Re: 98-07684

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IDWR/North

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE
PHASE 1 BUILDING AND TREATMENT EQUIPMENT

BONNERS FERRY, IDAHO
FUNDED BY BONNEVILLE POWER ADMINISTRATION
1998

ENGINEER

J-U-B Engineers Surveyors Planners

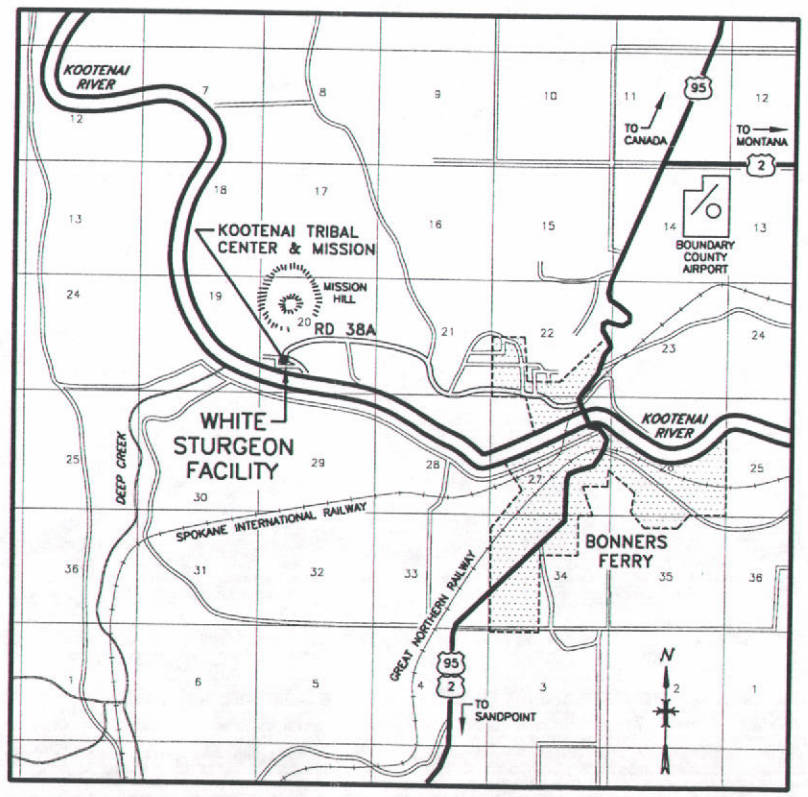
J-U-B ENGINEERS, INC.

1250 West Ironwood Drive, Suite 220 • Coeur d'Alene, Idaho 83814
Telephone (208) 667-1574
Fax (208) 667-2176

OWNER

KOOTENAI TRIBE
P.O. Box 1269
Bonners Ferry, Idaho 83805
Telephone (208) 267-3620
Fax (208) 267-1131

CHAIRPERSON	Velma Bahe
VICE CHAIRPERSON	Eileen Wheaton
SECRETARY	Dianne David
TREASURER	Raymond Abraham
COUNCIL MEMBER	Gary Aitken, Sr.
COUNCIL MEMBER	Mildred Aitken
COUNCIL MEMBER	Jennifer Bahe
FISHERIES BIOLOGIST/ADMINISTRATOR	Sue Ireland
HATCHERY MANAGER	Jack Siple



VICINITY MAP

APPROVAL

BY: _____

DATE: _____

INDEX OF SHEETS

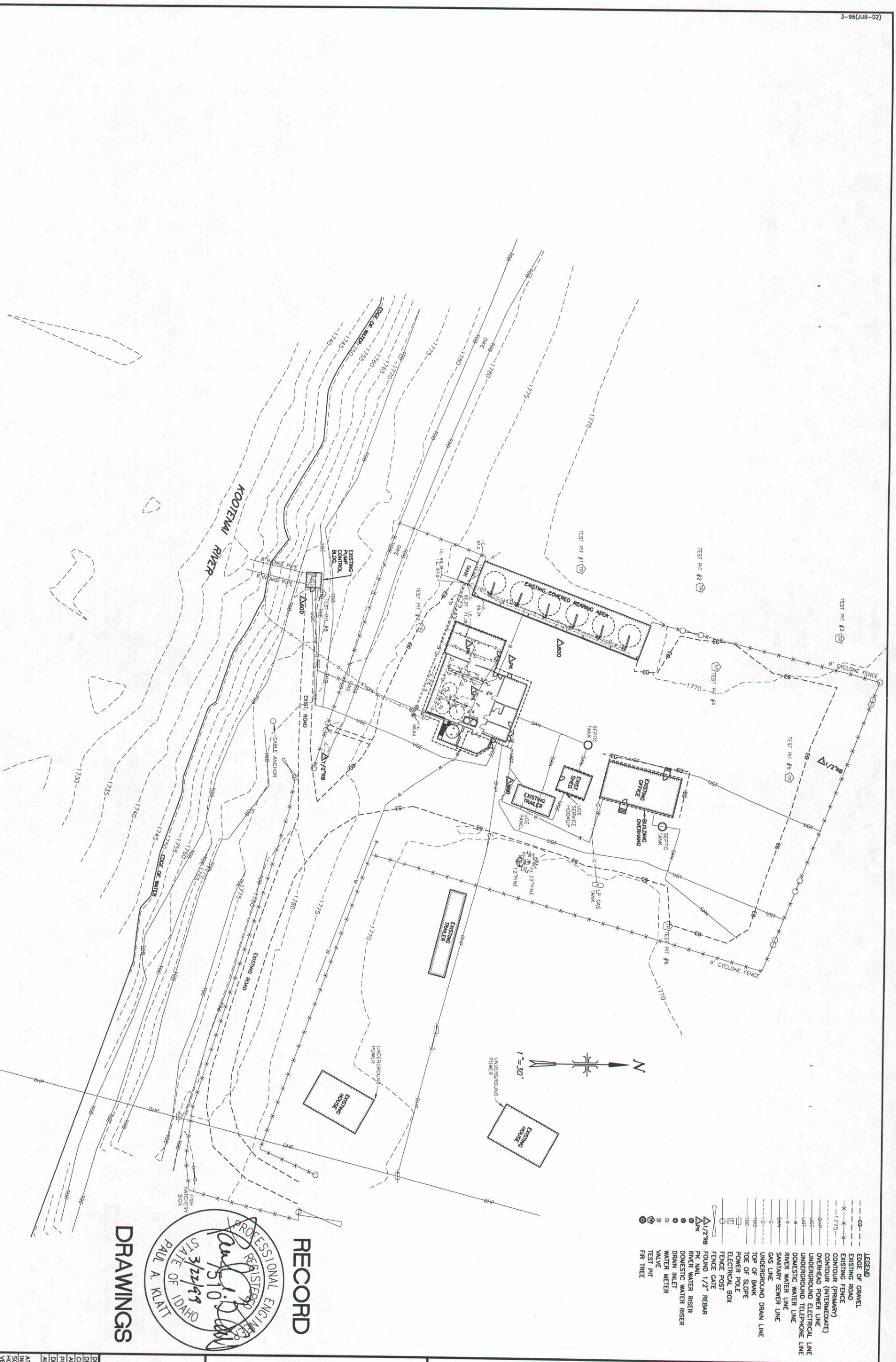
RC1	COVER SHEET
RC2	EXISTING SITE PLAN
RC3	NEW SITE PLAN
RC3A	RIVER INTAKE PLAN AND SECTIONS
RC4	PUMP STATION PLAN AND SECTIONS
RC5	PUMP STATION DETAILS
RC6	TREATMENT BUILDING MECHANICAL PLAN
RC7	TREATMENT BUILDING MECHANICAL SECTIONS
RC8	TREATMENT BUILDING ELEVATIONS AND DETAILS
RC9	TREATMENT BUILDING FOUNDATION PLAN
RC10	STEEL BUILDING STRUCTURAL DETAILS AND NOTES
RC11	SHOP/STORAGE BUILDING ELEVATIONS
RC12	SHOP/STORAGE BUILDING FOUNDATION PLAN
RC13	EXISTING HATCHERY MODIFICATIONS
RC14	TYPICAL DETAILS
RP1	PROCESS AND INSTRUMENTATION DIAGRAM
RP2	PROCESS CONTROL DESCRIPTION
RM1	INCUBATION WATER TEMPERATURE CONTROL SCHEMATIC
RM2	BOILER MECHANICAL AND CONTROL SCHEMATIC
RE1	ELECTRICAL SITE PLAN
RE2	GENERATOR AND PANEL ROOM
RE3	TREATMENT BUILDING ELECTRICAL AND HVAC
RE4	PANEL BOARD SCHEDULE AND ONE-LINE DIAGRAMS

RECORD DRAWINGS

F:\PROJECTS\20329\dwgs\RECORD\20329COV-R.dwg Fri Feb 26 09:41:40 1999 TLR

F:\PROJECTS\20329\dwgs\RECORD\20329R-EXB.dwg Fri Feb 26 09:43:34 1999 TLR

3-96(JUB-02)



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KOOTENAI TRIBE OF IDAHO WHITE STURGEON HATCHERY

PHASE 1 IMPROVEMENTS EXISTING SITE PLAN

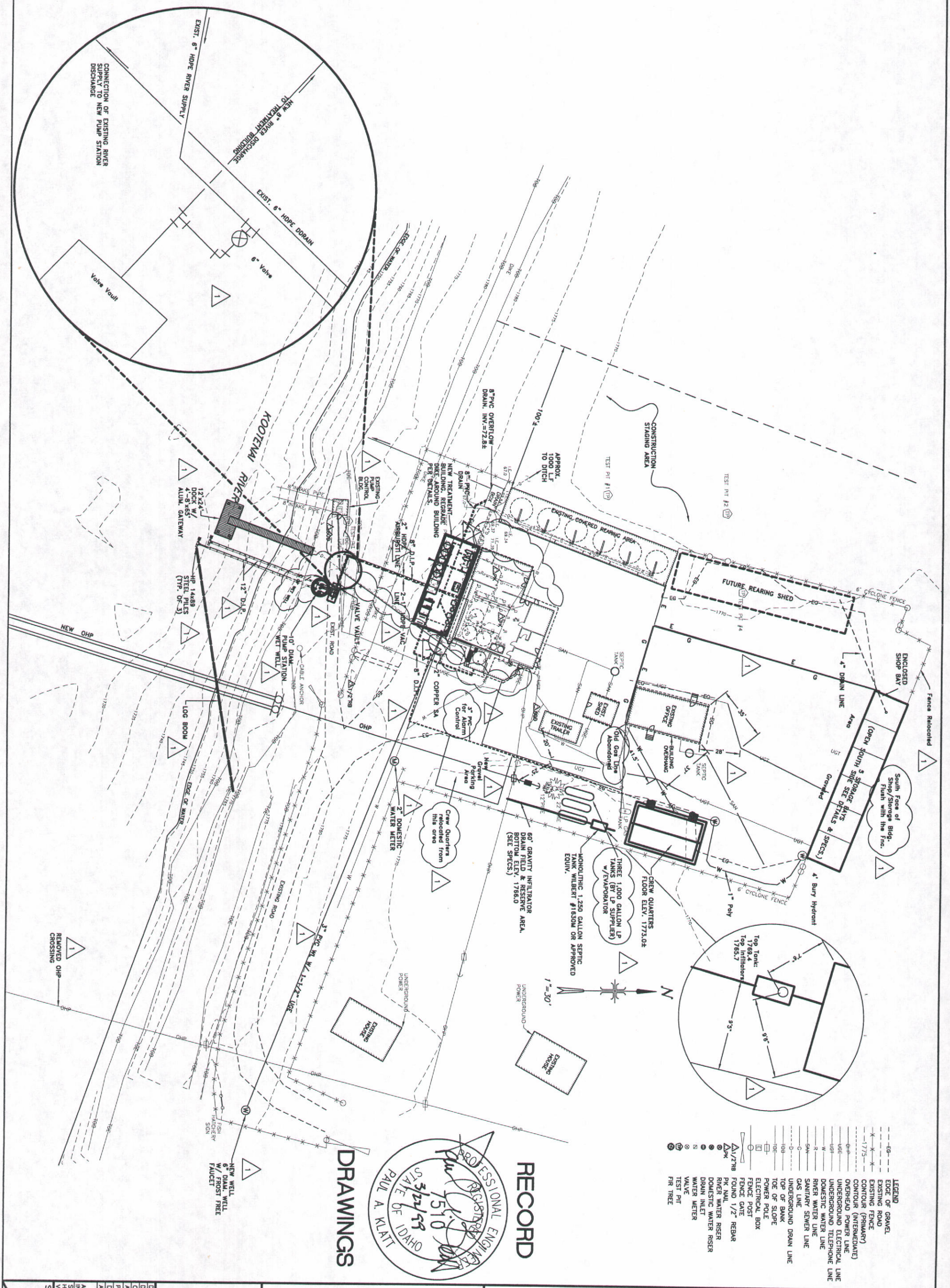
J-U-B ENGINEERS, Inc.
ENGINEERS • SURVEYORS • PLANNERS
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SUITE 220
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1574
FAX: 208-667-2176

DRAWN BY: TLR
DESIGN BY: PAK
CHECKED BY: PAK
ARCHIVE LOCALE:
PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=30
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: 1"=30'
VER SCALE: NONE

SHEET RC2 OF 22

F:\PROJECTS\20329\dwgs\RECORD\20329R-PB.dwg Fri Feb 26 10:26:44 1999 TLR

3-96(JUB-D2)



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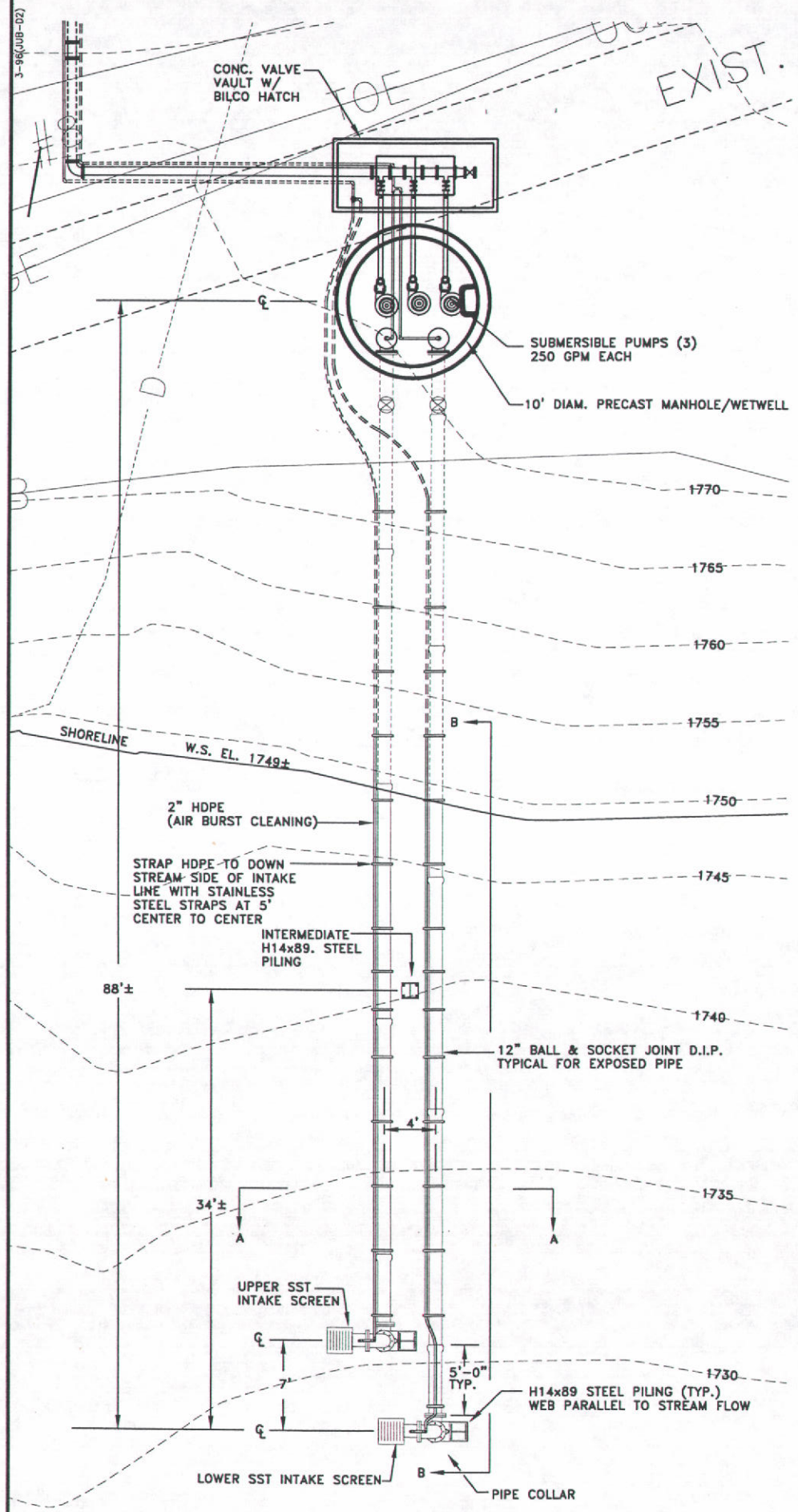
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CHECKED BY: PAK
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DRAWING NO.
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SCALE OF SHEET
HOR SCALE: 1"=30'
VER SCALE: NONE

SHEET RC3 OF 20

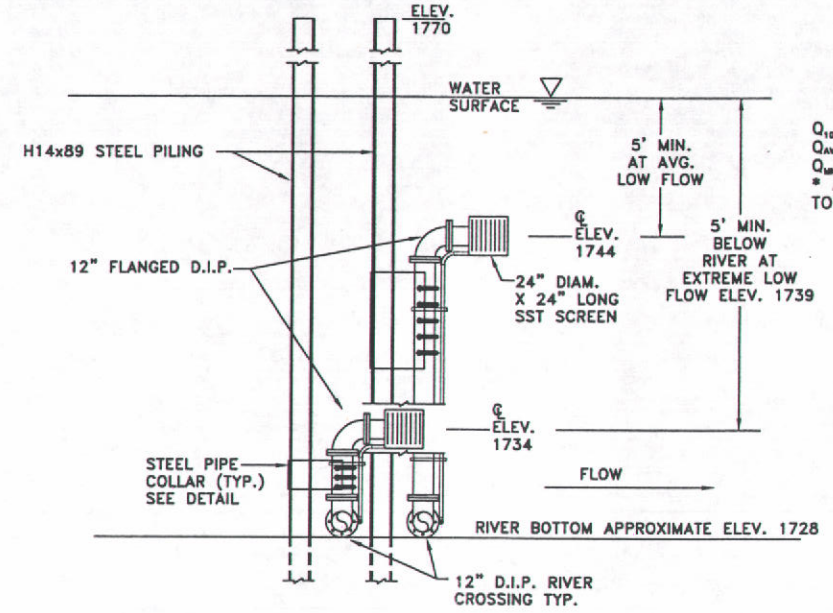
KOOTENAI TRIBE OF IDAHO WHITE STURGEON HATCHERY

NEW SITE PLAN

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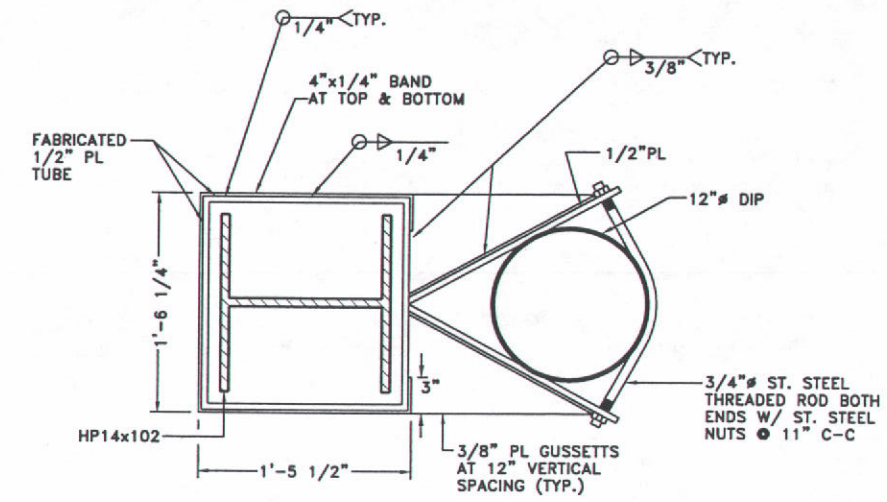


