

DRG Copy
✓ WMM

FOR	NAME	RON CLEVINGER	DATE	3-25-86	
	ADDRESS	11-158 SB-K	<input type="checkbox"/> Chatta	<input type="checkbox"/> M S	<input type="checkbox"/> Nor
----- Fold here for return -----					
FROM	NAME	JOHN BRANCH	EXTENSION		
	ADDRESS	W3 D 213 C-K	<input type="checkbox"/> Chatta	<input type="checkbox"/> M S	<input type="checkbox"/> Nor

Attached is a copy of the info I called you about today to get CSB on board.

I assume that in the very near future we will be requesting an official construction estimate from OC. FEP is already preparing material estimates for that purpose.

CC: L.D. Chapman, 10-111 SB-K w/Att

Larry please review the concept of what we intend to do for any problems in constructability. Let me know or R.E. Harris if you foresee any problems. - J. Branch
6387

R.E. Harris, W2 D 220 C-K w/Att.

TVA-450 (05-8-80) INTEROFFICE MAILING SLIP

KWB

KINGSTON STEAM PLANT
SPILLWAY RELOCATION & DIKE "C" SEEPAGE REPAIRS

SCOPE OF WORK

The following scope of work describes the general requirements for design and construction to effect the subject modifications.

1. SPILLWAY RELOCATION (See attached sketches)

A. COLLECTION BOX

Design and construct concrete collection/spillway box with weir and skimmer. Construction will require placement of unclassified earth coffer dike to minimum elevation of 755 feet and removal of same dike to elevation 750 feet. Pumping during construction will be required and the impacting of stone may be required if an unsuitable foundation is determined by the engineer. Lowering of the stilling pool water elevation to 753 feet (+/-) will be done by removing one (1) 2 foot riser from the 5 discharging spillway pipes. The removed section will be replaced and one additional section (2 foot riser) will be added.

B. DISCHARGE PIPES

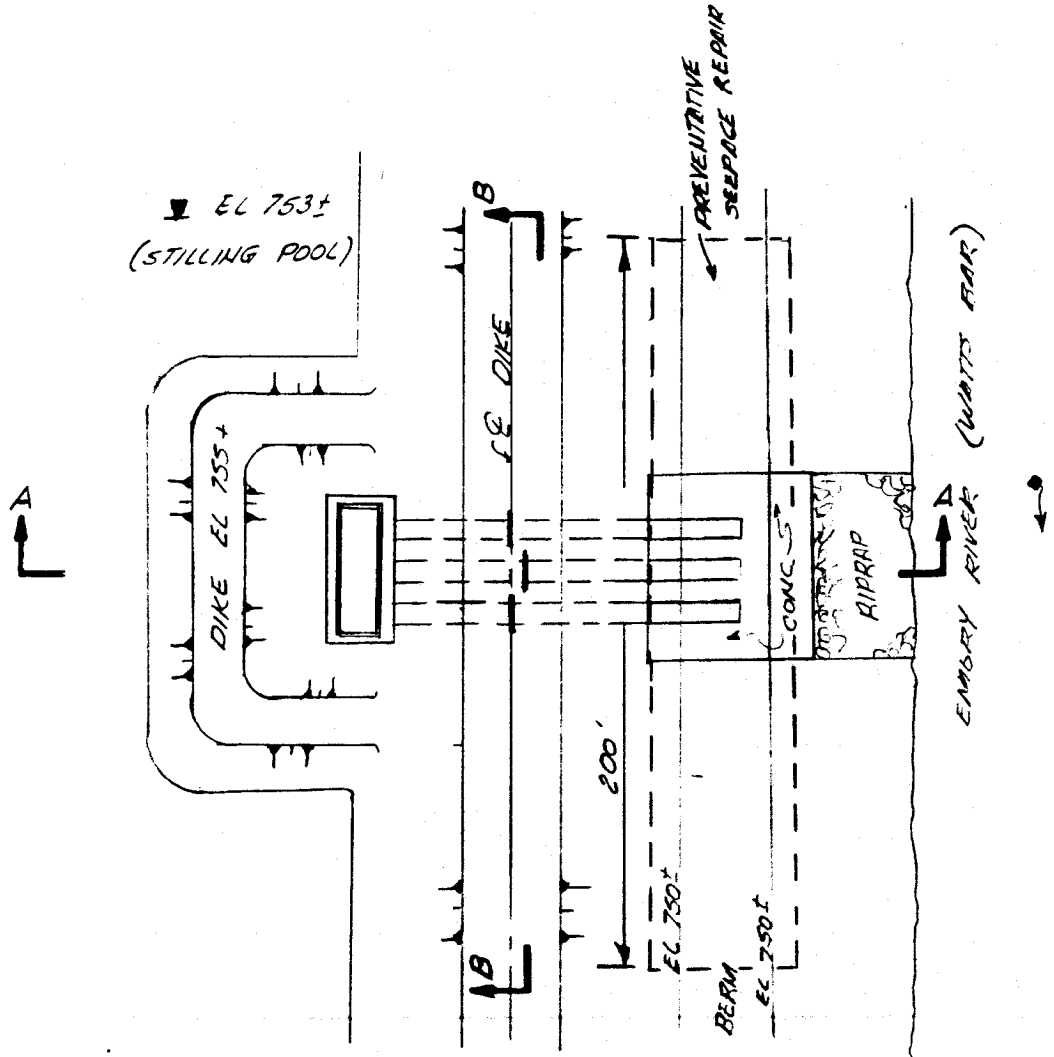
The existing exterior dike will be excavated approximately 8 feet (to elevation 757) by pan & dozer in this local area, with structural excavation continuing below this point for the pipe installation (approximately 7 feet). The excavation will be in two phases. The first will consist of work from the centerline of the dike toward the inside of the pond. The second phase begins after the discharge pipes are in place. The inside area will be back-filled and the outer half of the dike will be excavated for pipe installation. The pipes will have concrete seepage collars and a concrete/riprapped discharge pad. The backfill of the existing exterior dike will be placed and compacted to the normal standards set forth for all ash pond dikes. The excavated material from the exterior dike will be used for the backfill and the dike surfaced with crushed stone. *and the material stored for use in backfill*
(Borrow Material?)

2. DIKE "C" (EXTERIOR SLOPE)-SEEPAGE REPAIRS

- A. Seepage repairs as noted in memorandum B64 B5 0416 004 will also be implemented during this period since the stilling pool water elevation will be sufficiently low enough to accomplish the previously planned repair work.
- B. Preventative seepage repairs will also be implemented (utilizing the same method as referenced in the memorandum above) at the new installed discharge pipes for a distance of approximately 200 linear feet along the dike.

