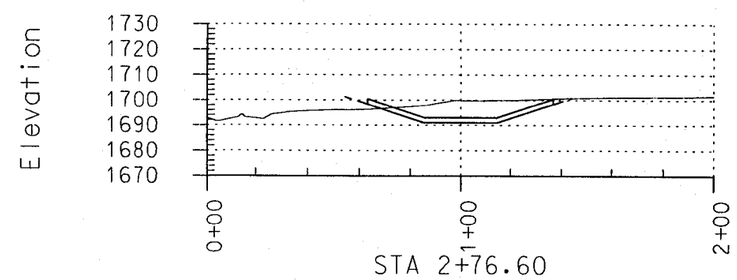
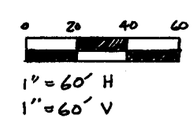
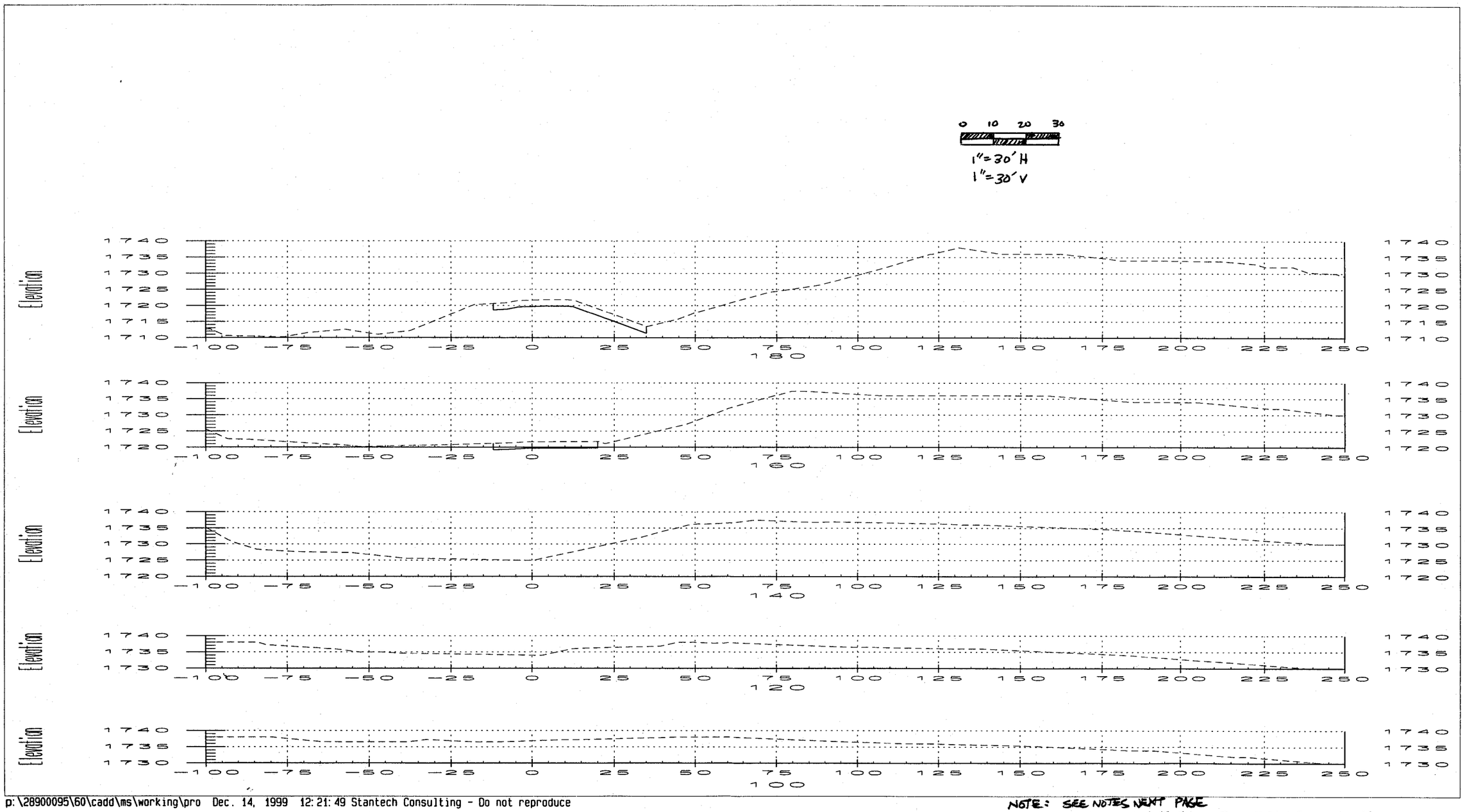
Works - RipRap Exc.





RIPRAP SUBGRADE
X SECTIONS



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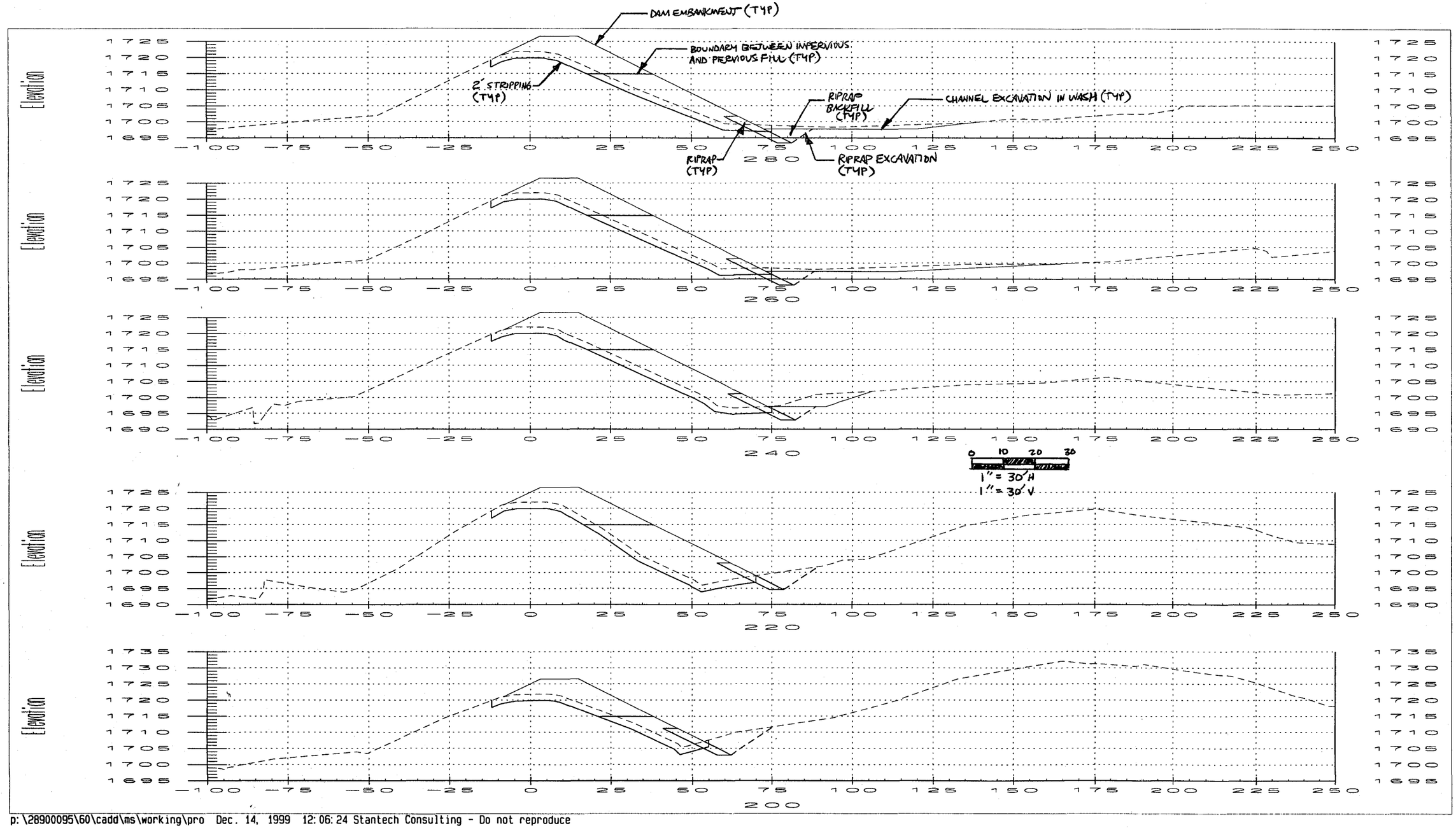
NOTE: SEE NOTES NEXT PAGE
NOT ALL STATIONS SHOW EXC. & BACKFILL LIMITS
BECAUSE END-AREA VOLUME CALC WAS USED

DAM X SECTIONS



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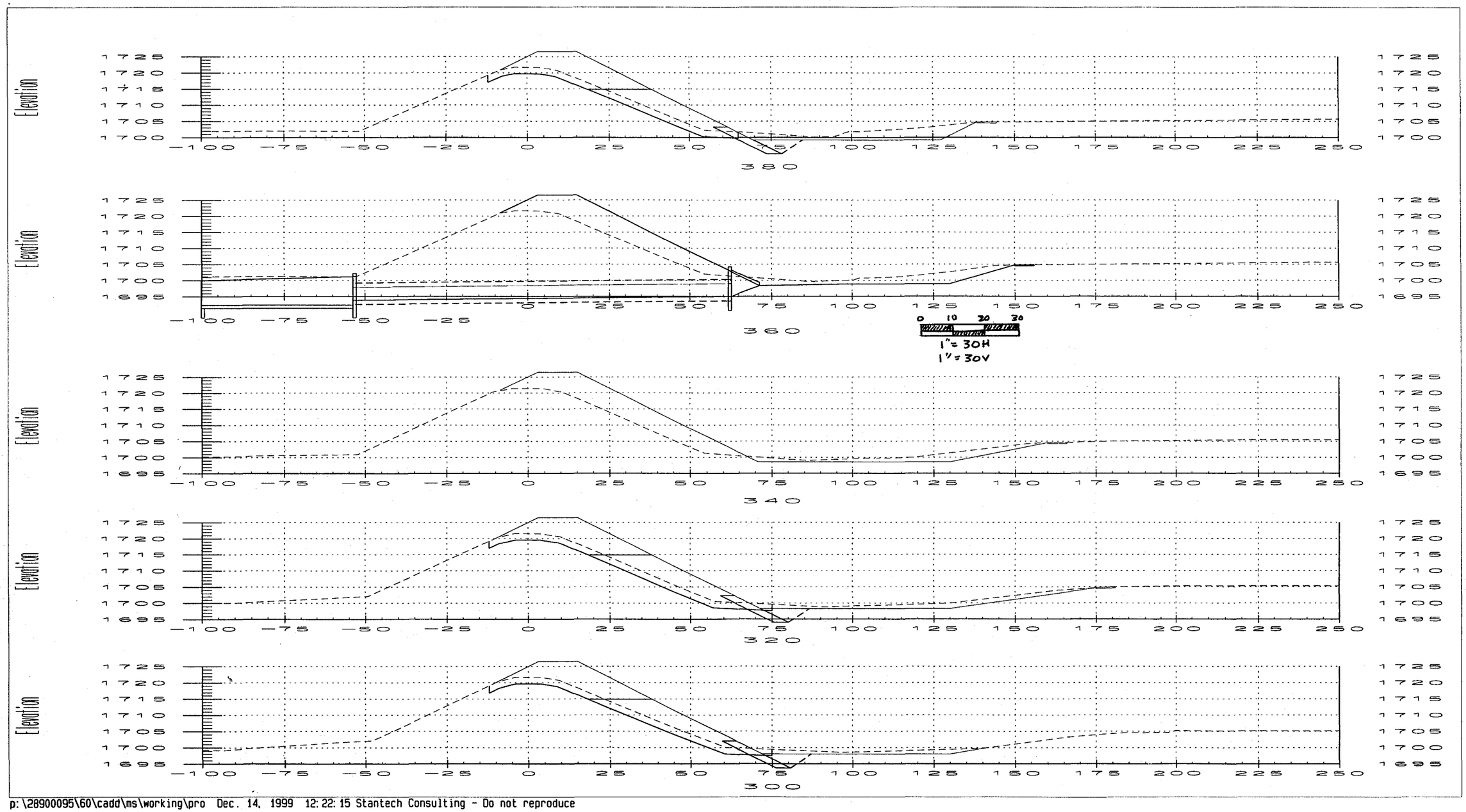

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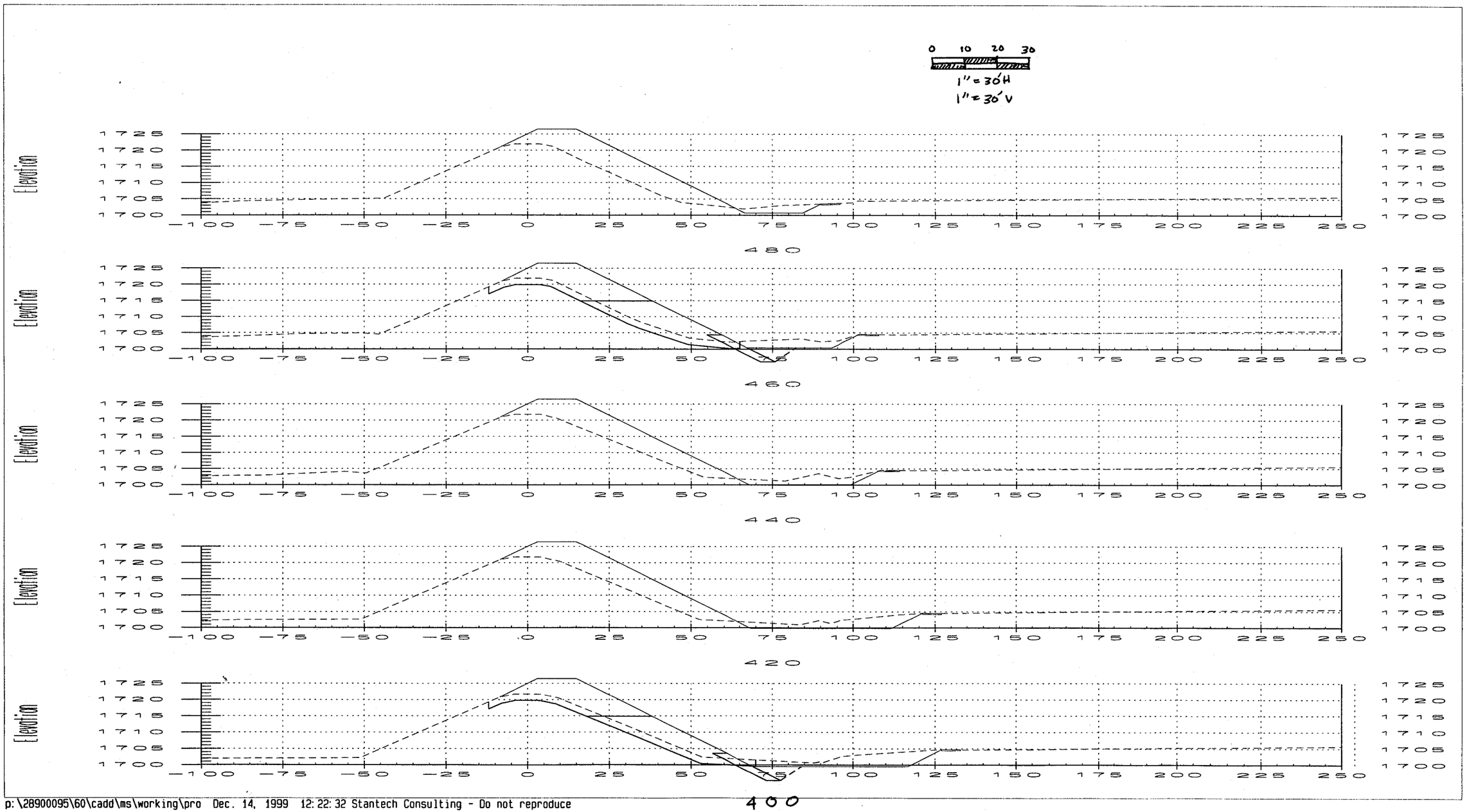

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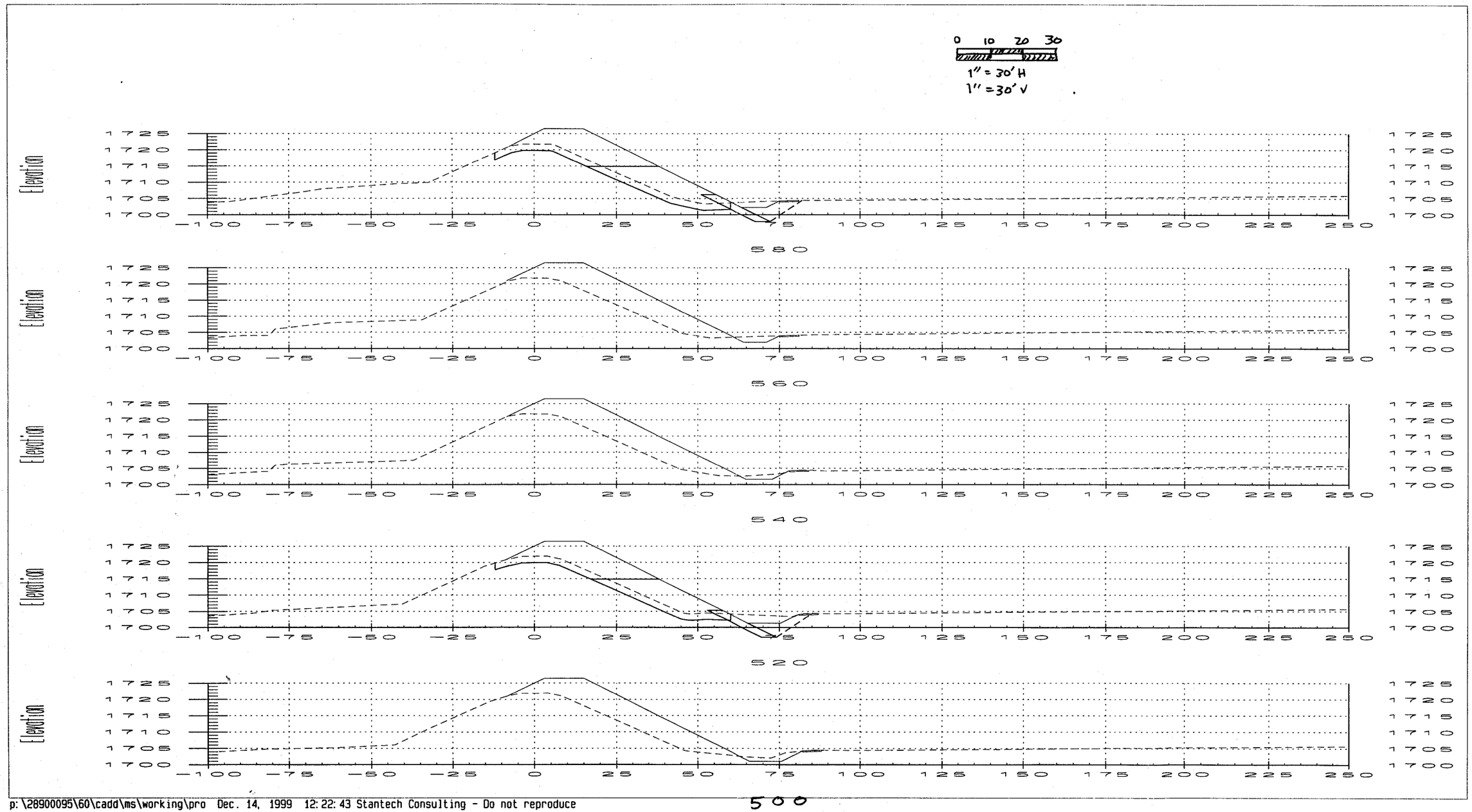