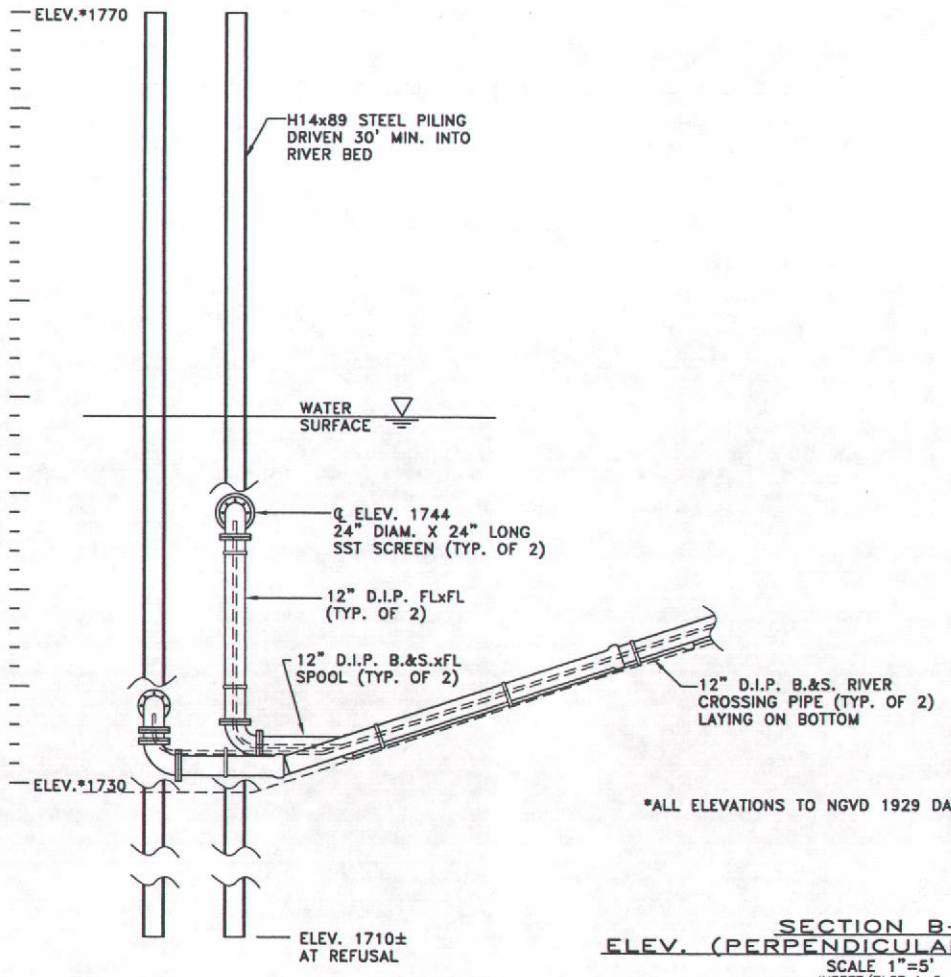
PUMP STATION PLAN VIEW
SCALE 1"=6'



Q_{100} ELEV. = 1768*
Q_{AVG} ELEV. = 1747±*
Q_{MIN} ELEV. = 1739*
* ALL ELEVATION TO NGVD 1929 DATUM

SECTION A–A
ELEV.(PARALLEL TO FLOW & SHORE)
SCALE 1"=5'
INSERT/PLOT 1=5

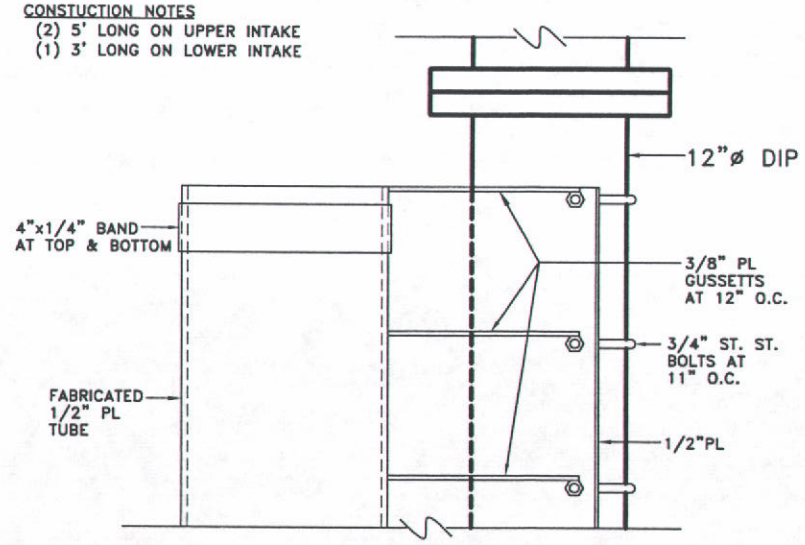




*ALL ELEVATIONS TO NGVD 1929 DATUM

SECTION B–B
ELEV. (PERPENDICULAR TO SHORE)
SCALE 1"=5'
INSERT/PLOT 1=5
ACAD: WELL-SECBBA.DWG

CONSTUCTION NOTES
(2) 5' LONG ON UPPER INTAKE
(1) 3' LONG ON LOWER INTAKE



VERTICAL INTAKE PIPE COLLAR
SCALE 1-1/2"=1'-0"
INSERT/PLOT 1=8
ACAD: COLLAR.DWG

RECORD

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DRAWINGS

J-96(JUB-02)

F:\PROJECTS\20329\dwgs\RECORD\20329DET1R.dwg Fri Feb 26 10:03:04 1999 TLR

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

RIVER INTAKE PLAN AND SECTIONS

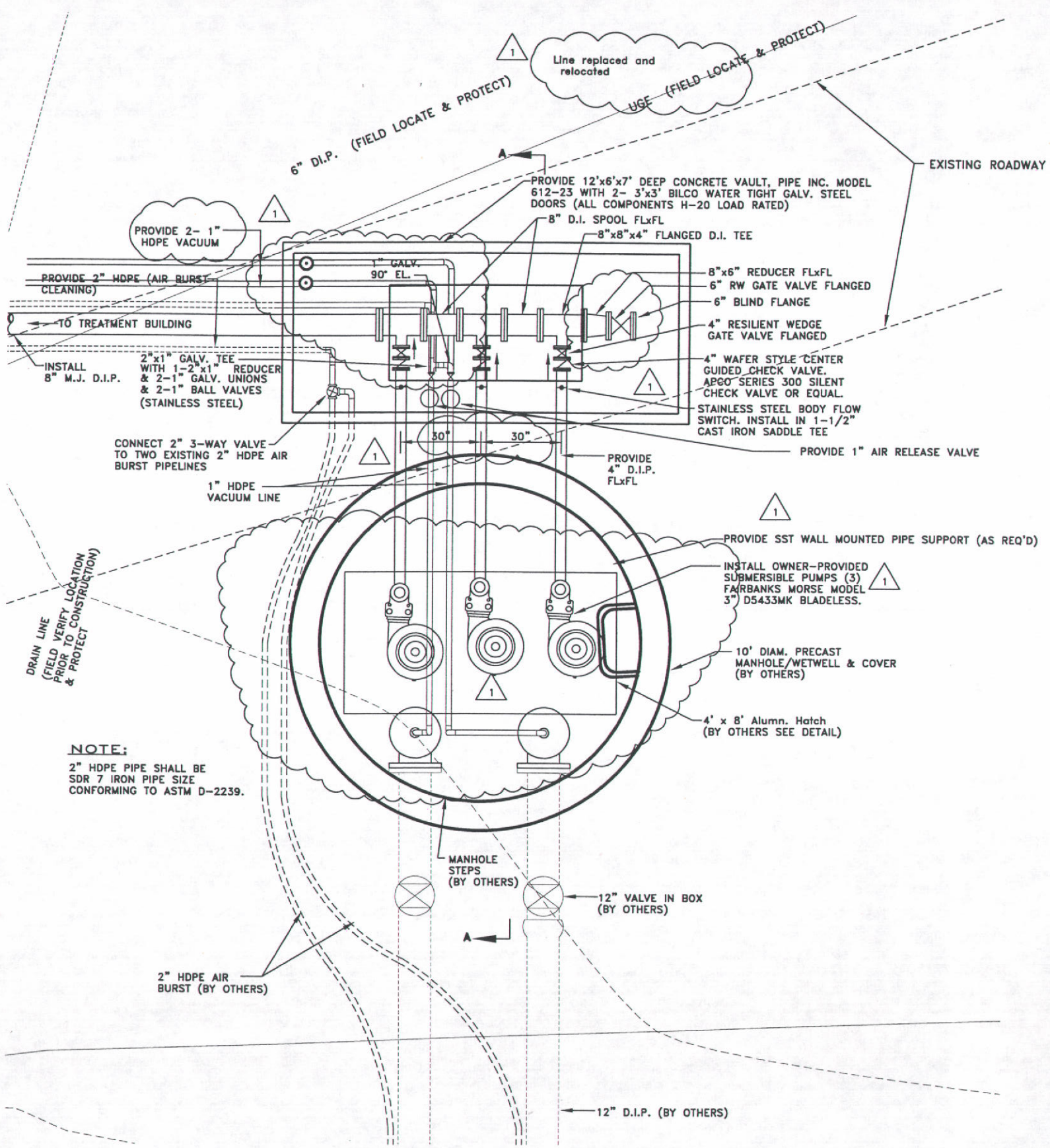
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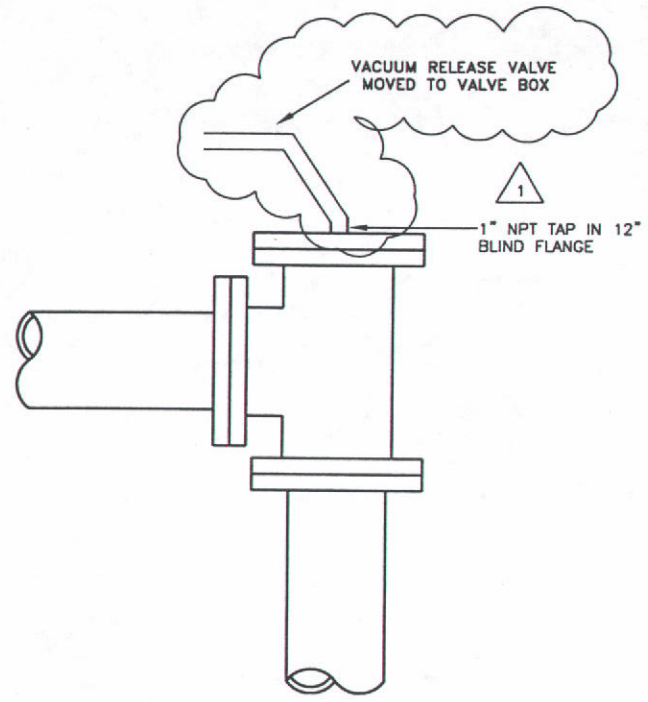
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CHECKED BY: PAK/DE
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PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=1
ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RC3A OF 22



NOTE:
2" HDPE PIPE SHALL BE SDR 7 IRON PIPE SIZE CONFORMING TO ASTM D-2239.

PLAN VIEW-PUMP STATION/WET WELL
SCALE 1/2"=1'-0"



AIR VALVE DETAIL
NOT TO SCALE
INSERT/PLOT 1=1
ACAD: AIRVALVE.DWG

RECORD

DRAWINGS

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

PUMP STATION PLAN AND SECTIONS

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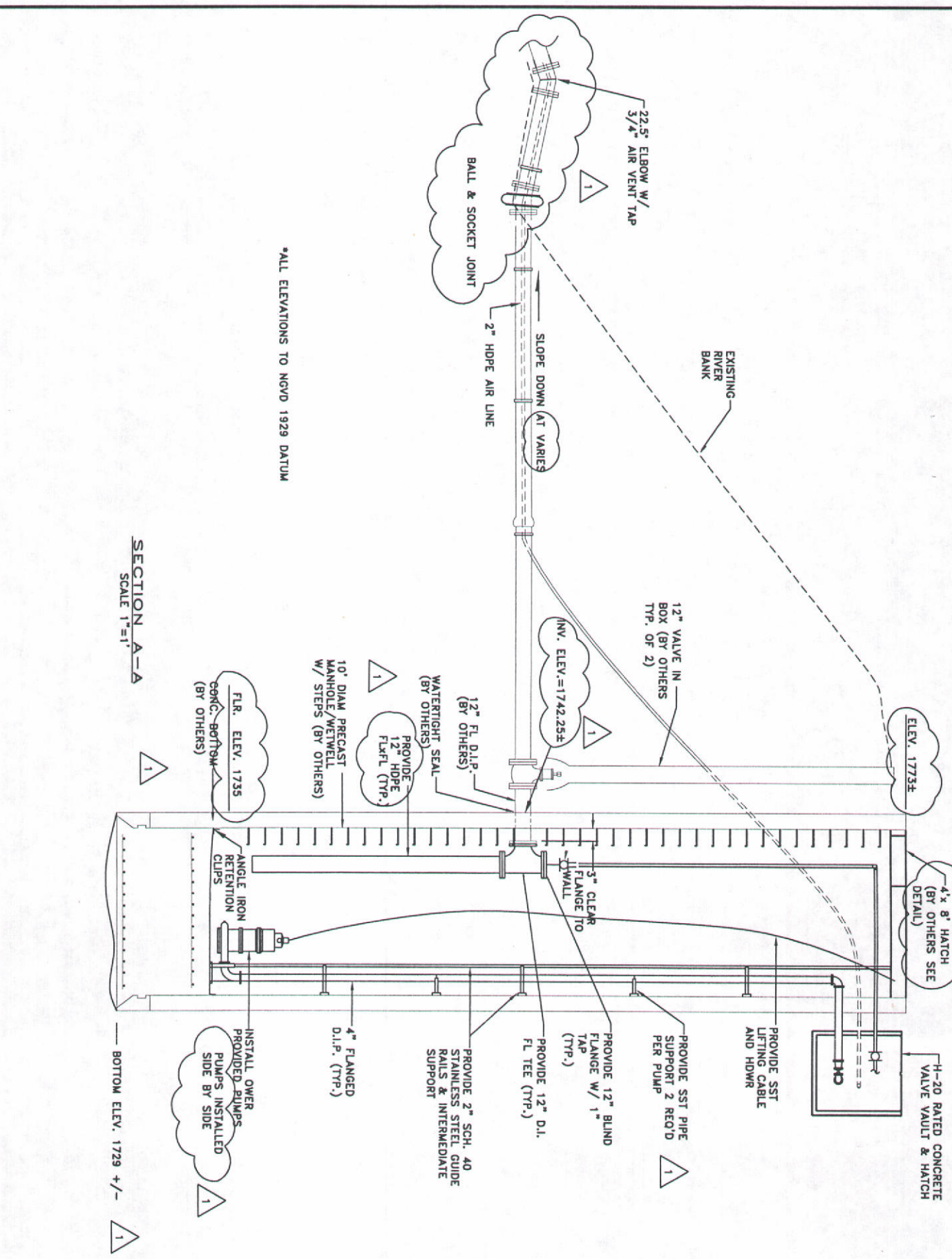
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CHECKED BY:	PAK/DE
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PROJECT NO.	20329
DRAWING NO.	
ACAD PLOT SCALE:	1=1
	1" ONE INCH
	AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET	
HOR SCALE:	x
VER SCALE:	NONE

SHEET RC4 OF 22

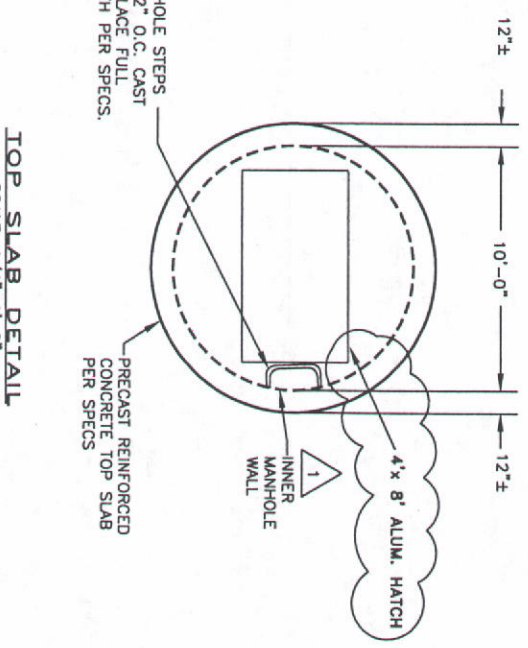
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3-96(JUB-D2)



*ALL ELEVATIONS TO NGVD 1929 DATUM

SECTION A-A
SCALE 1"=1'



TOP SLAB DETAIL
SCALE: 1/4"=1'-0"

RECORD DRAWINGS

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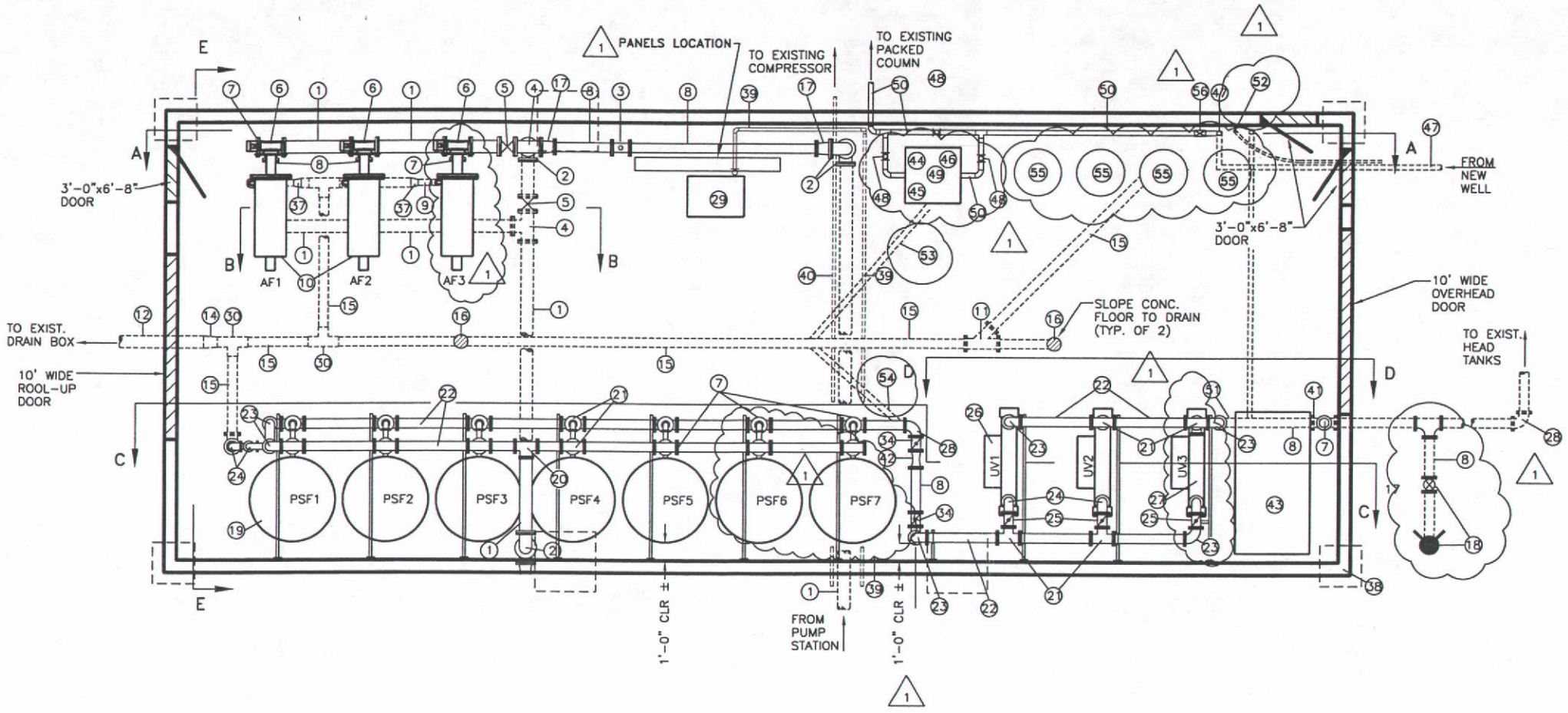
KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

PUMP STATION SECTIONS AND DETAILS

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PHONE: 208-667-1574
FAX: 208-667-2176

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CHECKED BY: PAK/DE
ARCHIVE LOCALE:
PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=1
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RC5 OF 22



BUILDING LAYOUT PLAN VIEW

SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48
ACAD:BLDG-PLAN.DWG

EQUIPMENT LIST

ALL PIPE AND FITTINGS FLANGED SCH. 80 PVC UNLESS NOTED OTHERWISE.
CONSULT MANUFACTURERS DETAIL DRAWINGS FOR FINAL LAYOUT/DIMENSIONS.
CONSULT SPECIFICATIONS FOR EQUIPMENT AND MATERIAL REQUIREMENTS.
SEE SHEET M1 AND SPECS FOR BOILER/HEAT EXCHANGERS.