3. DEFLECTOR DIKE

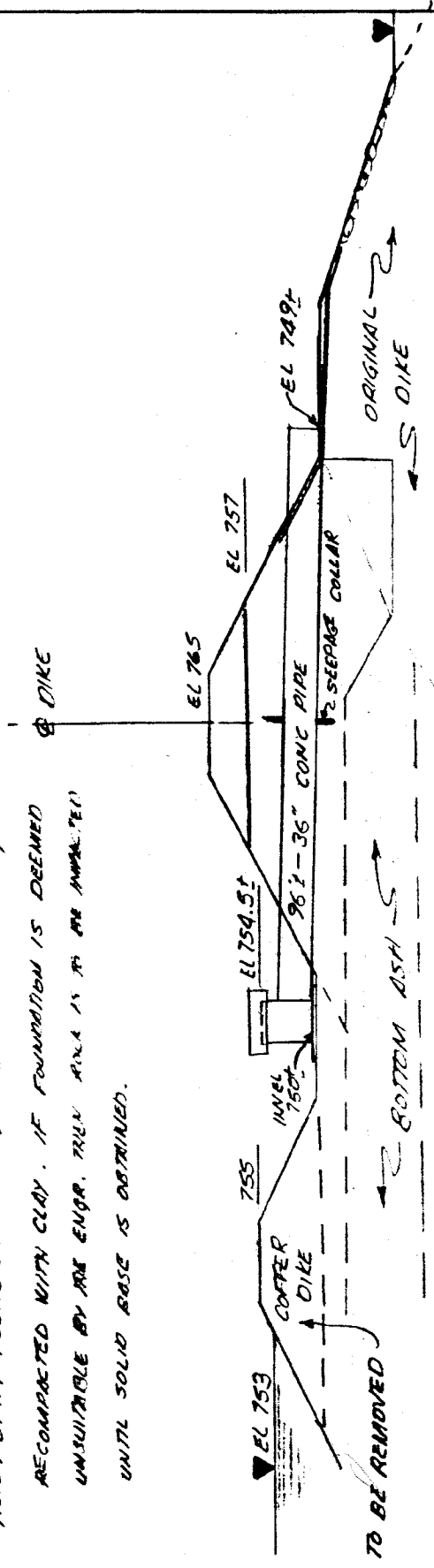
- A. A deflector dike will be constructed of heavy (bottom) ash within the stilling pool approximately 800 feet in length to elevation 758 +/-.



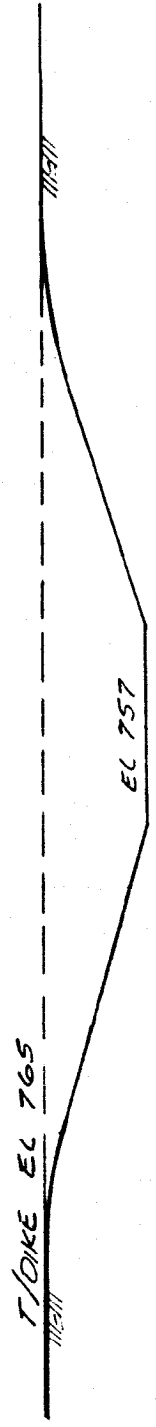
PLAN

TVA 11030 (WM-7-75)

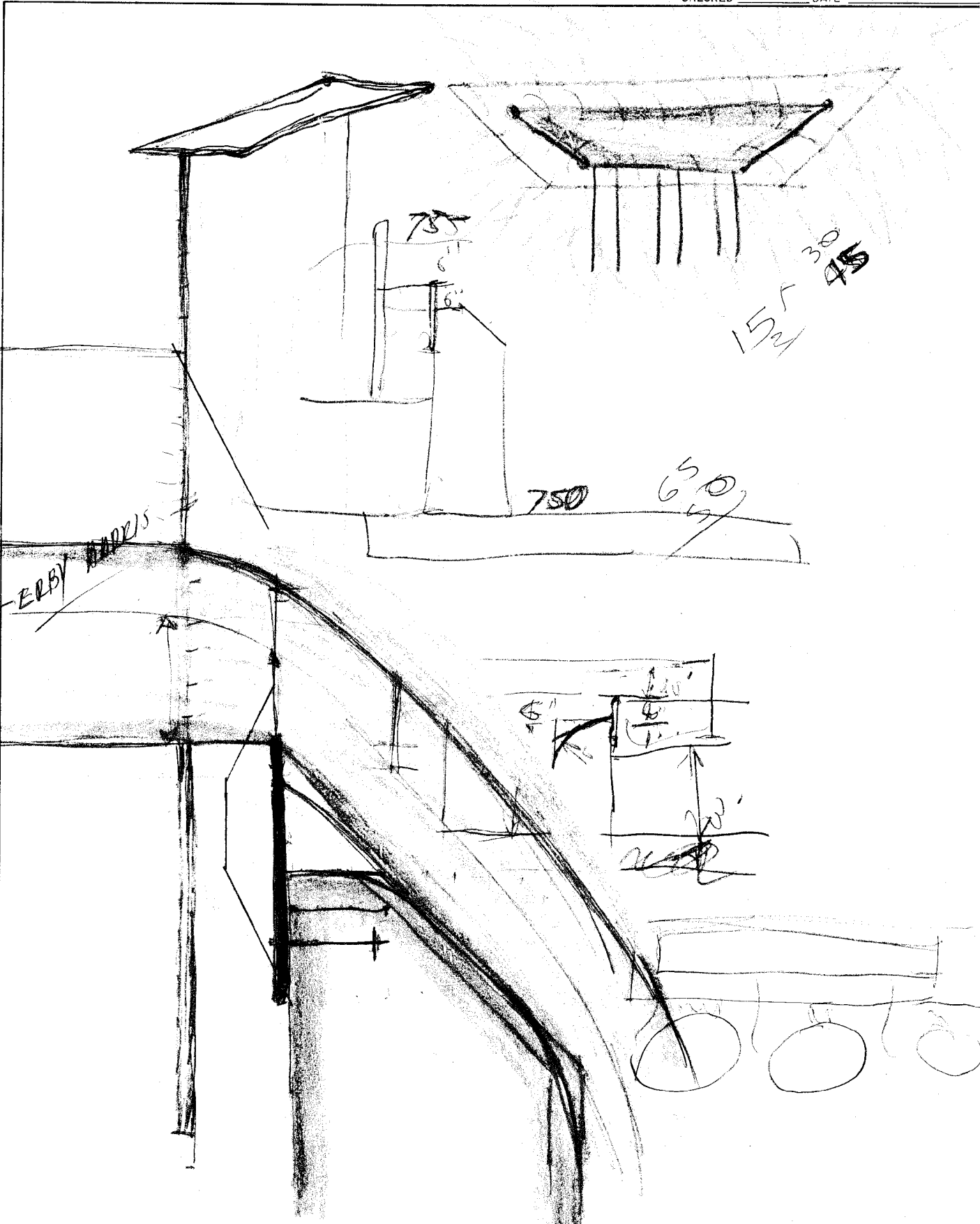
NOTE: SANDY FOUNDATION TO BE OVER EXCAVATED,
 RECOMPACTED WITH CLAY. IF FOUNDATION IS DEEMED
 UNSUITABLE BY THE ENGR. THEN AREA IS TO BE IMPROVED
 UNTIL SOLID BASE IS OBTAINED.