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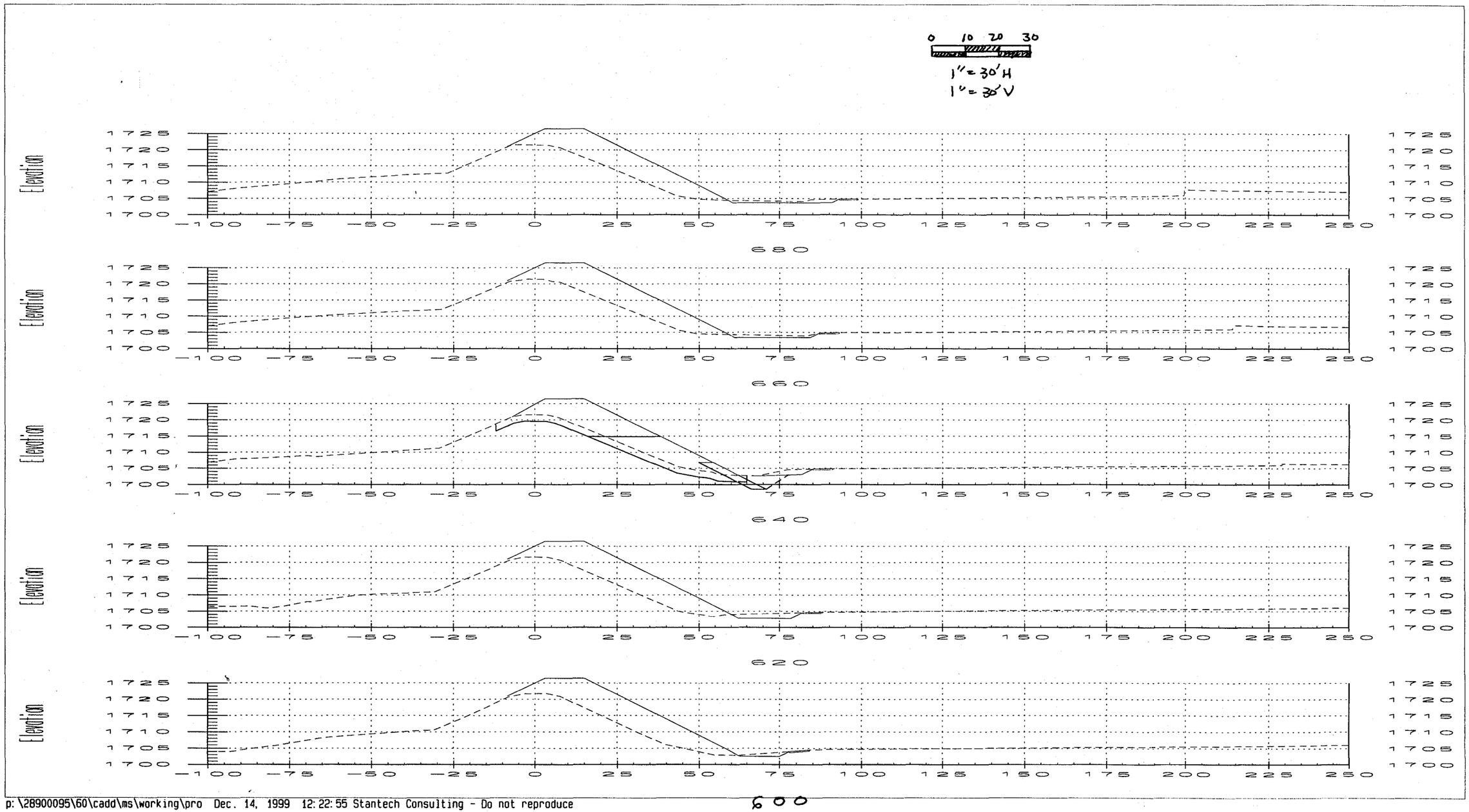

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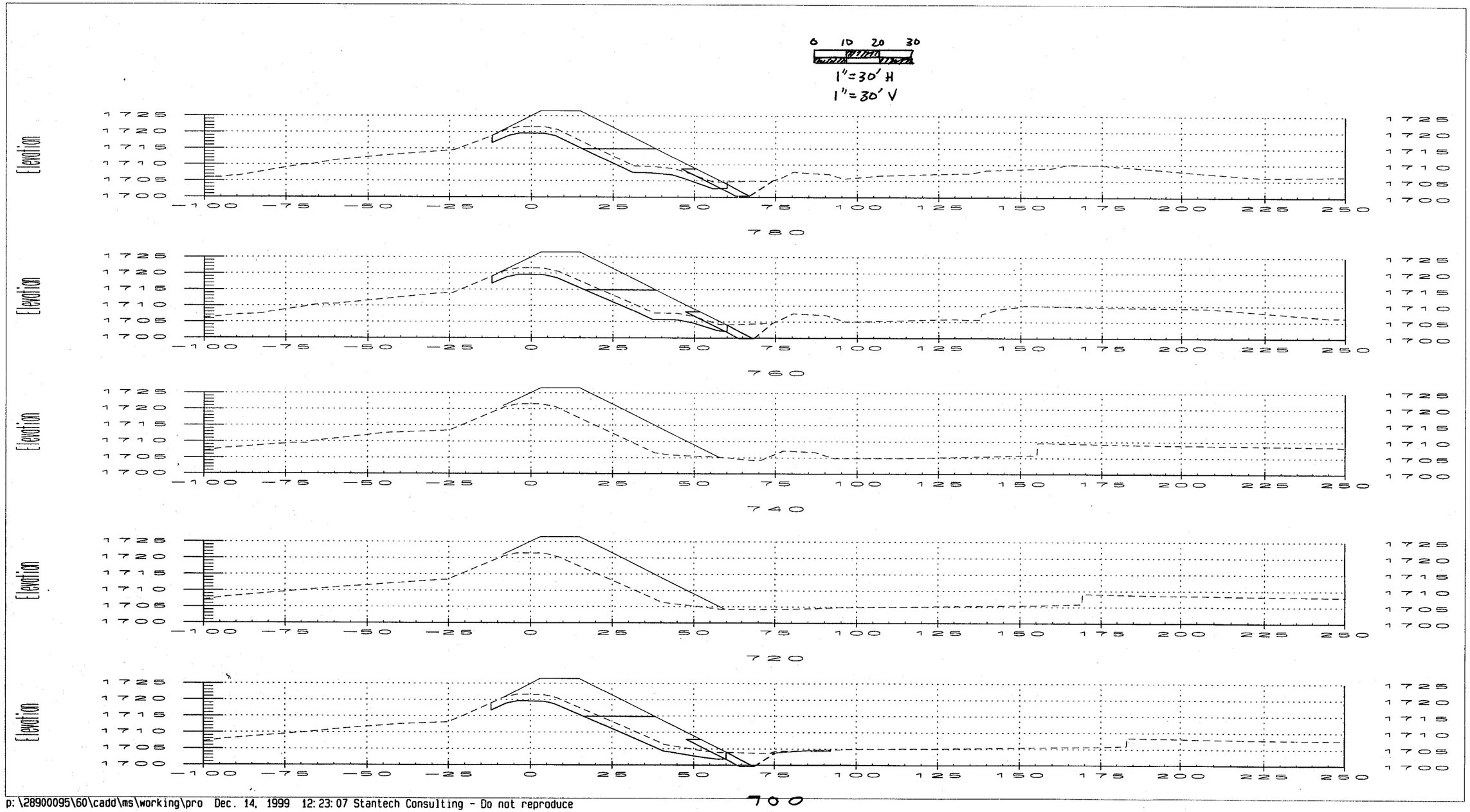

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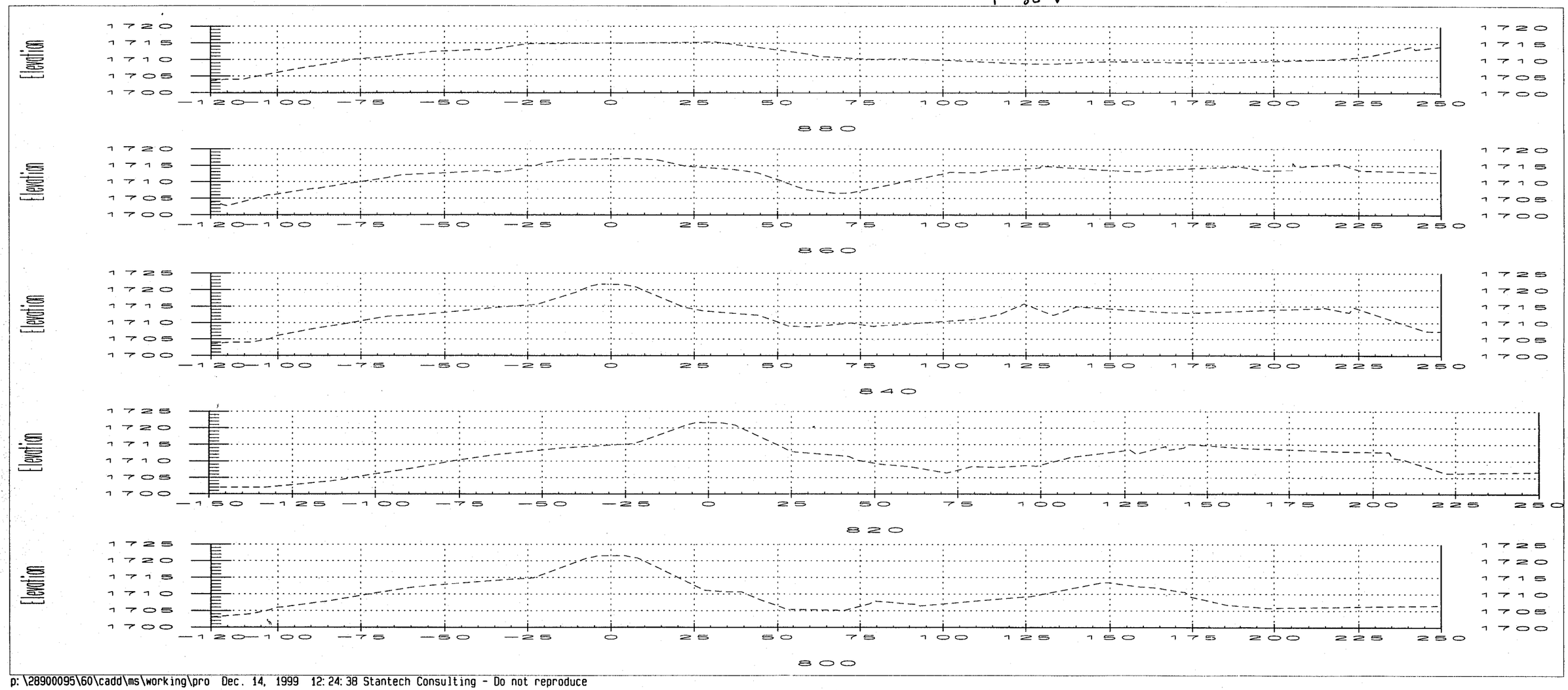
DAM X SECTIONS

0 10 20 30

1" = 30' H
1" = 30' V



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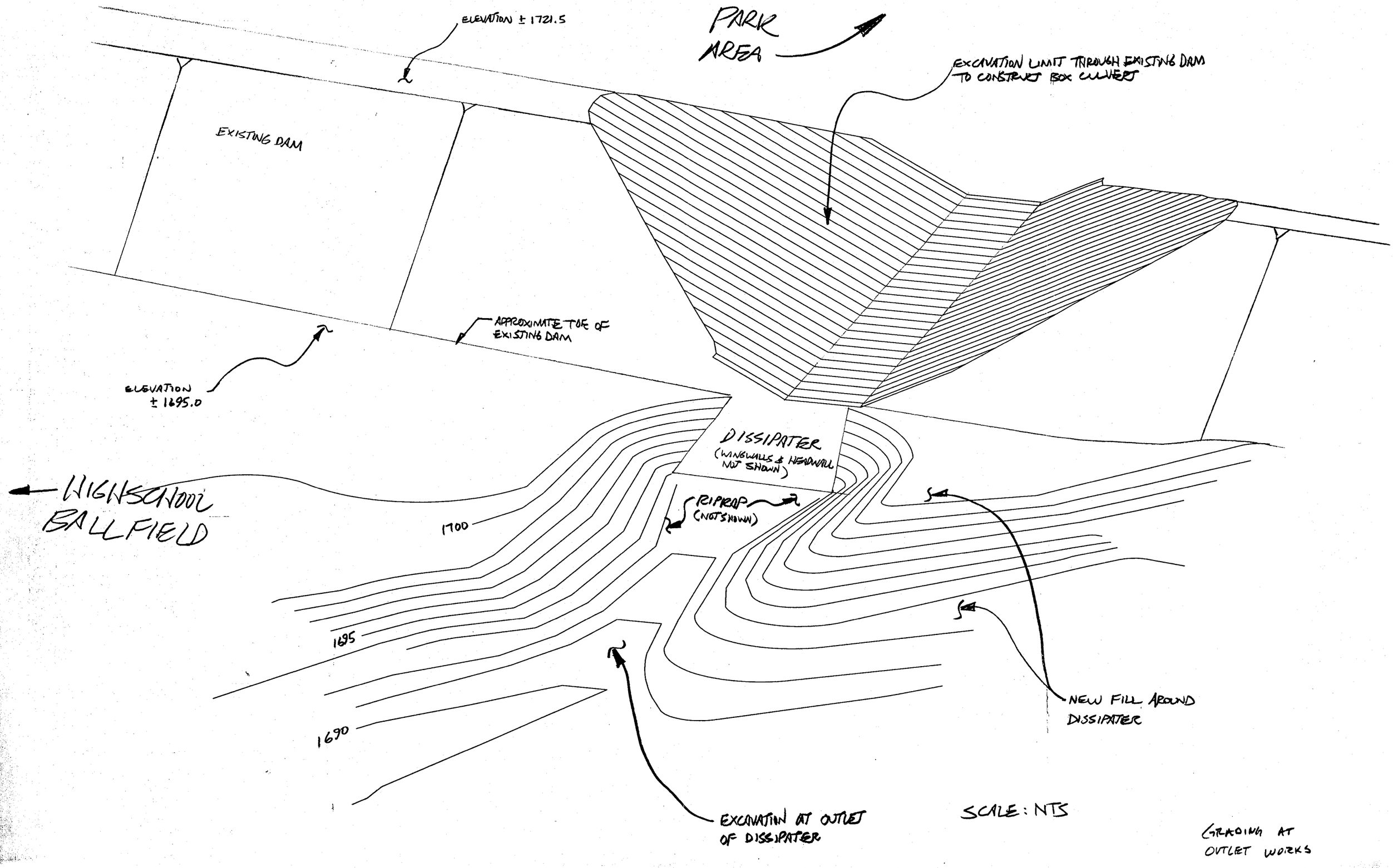
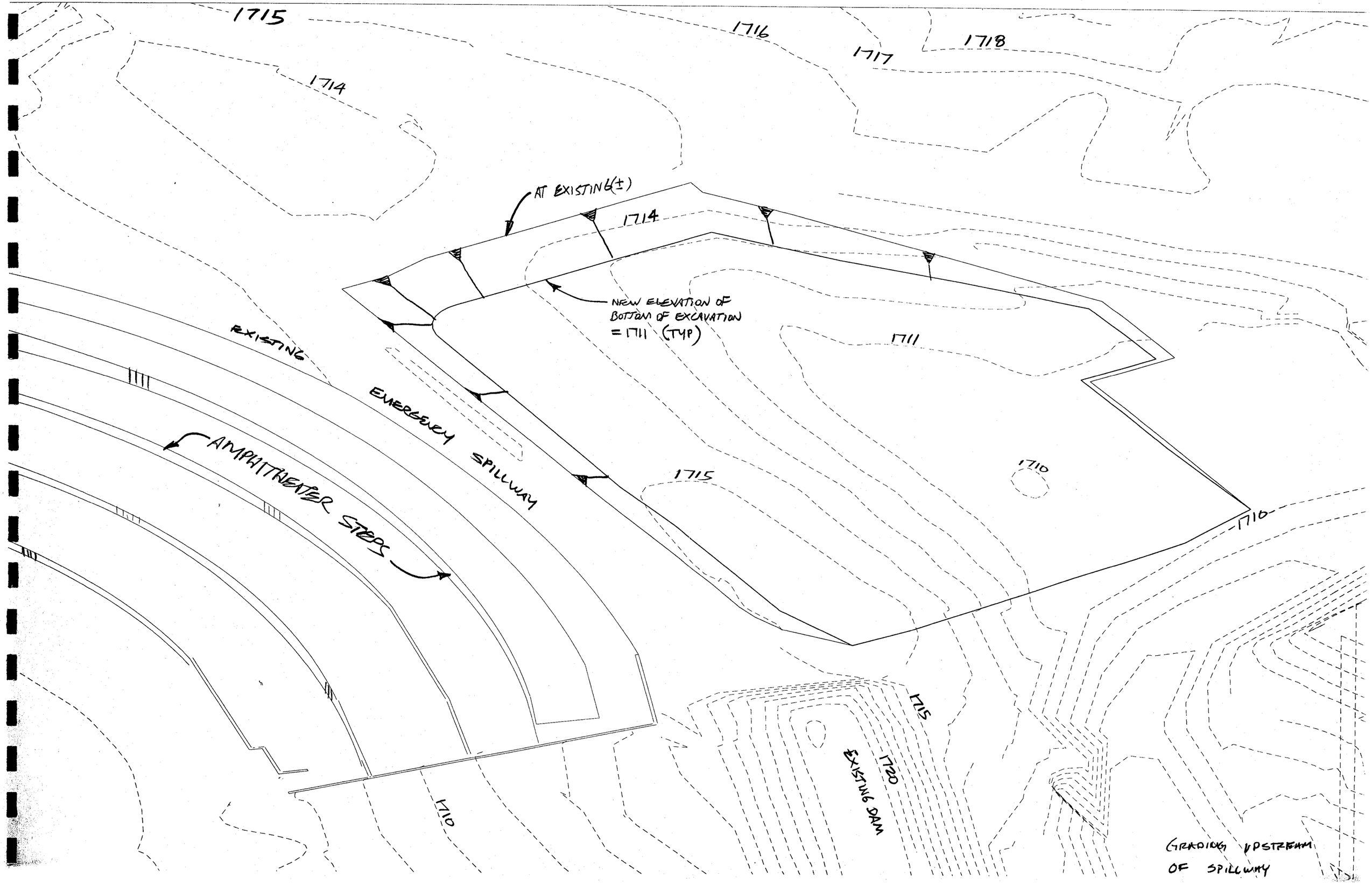
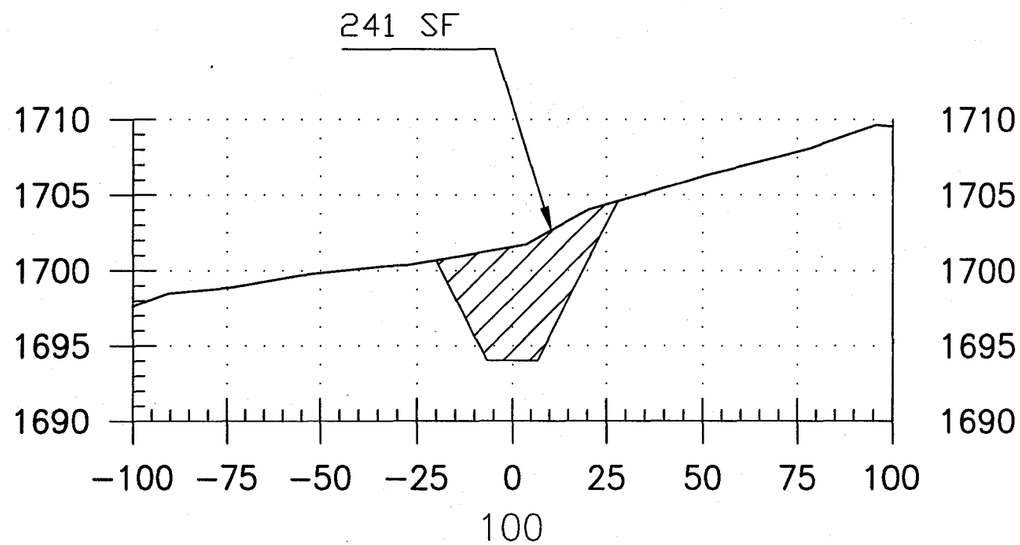
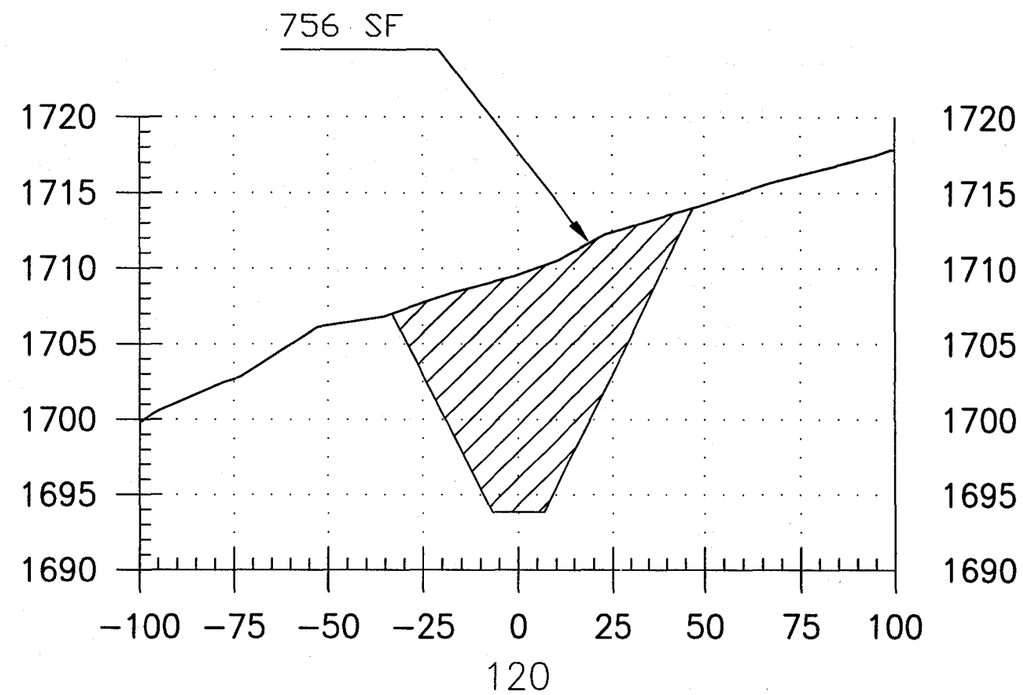
DAM X SECTIONS