1. 8" D.I.P.
2. 8" D.I. 90° EL
3. 6" MAGNETIC FLOW METER W/ REPLACEMENT SPOOL PIECE
4. 8" D.I. TEE
5. 8" GATE D.I. VALVE (IN BOX WHEN BURIED)
6. 8"x8"x6" D.I. TEE
7. BLIND FLANGE
8. 6" D.I.P.
9. 4" PVC DRAIN PIPE
10. AMIAD PRESSURE FILTER (TYP. OF 3) (1)
11. 6"x6"x6" WYE
12. 8" PVC DRAIN PIPE
13. 6"x6"x4" PVC WYE
14. 8"x6" PVC REDUCER
15. 6" PVC DRAIN PIPE
16. FLOOR DRAIN
17. 8"x6" D.I. REDUCER
18. FIRE HYDRANT ASSEMBLY W/ GATE VALVE
19. 55" PRESSURE SAND FILTER (TYP. OF 7) (1)
20. 8"x6"x6" D.I. TEE
21. 6"x6"x4" TEE (TYP.)
22. 6" PVC (TYP.)
23. 6" PVC 90° EL
24. 4" PVC 90° EL
25. 4" MANUAL BUTTERFLY VALVE
26. ULTRAVIOLET DISINFECTION UNIT (TYP. OF 3) (1)
27. 4" PVC
28. 6" D.I. 90° EL
29. DUPLEX VACUMM PUMP AND RECEIVER TANK
30. 6" PVC TEE
31. 4" MOTOR ACTUATED VALVE (TYP. OF 10)
32. UNISTRUT PIPE SUPPORTS @ 5'-0" O.C. MAX.
33. 6" AMIAD CHECK VALVE
34. 6" D.I. BUTTERFLY VALVE
35. 4" TEE
36. 6"x6"x4" D.I. TEE
37. 6"x4" REDUCER
38. PRE-ENGINEERED STEEL BUILDLING & FOOTINGS
39. 2" PVC VACUUM PIPING (IN 4" PVC SLEEVE WHEN UNDER SLAB)
40. 2" HDPE CA PIPING (IN 4" PVC SLEEVE WHEN UNDER SLAB)
41. 6" D.I. TEE
42. 6" FLOW CONTROL VALVE W/ REPLACEMENT SPOOL PIECE
43. DUPLEX AIR COMPRESSOR ON 200 GALLON TANK (1)
44. WELL WATER HEAT EXCHANGER
45. BOILER WATER HEAT EXCHANGER
46. BOILER
47. 3" PIPE AND FITTINGS
48. 3" BALL VALVE
49. DUPLEX INCUBATION BOOSTER PUMP SKID
50. INSULATED 3" PIPE & FITTINGS
51. SADDLE TAP

52. 2" POLY - WATER DIST. SERVICE
53. HEAT EXCHANGER DRAIN
54. CLA-VALVE DRAIN
55. CHARCOAL FILTER
56. 2" FLOW METER

(1)

RECORD DRAWINGS

PROFESSIONAL ENGINEER REGISTERED 7510 3/22/99 STATE OF IDAHO PAUL A. KLATT

RECORD DRAWINGS

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SUITE 220
COEUR d'ALENE, IDAHO 83814
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FAX: 208-667-2176

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

TREATMENT BUILDING MECHANICAL PLAN

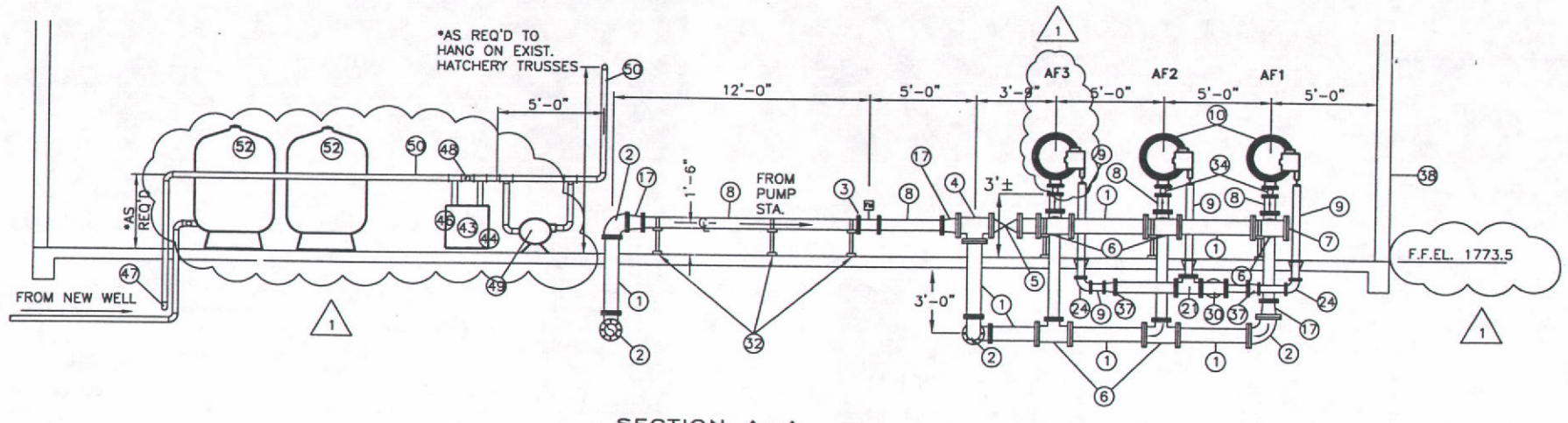
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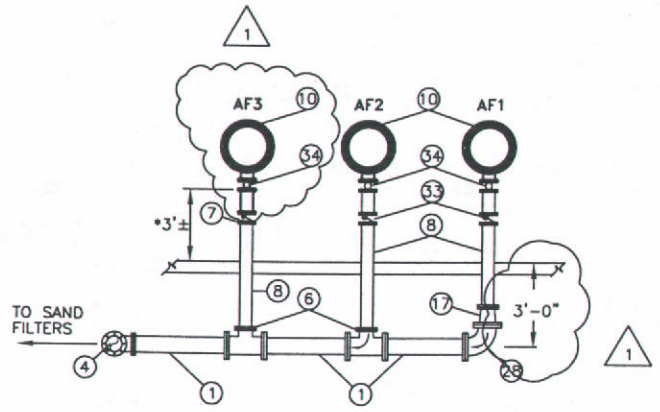
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PROJECT NO.	20329
DRAWING NO.	
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ONE INCH	
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY	
SCALE OF SHEET	
HOR SCALE:	x
VER SCALE:	NONE

SHEET RC6 OF 22

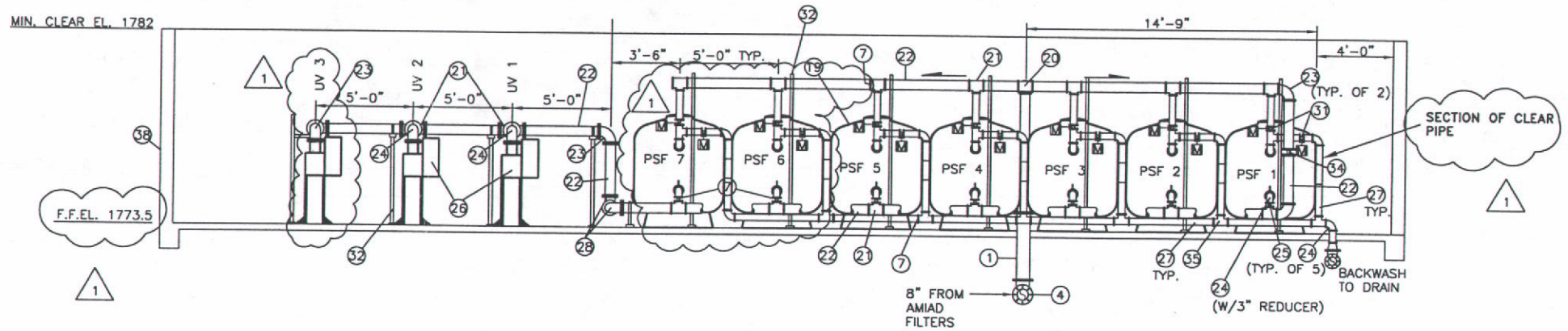
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SECTION A–A
INLET SIDE (RAW WATER)
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48



SECTION B–B
OUTLET SIDE (SCREENED WATER)
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48

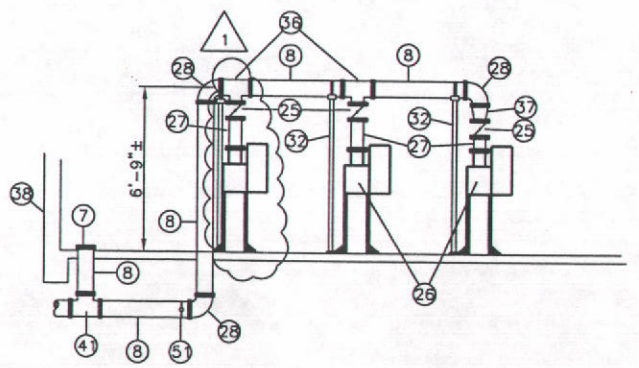


SECTION C–C
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48

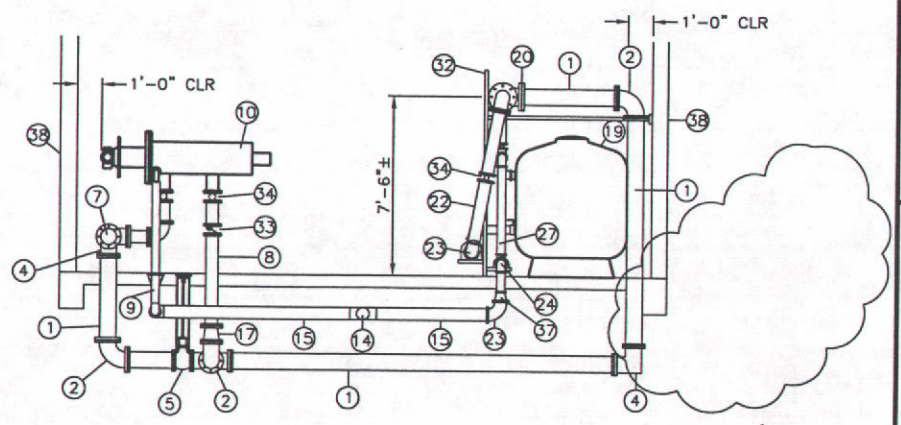
EQUIPMENT LIST

ALL PIPE AND FITTINGS FLANGED SCH. 80 PVC UNLESS NOTED OTHERWISE.
CONSULT MANUFACTURERS DETAIL DRAWINGS FOR FINAL LAYOUT/DIMENSIONS.
CONSULT SPECIFICATIONS FOR EQUIPMENT AND MATERIAL REQUIREMENTS.
SEE SHEET M1 AND SPECS FOR BOILER/HEAT EXCHANGERS.

1. 8" D.I.P.
2. 8" D.I. 90° EL
3. 6" MAGNETIC FLOW METER W/ REPLACEMENT SPOOL PIECE
4. 8" D.I. TEE
5. 8" GATE D.I. VALVE (IN BOX WHEN BURIED)
6. 8"x8"x6" D.I. TEE
7. BLIND FLANGE
8. 6" D.I.P.
9. 4" PVC DRAIN PIPE
10. AMIAD PRESSURE FILTER (TYP. OF 2)
11. 6"x6"x6" WYE
12. 8" PVC DRAIN PIPE
13. 6"x6"x4" PVC WYE
14. 8"x6" PVC REDUCER
15. 6" PVC DRAIN PIPE
16. FLOOR DRAIN
17. 8"x6" D.I. REDUCER
18. FIRE HYDRANT ASSEMBLY W/ GATE VALVE
19. 55" PRESSURE SAND FILTER (TYP. OF 5)
20. 8"x6"x6" D.I. TEE
21. 6"x6"x4" TEE (TYP.)
22. 6" PVC (TYP.)
23. 6" PVC 90° EL
24. 4" PVC 90° EL
25. 4" MANUAL BUTTERFLY VALVE
26. ULTRAVIOLET DISINFECTION UNIT (TYP. OF 2)
27. 4" PVC
28. 6" D.I. 90° EL
29. DUPLEX VACUMM PUMP AND RECEIVER TANK
30. 6" PVC TEE
31. 4" MOTOR ACTUATED VALVE (TYP. OF 10)
32. UNISTRUT PIPE SUPPORTS @ 5'-0" O.C. MAX.
33. 6" AMIAD CHECK VALVE
34. 6" D.I. BUTTERFLY VALVE
35. 4" TEE
36. 6"x6"x4" D.I. TEE
37. 6"x4" REDUCER
38. PRE-ENGINEERED STEEL BUILDLING & FOOTINGS
39. 2" PVC VACUUM PIPING (IN 4" PVC SLEEVE WHEN UNDER SLAB)
40. 2" HDPE CA PIPING (IN 4" PVC SLEEVE WHEN UNDER SLAB)
41. 6" D.I. TEE
42. 6" FLOW CONTROL VALVE W/ REPLACEMENT SPOOL PIECE
43. FUTURE HEAT EXCHANGER
44. WELL WATER HEAT EXCHANGER
45. BOILER WATER HEAT EXCHANGER
46. BOILER
47. 3" PIPE AND FITTINGS
48. 3" BALL VALVE
49. DUPLEX INCUBATION BOOSTER PUMP SKID
50. INSULATED 3" PIPE & FITTINGS
51. SADDLE TAP
52. CHARCOAL FILTER (TYP. OF 4)



SECTION D–D
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48
ACAD:SEC-DD.DWG



SECTION E–E
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48

RECORD

PROFESSIONAL ENGINEER REGISTERED 7510 3/22/99 STATE OF IDAHO PAUL A. KLATT

DRAWINGS

J-U-B ENGINEERS, Inc.
ENGINEERS•SURVEYORS•PLANNERS
1250 IRONWOOD DRIVE
SUITE 220
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1574
FAX: 208-667-2176

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

TREATMENT BUILDING
MECHANICAL SECTIONS

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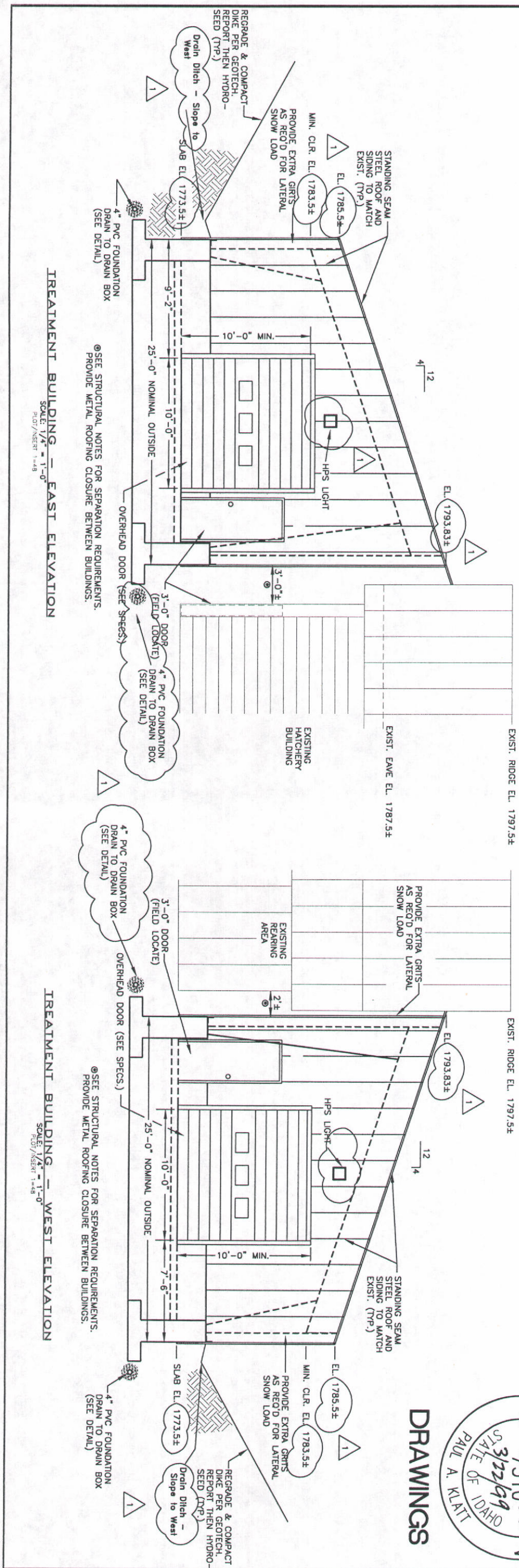
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VER SCALE: NONE

SHEET RC7 OF 22

3-96(JUB-D2)

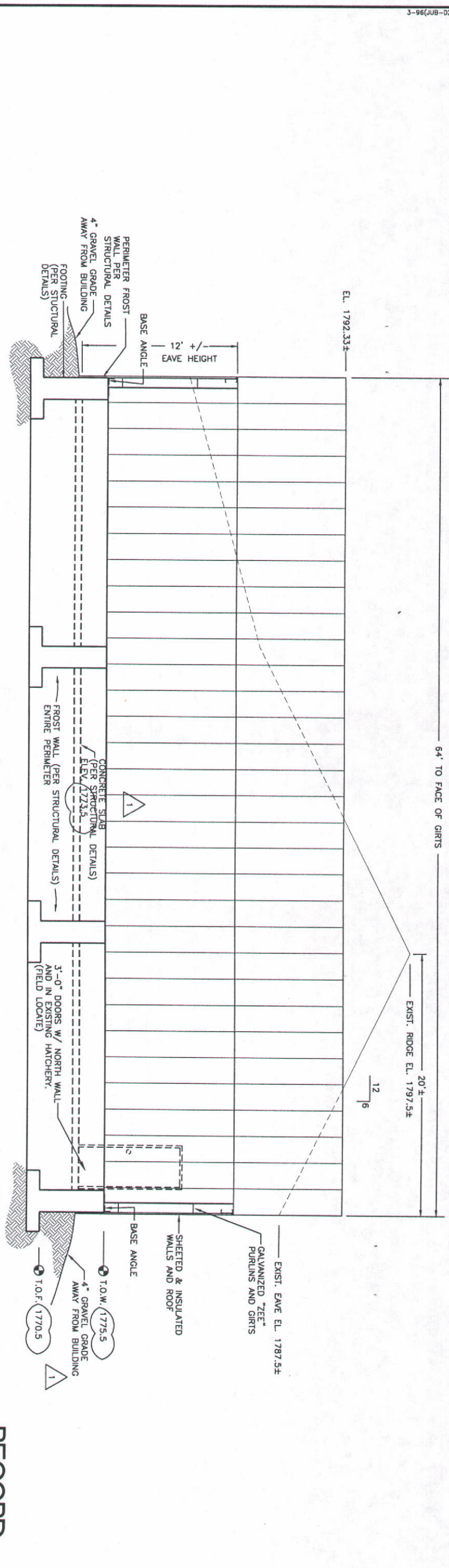
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3-96(JUB-D2)



TREATMENT BUILDING — EAST ELEVATION

SCALE: 1/4" = 1'-0"
PLOT/INSERT 1=48



TREATMENT BUILDING SOUTH ELEVATION

SCALE: 1/4" = 1'-0"
PLOT/INSERT 1=48

TREATMENT BUILDING — WEST ELEVATION

SCALE: 1/4" = 1'-0"
PLOT/INSERT 1=48

RECORD DRAWINGS

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PAUL A. KLATT
STATE OF IDAHO
3/22/99
15107

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CHECKED BY: PAK
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SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

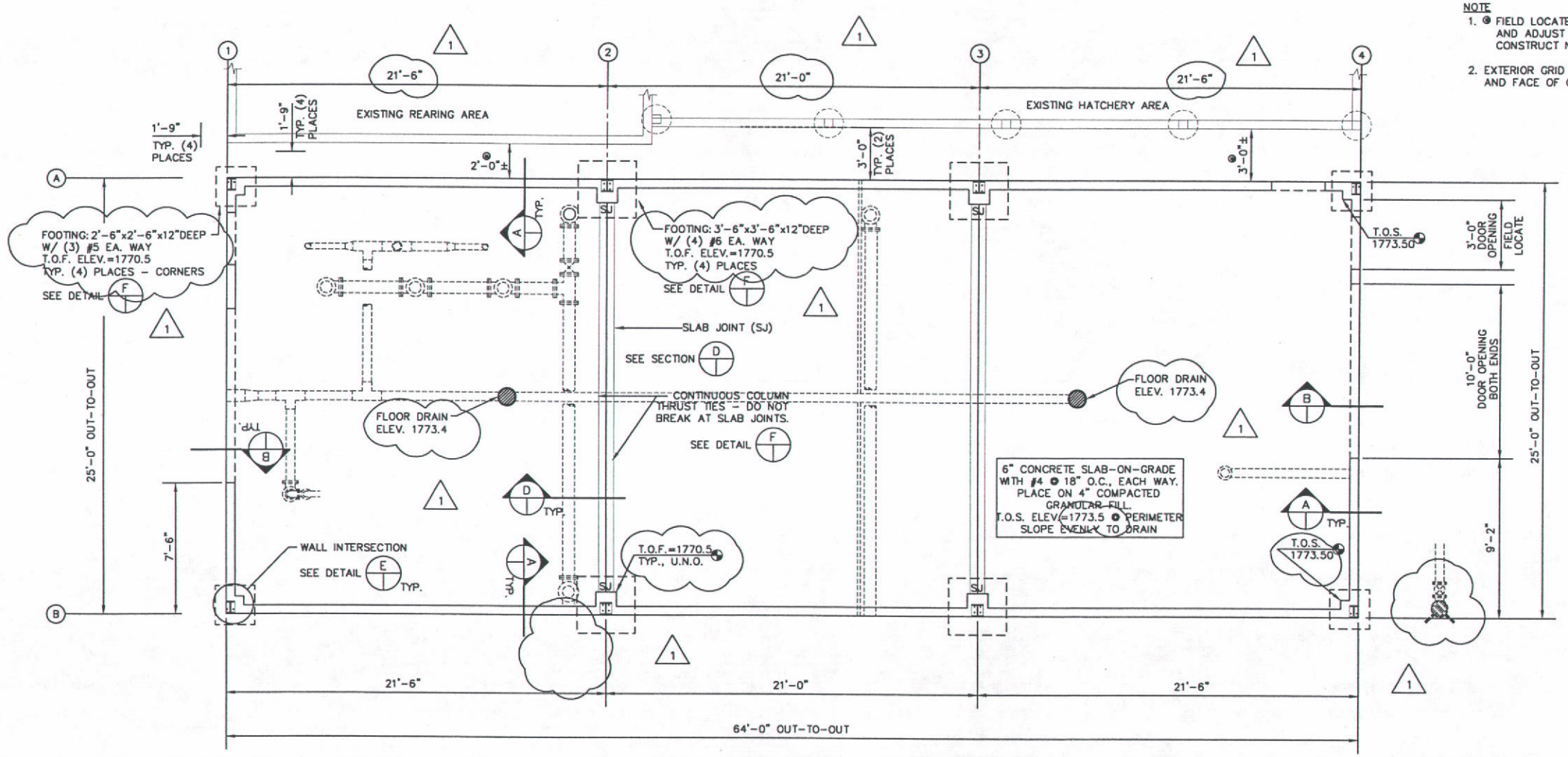
SHEET RC8 OF 22

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

TREATMENT BUILDING
ELEVATIONS AND DETAILS

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3-98(JOB-02)



NOTE

1. @ FIELD LOCATE EXISTING POLE BUILDING FOOTING AND ADJUST DIMENSION AS REQUIRED TO CONSTRUCT NEW FOOTINGS
2. EXTERIOR GRID LINES ARE ON FACE OF CONCRETE AND FACE OF GIRTS.