A-A



B-B



TVA 11030 (WM-7-75)

Kings Hill

SCOPE:

1.) SPILLWAY REGULATIONS

A) COLLECTION BOX

DESIGN & CONSTRUCT CONCRETE COLLECTION/SPRAY BOX WITH WEIR AND SKIMMER. CONSTRUCTION WILL REQUIRE PLACEMENT OF UNCLASSIFIED EARTH COFFER DIAL TO MIN EL 755 AND REMOVAL OF SOME DIAL TO EL 750. PUMPING CURTAINS CONSTRUCTION WILL BE REQUIRED AND THE INITIATING OF STONE MAY BE REQ'D IF AN UNSUITABLE FOUNDATION IS

EXISTING H₂O LEVEL TO EL?

ONE ~~REQUIRE~~ BY THE LANDLORD. LOWERING OF THE STILLING POOL ~~WILL BE DONE~~ BY REMOVING THE RISE OF THE EXISTING SPILLWAYS. AN ADDITIONAL SECTION WILL BE REQ'D ON SPILLS AT THE CONCLUSION OF CONSTRUCTION.

FROM EACH

B) DISCHARGE PIPES

EACH OF THE 5 EXISTING

THE EXISTING EXCLUSIVE PIPE WILL BE EXCAVATED APPROX. 8' (EL 757) BY PAN & TIE IN THIS LOCAL AREA, WITH STRUCTURAL EXCAV. CONTINUING BELOW THIS POINT FOR THE PIPE INSULATION (APPROX 7')

INSERT 1

THE PIPES WILL HAVE CONCRETE SEEPAGE COLLARS AND A CONCRETE DISCHARGE PAD.

THE BACKFILL OF THE EXISTING EXCLUSIVE PIPE WILL BE PLACED AND COMPACTED TO THE NORMAL STANDARD SET FORTH FOR ALL REINFORCED CONCRETE. THE EXCAVATED MATERIAL FROM THE EXCLUSIVE PIPE WILL BE USED AND SURFACED WITH CRUSHED STONE.

2.) DILE C (EXTERIOR SLOPE)

A) SEEPAGE REPAIRS AS NOTED IN MEMO B64 85 0416 004 WILL BE EFFECTED DURING THE PERIOD OF LOWERED STILLING POND. **(Z) WATER ELEVATION**

B) ~~PREVENTATIVE SEEPAGE REPAIRS WILL BE MADE AT THE NEW INSTALLED DISCHARGE PIPES FOR A DISTANCE OF 200'±.~~

(A) ~~PREVENTATIVE SEEPAGE REPAIRS WILL BE MADE AT THE NEW INSTALLED DISCHARGE PIPES FOR A DISTANCE OF 200'±.~~

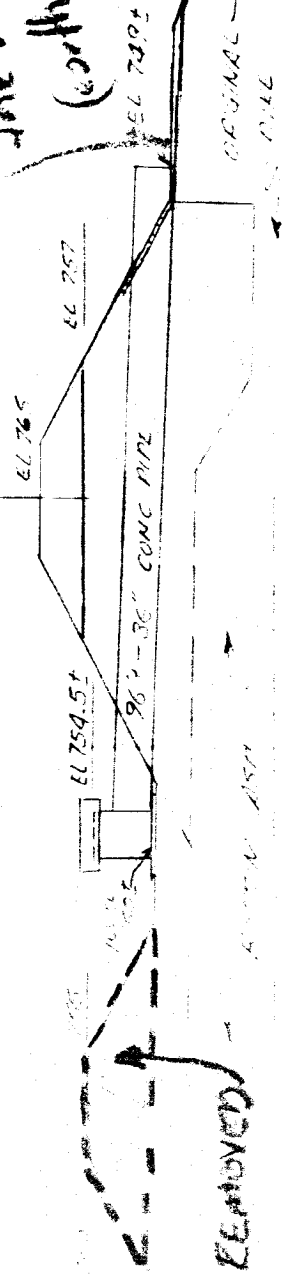
PREVENTATIVE SEEPAGE REPAIRS WILL BE MADE AT THE NEW INSTALLED DISCHARGE PIPES FOR A DISTANCE OF 200'±.

TVA 111030 (MAY 7-75)

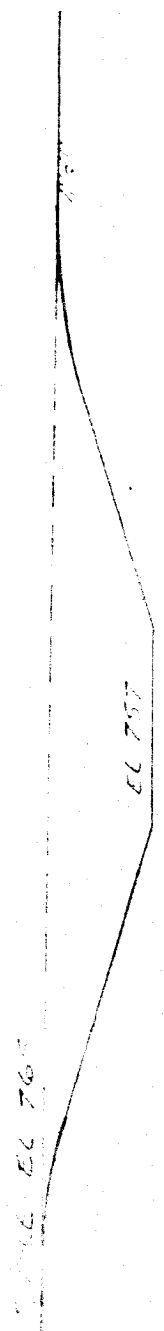
we are going to need
 some thing to confine
 the water. (wall?)
 (orth dike, riprap?)