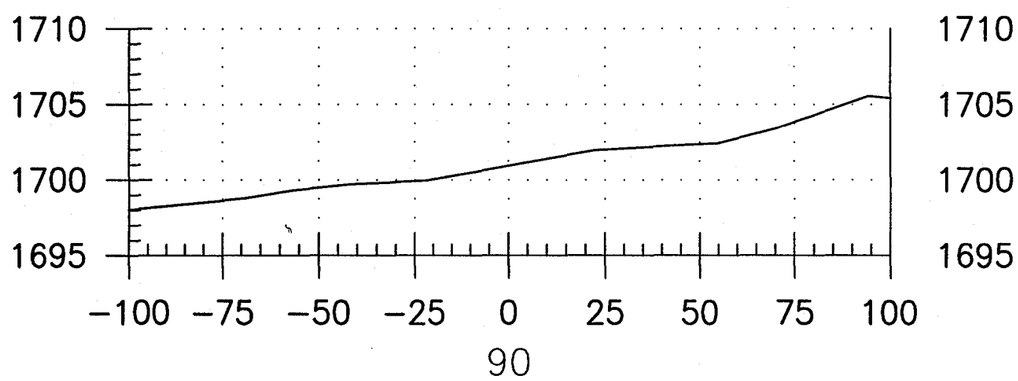


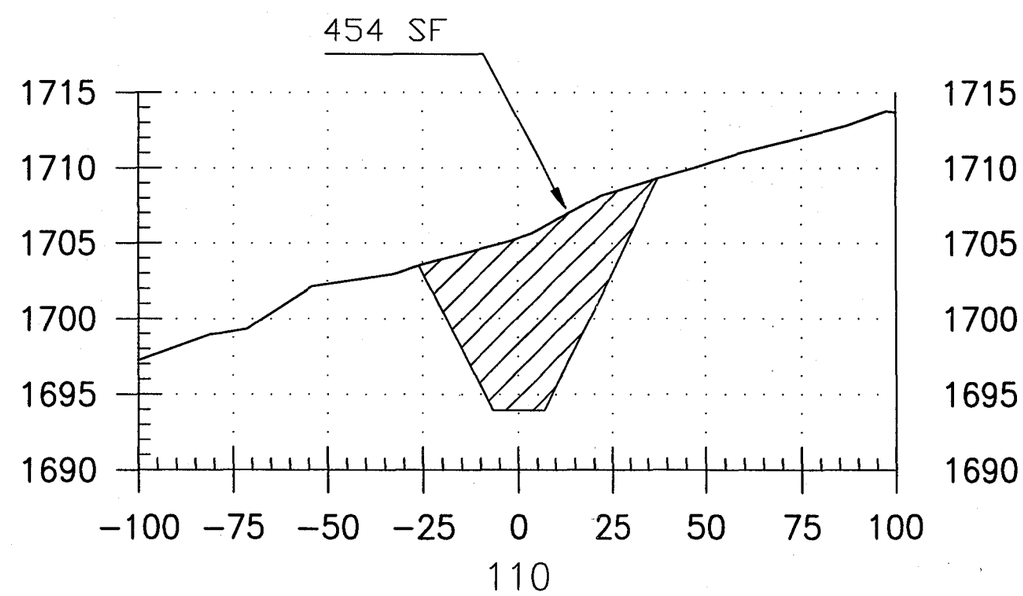
GRADING AT OUTLET WORKS


1715
1716
1717
1718
1714
AT EXISTING(±)
1714
NEW ELEVATION OF
BOTTOM OF EXCAVATION
= 1711 (TYP)
1711
EXISTING
EMERGENCY SPILLWAY
AMPHITHEATER STEPS
1715
1710
1710
1715
1720
EXISTING DAM
1710
GRADING UPSTREAM
OF SPILLWAY