FOUNDATION PLAN

SCALE: 1/4"=1'-0"

RECORD

DRAWINGS

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PHONE: 208-667-1574
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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

TREATMENT BUILDING
FOUNDATION PLAN

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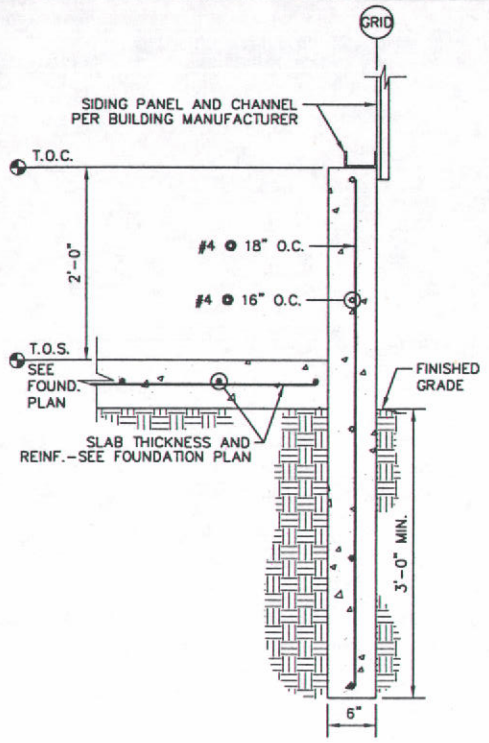
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CHECKED BY:	PAK/DE
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SCALE OF SHEET	HOR SCALE: x VER SCALE: NONE

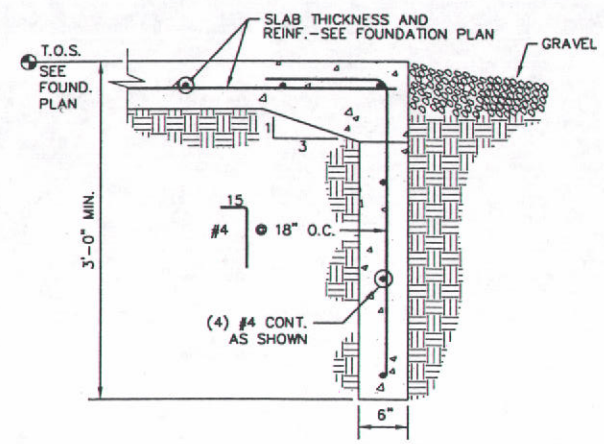
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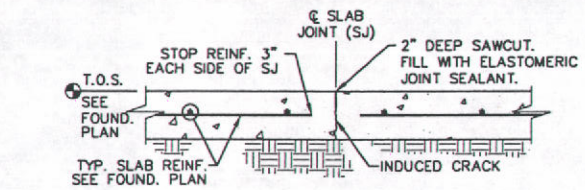
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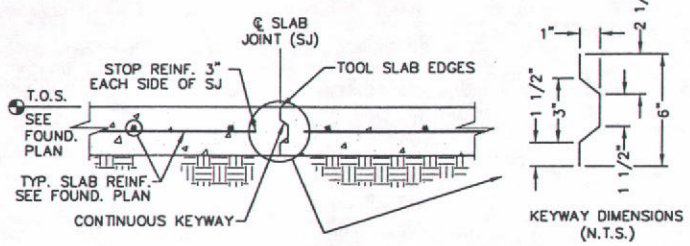
A TYP. FROST WALL DETAIL
SCALE: 1"=1'-0"



B FROST WALL AT OPENINGS
SCALE: 1"=1'-0"



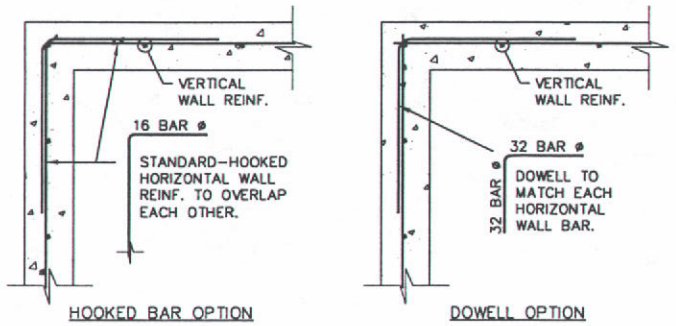
SAWCUT OPTION



KEYWAY OPTION

KEYWAY DIMENSIONS (N.T.S.)

D TYP. SLAB JOINT SECTION
SCALE: 1"=1'-0"

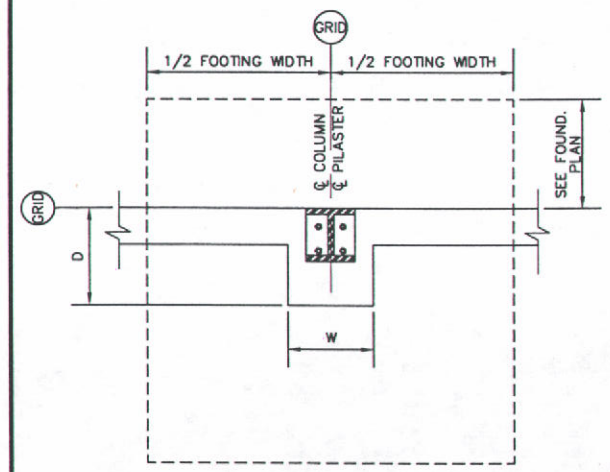


HOOKED BAR OPTION

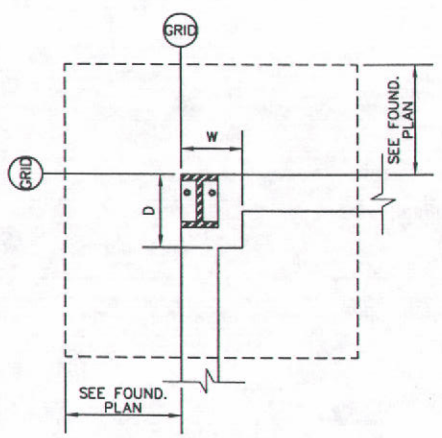
DOWELL OPTION

NOTE:
TYPICAL FOR FROST WALL

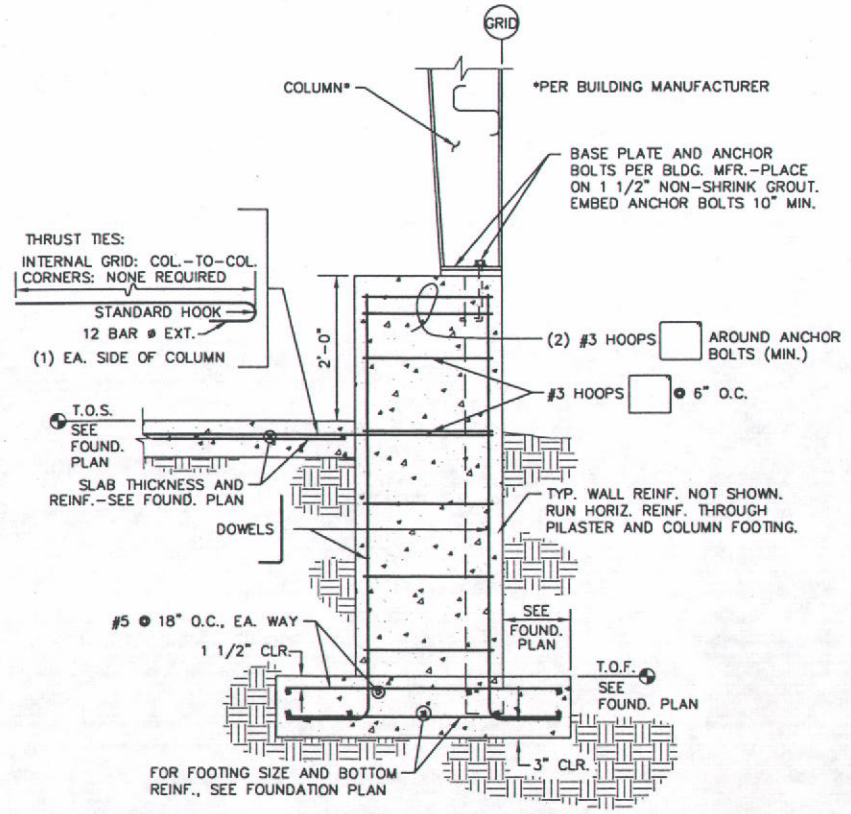
E TYP. WALL INTERSECTION
NOT TO SCALE



TYPICAL PLAN-GRID 2



TYPICAL CORNER PLAN



TYPICAL SECTION

DATA TABLE

COLUMN LOCATION	PILASTER SIZE W	PILASTER SIZE D	REINFORCEMENT DOWELS	REINFORCEMENT THRUST TIES
GRID 2	1'-5"	1'-2"	(4) #9	(2) #5
CORNERS	1'-5"	1'-4"	(4) #8	NONE

1

F TYP. COLUMN PILASTER AND FOOTING DETAIL
NOT TO SCALE

GENERAL STRUCTURAL NOTES

GENERAL
The General Contractor shall verify all dimensions and site conditions before starting work. The Engineer shall be notified of any discrepancy. Use details marked "Typical" wherever applicable. Changes, omissions or substitutions are not permitted without written approval of the Engineer. Refer to specifications for further requirements. All materials and workmanship shall conform to the latest edition of the Uniform Building Code. The design, adequacy and safety of erection bracing, shoring, temporary supports, etc., is the sole responsibility of the Contractor, and has not been considered by the Structural Engineer. The Contractor is responsible for the stability of the structure prior to the completion of all shear walls, roof and floor diaphragms and finish materials. The Contractor shall provide the necessary bracing to provide stability prior to the application of the above-mentioned components. Observation visits to the site by the Structural Engineer shall not include inspection of the above items.

SHOP DRAWINGS
Shop drawings are to be checked and approved by the General Contractor prior to submitting for Engineer review. General Contractor is responsible for verification and coordination of dimensions and details for each Subcontractor.

DESIGN LOADS
Snow Load . . . . 60 PSF
Floor Live Load . . . 125 PSF
Basic Wind Speed per UBC . . . 70MPH, Exposure C, I_w=1.15
Seismic Loading per UBC . . . Zone 2B, I = 1.25
See plans for special mechanical unit loading.

FOUNDATION
Assumed design allowable soil bearing pressure = 2,000 PSF.
Bottom of all footings to bear on native, inorganic, undisturbed soil 1'-0" minimum below existing grade. Extend all exterior footings 3'-0" minimum below finished grade. No footing shall bear higher than a 1 vertical to 1.5 horizontal slope above any excavation, existing or planned. Contractor shall provide temporary shoring to prevent movement of walls if backfill is placed before floor system is in place. There shall be 95% compaction (ASTM D1557 Modified Proctor Density) of all backfill soil under slabs on grade.

CAST-IN-PLACE CONCRETE
COMPRESSIVE STRENGTH: 3,000 PSI minimum at 28 days.
MAXIMUM SLUMP: 3" for slabs & footings; 4" for walls, columns and beams.
Construction to be in accordance with ACI 381-83, "Part 2 - Standards for Tests and Materials" and "Part 3 - Construction Requirements." Location of construction pour joints must be approved by the Engineer, if different from that shown on plans. All concrete to contain 4-6% entrained air.

REINFORCING STEEL
WELDED WIRE FABRIC: ASTM A82 and A185.
DEFORMED BARS: ASTM A615, Grade 40 for #3; Grade 60 for #4 and larger. Securely tie in place with double-annealed 16-gauge iron wire or approved clips.
LAP SPLICES: Concrete 40 bar diameters, typical unless otherwise noted on drawing.
Unless otherwise noted on these drawings, provide clear embedment at reinforcing bars as follows:
Concrete cast against soil = 3"
Formed concrete against soil = 2"
Walls, columns and beams exposed to weather = 2"
Walls, columns and beams not exposed to weather = 1 1/2"
Slab on grade = 2"
Low hydrogen welding rods shall be used for all welding of reinforcing bars. Submit shop drawings of reinforcing steel for review by the Engineer prior to fabrication.

STRUCTURAL SHAPES AND MISCELLANEOUS STEEL
SHAPES, PLATES AND BARS: ASTM A36, Fy = 36 KSI.
PIPE: ASTM A53 or A501, Fy = 35 KSI minimum.
TUBING: ASTM A500, Grade B, Fy = 46 KSI.
BOLTS: ASTM A325 high-strength bolts (H.S.B.) unless noted as ASTM A307 machine bolts (M.B.). Where high-strength bolts are used, they shall be installed with load-indicator devices (load-indicator washers or snap-off heads).
ANCHOR BOLTS (A.B.): ASTM A 307. Provide double nut for leveling at columns or beam base plates or as provided by building manufacturer.
EXPANSION BOLTS (E.B.): "Hilti Kwik Bolt II" or approved equivalent. Expansion bolts in grouted masonry shall be sleeve-type.
ADHESIVE ANCHORS: "Hilti HVA" or approved equivalent.
HEADED ANCHOR STUD (H.A.S.) and Threaded Anchor Stud (T.A.S.): ASTM A108-69T, Fy=50 KSI, end-welded per manufacturer's recommendations.
DEFORMED BAR ANCHORS (D.B.A.): ASTM A706, Fy = 70 KSI, end-welded, per manufacturer's recommendations.
WELDING ELECTRODES OR WIRES: AWS A5.1 or A5.5, E70XX; AWS A5.18, E70S-X; AWS A5.20, E7XT-X.
Erection and fabrication in accordance with AISC "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings." Welding shall conform to AWS "Code for Arc and Gas Welding in Building Construction." All welding shall be performed by AWS Certified Welders. All columns and beams to be from unspliced lengths unless noted otherwise on the drawings. Submit shop drawings showing sizes, dimensions and required connection details for review by the Engineer prior to fabrication.

GROUT AND EPOXY RESIN
NON-SHRINK GROUT: "Masterflow 928" as manufactured by Master Builders Inc. or approved equivalent.
EPOXY ANCHORS: For anchoring deformed or smooth rebars into existing or hardened concrete or solid grouted masonry, use Hilti HVA system or approved equivalent.

SPECIAL STRUCTURAL INSPECTIONS
REINFORCED CONCRETE: Inspection required for reinforcement and placement for footings.
BOLTS INSTALLED IN CONCRETE: Inspection as required per building manufacturer.
WELDING: Periodic inspection required; 50% allowable stresses used for weld design. Provide other special testing/inspection as noted on drawings.

RECORD

PROFESSIONAL ENGINEER REGISTERED 7510 3/22/99 STATE OF IDAHO PAUL A. KLATT

DRAWINGS

J-U-B ENGINEERS, Inc.
ENGINEERS • SURVEYORS • PLANNERS
1250 IRONWOOD DRIVE
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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

STEEL BUILDING STRUCTURAL
DETAILS AND NOTES

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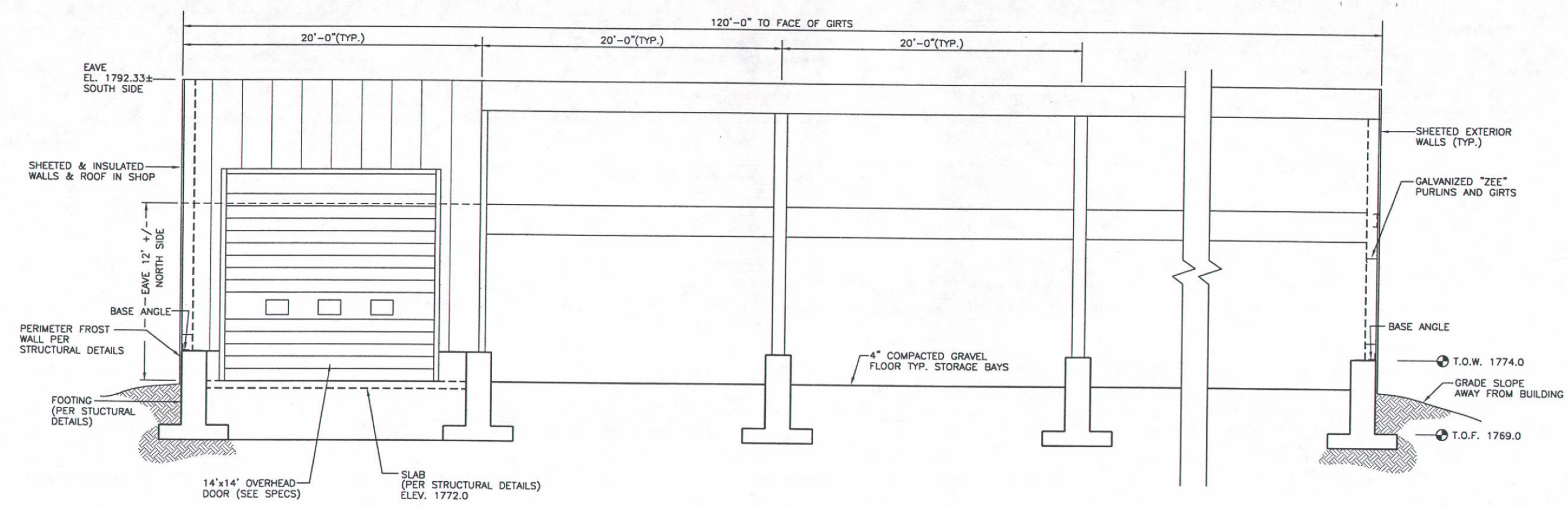
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CHECKED BY: PAK
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PROJECT NO. 20329
DRAWING NO.
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ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RC10 OF 22

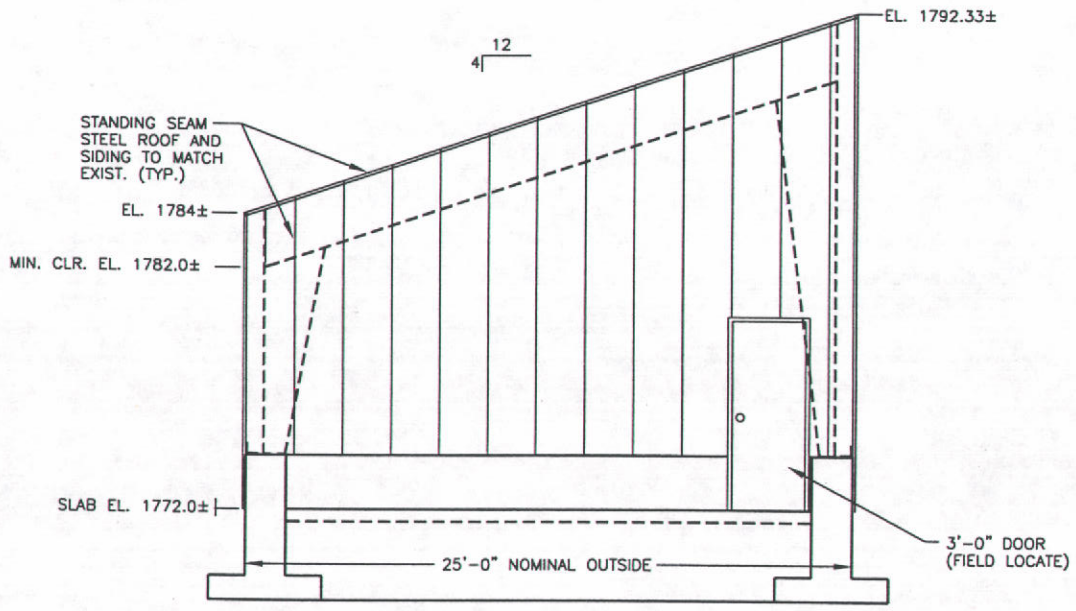
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3-98(JUB-D2)

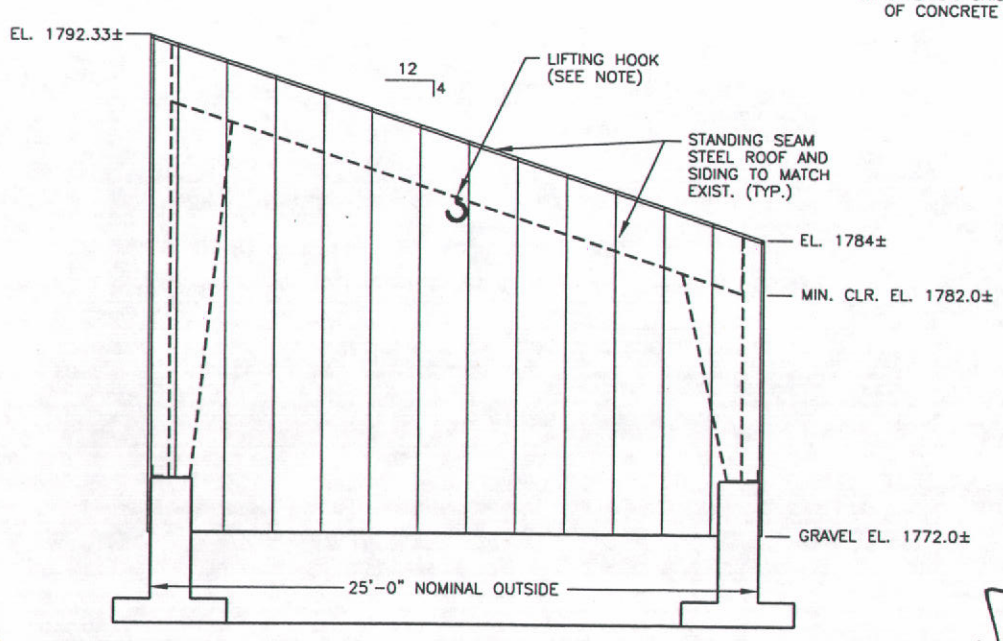


SHOP/STORAGE BUILDING—SOUTH ELEVATION
SCALE: 1/4" = 1'-0"
ACAD: SBLDG-XSEC.DWG
PLOT/INSERT 1=48

NOTES:
1. 4" DIAM. 1,000-POUND CAPACITY LIFTING HOOK CENTERED ON EACH OF 4 INTERIOR SPAN AND PERMANENTLY LABELED.
2. EXTERIOR GRID LINES ARE ON FACE OF CONCRETE AND FACE OF GIRTS.