PILE

TO BE REMOVED -

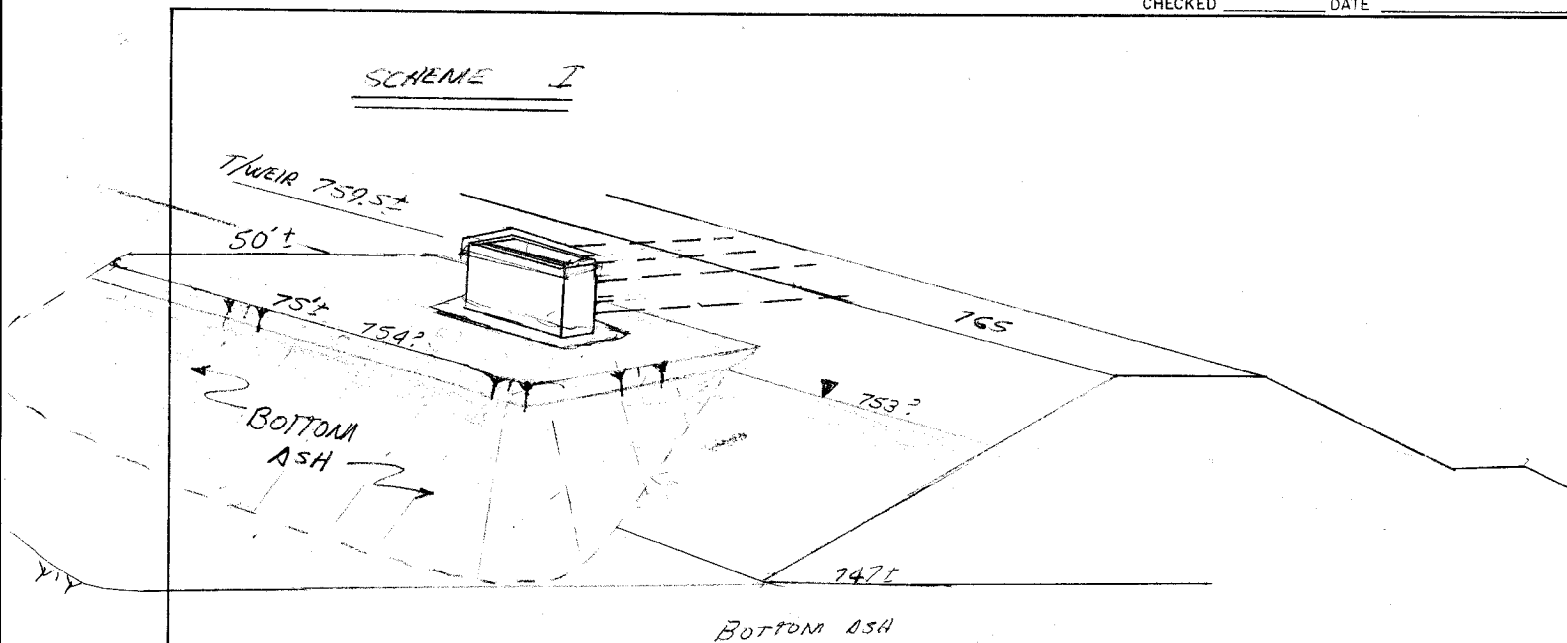


A-A



NOTE: NUMBER OF PILING PILES
 HAVE NOT BEEN DETERMINED
 AT THIS TIME 5-17-96

B-B

SCHEME IEXISTING.

SPWY EL = 746 + 6 (WITHOUT WEIR)

$$\nabla = 752 + 1' = 753 \pm$$

PROPOSED

$$754 + 5(\text{BOX}) + 0.5(\text{WEIR})$$

$$= \text{EL } 759.5$$

USING 0.5' FLOW (52 cfs) OVER WEIR = NORMAL POOL EL 760.0 ±

A.) THIS CONDITION IS THE ABSOLUTE BEST WE COULD HOPE FOR -

1. ASSUMING WE CAN DROP THE ∇ TO EL 753

B.) IN THE EVENT THE ∇ CANNOT BE DRAWN DOWN TO MEET THIS CONDITION

OR PLANT CANNOT ACCEPT OPERATING OF EL 760. SEE NEXT PAGE.

SECTION ESTIMATE SUMMARY SHEET

*Kingston steam plant -
Ash pond discharge relocation.*

Date 3-26-86

DCR/ECN No. _____

Acct. No. _____

Project Code _____

Section Supervisor R. W. Burnett

Branch or Project _____

Cost Estimate Request No. _____

WBS Item No. _____

Drawings, Bills of Material, etc.
Engineering

300

MH

Procurement Request (Attach bills of material, form TVA 5198.)

MH

Squadcheck Review and Coordination
TVA Drawings/Data
Vendor Drawings/Data

20

MH

MH

MH

Lead Engineer (Include SC-4 and M-5 review time)

MH

Procurement Activity: Contract Administration
Requisition
Award

MH

MH

MH

Source inspection hours

ON SITE MH

MH

Hours required to make estimate

DURING CONST.

MH

Clerk/Secretarial hours

NOT INCL.

MH

Analysis: Type _____

(I SUGGEST 1MO. MIN)

MH

MH

00N

Constructibility Walkdown

MH

Total Drafting Hours

200

MH

Other:

M.H. Miller (Conc. Box + Weir Design 120, Drafting 160)

280

MH

MH

Computer Costs

Contracts for Engineering _____

Travel Costs

Other

\$
\$
\$
\$

SCOPE OF WORK

Design Duration _____

Procurement Duration _____

Contracts for Engineering Duration _____

[SECTION ESTIMATE SUMMARY SHEET

*Kingsford steam plant -
Ash pond discharge relocation*

Date 3-26-86

DCR/ECN No. _____ Acct. No. _____ Project Code _____

Section Supervisor R.W. Burnett Branch or Project _____

Cost Estimate Request No. _____ WBS Item No. _____

Drawings, Bills of Material, etc. Engineering	<u>300</u>	
Procurement Request (Attach bills of material, form TVA 5198.)	_____	
Squadcheck Review and Coordination TVA Drawings/Data	<u>20</u>	
Vendor Drawings/Data	_____	
Lead Engineer (Include SC-4 and M-5 review time)	_____	
Procurement Activity: Contract Administration	_____	
Requisition	_____	
Award	_____	
Source inspection hours	_____	
Hours required to make estimate	_____	
Clerk/Secretarial hours	_____	
Analysis: Type <u>GGEG FROM CAP/ TACKSTEIN 4-7-86</u>	<u>80</u>	
<u>CONSTR COORD & INSPECTION</u>	<u>250</u>	
Constructibility Walkdown	_____	
Total Drafting Hours	<u>200</u>	
Other: <u>M.H. Miller (Conc. Bot-Wall Design 120, Drafting 160)</u>	<u>280</u>	
<u>CIVIL P.E. REH</u>	<u>100</u>	
Computer Costs	\$ _____	
Contracts for Engineering	\$ _____	
Travel Costs	\$ _____	
Other	\$ _____	

SCOPE OF WORK

Design Duration _____ Procurement Duration _____
Contracts for Engineering Duration _____

PROJECT KINGSTON S.P.

ESTIMATE NO. _____

DESCRIPTION DISCH. RELOC.