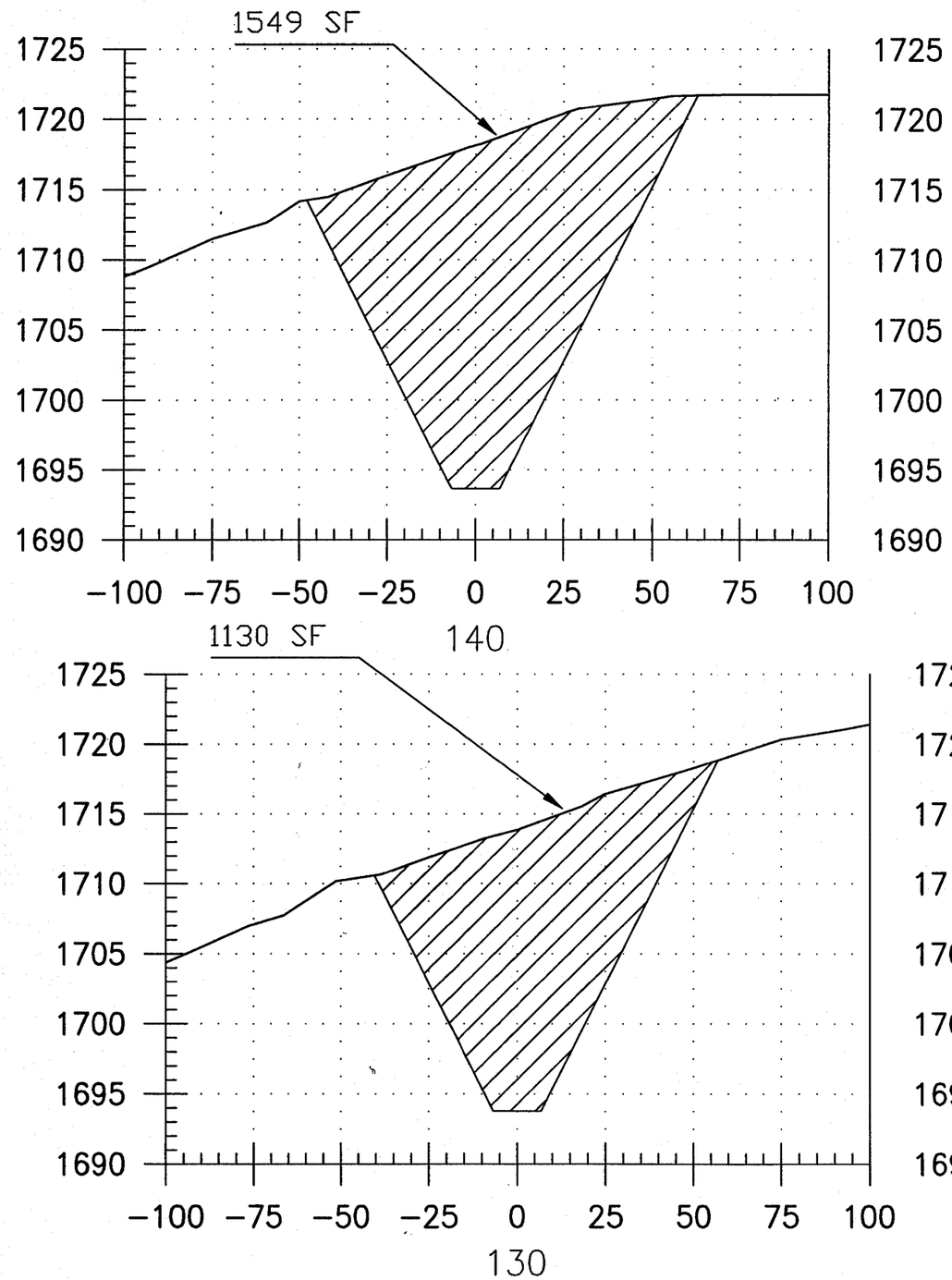


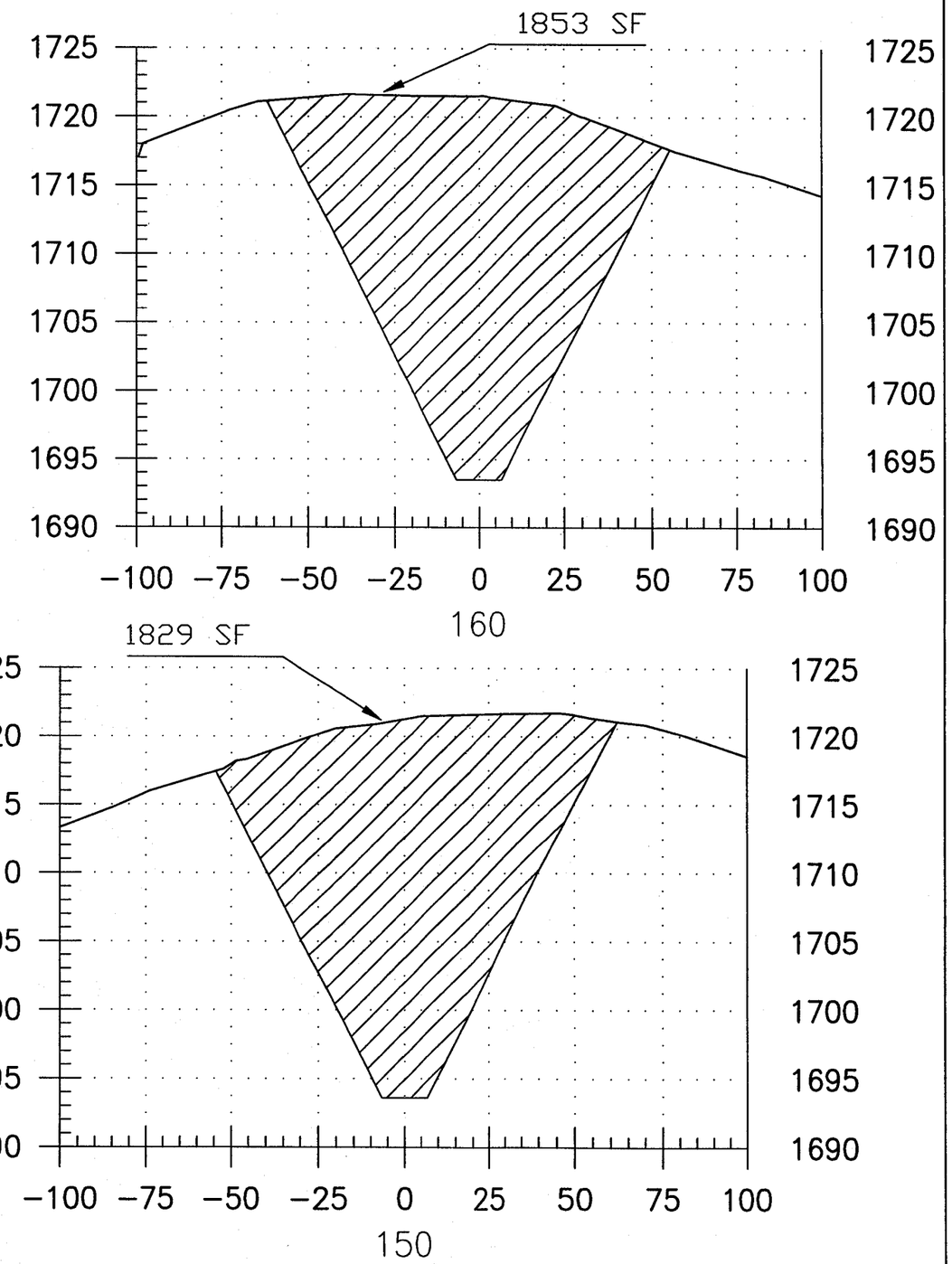




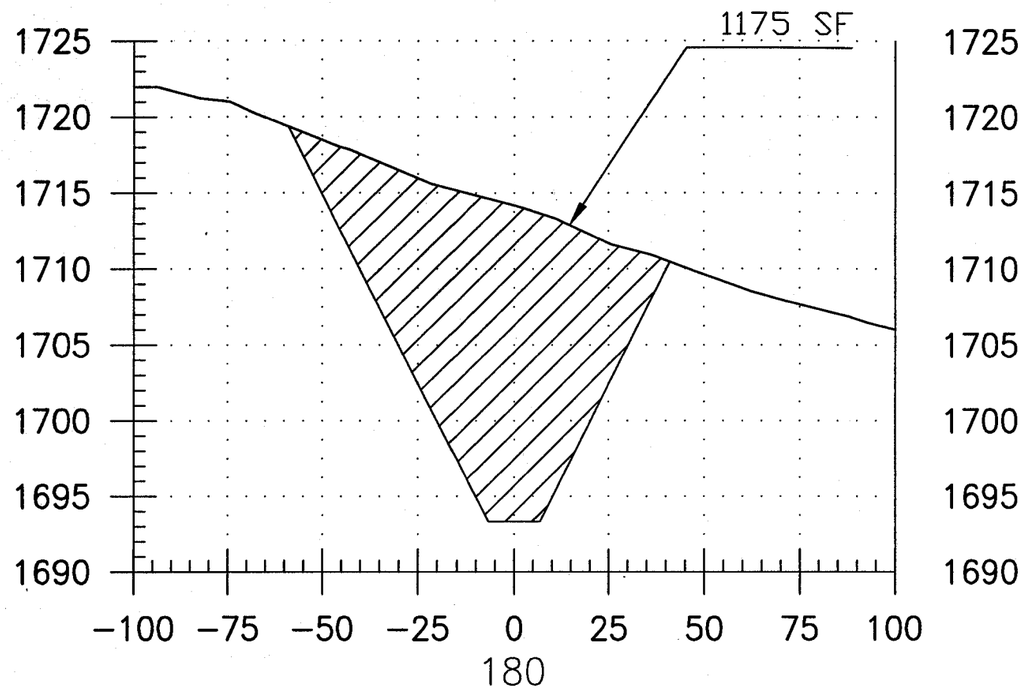


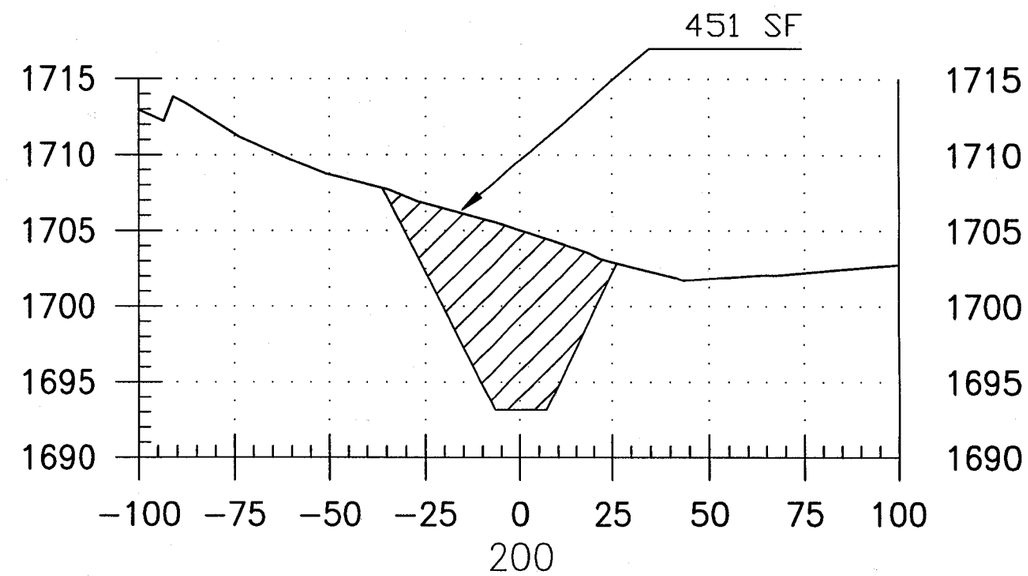
AUXILIARY OUTLET WORKS CROSS SECTIONS

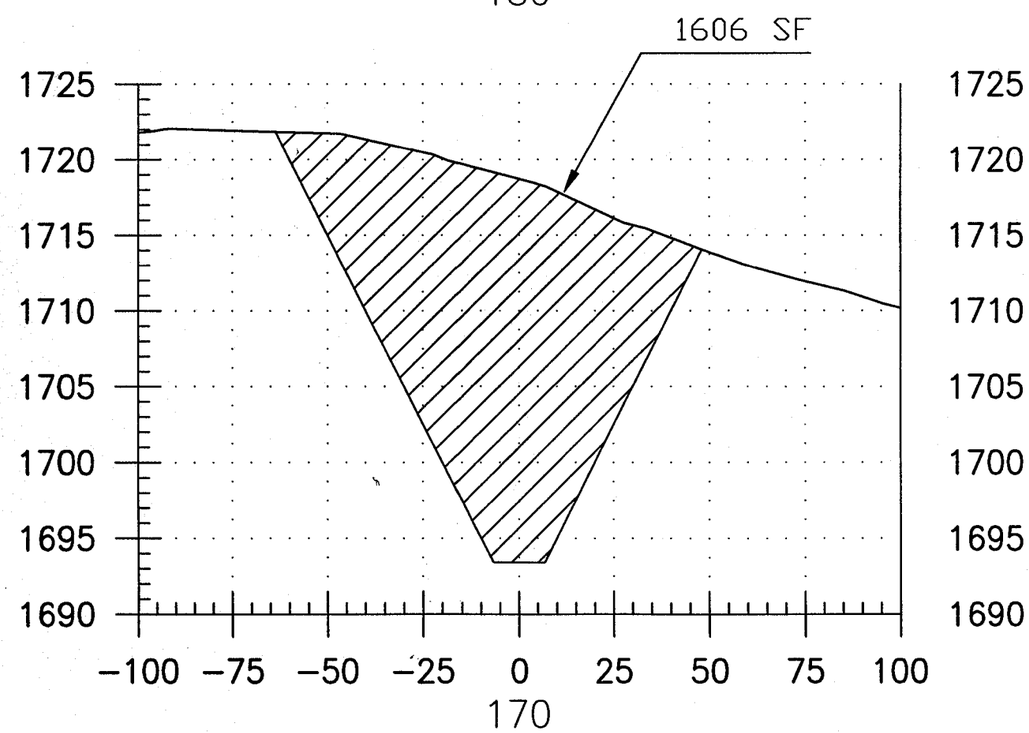


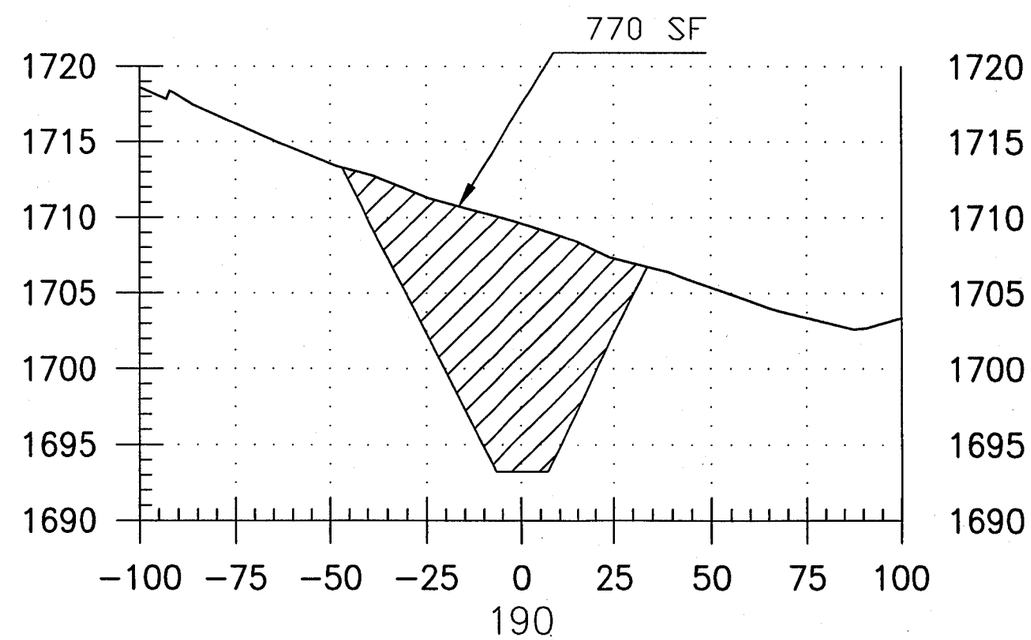


AUXILIARY OUTLET WORKS CROSS SECTIONS

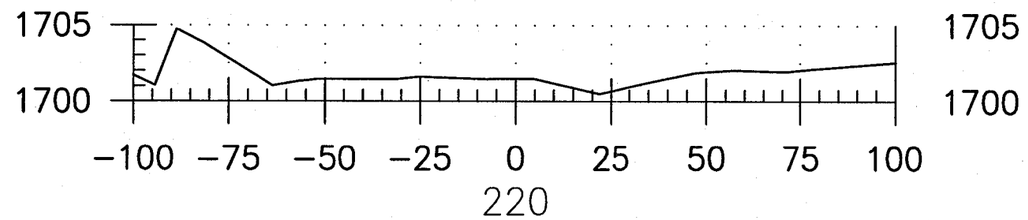


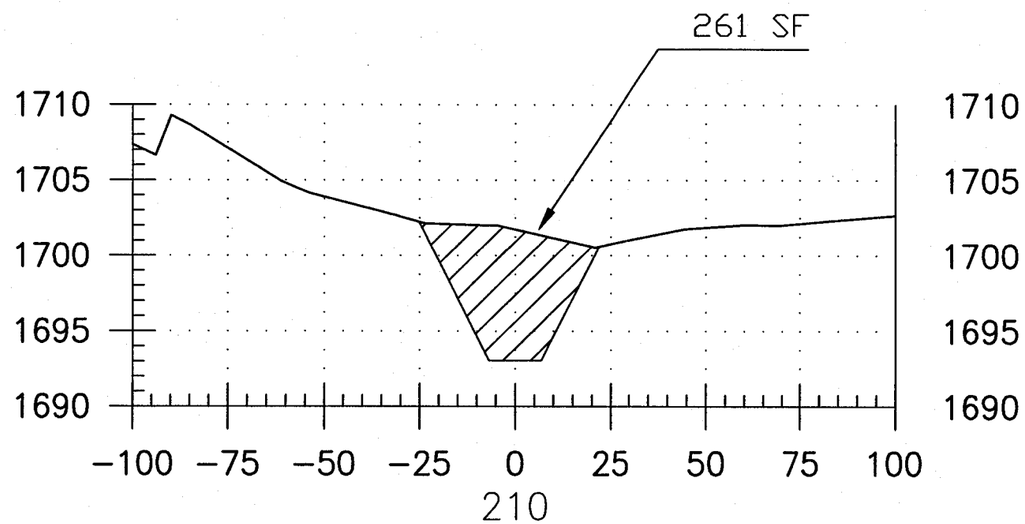






AUXILIARY OUTLET WORKS CROSS SECTIONS





AUXILIARY OUTLET WORKS CROSS SECTIONS

Stantech Consulting

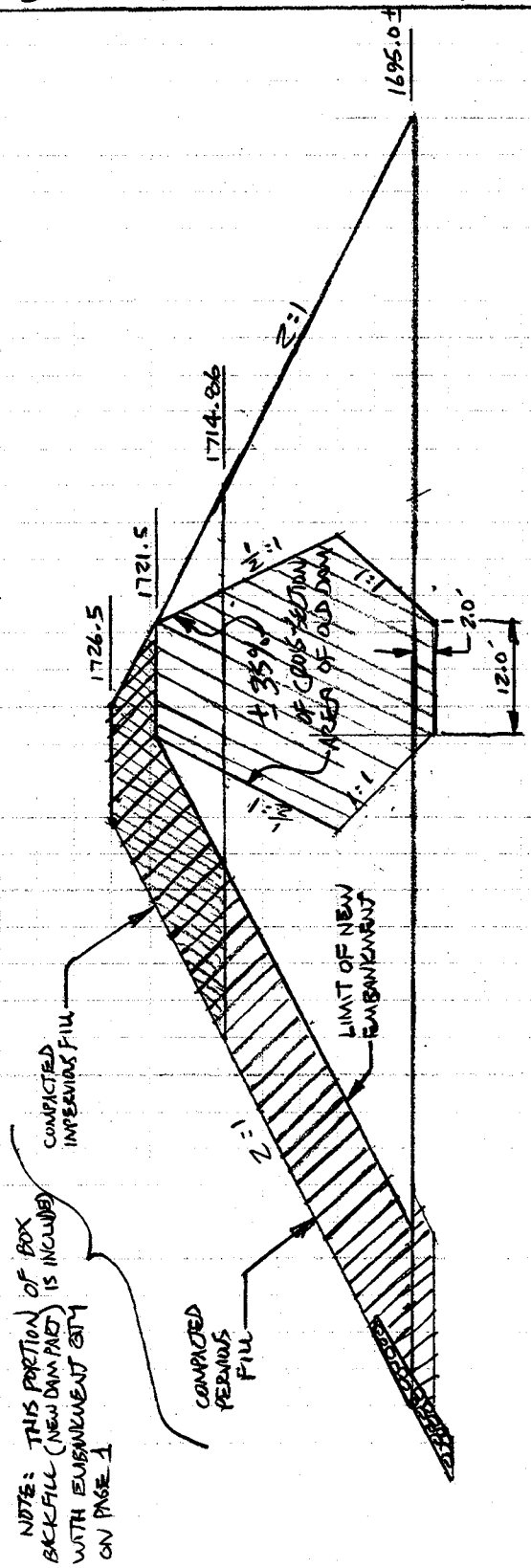
Project: GOLDEN EAGLE PARK DAM — Project Number: 28900095 (82000157)

Notes: EMBANKMENT/BACKFILL QUANTITIES — Scale: —

Page 2 of 3 Page(s)

Computed By: JPK — Date: 12-13-99 — Checked By: [illegible] — Date:

BACKFILL OF THE TRENCH THROUGH THE DAM TO CONSTRUCT THE BOX CULVERT



NOTE: THIS PORTION OF BOX BACKFILL (NEW DAM PART) IS INCLUDED WITH EMBANKMENT QTY ON PAGE 1

STRUCTURAL

VOLUME OF BACKFILL TO BRING GROUND LEVEL OVER NEW BOX CULVERT BACK TO PREVIOUS CONDITIONS EQUALS:

$\forall_{BF}$ = (TRENCH EXC − SAND DIA − BOX VOL)

$\forall_{BF}$ = (4057 − 162 − 25.8)

$\forall_{BF}$ = 3869.2 cy ← VOLUME OF BACKFILL NOT INCLUDING PORTION NEEDED TO CONSTRUCT NEW DAM EMBANKMENT

IMPERVIOUS

$\forall_{IBF}$ = 35% ($\forall_{BF}$) = 1354 cy

BASED ON CROSS-SECTIONAL AREA PROPORTIONS

$\forall_{PBF}$ = 65% ($\forall_{BF}$) = 2515 cy

ARIZONA

7776 Pointe Parkway West., Suite 290
Phoenix, AZ 85044
Voice (602) 438-2200
Fax (602) 431-9562

NEVADA

1100 Grier Drive
Las Vegas, NV 89119
(702) 361-9050
Fax (702) 361-0659

950 Industrial Way
Sparks, NV 89431
(702) 358-6931
Fax (702) 358-6954

Stantech Consulting

Project: GOLDEN EAGLE PARK DAM Project Number: 28900095 (82000157)

Notes: EMBANKMENT/BACKFILL QUANTITIES Scale: —

Page 3 of 3 Page(s)

Computed By: JKK Date: 12-13-99 Checked By: [illegible] Date:

BACKFILL OVER GABION AND RIPRAP EROSION PROTECTION

GABION BACKFILL

AREAS FROM INROADS CROSS SECTIONS

STATION	AREA
7+69.13	68.1
7+89.13	62.1
8+09.13	53.9
8+29.13	67.6
8+49.13	66.4
8+66.88	69.6
9+19.29	63.0

RIPRAP BACKFILL

STATION	AREA
200	73.6
220	53.7
240	32.4
260	32.4
280	32.4
300	32.4
320	32.4
380	32.4
400	32.4
460	32.4
520	44.0
580	45.5
640	31.3
700	30.9
760	32.7
780	34.9
800	0.0

FILL TO CONSTRUCT DIKES AND BERMS

AREA AROUND DISSIPATER

FROM INROADS SURFACES VOLUME CALC

FILL = 276 cy

ARIZONA

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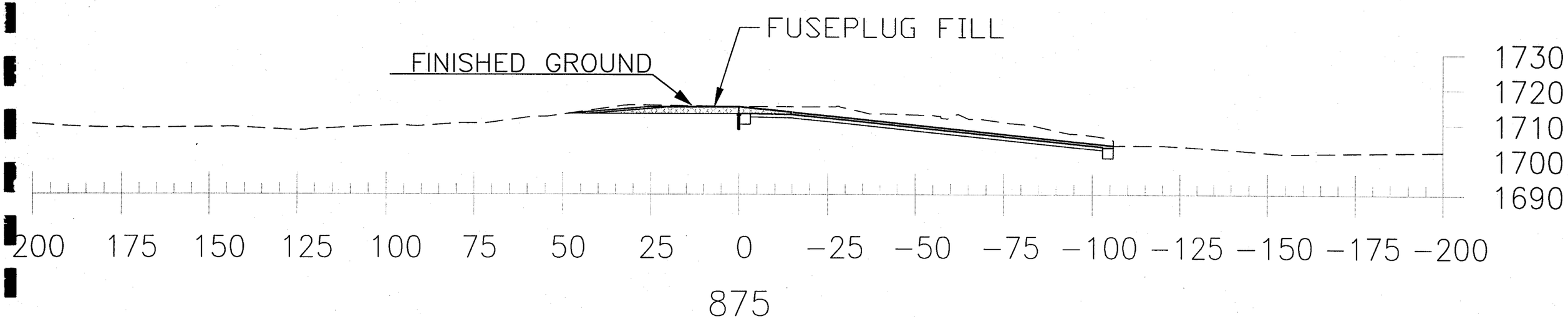
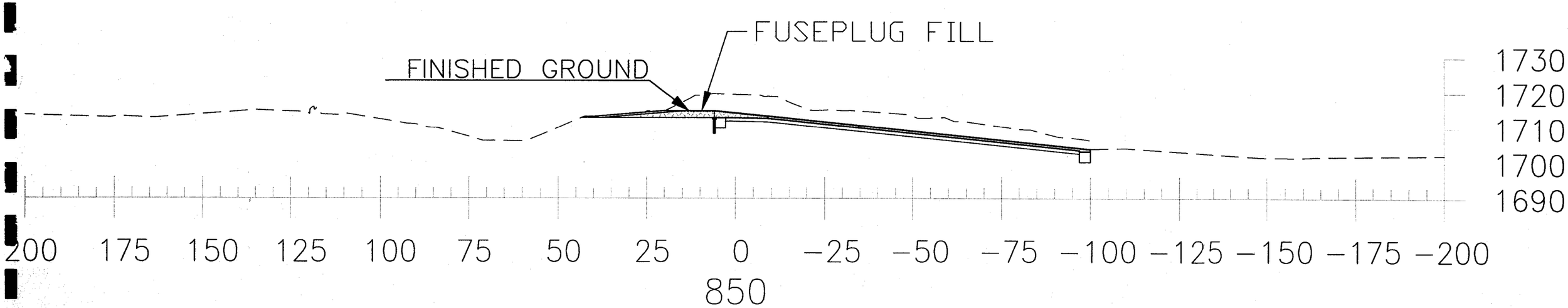
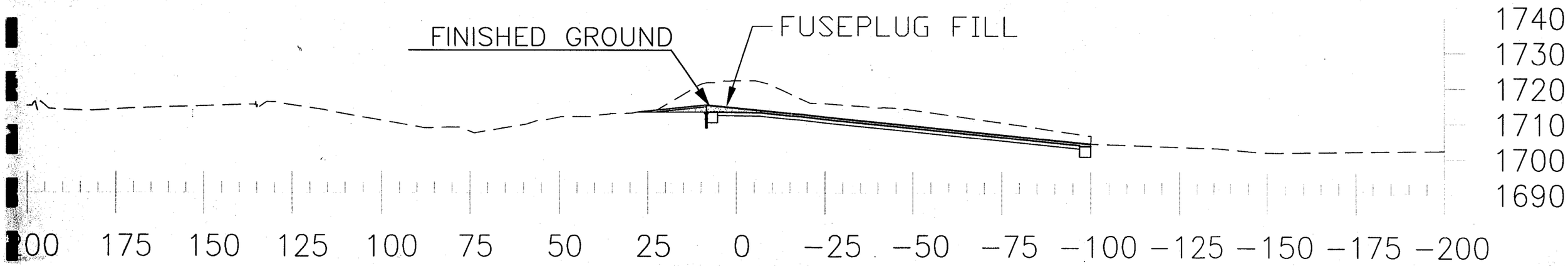
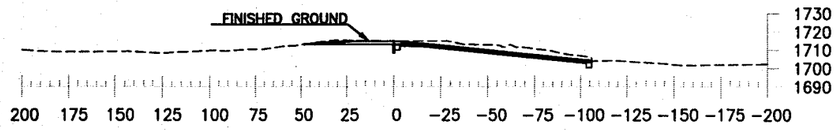
Las Vegas, NV 89119
(702) 361-9050
Fax (702) 361-0659

950 Industrial Way
Sparks, NV 89431
(702) 358-6931
Fax (702) 358-6954


FUSEPLUG FILL
FINISHED GROUND
1730
1720
1710
1700
1690
200 175 150 125 100 75 50 25 0 −25 −50 −75 −100 −125 −150 −175 −200
875


FUSEPLUG FILL
FINISHED GROUND
1730
1720
1710
1700
1690
200 175 150 125 100 75 50 25 0 −25 −50 −75 −100 −125 −150 −175 −200
850


FINISHED GROUND
FUSEPLUG FILL
1740
1730
1720
1710
1700
1690
200 175 150 125 100 75 50 25 0 −25 −50 −75 −100 −125 −150 −175 −200



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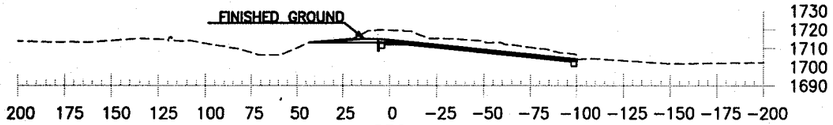

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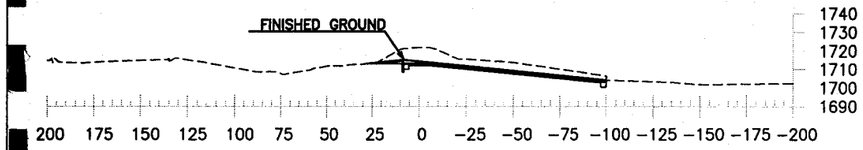

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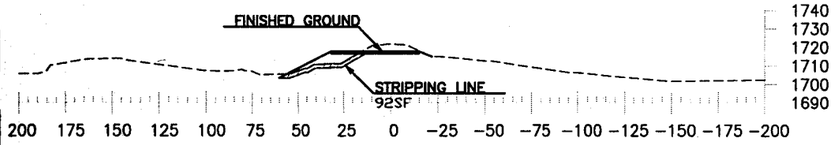

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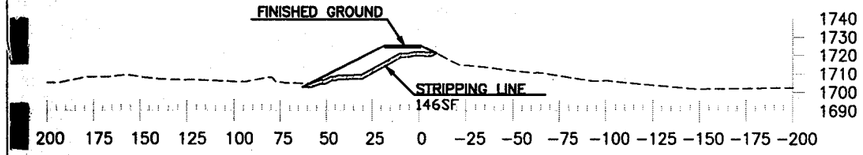

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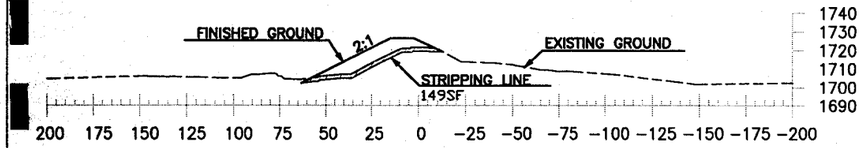