SHOP/STORAGE BUILDING — WEST ELEVATION
SCALE: 1/4" = 1'-0"
ACAD: SBLDG-ELEV1.DWG
PLOT/INSERT 1=48



SHOP/STORAGE BUILDING — EAST ELEVATION
SCALE: 1/4" = 1'-0"
ACAD: SBLDG-ELEV2.DWG
PLOT/INSERT 1=48

RECORD

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DRAWINGS

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

SHOP/STORAGE BUILDING
ELEVATIONS AND DETAILS

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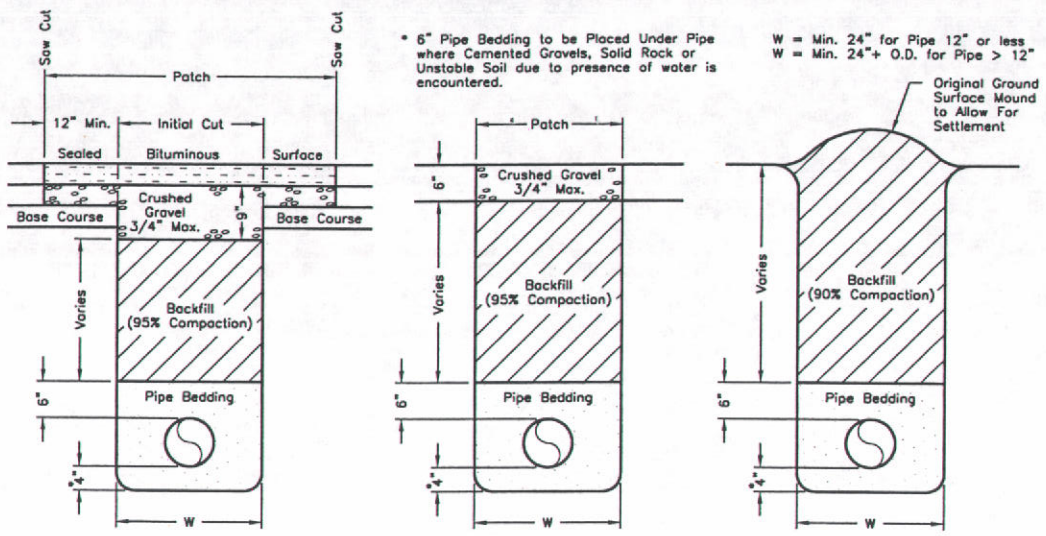
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VER SCALE:	NONE

SHEET RC11 OF 22

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3-96(JUB-02)



TYPE "A" SURFACE REPAIR
(Existing Bituminous Surface)

TYPE "B" SURFACE REPAIR
(Existing Gravel Surface)

TYPE "C" SURFACE REPAIR

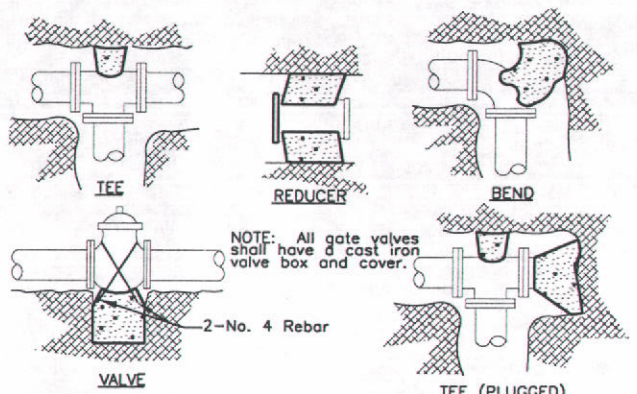
NOTES

1. All loose and foreign material shall be removed from the face of the existing bituminous surface-cut.
2. Any fractured bituminous surface beyond the face of the surface-cut shall be removed.
3. The face of the bituminous surface-cut must be primed before applying patch.
4. Patch shall not overlap the existing bituminous surface.
5. The patch thickness shall be four (4) inches or equal to the existing asphalt thickness, whichever is greater.

TRENCH BACKFILL & SURFACE REPAIR

NOT TO SCALE

DISK: "SEWER-1"
ACAD: BCK-SURF.Dwg
(plot/insert 1=16)



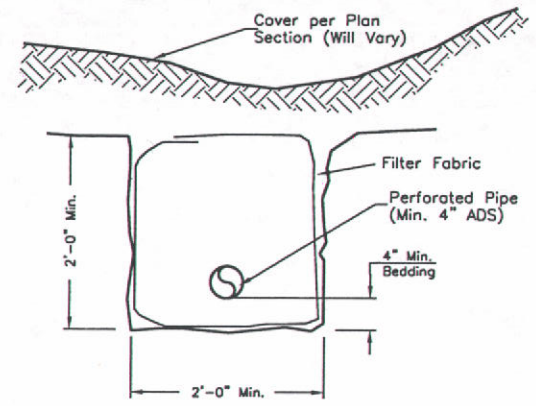
*Soil Bearing Pressure= 2000 PSF
*Working Pressure Rating= 150 PSI
*Safety Factor= 1.5

PIPE SIZES	TEES & PLUGS	90° BEND	45° BEND	22-1/2° & 11-1/2° BEND & REDUCER	GATE VALVES
3"	0.8	1.1	0.6	0.3	0.8
4"	1.4	2.0	1.1	0.6	1.4
6"	3.2	4.5	2.4	1.2	3.2
8"	5.7	8.0	4.3	2.2	5.7
10"	8.8	12.5	6.8	3.4	8.8
12"	12.7	18.0	9.7	5.0	12.7
14"	17.3	24.5	13.3	6.8	17.3

NOTES:
Thrust block area in square feet as a function of pipe size and type of fitting and bearing on undisturbed soil. (Soil bearing at 2000psf) Based on a working pressure of 150psi.

THRUST BLOCK DETAIL

Not To Scale

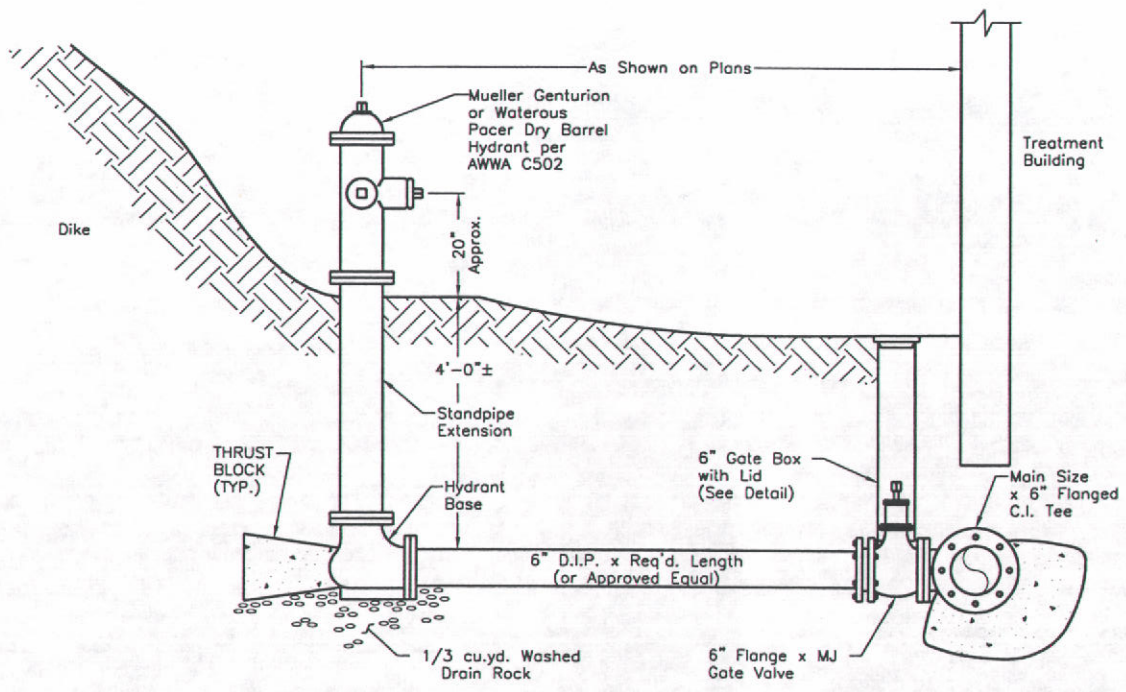


FRENCH DRAIN

SCALE: 1"=1'-0"
DISK: "STREET-1"
ACAD: FRENCH.DWG
(PLOT/INSERT 1=12)

VALVE BOX DETAIL

NOT TO SCALE
PLOT SCALE: 1=48



TYPICAL 6" FIRE HYDRANT SETTING

Not to Scale
ACAD: HYDRANT.Dwg
(plot/insert 1=16)

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TYPICAL DETAILS

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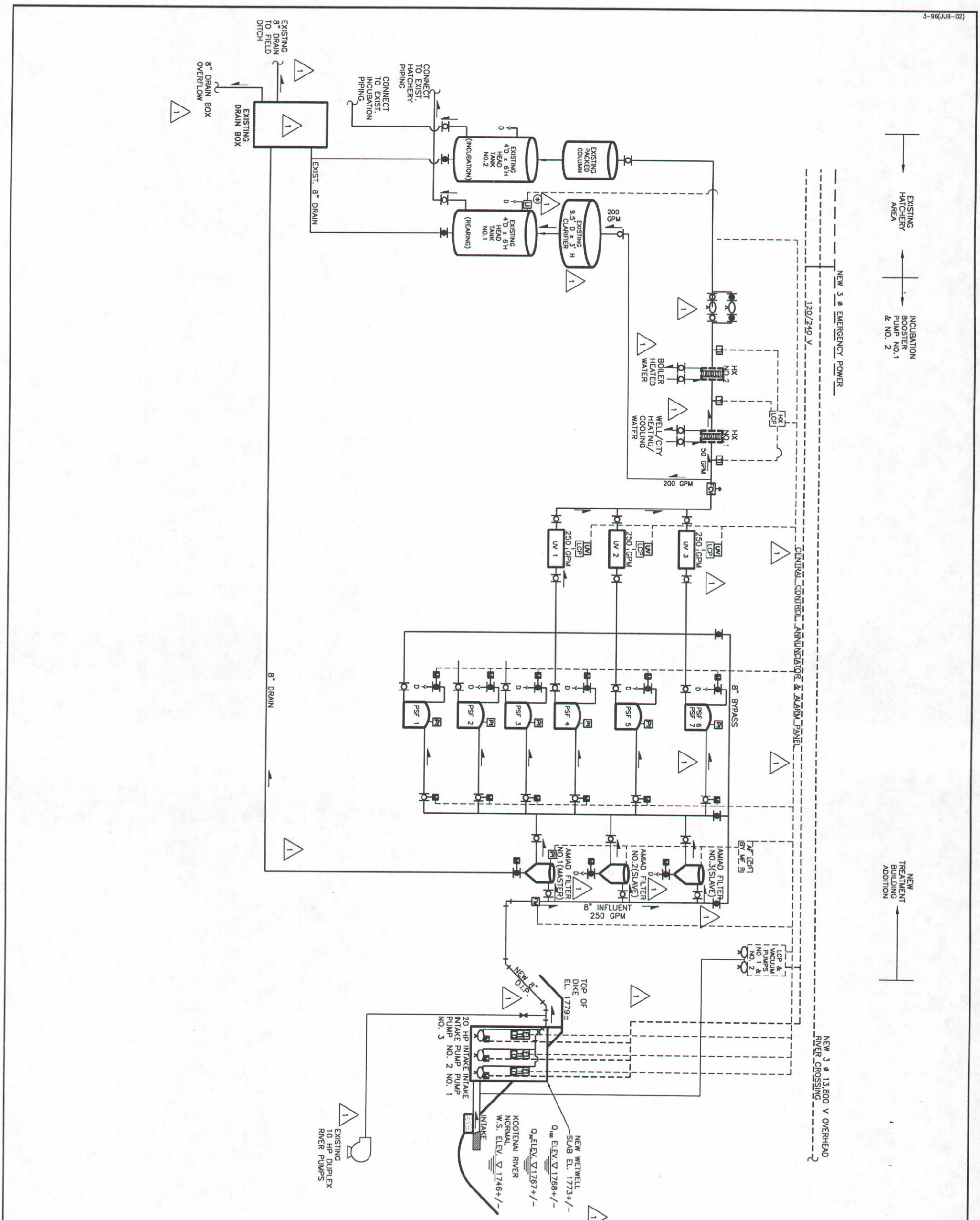
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AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RC14 OF 22

F:\PROJECTS\20329\dwgs\RECORD\20329TYPDr.dwg Fri Feb 26 10:18:02 1999 TLR

F:\PROJECTS\20329\dwgs\RECORD\20329-P1R.dwg Fri Feb 26 10:19:27 1999 TLR

3-96(JUB-02)



RECORD DRAWINGS

PROFESSIONAL ENGINEER REGISTERED STATE OF IDAHO PAUL A. KLATT 7510 3/22/99

REUSE OF DRAWINGS

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REVISION

NO.	DESCRIPTION	BY	APR.	DATE
1	RECORD DRAWINGS	JW/TR	PAK	2.19.99

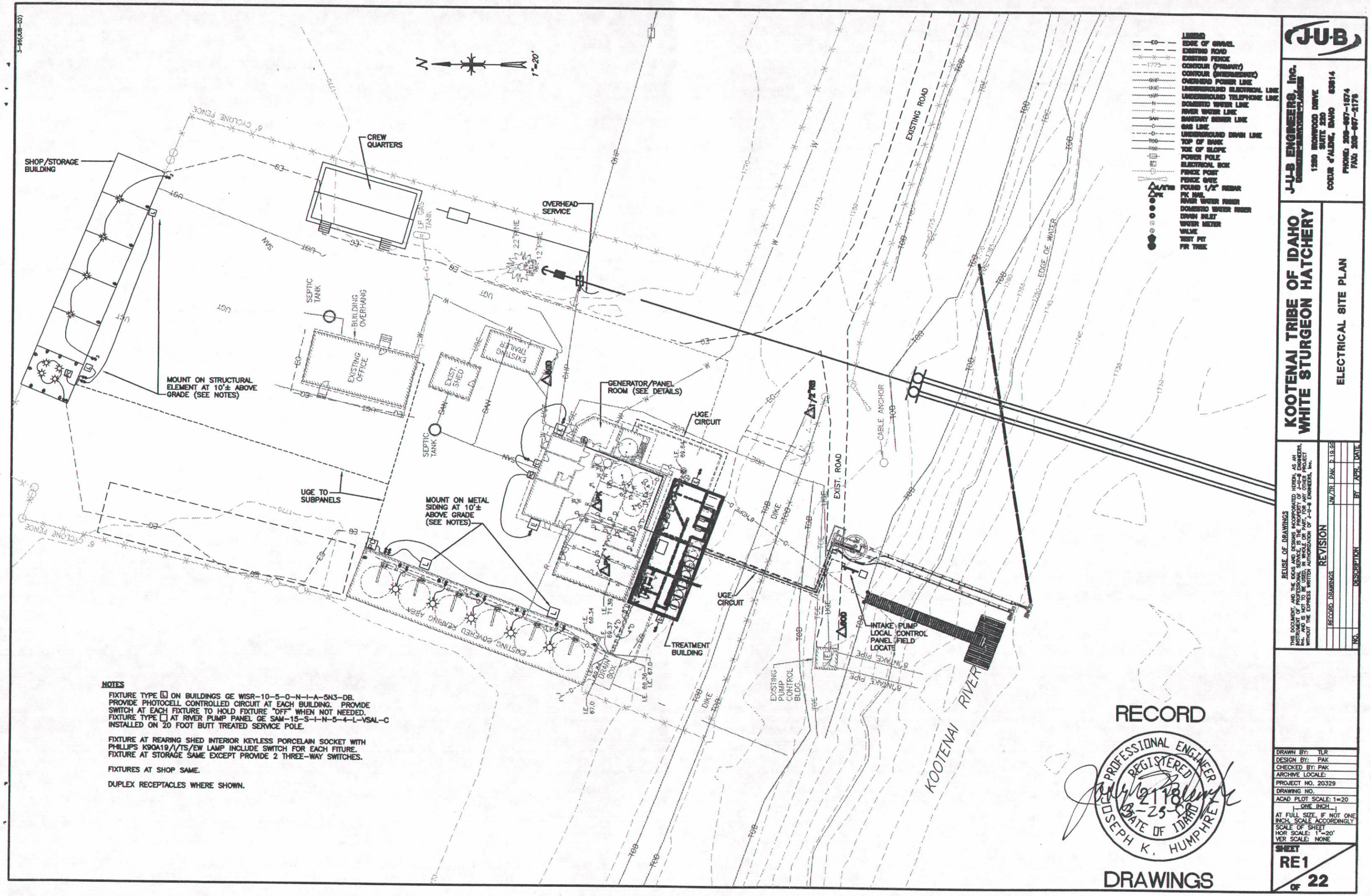
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DESIGN BY: PAK/DE
CHECKED BY: PAK/DE
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PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=1
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE
SHEET RP1 OF 22

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

PHASE 1
PROCESS & INSTRUMENTATION DIAGRAM

J-U-B ENGINEERS, Inc.
ENGINEERS•SURVEYORS•PLANNERS
1250 IRONWOOD DRIVE
SUITE 220
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1574
FAX: 208-667-2176

DRAWINGS



NOTES

FIXTURE TYPE L ON BUILDINGS GE WISR-10-5-0-N-I-A-5N3-DB. PROVIDE PHOTOCELL CONTROLLED CIRCUIT AT EACH BUILDING. PROVIDE SWITCH AT EACH FIXTURE TO HOLD FIXTURE "OFF" WHEN NOT NEEDED. FIXTURE TYPE □ AT RIVER PUMP PANEL GE SAM-15-S-I-N-5-4-L-VSAL-C INSTALLED ON 20 FOOT BUTT TREATED SERVICE POLE.

FIXTURE AT REARING SHED INTERIOR KEYLESS PORCELAIN SOCKET WITH PHILLIPS K90A19/I/TS/EW LAMP INCLUDE SWITCH FOR EACH FITURE. FIXTURE AT STORAGE SAME EXCEPT PROVIDE 2 THREE-WAY SWITCHES.

FIXTURES AT SHOP SAME.

DUPLEX RECEPTACLES WHERE SHOWN.