SHEET No. 1 of 2

DATE 3-26-80

ACCOUNT NO. _____

APPROVED _____

PRICED BY _____

CHECKED BY JPHS

QUANTITIES BY DRG

Item	Description	Quantity	Unit	Rate	Material	Labor	Total Amounts
A	DISCHARGE PIPES RELOCATION						
1.	UNCLASSIFIED EARTH FILL (1.3 MI. ROUND TRIP)	5000	C.Y.				
2.	EXCAVATION (EARTH - PAN/OBBER)	4150	C.Y.				
3.	EXCAVATION (EARTH - DRAGLINE)	1800	C.Y.				
4.	CLASSIFIED FILL (3200 C.Y. BORROW, 1.3 MI RT.) (2000 C.Y. FROM EXCAV. OF DIKE)	5200	C.Y.				
5.	STRUCTURAL EXCAV	450	C.Y.				
6.	IMPACT ROCK (FOUNDATION)	225	C.Y.				
7.	CONC. BOX	14	C.Y.				
8.	CONC. SEEPAGE COLLARS (3)	8	C.Y.				
9.	CONC. TROUGH (130 S.Y. OF FINISH SURE)	21	C.Y.				
10.	SKINNER & WEIR	1000	L.B.				
11.	CRUSHED STONE (SURFACING)	95	TONS				
12.	FILTER STONE	190	TONS				
13.	RIPRAP (RIVER BANK DISCH. POINT)	45	C.Y.				
14.	PIPES (3'-90'-36" CLASS III 0° RING)	270	L.F.				
15.	SEEDING & MULCHING	2700	S.Y.				
16.	6" PERFORATED DRAIN - ADS TYPE	250	L.F.				

TVA 5198 (3-4-57)

DIVISION OF DESIGN COST ESTIMATE

FED
BRA. 4
SECTION

PROJECT KINGSTON S.P.
DESCRIPTION DISCH. RELOC.
ESTIMATE NO.
SHEET No. 2 of 2
DATE 3-26-86

ACCOUNT NO. _____
QUANTITIES BY arf CHECKED BY J.P.H.S PRICED BY _____ APPROVED _____

Item	Description	Quantity	Unit	Rate	Material	Labor	Total Amounts
B	DEFLECTOR DIKE (BOTTOM ASH)	35,000	C.Y.				
C	DIKE "C" SEEPAGE REPAIR (PER APRIL 1985)						
1.	UNGRAVELLED EXCAV (EARTH & ASH)	1,500	C.Y.				
2.	EARTH FILL (BORROW - 1.3 MI. R.T.)	7000	C.Y.				
3.	STR. EXCAV	825	C.Y.				
4.	6" PERFORATED DRAIN - ADS TYPE	500	L.F.				
5.	FILTER STONE	850	T				
6.	CRUSHED STONE	350	T				
7.	SEEDING & MULCHING	2,500	S.Y.				

PROJECT KINGSTON S.P.

DESCRIPTION DISECH RELOC.

ACCOUNT NO. _____

QUANTITIES BY DRE CHECKED BY JPHS

PRICED BY _____ APPROVED _____

ESTIMATE NO. _____

SHEET No. / of 2

DATE 3-26-86

Item	Description	Quantity	Unit	Rate	Material	Labor	Total Amounts
A	DISCHARGE PIPES RELOCATION						
1.	UNCLASSIFIED EARTH FILL (1.3 MI. ROUND TRIP)	5000	C.Y.				
2.	EXCAVATION (EARTH) PAN/DOZER)	4150	C.Y.				
3.	EXCAVATION (EARTH - DRAGLINE)	1800	C.Y.				
4.	CLASSIFIED FILL (3200 C.Y. BORROW, 1.3 MI. R.T. (2000 C.Y. FROM EXCAV. OF DIKE)	5200	C.Y.				
5.	STRUCTURAL EXCAV	450	C.Y.				
6.	IMPACT ROCK (FOUNDATION)	225	C.Y.				
7.	CONC. BOX	14	C.Y.				
8.	CONC. SEEPAGE COLLARS (3)	8	C.Y.				
9.	CONC. TROUGH (130 S.Y. OF FINISH SURE)	21	C.Y.				
10.	SKINNER & WEIR	1000	L.B.				
11.	CRUSHED STONE (SURFACING)	95	TONS				
12.	FILTER STONE	190	TONS				
13.	RIPRAP (RIVER BANK DISECH. POINT)	45	C.Y.				
14.	PIPES (3-90'-36" CLASS III 6" RING)	870	L.F.				
15.	SEEDING & MULCHING	2700	S.Y.				
16.	6" PERFORMED DRAIN - ADS TYPE	250	L.F.				

DIVISION OF DESIGN COST ESTIMATE

BRANCH

SECTION

ESTIMATE NO.

SHEET No. 2 of 2

DATE 3-26-86

PROJECT KINGSTON S.P.

DESCRIPTION DISCH. RELOC.

ACCOUNT NO.

QUANTITIES BY oef CHECKED BY J.P.H.S PRICED BY APPROVED

Item	Description	Quantity	Unit	Rate	Material	Labor	Total Amounts
B	DEFLECTOR DIKE (BOTTOM ASH)	35,000	C.Y.				
C	DIKE "C" SEEPAGE REPAIR (PER APRIL 1985)						
1.	UNCASTLED EXCAV (EARTH & ASH)	1500	C.Y.				
2.	EARTH FILL (BORROW - 1.3 MI. A.T.)	7000	C.Y.				
3.	STR. EXCAV	825	C.Y.				
4.	6" PERFORATED DRAIN - ADS TYPE	500	L.F.				
5.	FILTER STONE	850	T				
6.	CRUSHED STONE	350	T				
7.	SEEDING & MULCHING	2500	S.Y.				

KINGSTON - DISCH. RELOC.

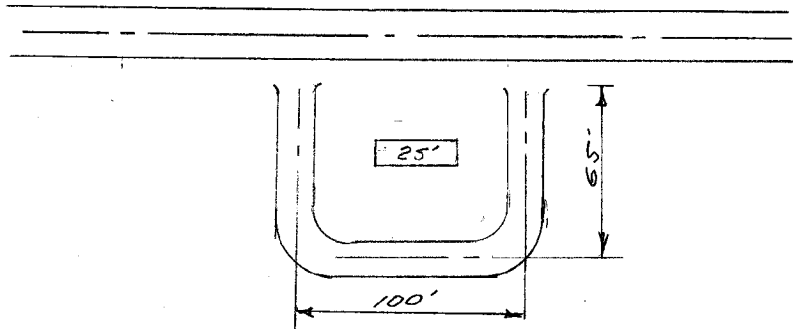
SUMMARY OF QUANTITIES

COMPUTED _____ DATE _____

CHECKED _____ DATE _____

COFFER DIKE

UNCLASSIFIED EARTH FILL



X-SEC WORK SH:

$$= 410 \text{ s.f.} \times \frac{[(65 \times 2) + 100]}{27 \times 0.7} \approx 5000 \text{ c.y.}$$