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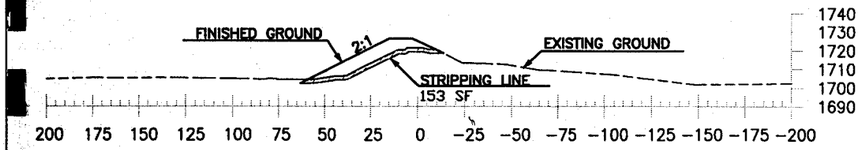

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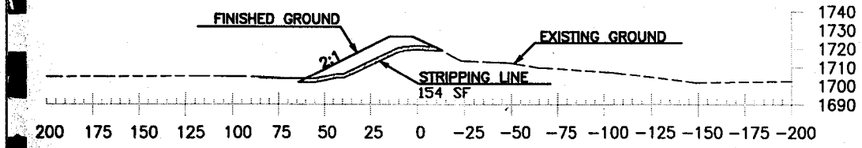

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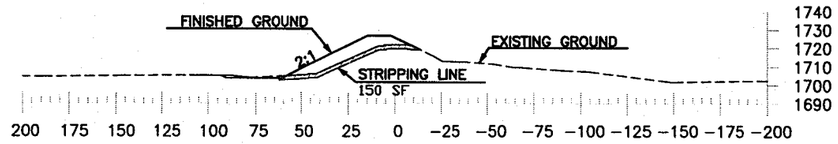

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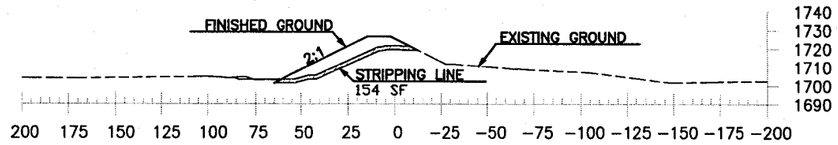

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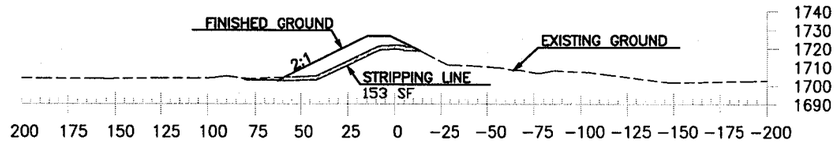

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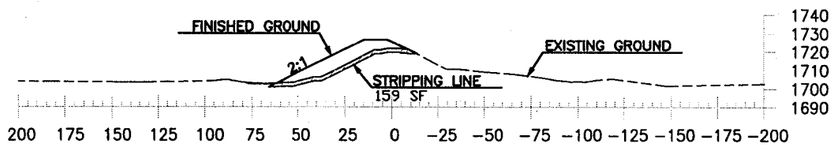

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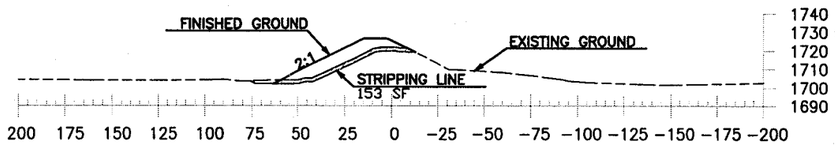

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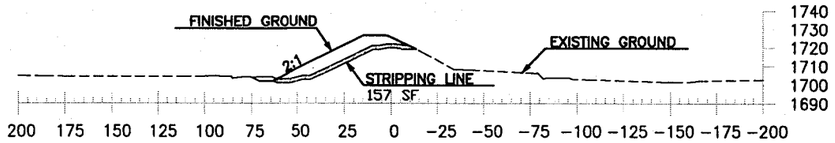

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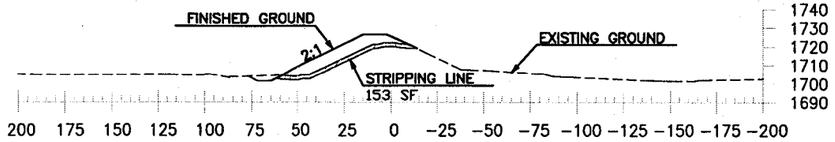

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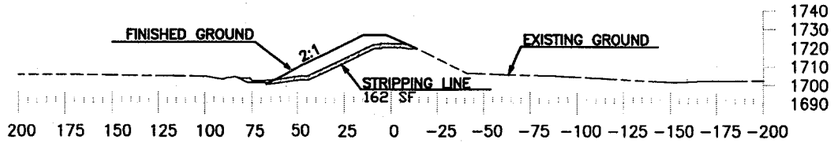


500

STRIPPING

PRELIMINARY, 90% DESIGN

NO.	REVISION	BY	DATE
3			
2			
1			

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

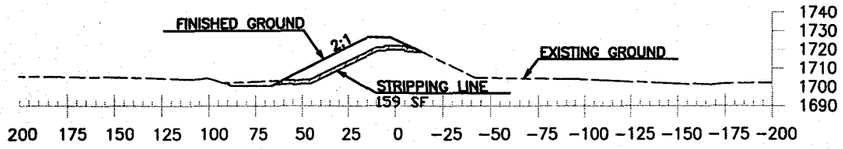
GOLDEN EAGLE PARK DAM MODIFICATIONS
FOUNTAIN HILLS, ARIZONA
PROJECT CONTROL NO. 6700331

PRELIMINARY NOT FOR CONSTRUCTION

	BY	DATE
DESIGNED	CVG	2/00
DRAWN	LMM	2/00
CHECKED	GVS	2/00

Stantec

DRAWING NO.	DAM AND SPILLWAY CROSS SECTIONS	SHEET OF
XS2		34 37



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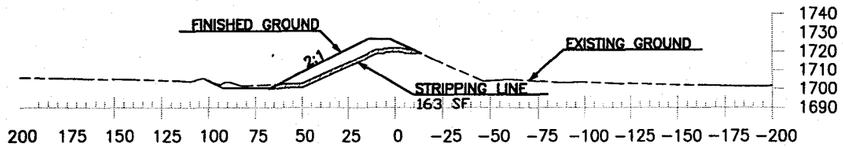

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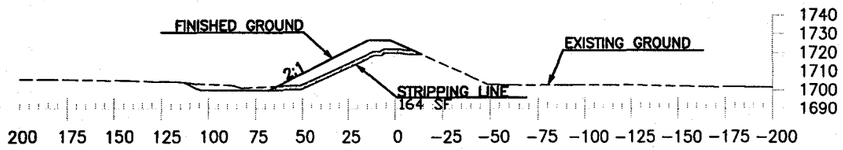

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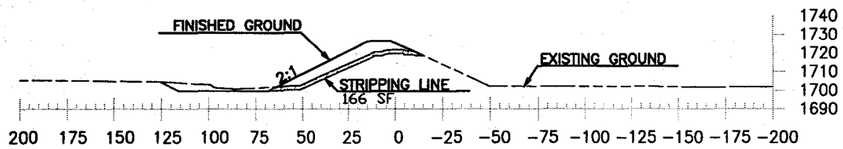

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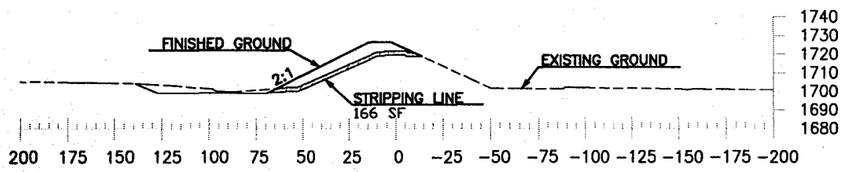

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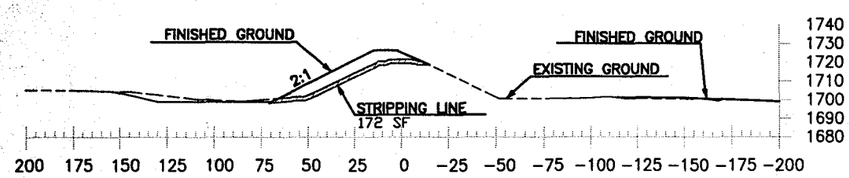

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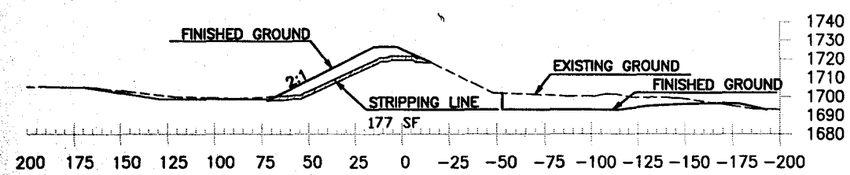

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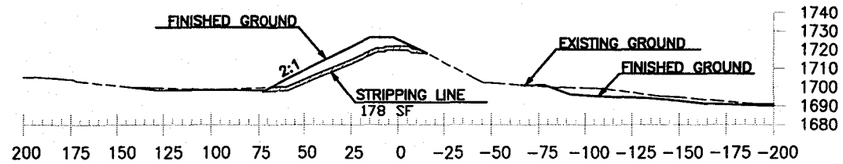

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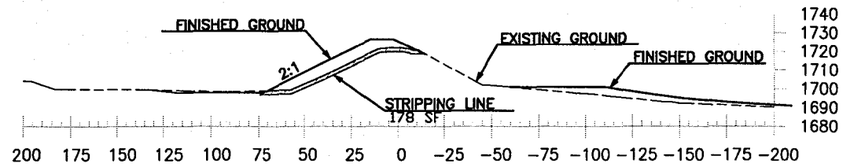

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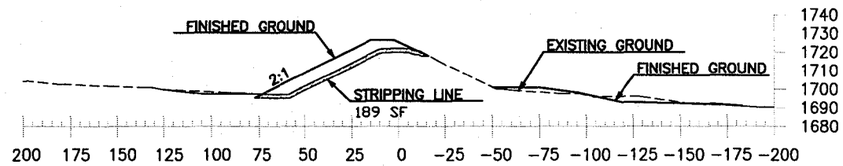

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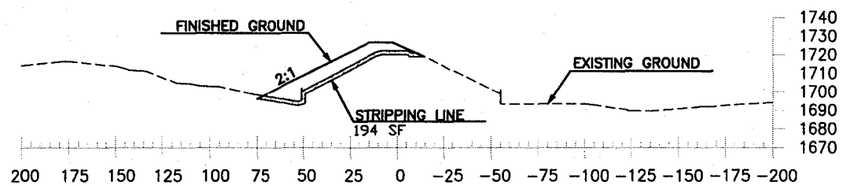

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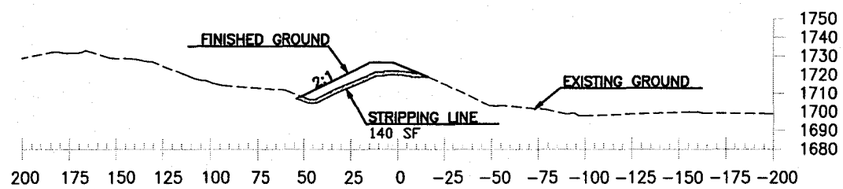

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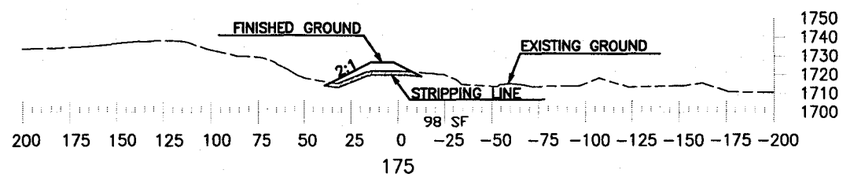

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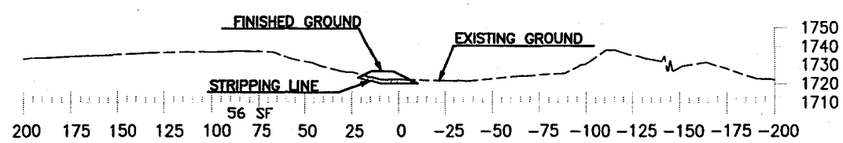


150

STRIPPING

PRELIMINARY, 90% DESIGN

NO.	REVISION	BY	DATE
3			
2			
1			

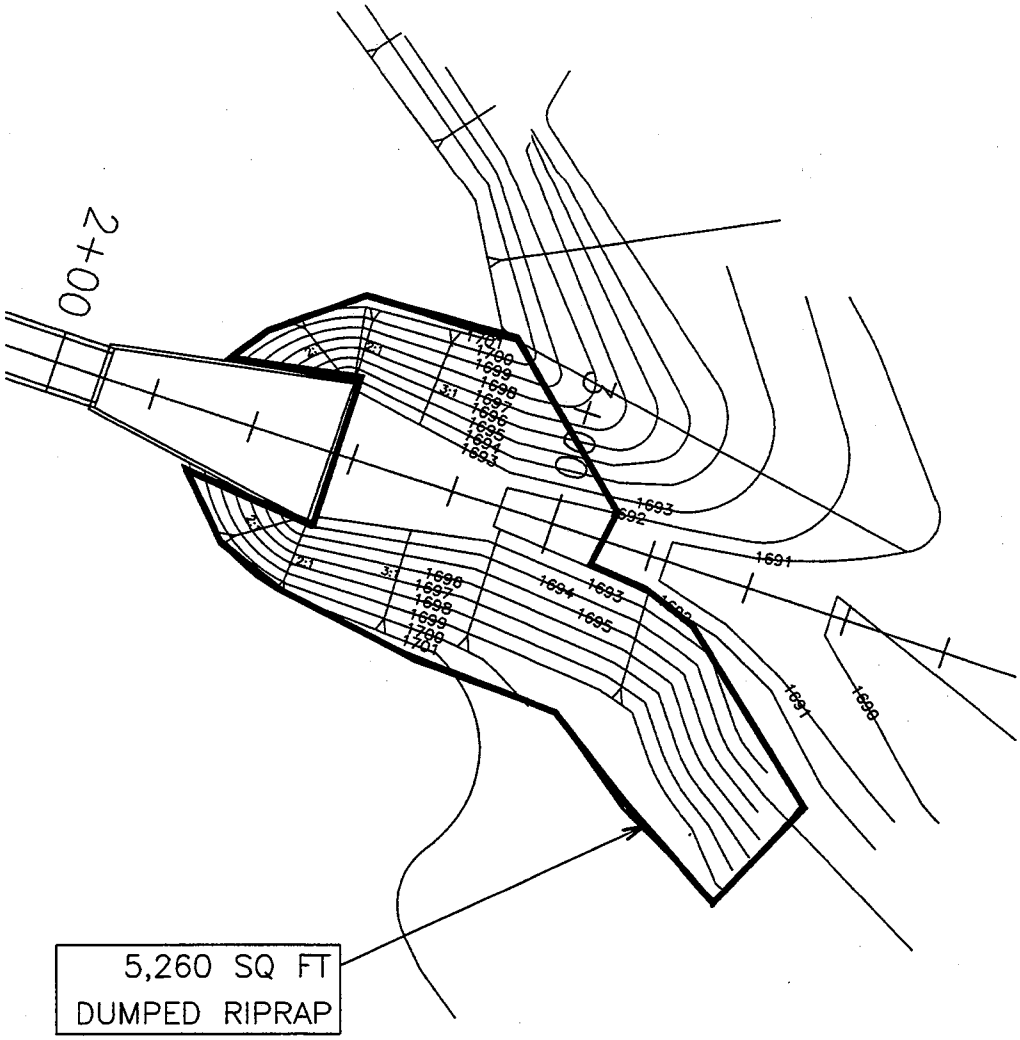
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

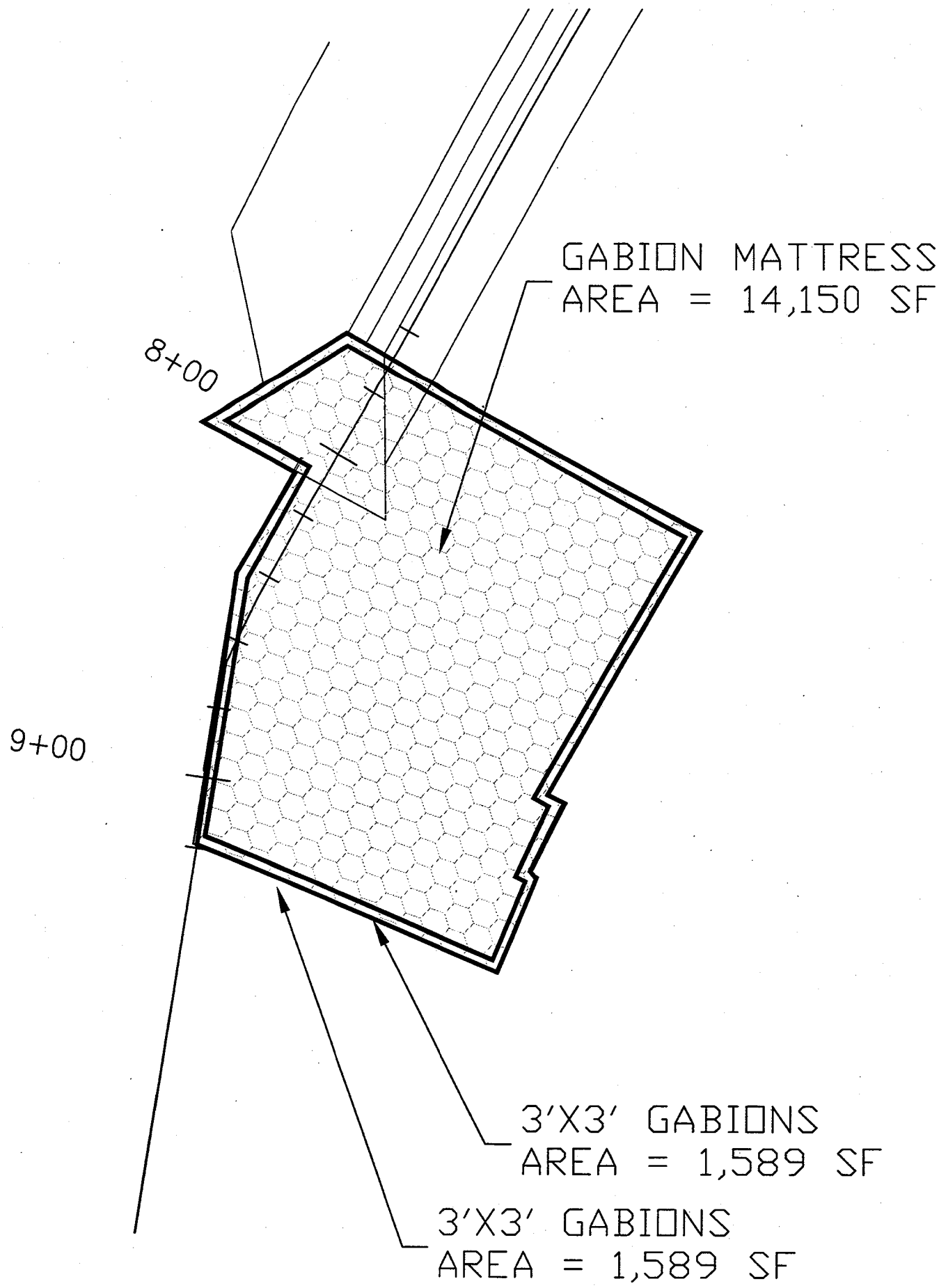
GOLDEN EAGLE PARK DAM MODIFICATIONS
FOUNTAIN HILLS, ARIZONA
PROJECT CONTROL NO. 6700331