RECORD DRAWINGS

J-U-B ENGINEERS, Inc.
1329 RIVERWOOD DRIVE
SUITE 220
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1874
FAX: 208-667-2178

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY

ELECTRICAL SITE PLAN

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NO.	DESCRIPTION	BY	APR.	DATE
	RECORD DRAWINGS	JW/TRL	PAK	9.18.98

REVISION

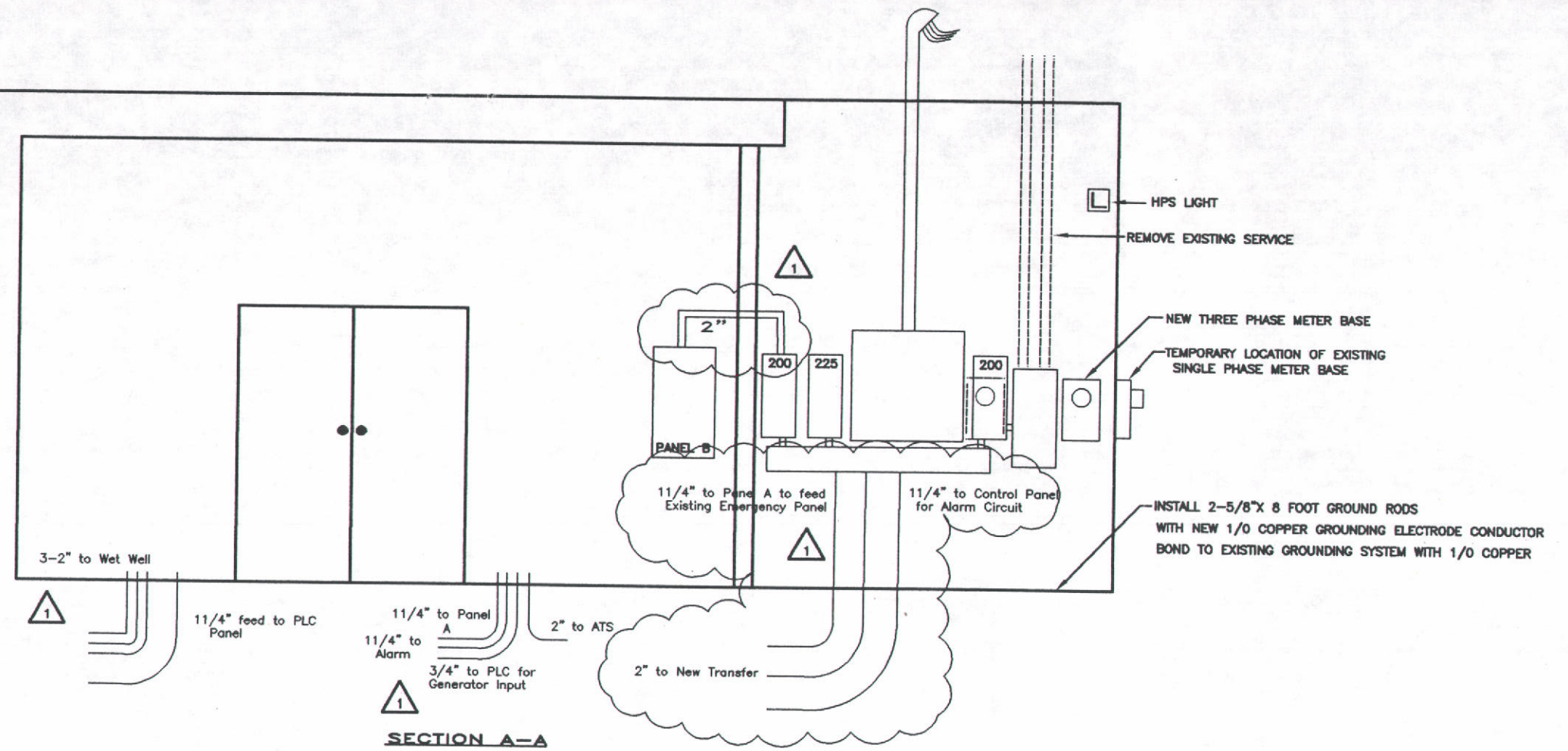
PROFESSIONAL ENGINEER
REGISTERED
JOSEPH K. HUMPHREY
STATE OF IDAHO
9-25-98

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DESIGN BY:	PAK
CHECKED BY:	PAK
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AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY	
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HOR SCALE:	1"=20'
VER SCALE:	NONE

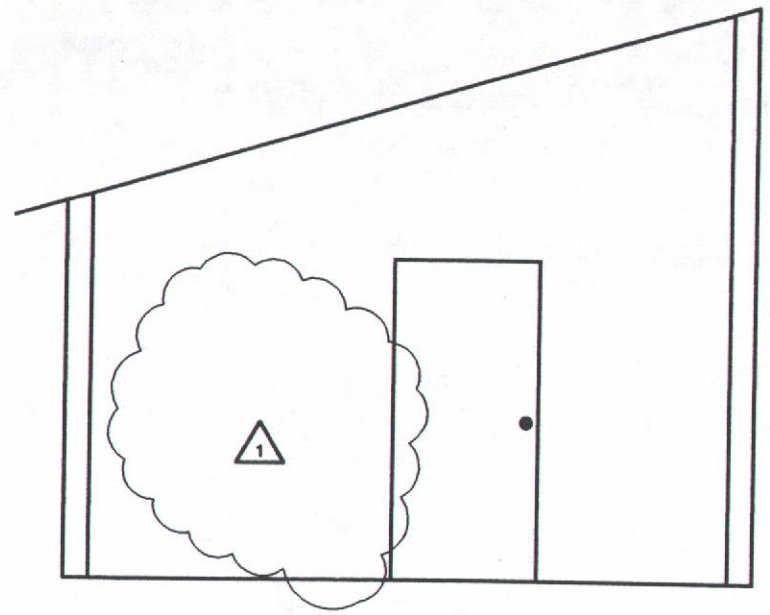
SHEET
RE1
OF 22

DRAWINGS

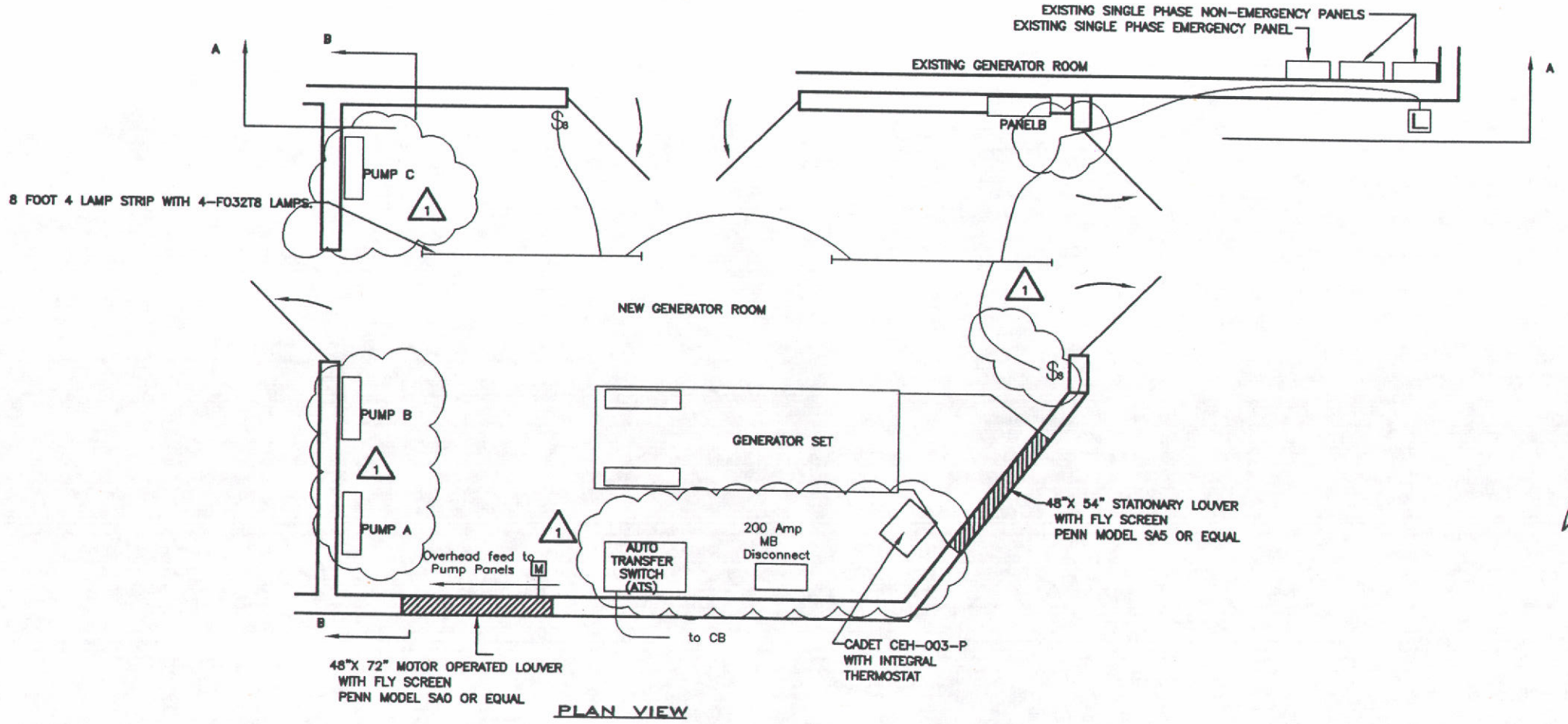
3-96(JUB-02)



SECTION A-A



SECTION B-B



PLAN VIEW

RECORD

DRAWINGS

J-U-B ENGINEERS, Inc.
1329 IRONWOOD DRIVE
SUITE 220
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1674
FAX: 208-667-2178

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

GENERATOR AND PANEL ROOM

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NO.	DESCRIPTION	BY	APPR.	DATE
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REVISION

PROFESSIONAL ENGINEER REGISTERED STATE OF IDAHO JOSEPH K. HUMPHREY 8258

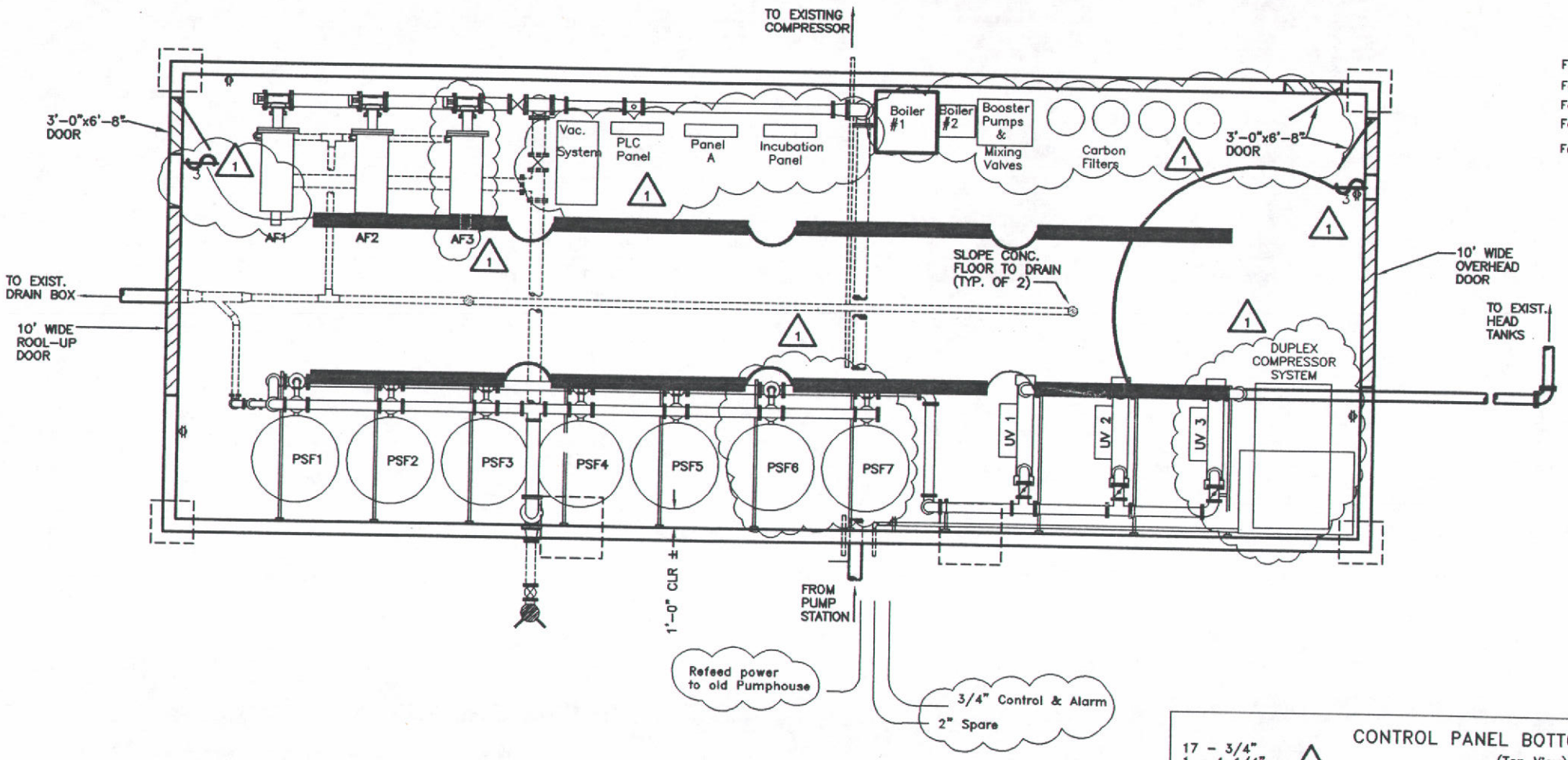
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VER SCALE:	NONE

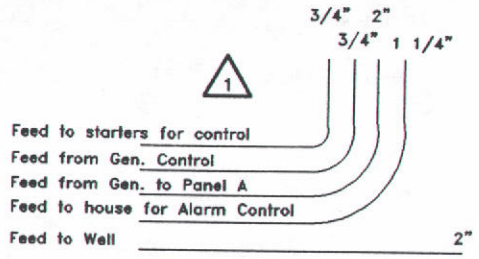
SHEET RE2 OF 22

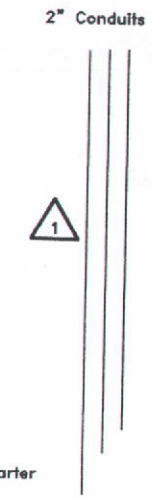
3-96(JUB-02)

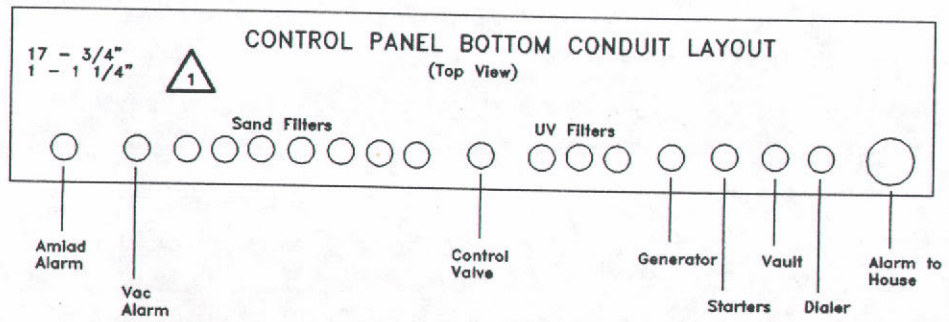
LEGEND

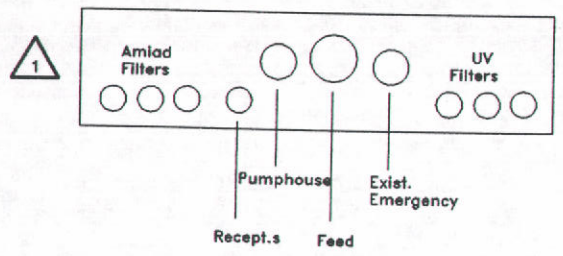
8 FOOT VAPORLUMEWITH 4 F032T8











RECORD DRAWINGS

PROFESSIONAL ENGINEER REGISTERED STATE OF IDAHO JOSEPH K. HUMPHREY 12-23-98

J-U-B ENGINEERS, Inc.
1250 IRONWOOD DRIVE
SUITE 220
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1574
FAX: 208-667-2176

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

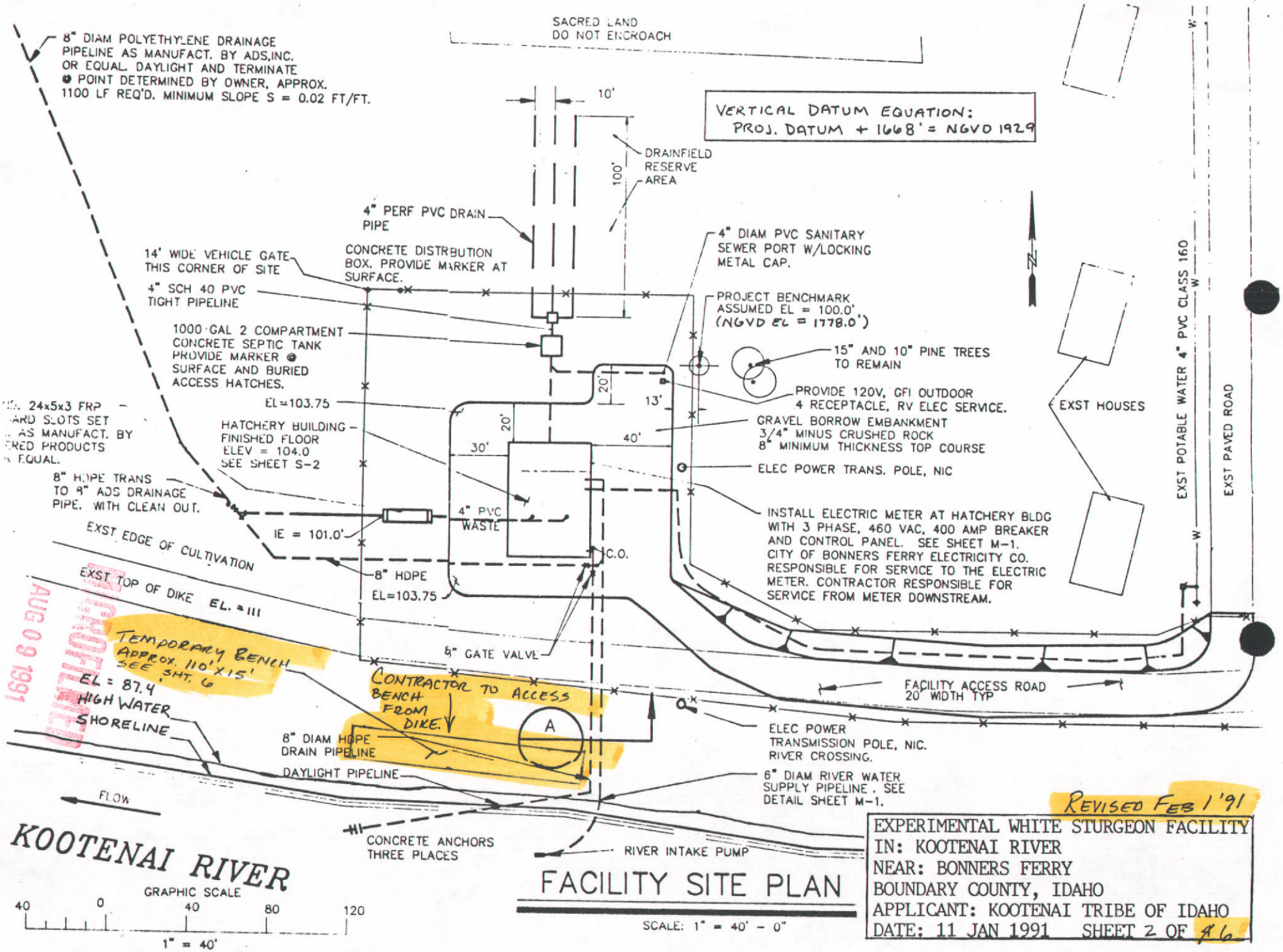
TREATMENT BUILDING ELECTRICAL PLAN

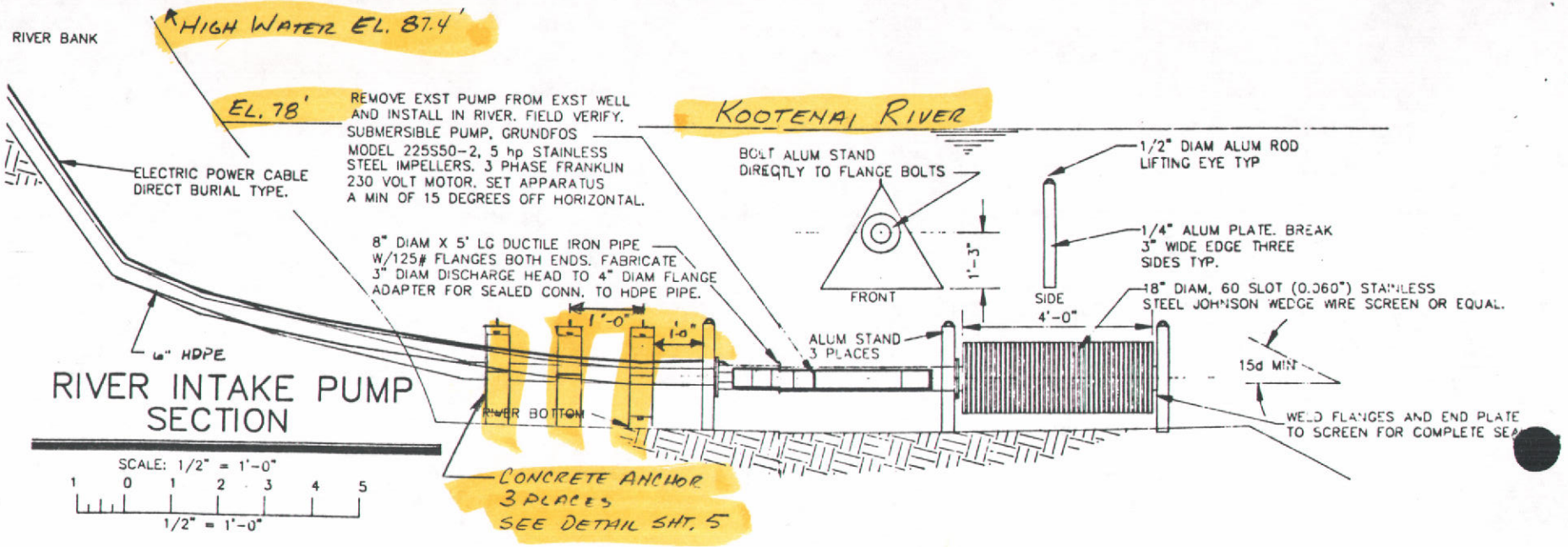
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NO.	DESCRIPTION	BY	APR.	DATE
1	RECORD DRAWINGS	JW/TR	PAK	2.19.99

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DESIGN BY:	PAK/DE
CHECKED BY:	PAK/DE
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PROJECT NO.	20329
DRAWING NO.	
ACAD PLOT SCALE:	1=48
ONE INCH	
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY	
SCALE OF SHEET	
HOR SCALE:	x
VER SCALE:	NONE