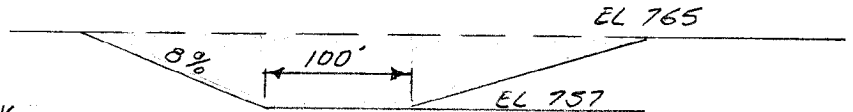
EXCAV TO EL 750±

$$210 \text{ s.f.} \times \frac{230'}{27} \approx 1800 \text{ c.y.}$$

EXTERIOR DIKE

EXCAV.

$$200' \times \frac{288}{27} \times \frac{2150}{27} \approx 2000 \text{ c.y.}$$



CLASSIFIED FILL 2700

$$2000 \text{ c.y.} \times \frac{2700}{0.8} = 2500 \text{ c.y.}$$

CRUSHED STONE

$$350 \times \frac{4'}{12} \times 16' \times 100 \text{ s.f.} \times \frac{\text{TON}}{2000 \text{ \#}} \approx 95 \text{ TONS}$$

SEEDING & MULCHING

$$300' \times \frac{60'}{9} = 1500 \text{ s.y.}$$

KINGSTON - DISCH. PAVOC

COMPUTED _____ DATE _____

CHECKED MB DATE 3-25-86SPILLWAY

✓ CONC. BOX. = 14 c.y. (SEE ATTACH. SH 4)

✓ SKIMMER & WEIR = 1000 #

✓ ROCK FOUNDATION: $50' \times 20' \times \frac{6'}{27} = 225 \text{ c.y.}$ ✓ PIPES: STR. EXCAV = $20' \times 60' \times \frac{6'}{27} = 300 \text{ c.y.}$ 266✓ PIPES: $90 \times 3 = 270 \text{ L.F.}$ 27CONC. TROUGH:
(2%)

$$Q = \frac{K' b^{8/3} S^{1/2}}{n}$$

$$K' = \frac{(75)(0.012)}{(20)^{2.667} (0.02)^{0.5}} = 0.0022$$

$$\frac{D}{b} = 0.02$$

$$\therefore D = (0.02)(20) = 0.4'$$

$$(25\%) \quad K' = \frac{(75)(0.012)}{(20)^{2.667} (0.25)^{0.5}} = 0.0006$$

$$\frac{D}{b} = 0.01$$

$$D = (0.01)(20) = 0.2'$$

$$V = \frac{1.49}{0.012} (R)^{2/3} (S)^{1/2}$$

$$R = \frac{A}{W} = \frac{4.08}{20.9} \quad S = 0.25$$

$$V = 21 \text{ f.s. (NEED ENERGY DISSIPATOR.)}$$

CONC.

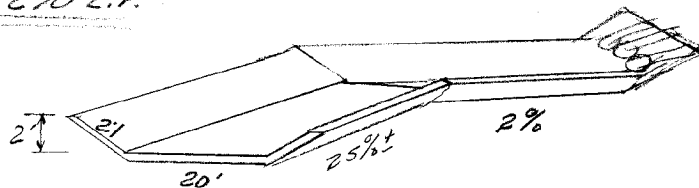
$$40' \times 29' \times \frac{0.5'}{27} = 21 \text{ c.y. OR } 130 \text{ S.Y. (FINISH)}$$

✓ CONC. SEEPAGE COLLARS

$$3 \left(\frac{9 \times 9 \times 1 - \pi D^2}{4} \right) \frac{1}{27} \approx 8 \text{ c.y.}$$

✓ FILTER BLANKET

$$20 \times 30 \times \frac{6''}{12} \times \frac{100}{2000} = 15 \text{ TONS}$$



KINGSTON - DISCH RECON

COMPUTED _____ DATE _____

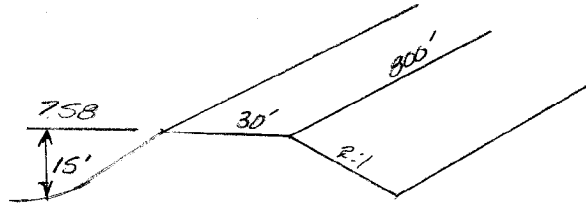
CHECKED _____ DATE _____

RIPRAP

$20' \times 30' \times \frac{2}{27} = 45 \text{ C.Y.}$

DEFLECTOR DIKE

60x15x300,
0.8 (0.54 SETTLE) x 27
= 35,000 C.Y.



DIKE G" SEEPAGE REPAIRS

PER MEMO B64 - 85 0416 004

DISCHARGE AREA

- EXCAV : 1500 C.Y.
- FILL (BORROW) = 2000 C.Y.
- SEEDING & MULCHING = 3500 S.Y.
- STR EXCAV = 225 C.Y.
- CR. STONE = 350 T
- G" DRAIN = 500 L.F.
- FILTER STONE = 350 T

- EXCAV: $270' \times 200/27 = 2000 \text{ C.Y.}$
- FILL $\frac{2000}{0.8} = 2500 \text{ C.Y.}$
- SEEDING : $= 200' \times 50'/9 \approx 1200 \text{ S.Y.}$
- STR. EXCAV : $= 7 \times 2 \times 250/27 = 150 \text{ C.Y. } 130$
- FILTER STONE $= 7 \times 2 \times 100' \times 250 = 175 \text{ TONS}$
- G" DRAIN = 250 L.F.

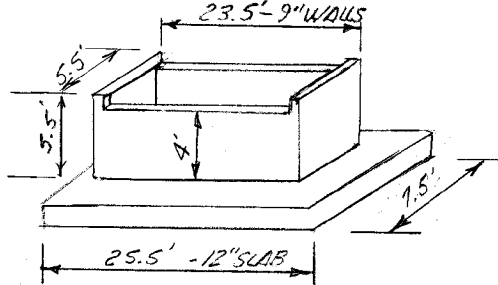
NOTE: I ASSUME THE PLANT HAS THE 5 - 2' RISERS REQ'D.

KINGSTON - DISCH RELOC.