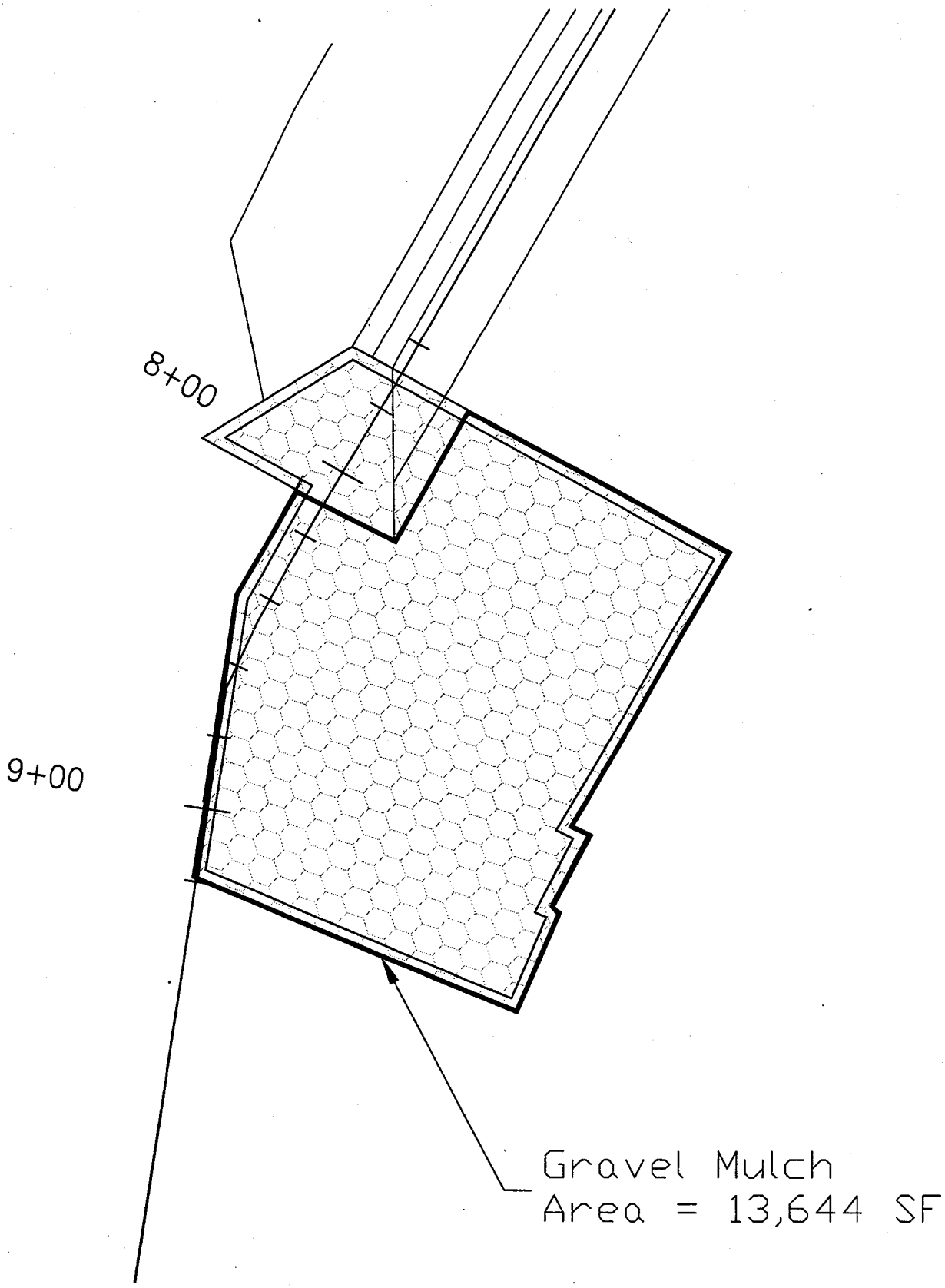
		BY	DATE
PRELIMINARY NOT FOR CONSTRUCTION	DESIGNED	CVG	2/00
	DRAWN	LMM	2/00
	CHECKED	GVS	2/00

Stantec

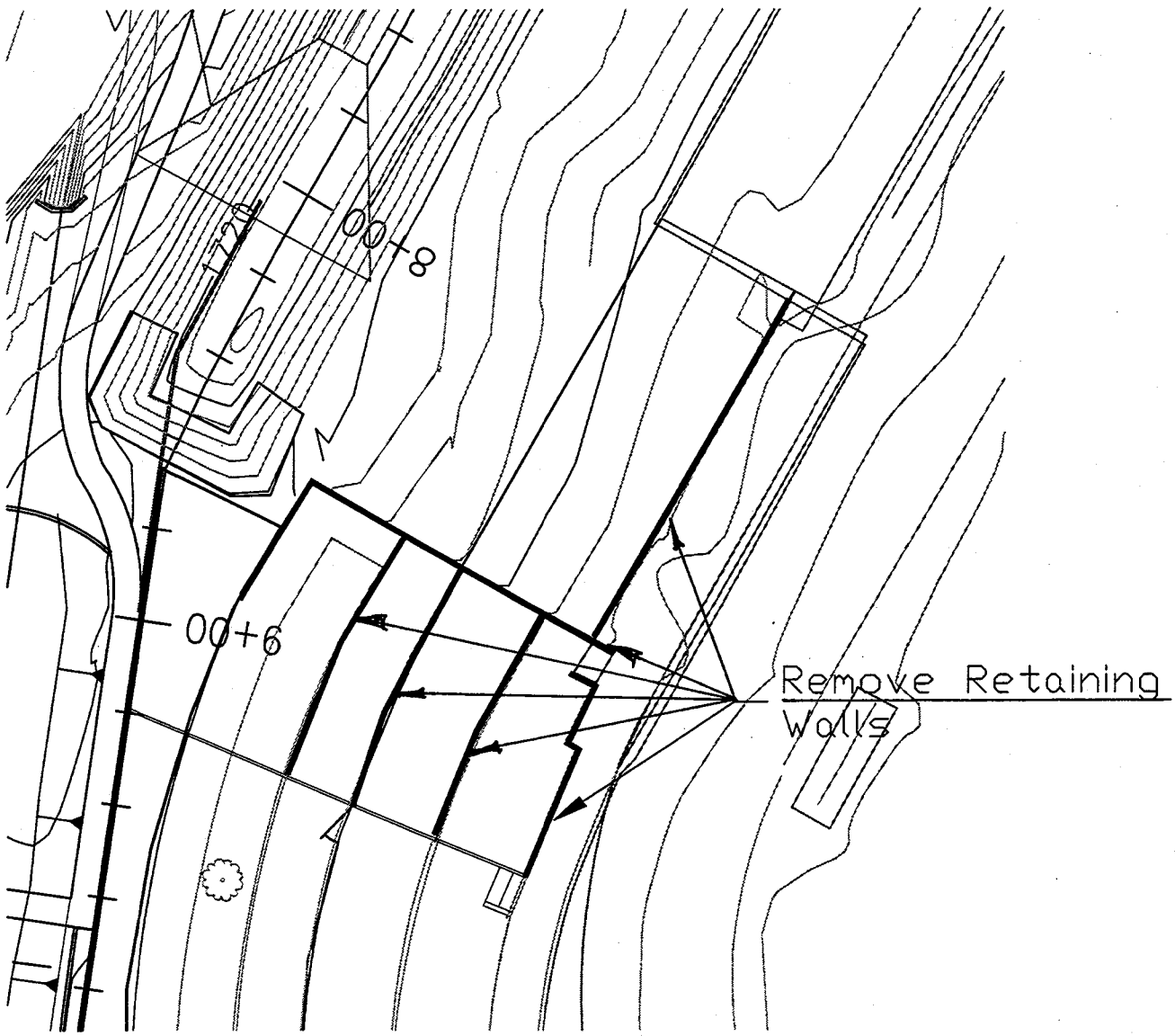
DRAWING NO.		SHEET OF
XS3	DAM AND SPILLWAY CROSS SECTIONS	35 37

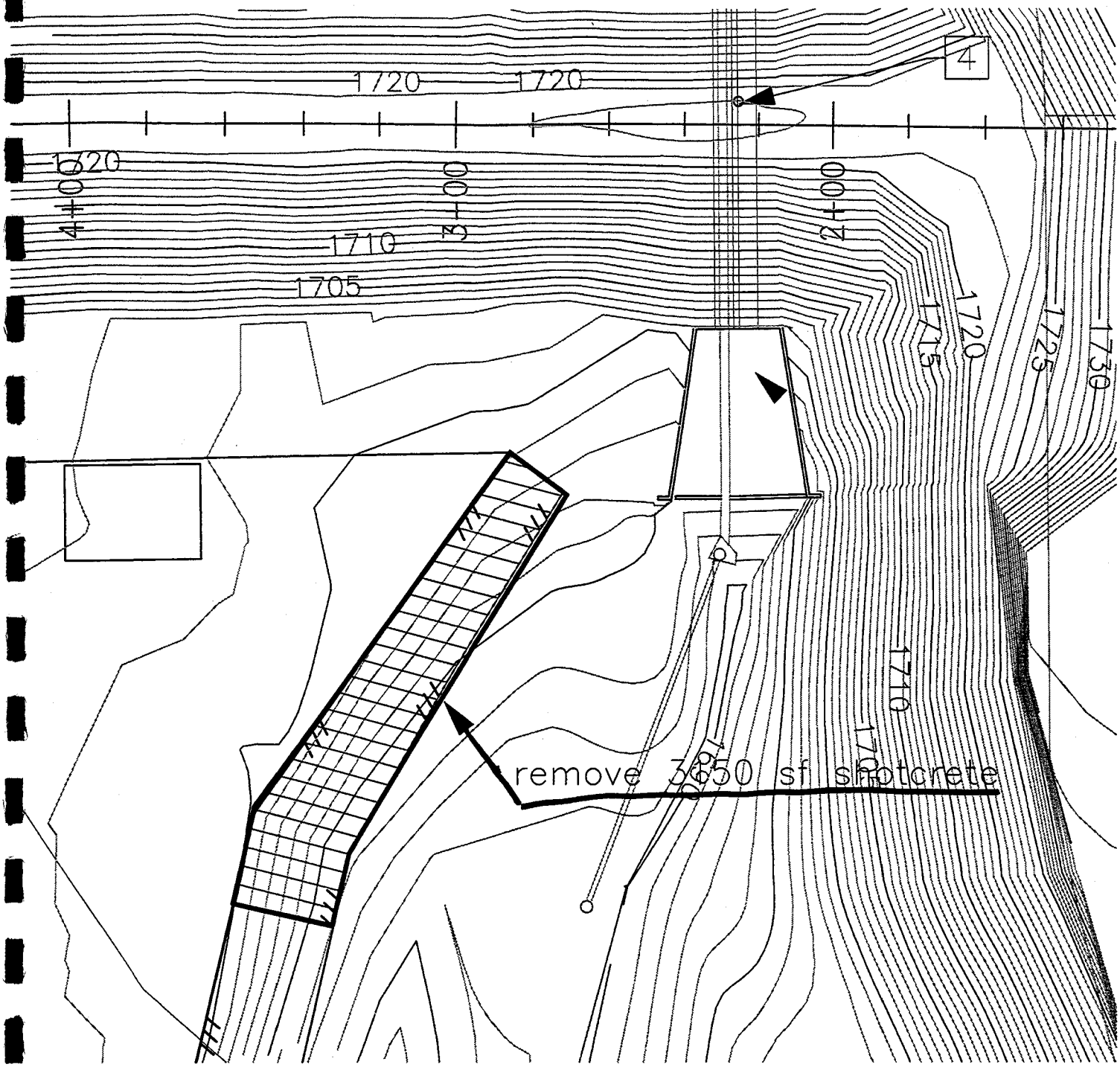

2+00
1701
1700
1699
1698
1697
1696
1695
1694
1693
1692
1691
1690
3:1
2:1
5,260 SQ FT
DUMPED RIPRAP

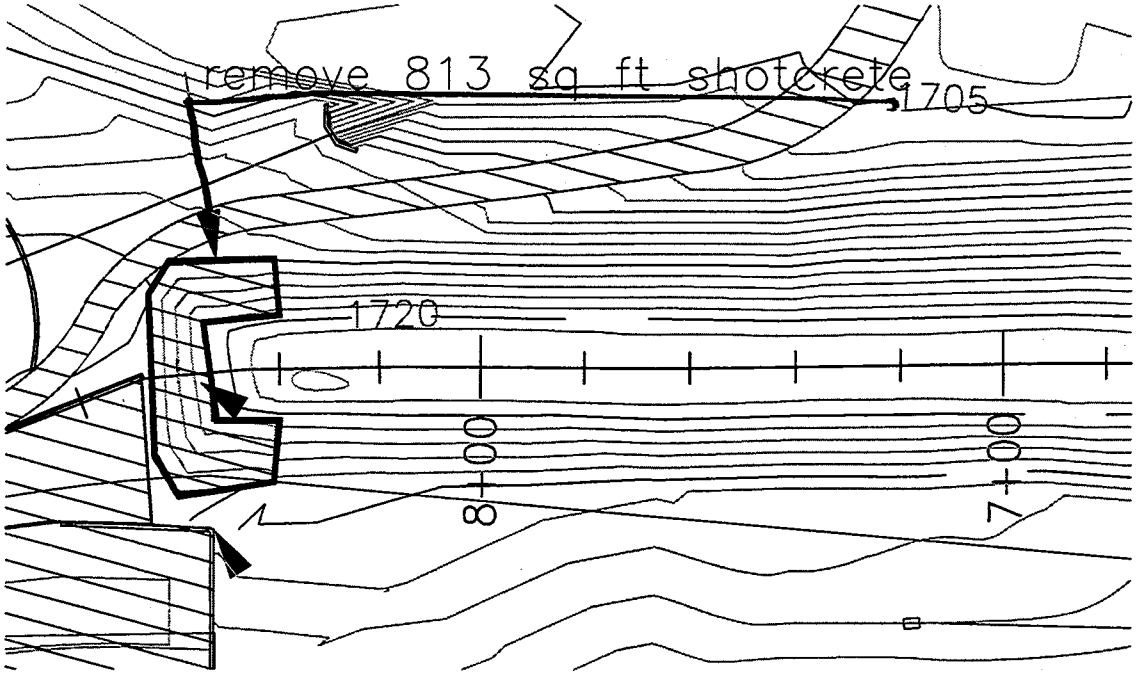

GABION MATTRESS
AREA = 14,150 SF
8+00
9+00
3'X3' GABIONS
AREA = 1,589 SF
3'X3' GABIONS
AREA = 1,589 SF

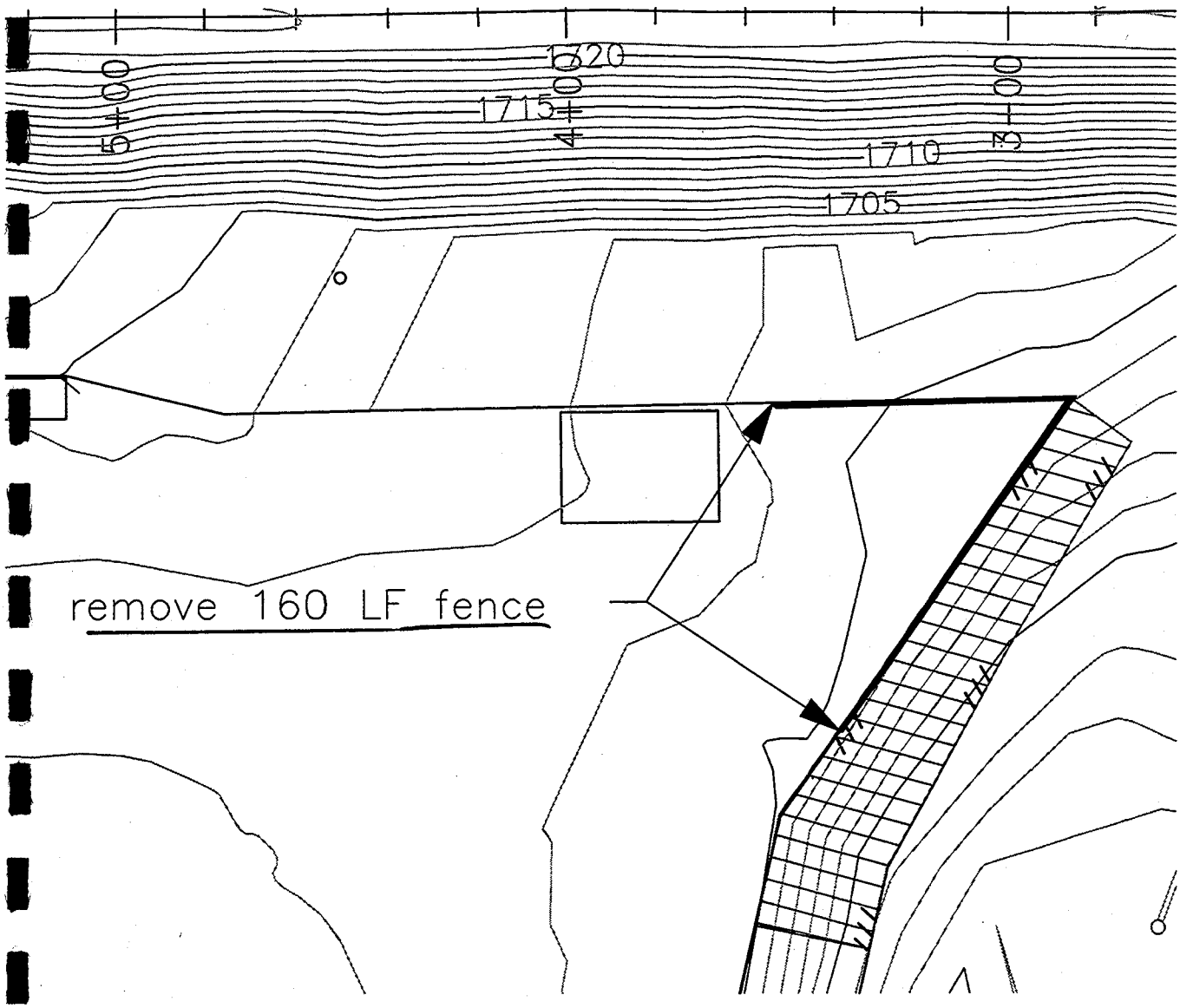

8+00
9+00
Gravel Mulch
Area = 13,644 SF

27970 SF
ASPHALT PAVEMENT

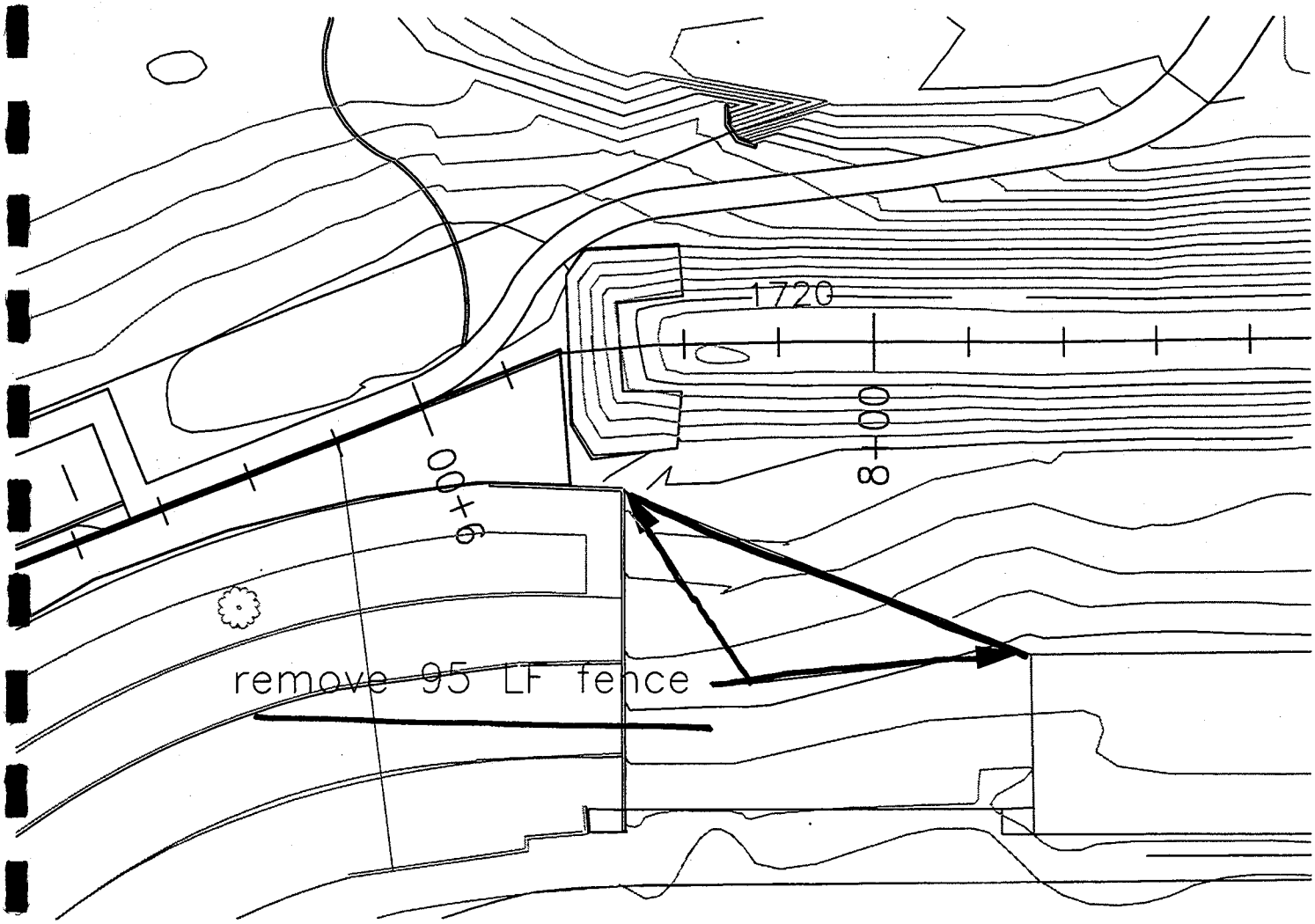

00+6
00+8
Remove Retaining
Walls


4
1720
1720
4+00
3+00
2+00
1620
1710
1705
1720
1715
1725
1730
1710
remove 3650 sf shotcrete