SHEET RE3 OF 22


8" DIAM POLYETHYLENE DRAINAGE PIPELINE AS MANUFACT. BY ADS,INC. OR EQUAL. DAYLIGHT AND TERMINATE @ POINT DETERMINED BY OWNER, APPROX. 1100 LF REQ'D. MINIMUM SLOPE S = 0.02 FT/FT.
SACRED LAND DO NOT ENCROACH
VERTICAL DATUM EQUATION: PROJ. DATUM + 1668' = NGVD 1929
10'
100'
DRAINFIELD RESERVE AREA
4" PERF PVC DRAIN PIPE
CONCRETE DISTRBUTION BOX. PROVIDE MARKER AT SURFACE.
14' WIDE VEHICLE GATE THIS CORNER OF SITE
4" SCH 40 PVC TIGHT PIPELINE
1000 GAL 2 COMPARTMENT CONCRETE SEPTIC TANK PROVIDE MARKER @ SURFACE AND BURIED ACCESS HATCHES.
EL=103.75
HATCHERY BUILDING FINISHED FLOOR ELEV = 104.0 SEE SHEET S-2
20'
30'
40'
13'
4" DIAM PVC SANITARY SEWER PORT W/LOCKING METAL CAP.
PROJECT BENCHMARK ASSUMED EL = 100.0' (NGVD EL = 1778.0')
15" AND 10" PINE TREES TO REMAIN
PROVIDE 120V, GFI OUTDOOR 4 RECEPTACLE, RV ELEC SERVICE.
GRAVEL BORROW EMBANKMENT 3/4" MINUS CRUSHED ROCK 8" MINIMUM THICKNESS TOP COURSE
ELEC POWER TRANS. POLE, NIC
INSTALL ELECTRIC METER AT HATCHERY BLDG WITH 3 PHASE, 460 VAC, 400 AMP BREAKER AND CONTROL PANEL. SEE SHEET M-1. CITY OF BONNERS FERRY ELECTRICITY CO. RESPONSIBLE FOR SERVICE TO THE ELECTRIC METER. CONTRACTOR RESPONSIBLE FOR SERVICE FROM METER DOWNSTREAM.
EXST HOUSES
EXST POTABLE WATER 4" PVC CLASS 160
EXST PAVED ROAD
24x5x3 FRP ARD SLOTS SET AS MANUFACT. BY RED PRODUCTS EQUAL.
8" HDPE TRANS TO 8" ADS DRAINAGE PIPE. WITH CLEAN OUT.
IE = 101.0'
4" PVC WASTE
C.O.
8" HDPE
EL=103.75
EXST EDGE OF CULTIVATION
EXST TOP OF DIKE EL. = 111
TEMPORARY BENCH APPROX. 110'X15' SEE SHT. 6
EL = 87.4 HIGH WATER SHORELINE
8" GATE VALVE
CONTRACTOR TO ACCESS BENCH FROM DIKE.
A
8" DIAM HDPE DRAIN PIPELINE
DAYLIGHT PIPELINE
FACILITY ACCESS ROAD 20' WIDTH TYP
ELEC POWER TRANSMISSION POLE, NIC. RIVER CROSSING.
6" DIAM RIVER WATER SUPPLY PIPELINE. SEE DETAIL SHEET M-1.
FLOW
CONCRETE ANCHORS THREE PLACES
RIVER INTAKE PUMP
KOOTENAI RIVER
GRAPHIC SCALE
40 0 40 80 120
1" = 40'
FACILITY SITE PLAN
SCALE: 1" = 40' - 0"
AUG 09 1991
REVISED FEB 1'91
EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 2 OF 16



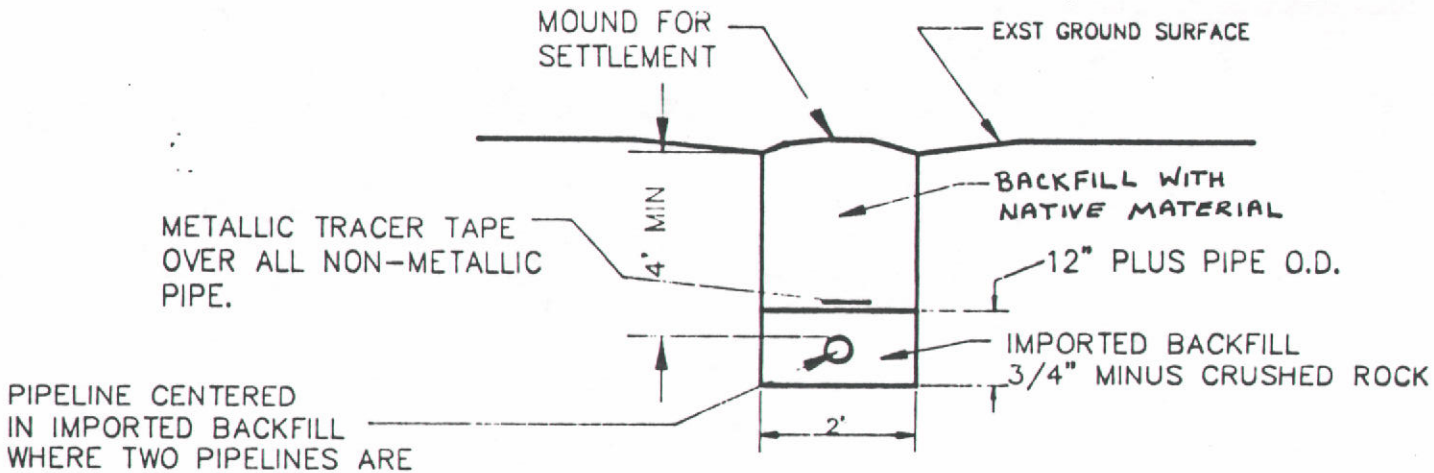
Note:
PROJECT DATUM + 166.8' = NGVD 1929

SITE PROFILE

RECEIVED
AUG 09 1991
Water Resources

REV. Feb 1, '91

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 3 OF 96



A

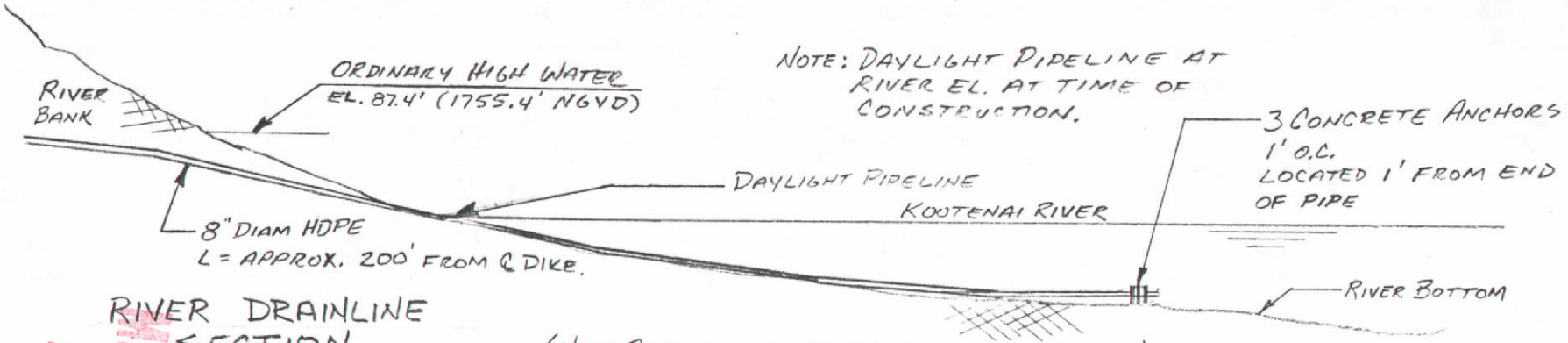
TYPICAL TRENCH SECTION

SCALE: NONE

MICROFILMED
AUG 09 1991

Revised Feb 1, '91

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 9 OF 46



RIVER DRAINLINE SECTION

SCALE 1/2" = 10'-0"

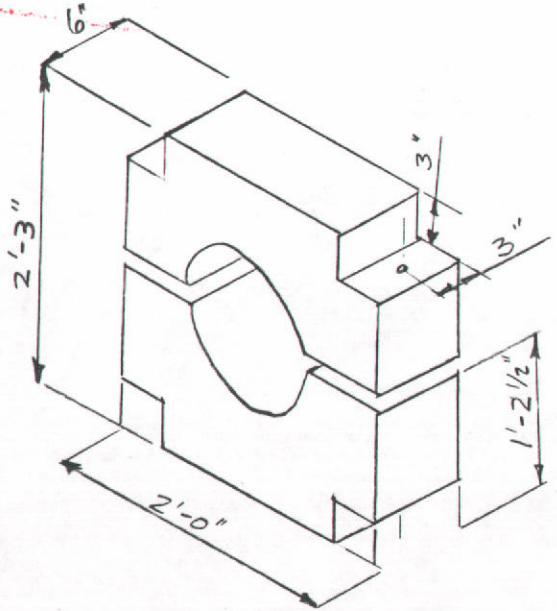
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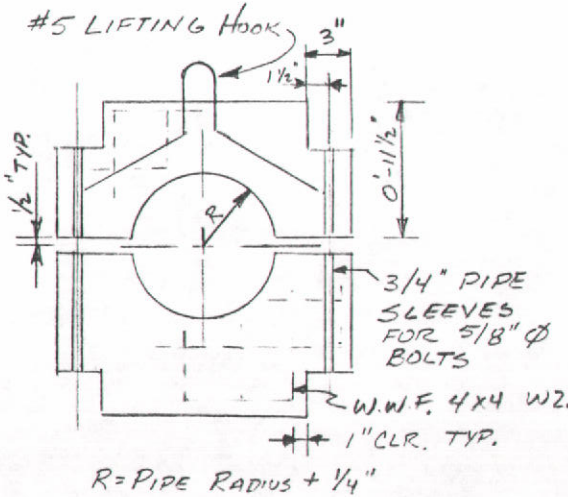
1/2" = 10'

(NOTE: PIPELINE IS NOT PERPENDICULAR TO SHORELINE.)
SEE FACILITY SITE PLAN

RECEIVED AUG 09 1991

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 1 FEB 1991 SHEET 5 OF 6



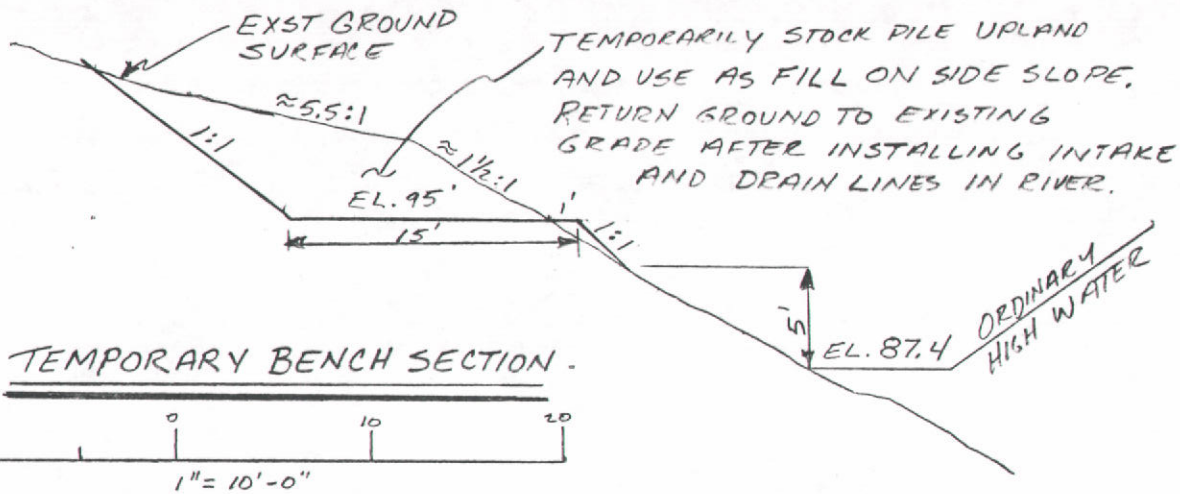


CONCRETE ANCHOR DETAIL

NO SCALE

NOTES:

1. POLYETHYLENE PIPE SHALL BE WRAPPED W/ 1/4" THICK NEOPRENE SPONGE ALL AROUND. THE WRAPPING SHALL EXTEND AT LEAST ONE INCH BEYOND BOTH EDGES OF CONCRETE ANCHOR.
2. CLOSED CELL NEOPRENE SPONGE SHALL BE FURNISHED WITH "SKIN" ONE SIDE, SIMILAR TO BOYD INDUSTRIAL RUBBER TYPE R-421-N.
3. BOLTS FOR CONCRETE ANCHORS SHALL BE ASTM A307 MATERIAL, HOT DIP GALVANIZED. NUT SHALL BE FURNISHED W/ SELF LOCKING NYLON PELLET. WASHERS BEARING ON CONCRETE SHALL BE 2 7/8" DIA. X 3/16" THICK, GALVANIZED. WASHERS BEARING ON STEEL SHALL BE MFG. STANDARD GALVANIZED.

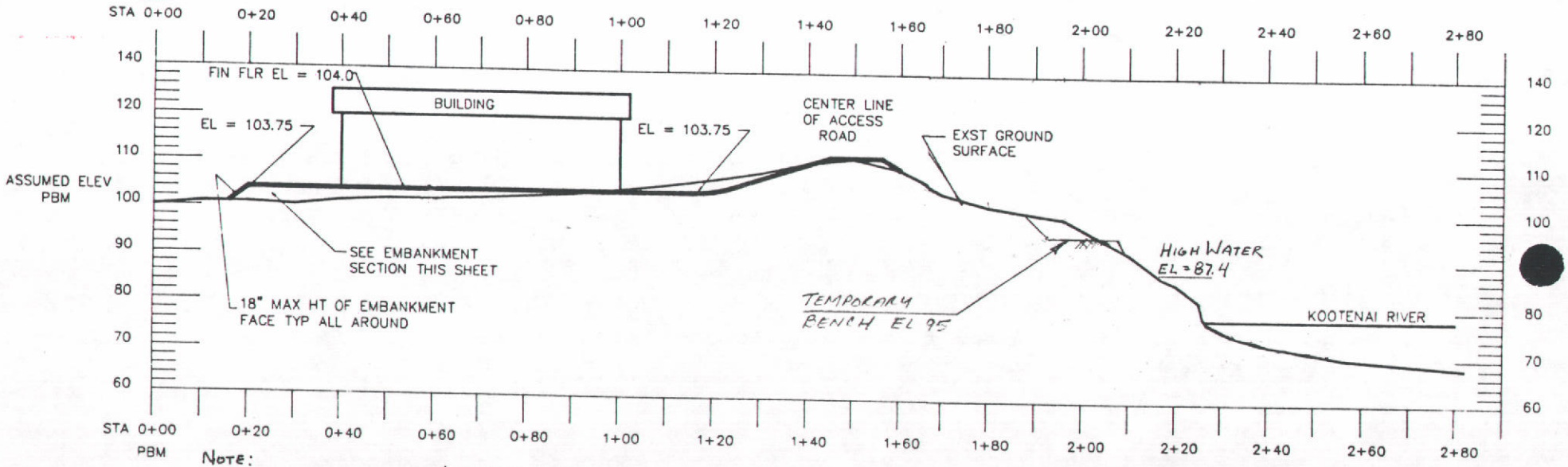


TEMPORARY BENCH SECTION -

10 0 10 20

1" = 10'-0"

RECEIVED
AUG 09 1991



Note:
PROJECT DATUM + 166.8' = NGVD 1929

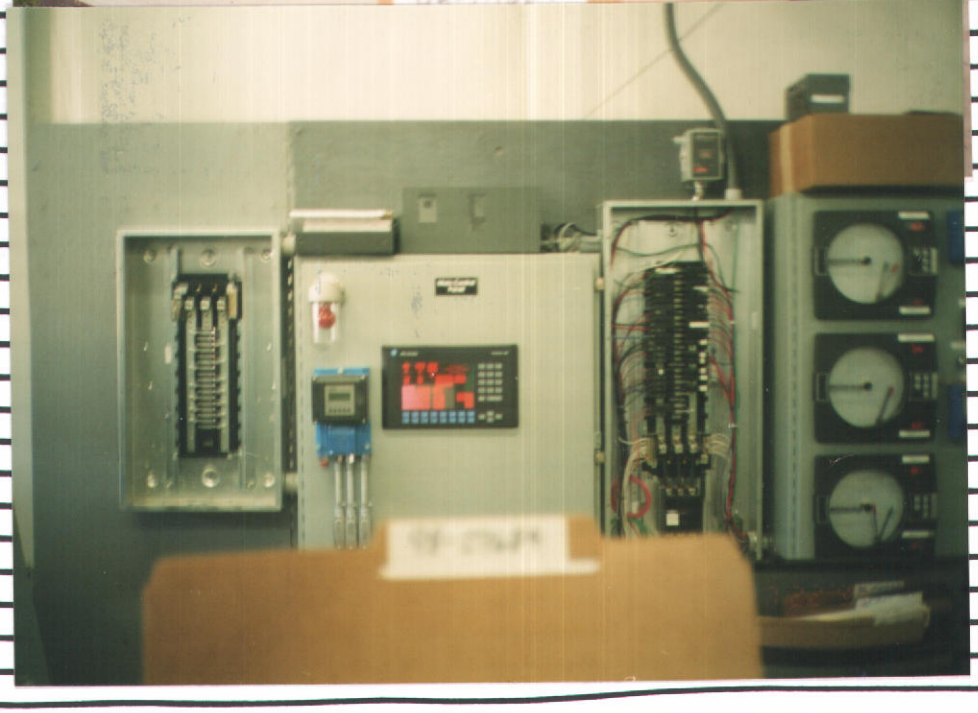
SITE PROFILE

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 1 FEB 1991 SHEET 6 OF 6

PERMIT # 98-07684







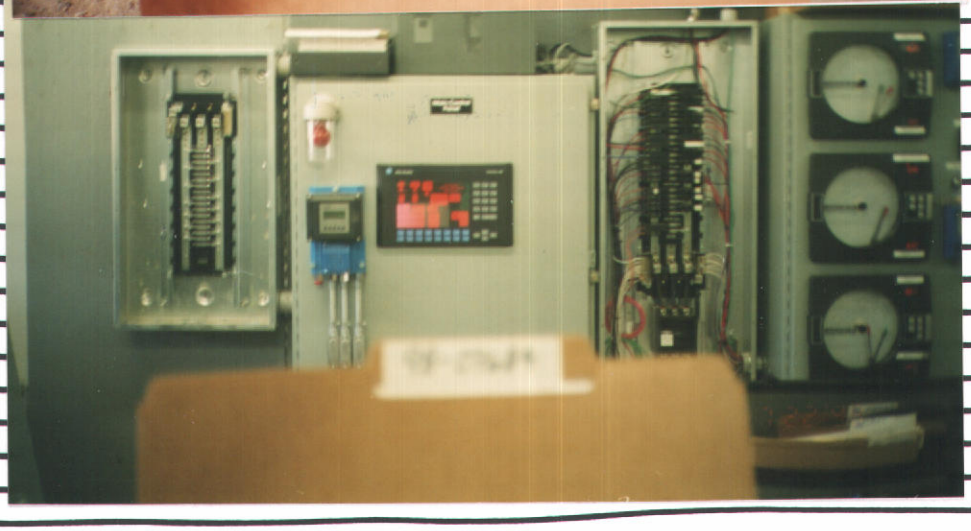
PP
Pipe Connection
to Pump
Motors

OVER →

PERMIT # 98-07684





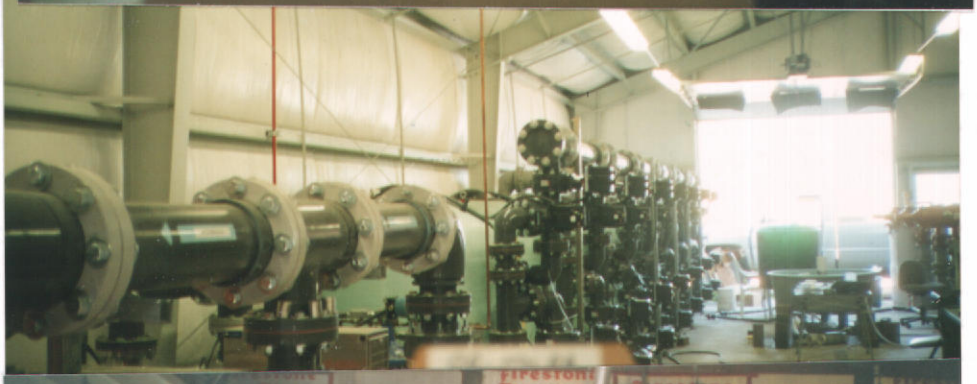


RP
Pipe Connection
to Pump Motors

OVER



Filters



Filters



Tanks



Filters



Filters



Tanks

PERMIT # 98-07684

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
FIELD REPORT SUPPLEMENT







Trucks

Tanks

Culture Tanks (Behind)