COMPUTED _____ DATE _____

CHECKED *MLR* DATE 4-25-86

CONC. BOX BUOYANT FORCES



UPLIFT @ H = 4' END OF CONST = $62.4 \times 4 = 250 \frac{\#}{s.f}$

WT. BOX = $\left[2(22)(4) + 2(5.5)(5.5) \right] \frac{2}{2} + (25.5)(7.5)(1)$

= $368 \text{ c.f.} \times 150 \frac{\#}{c.f.}$

≈ $55,295 \#$

SLAB UPLIFT: $55,295 \frac{\#}{25.5 \times 7.5 \text{ s.f.}} = 289 > 250 \frac{\#}{s.f.}$

VOLUME OF WATER DISPLACED: $(25.5)(7.5)(1) + (23.5)(9.5)(5.5)$

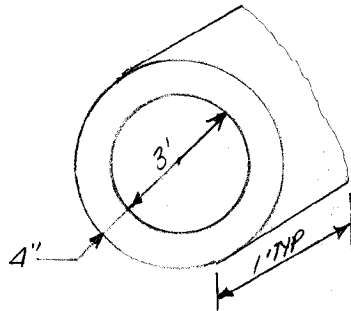
TO EL 754.5 (T/WEIR) = $773 \text{ c.f.} \times 62.4 \frac{\#}{c.f.}$

= $48,230 \#$

∴ $55,295 \# > 48,230 \#$

(NOTE: DOES NOT CONSIDER WT OF STEEL @ $490 \frac{\#}{c.f.}$
(I.E. WEIR, REINF, SKIMMER)

CHECK PIPE BUOYANCY:



$C_1 = \pi 3$

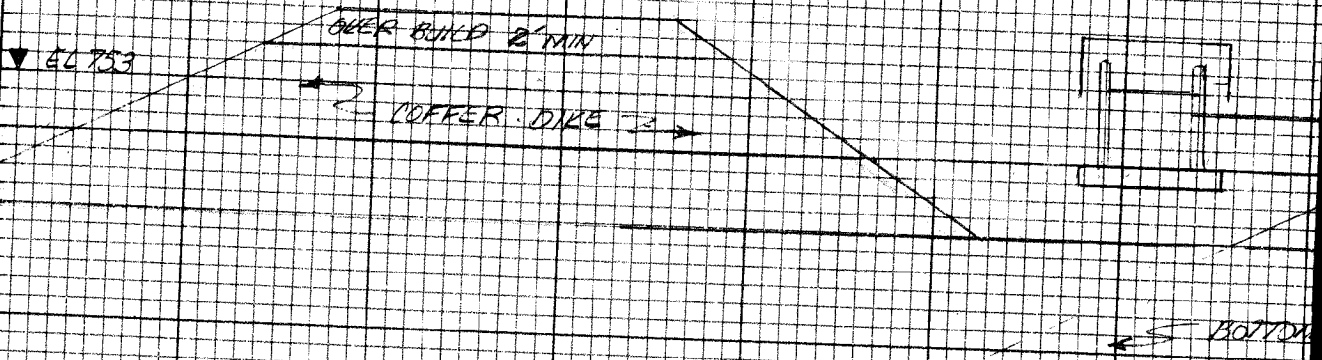
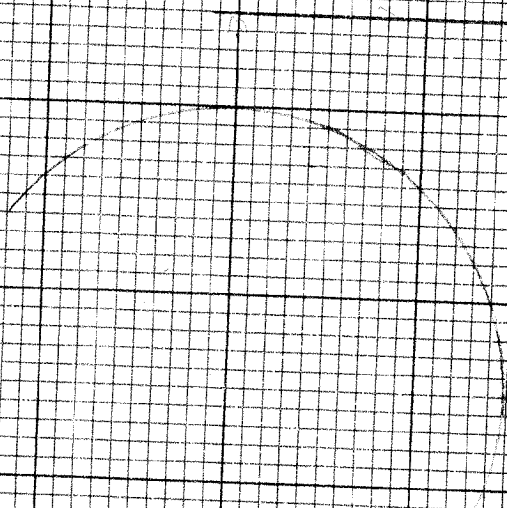
$C_2 = \pi 3.667$

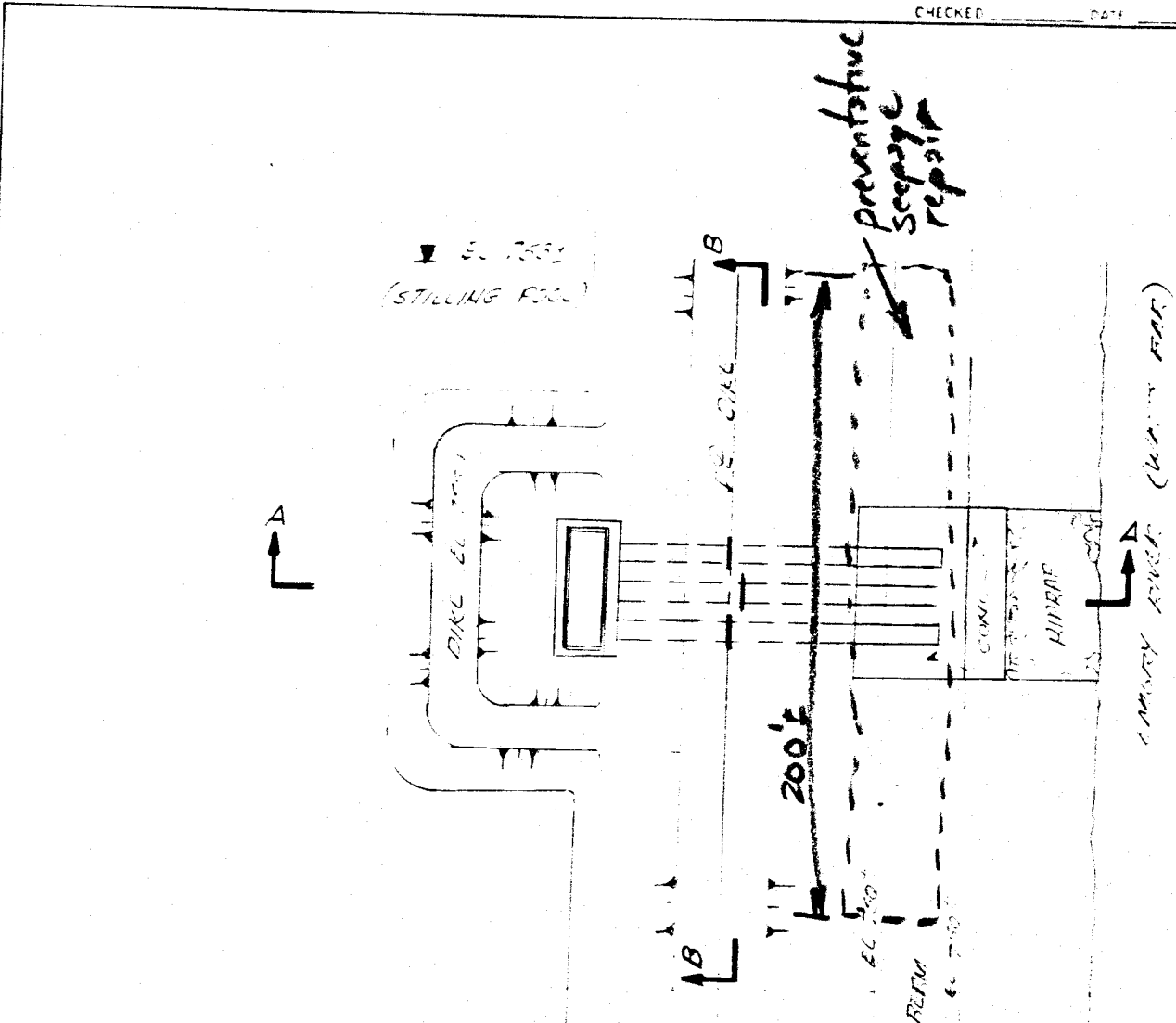
WT = $\frac{9.42' + 11.5'(4)}{2} \times 150 \frac{\#}{c.f.} = 523 \frac{\#}{l'}$