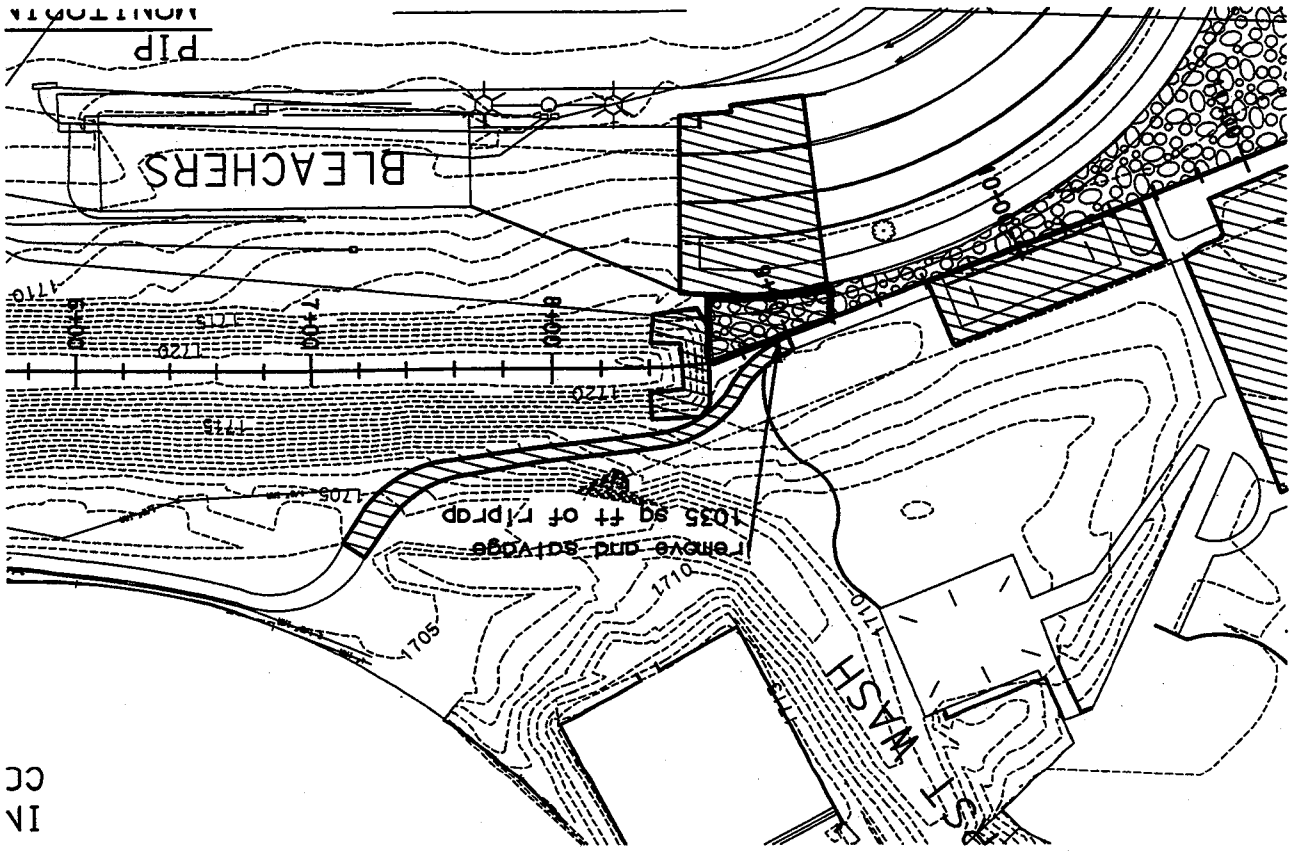

remove 813 sq ft shotcrete
1705
1720
8+00
7+00

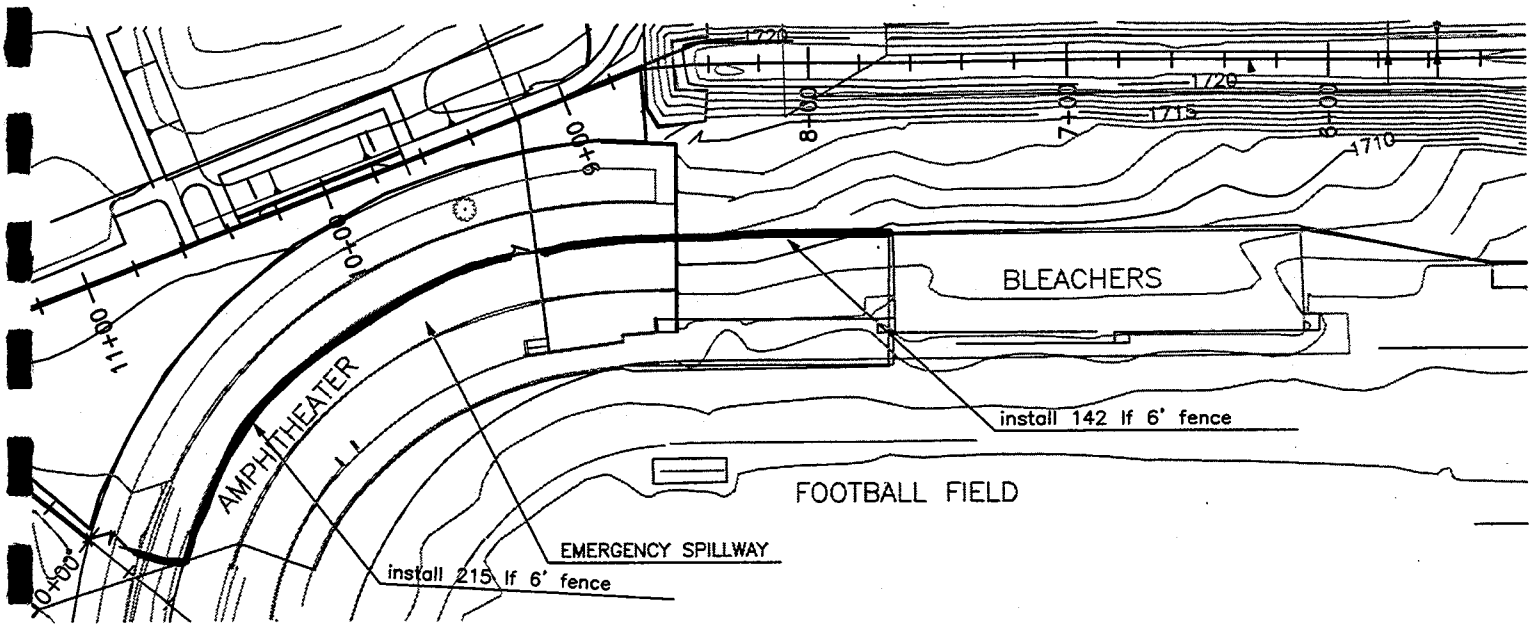


FENCE

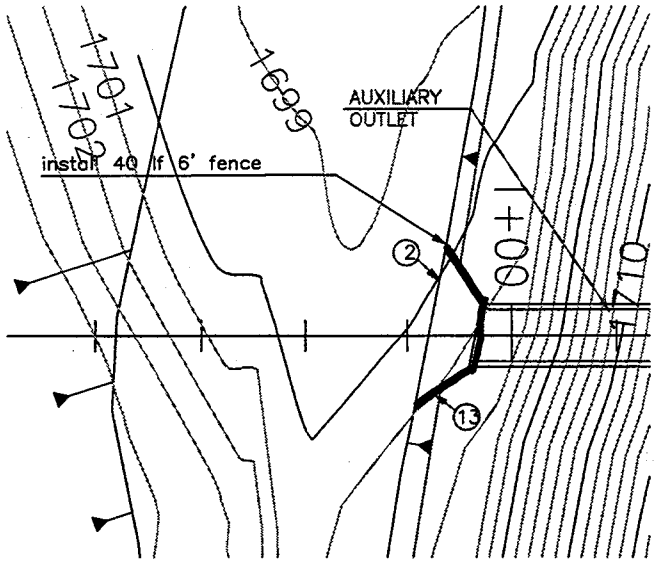


Fence

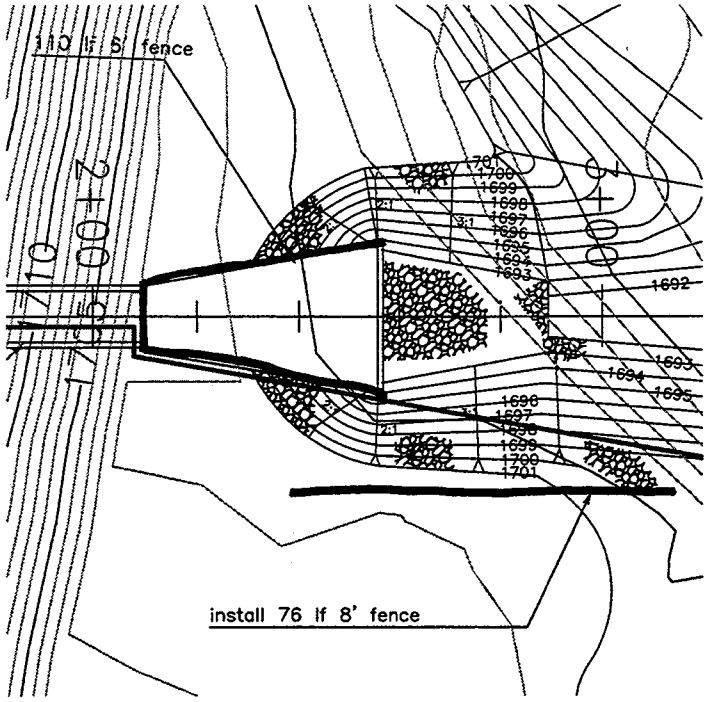

IN
CC
WASH
ST
1710
1705
1710
remove and salvage
1035 sq ft of riprap
1715
1720
1725
1730
1710
BLEACHERS
PIP
MONITORIN


1720
1720
1715
1710
8+00
7+00
6+00
9+00
10+00
11+00
BLEACHERS
AMPHITHEATER
install 142 lf 6' fence
FOOTBALL FIELD
EMERGENCY SPILLWAY
install 215 lf 6' fence

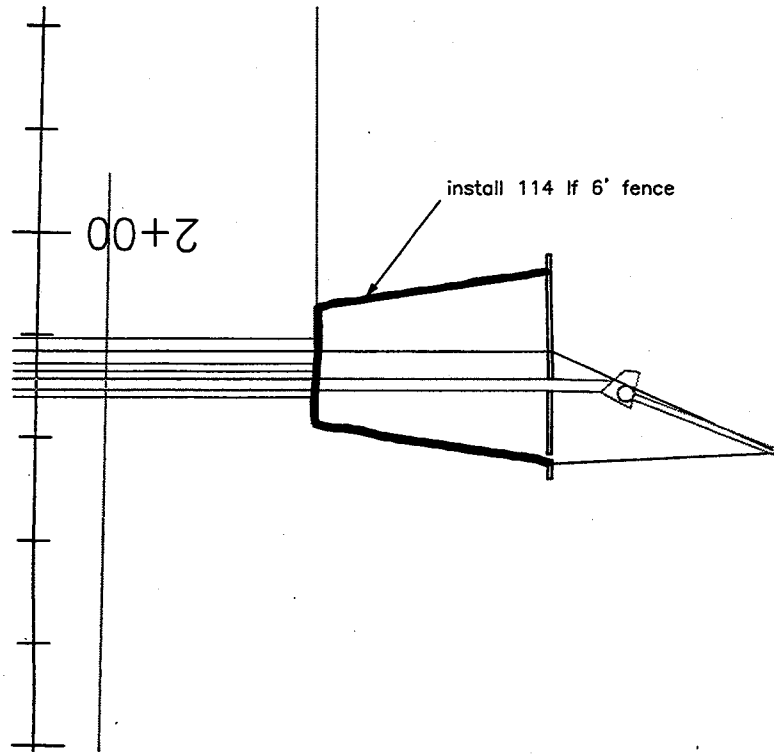
FENCE


1710
1+00
AUXILIARY
OUTLET
2
13
1699
1701
1702
install 40 lf 6' fence

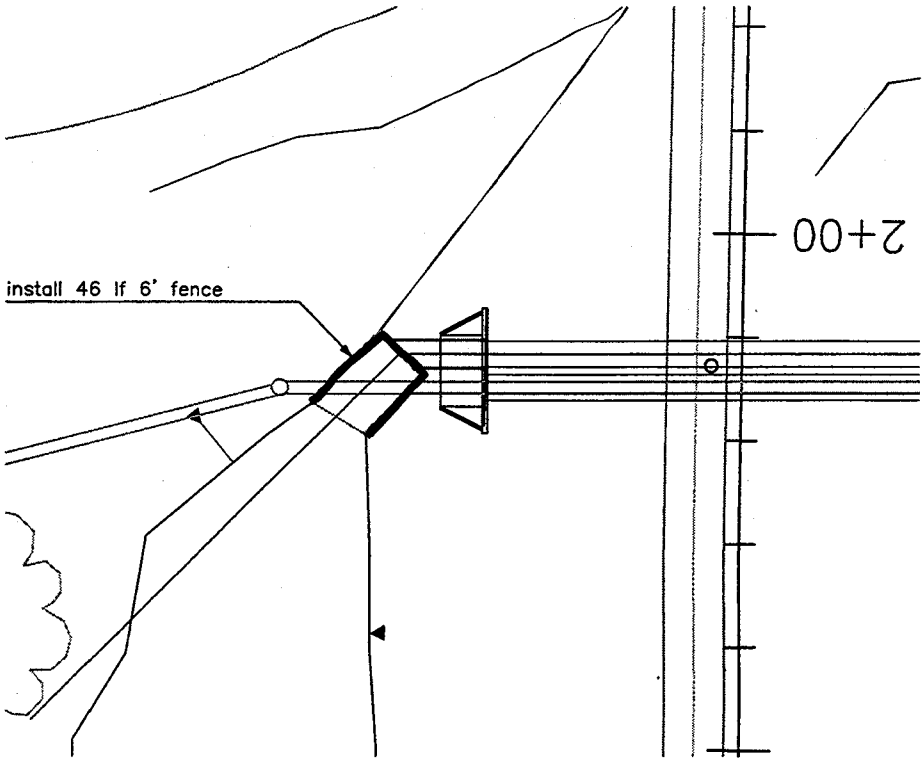
Fence


110 lf 5' fence
install 76 lf 8' fence
1692
1693
1694
1695
1696
1697
1698
1699
1700
1701
2:1
3:1