VOL. OF WATER DISPLACED:

$\pi (3.667)(1) (62.4) \frac{\#}{c.f.} = 719 \frac{\#}{l'}$

$719 \frac{\#}{l'} < 523 \frac{\#}{l'}$





PLAN

FOR	NAME	DRG/MHM	DATE	MAR 5, 1985
	ADDRESS	WZD199	<input type="checkbox"/> Chatta <input type="checkbox"/> M. S.	<input type="checkbox"/> Knox <input type="checkbox"/> Nor.
Fold here for return				
OM	NAME	JMH/CDT	EXTENSION	
	ADDRESS		<input type="checkbox"/> Chatta <input type="checkbox"/> M. S.	<input type="checkbox"/> Knox <input type="checkbox"/> Nor.

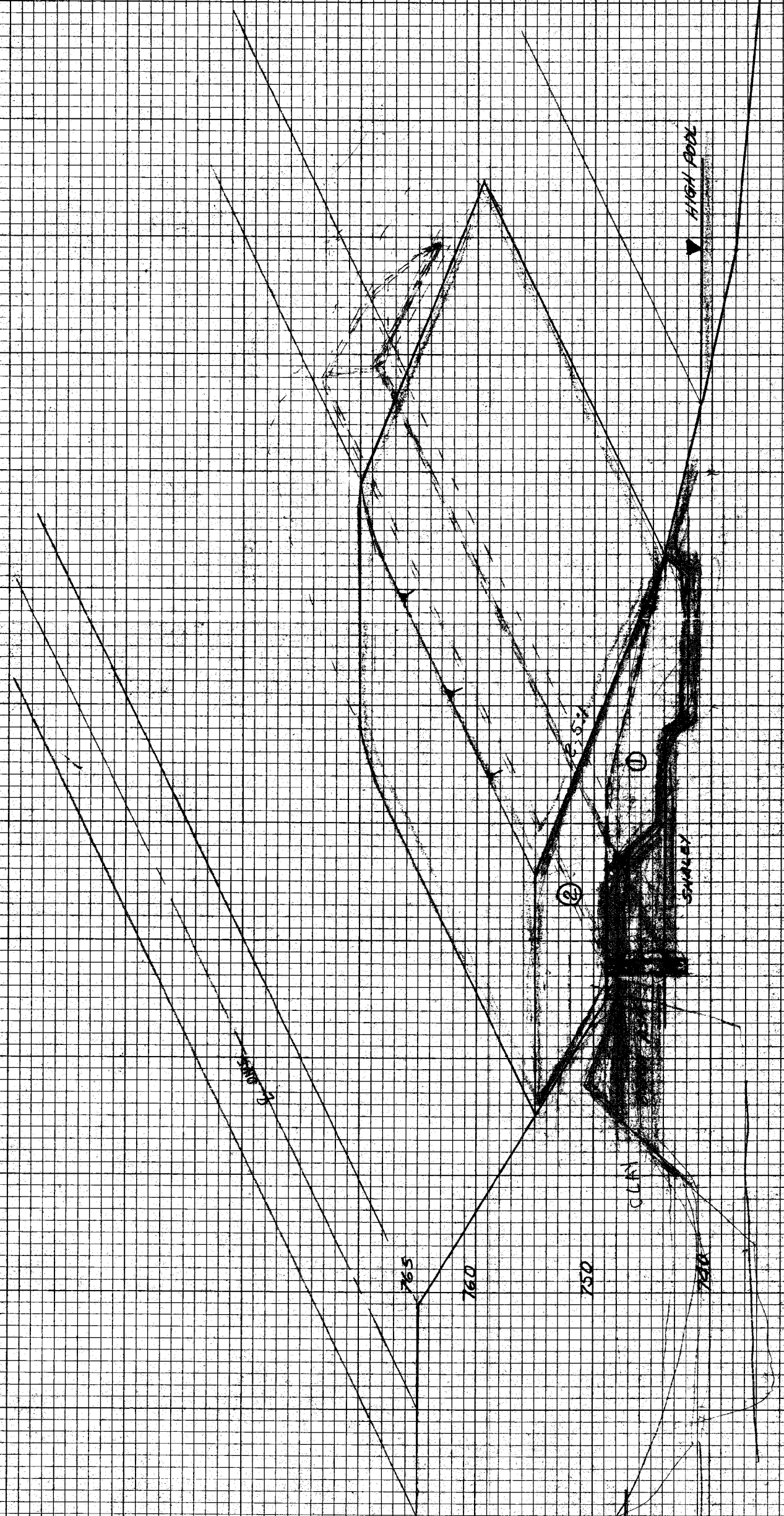
KINGSTON DIKE "C"

COMMENTS ON PROPOSED FIX

①. MAKE SURE THE TRENCH FOR THE 6" ϕ PERF. PIPE IS NOT LEFT OPEN FOR MORE THAN $\frac{1}{2}$ HOUR. THE MOVEMENT OF THE WATER MAY CAUSE A COLLAPSE AND UNKNOWN STABILITY.

②. AT STAGE ④ OF THE FIX, THE COMPACTION OF THE SOIL SHOULD BE BY SOIL RAMMER OR BACKFILL TAMPER NOT BY BACKHOE.

We agree in principle with your Concept. Pls let us review your final plans + notes. cmt



EXCAV @ 100' = 2.75 cu/100' ✓
 FILL @ + @ = 2.20' = 12.50 cu/100' (13.75 cu/100')
 TRENCH: 7' x 2' x 100' = 140 cu/100' (EXCAV) ✓
 CH. STN: 7' x 2' x 100' x 100' = 20 cu/100' BOTTOM/100' ✓
 SEEDING GRASS = X 5.5 ✓
 5.5' x length dike