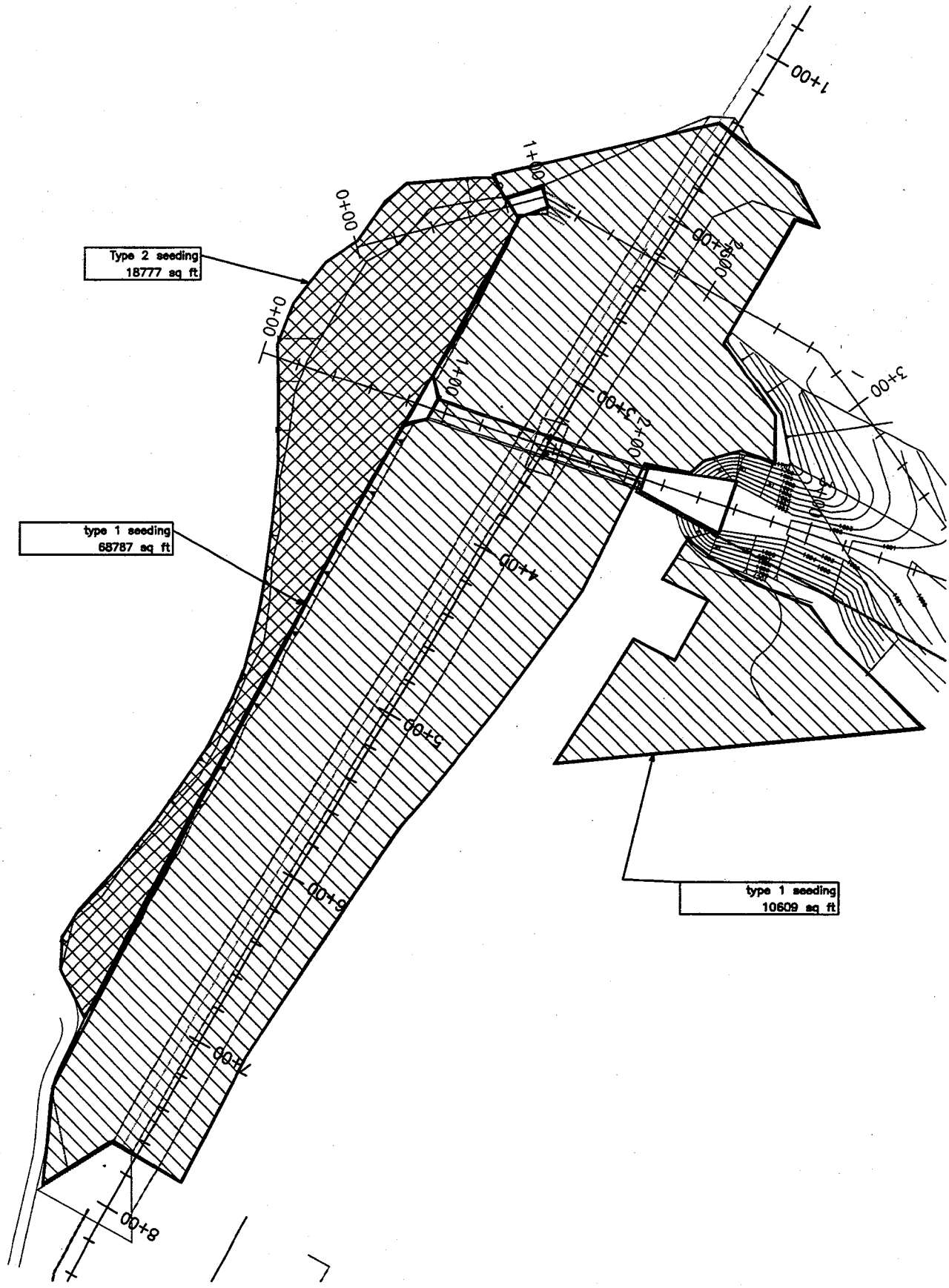
Fence



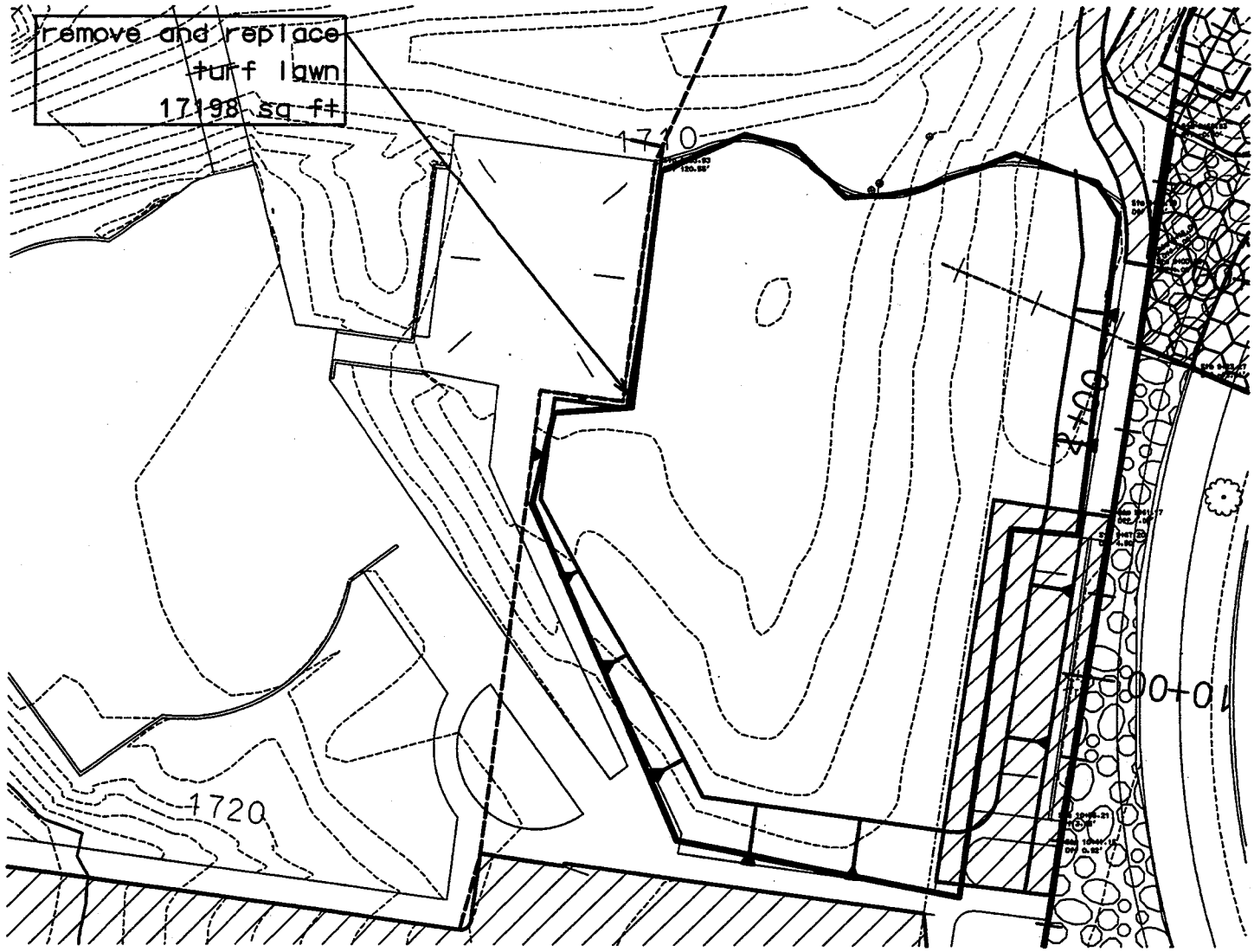
FENCE

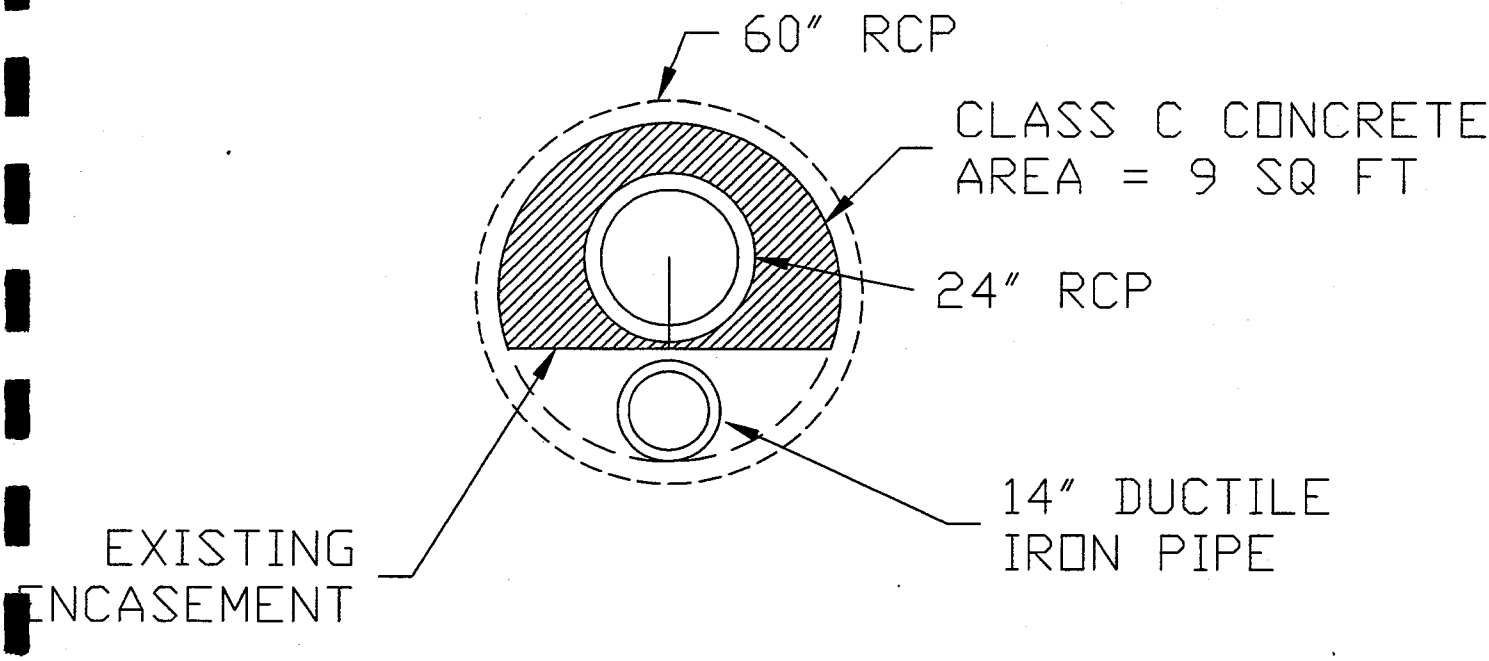


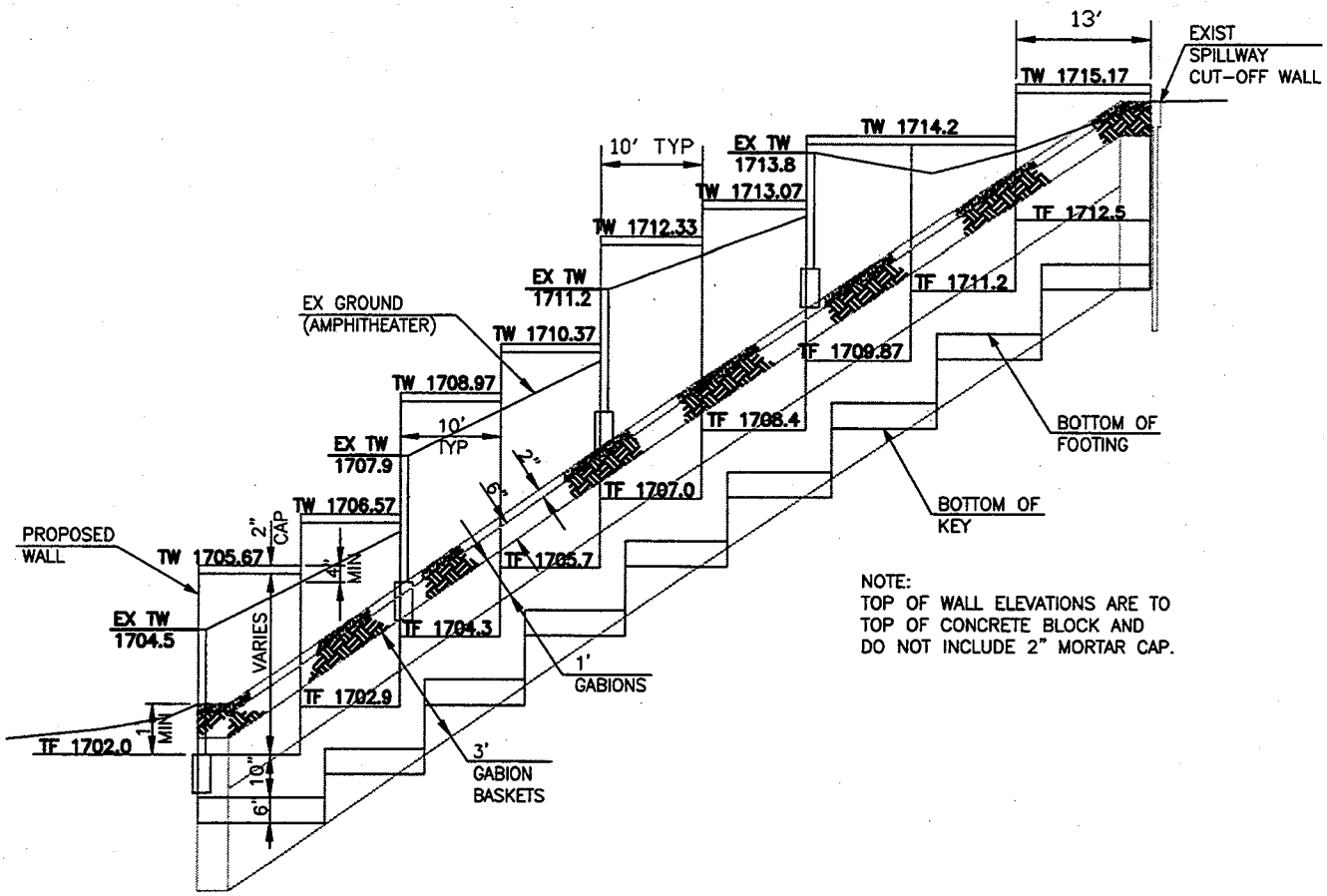
FENCE


Type 2 seeding
18777 sq ft
type 1 seeding
68787 sq ft
type 1 seeding
10609 sq ft
0+00
1+00
2+00
3+00
4+00
5+00
6+00
7+00
8+00

type 2 seeding
10972 sq ft
2+00
3+00
3+00
4+00
1693
1694
1695
1696
1697
1698
1699
1700
1701
2:1
3:1


remove and replace
turf lawn
17198 sq ft
1710
1720
2+00
1+00

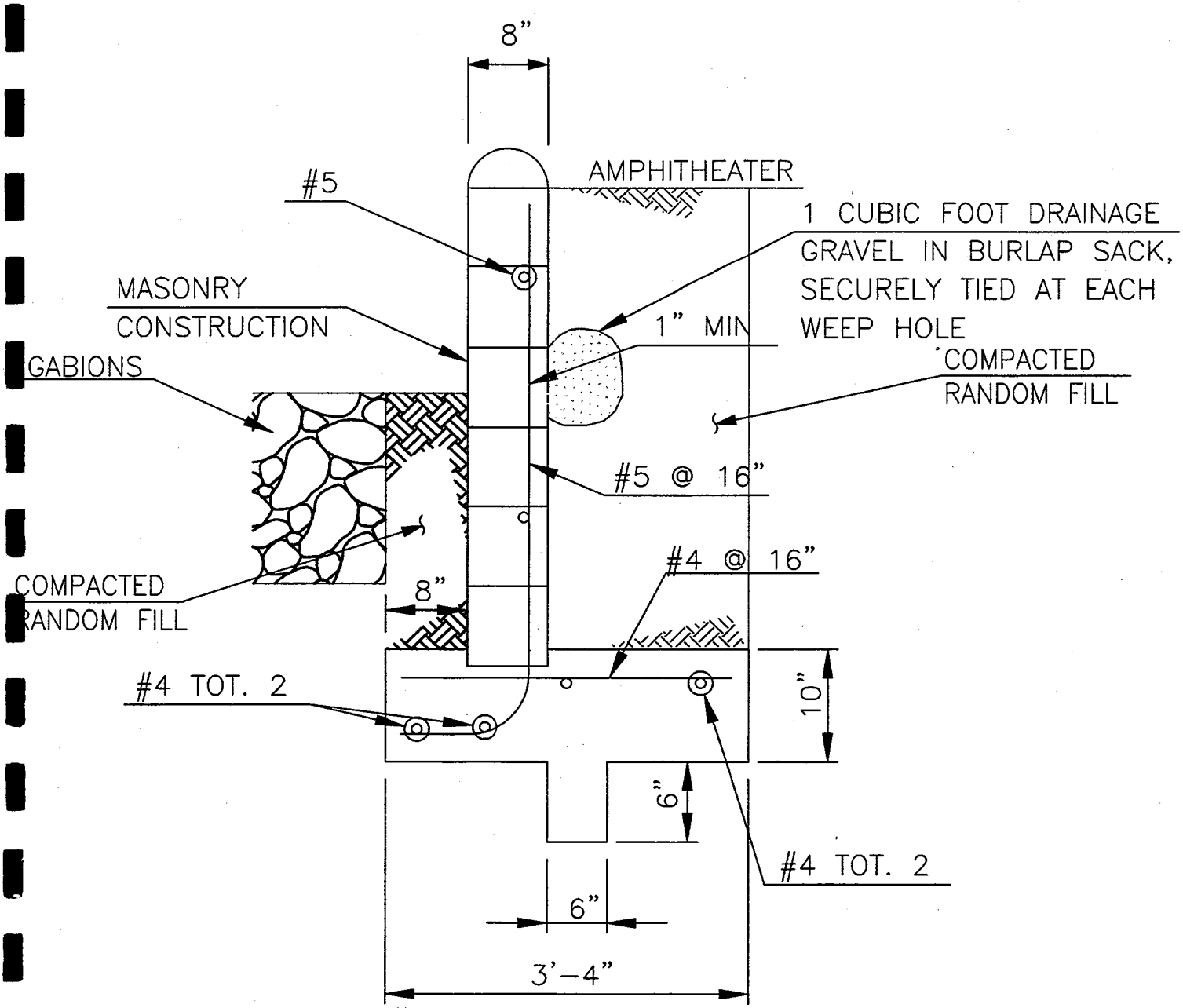

60″ RCP
CLASS C CONCRETE
AREA = 9 SQ FT
24″ RCP
14″ DUCTILE
IRON PIPE
EXISTING
ENCASEMENT



NOTE:
TOP OF WALL ELEVATIONS ARE TO TOP OF CONCRETE BLOCK AND DO NOT INCLUDE 2" MORTAR CAP.

PROFILE MASONRY RETAINING WALL

H 1" = 10'
V 1" = 2'



TYPICAL SECTION
MASONRY RETAINING WALL

NTS

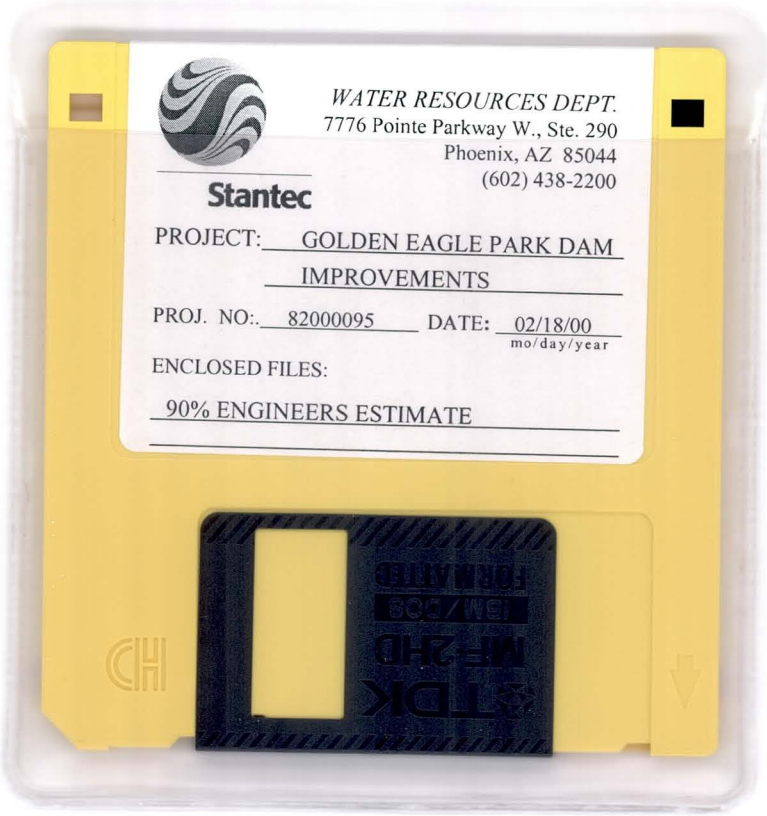
Masonry Retaining Wall at Emergency Spillway

Top of Wall Elevation (feet)	Top of Footing Elevation (feet)	Height of Wall (feet)	number of 8" courses
1705.67	1702.00	3.67	5.51
1706.57	1702.90	3.67	5.50
1708.97	1704.30	4.67	7.01
1710.37	1705.70	4.67	7.00
1712.33	1707.00	5.33	7.99
1713.07	1708.40	4.67	7.00
1714.20	1709.87	4.33	6.50
1714.20	1711.20	3.00	4.50
1715.17	1712.50	2.67	4.01

Note: top of wall elevations are to top of concrete block, and do not include 2" mortar cap

Standard heights are in increments of 8"
can use 4" increments by using 4" high block
other increments require cutting blocks

Number of courses	Height inches	Height feet
3.0	24	2.00
3.5	28	2.33
4.0	32	2.67
4.5	36	3.00
5.0	40	3.33
5.5	44	3.67
6.0	48	4.00
6.5	52	4.33
7.0	56	4.67
7.5	60	5.00
8.0	64	5.33
8.5	68	5.67



ELECTRONIC FILES FOR COST ESTIMATE

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