over →

PERMIT # 98-07684

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
FIELD REPORT SUPPLEMENT





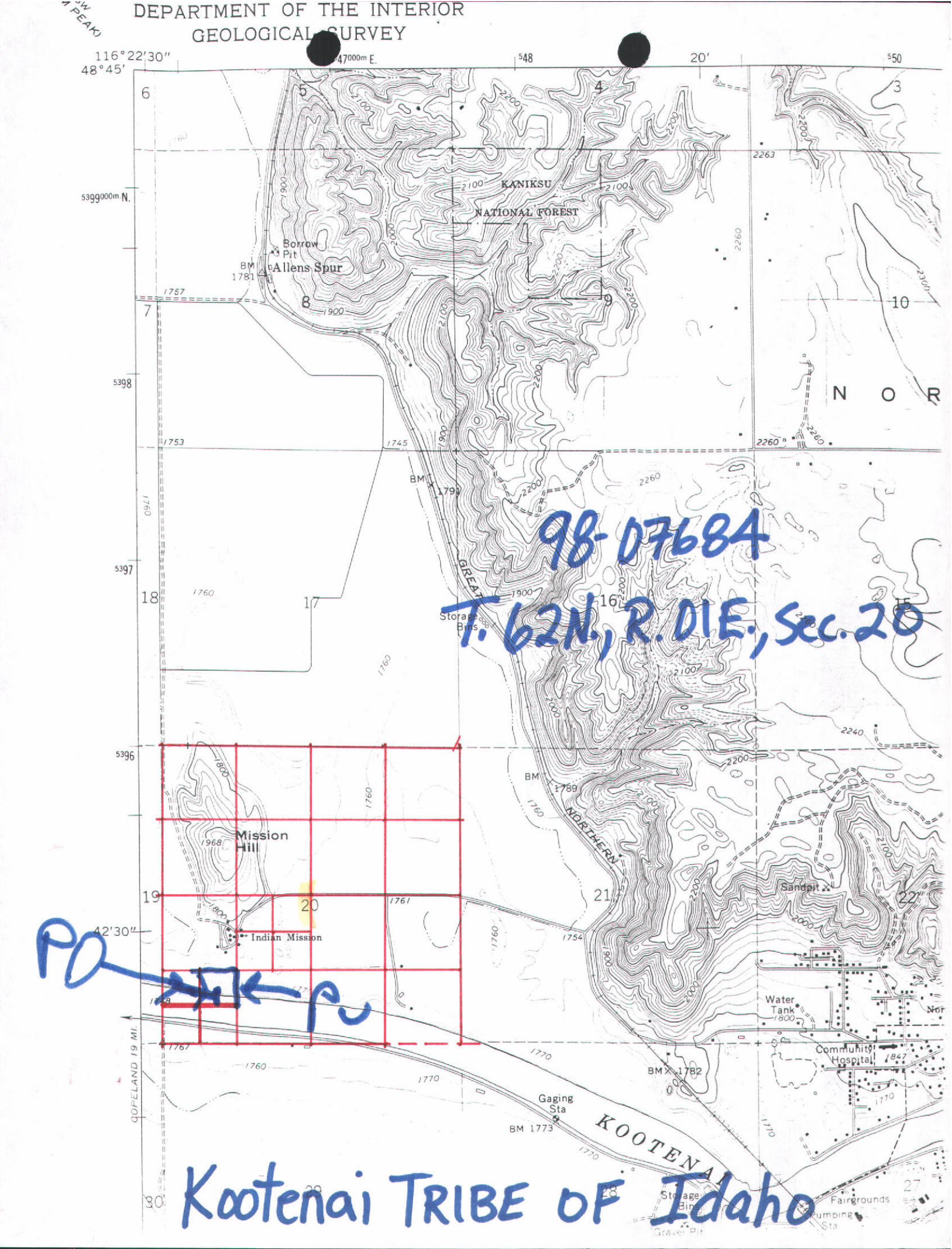


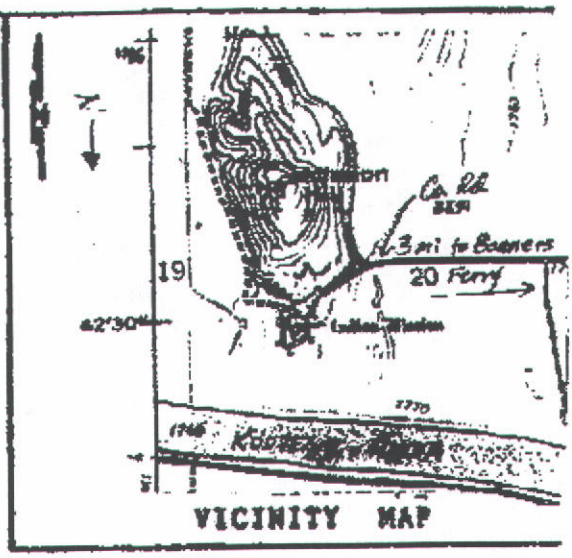
Tanks

Tanks

Culture Tanks (Rearing)

over →

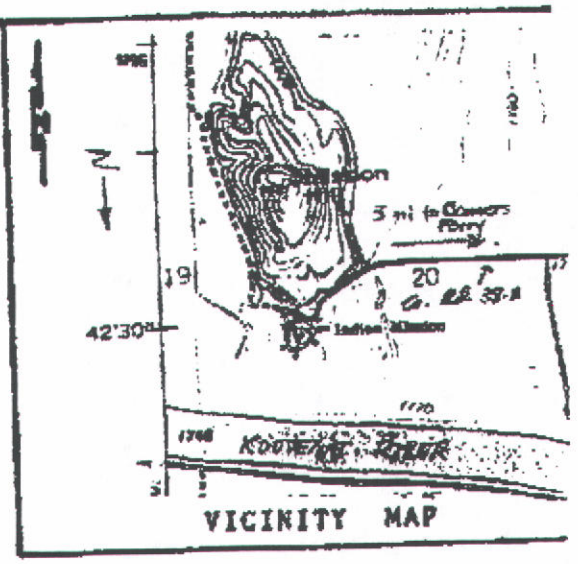

DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
116°22'30"
48°45'
547000m E.
548
20'
550
5399000m N.
5398
5397
5396
42'30"
KANIKSU
NATIONAL FOREST
Borrow Pit
Allens Spur
BM 1781
BM 1799
BM 1789
Storage Bins
GREAT NORTHERN
Mission Hill
1968
Indian Mission
Sandpit
Water Tank
1800
Community Hospital
1847
BM 1782
Gaging Sta
BM 1773
KOOTENAI
GOFELAND 19 MI.
Storage Bins
Fairgrounds
Pumping Sta
Gravel Pit
98-07684
T. 62N., R. 01E., Sec. 20
PO
Kootenai TRIBE OF Idaho



From

IN
IN/NEAR Bonners Ferry, Idaho
Boundary COUNTY,
DATE: 4/15/93 SHEET 1 OF 3
APPLICATION BY: Paul Anders
Kootenai Tribe of Idaho

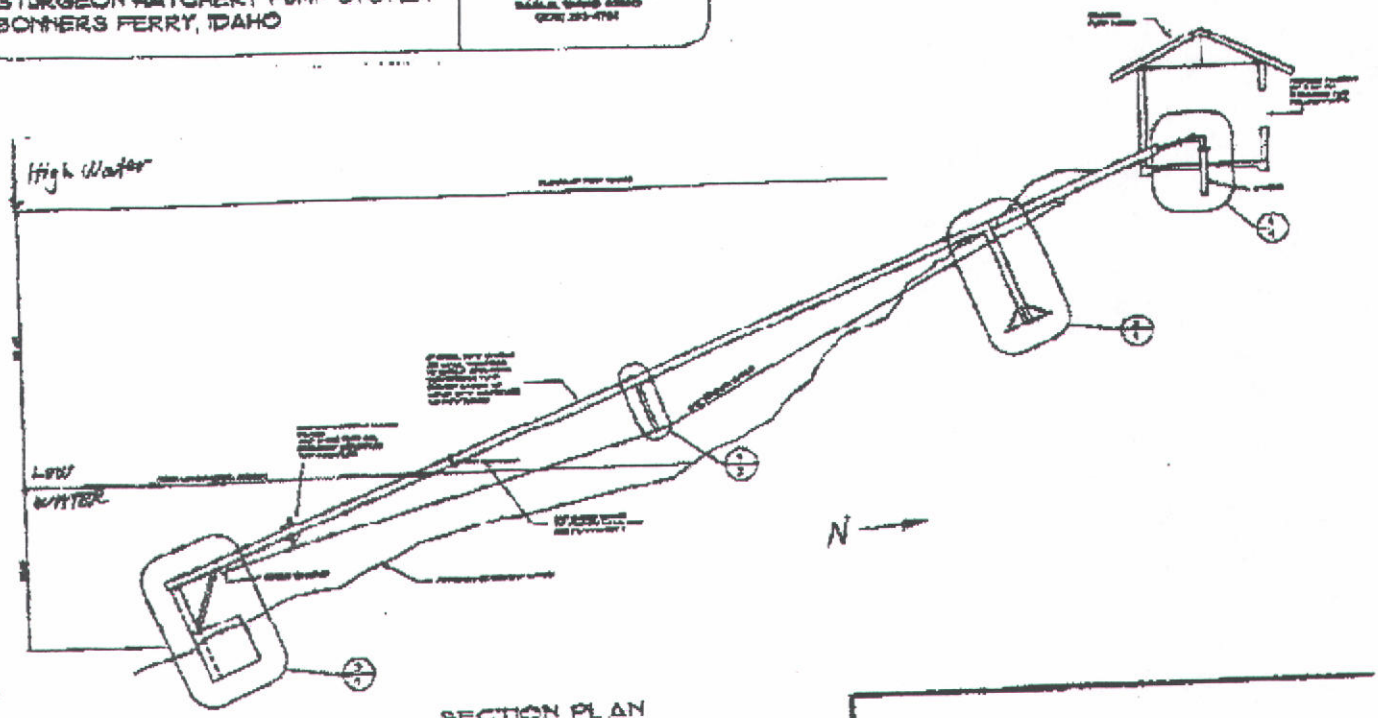
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JUN 14 1995



From

KOOTENAI TRIBE
STURGEON HATCHERY PUMP SYSTEM
BONNERS FERRY, IDAHO

PLANS BY:
JAMES CARNAHAN & ASSOCIATES

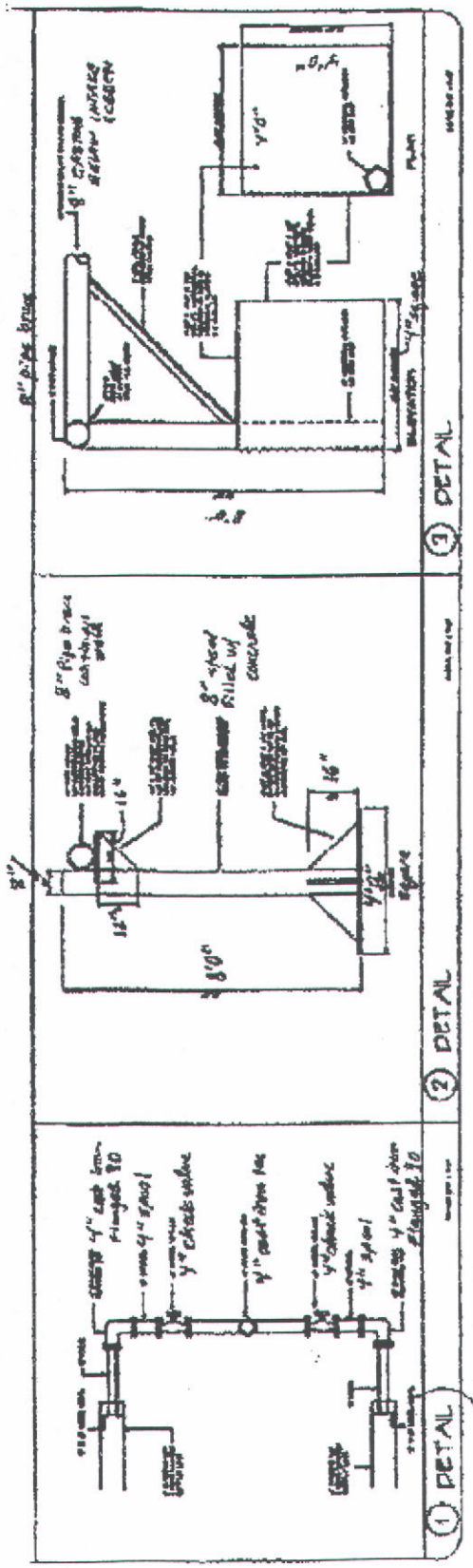


SECTION PLAN
SIDE VIEW

IN
IN/NEAR Bonners Ferry, Idaho
Boundary COUNTY,
DATE: 4/15/93 SHEET 2 OF 3
APPLICATION BY: Paul Anders
Kootenai Tribe of Idaho

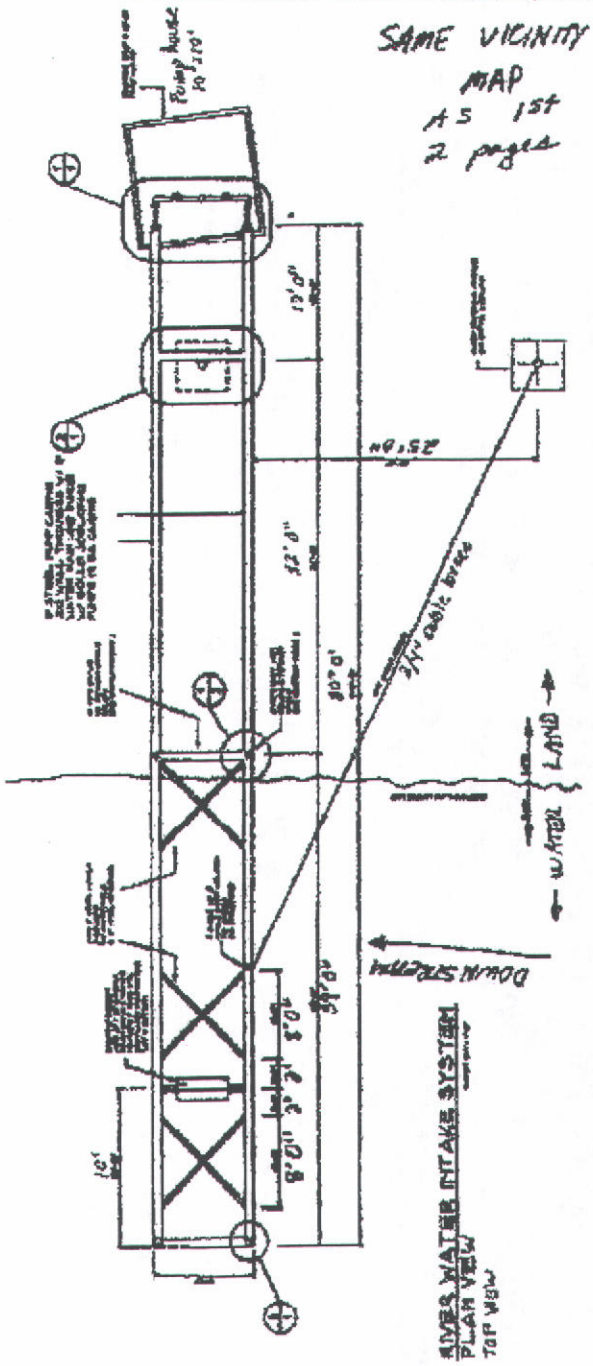
APPROVED
JUN 14 1995

SAME VICINITY MAP AS 1st 2 pages



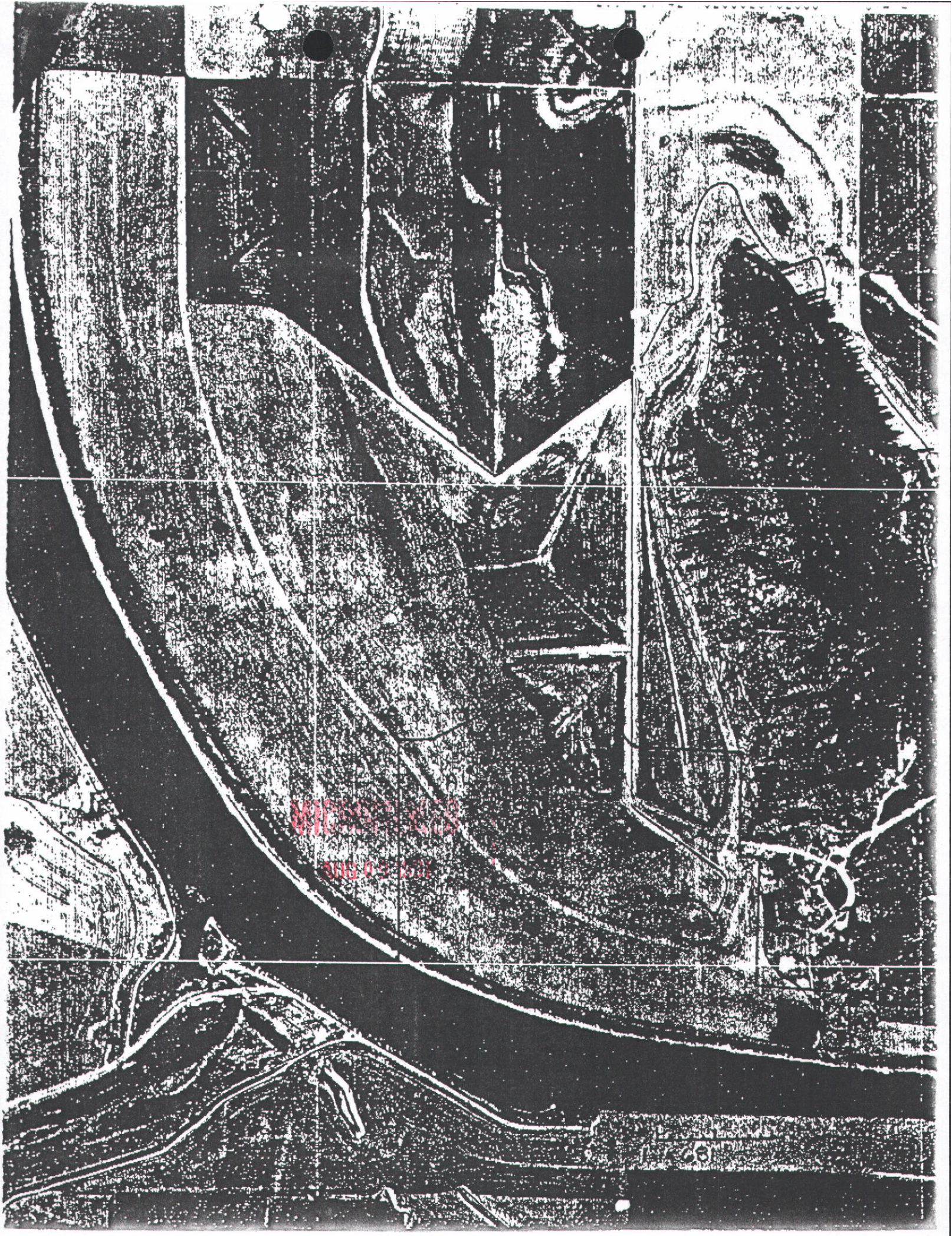
KOOTENAI TRIBE
STURGEON HATCHERY
BONNERS FERRY, IDAHO

PLAN
WATER INTAKE SYSTEM



IN:
IN/NEAR Bonners Ferry, Idaho
Boundary COUNTY.
DATE: 4/15/93 SHEET 3 OF 3
APPLICATION BY: Paul Anders
Kootenai Tribe of Idaho

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JUN 14 1995



Re: 98-07684

RECEIVED
JUL 22 1999
IDWR/North

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE
PHASE 1 BUILDING AND TREATMENT EQUIPMENT

BONNERS FERRY, IDAHO
FUNDED BY BONNEVILLE POWER ADMINISTRATION
1998

ENGINEER

J-U-B Engineers Surveyors Planners

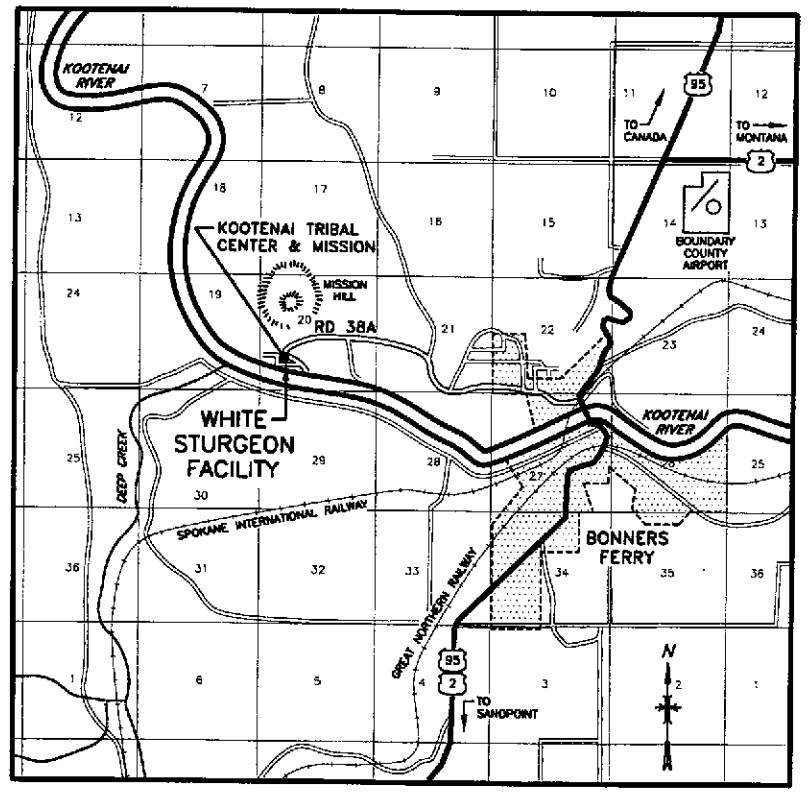
J-U-B ENGINEERS, INC.

1250 West Ironwood Drive, Suite 220 • Coeur d'Alene, Idaho 83814
Telephone (208) 667-1574
Fax (208) 667-2176

OWNER

KOOTENAI TRIBE
P.O. Box 1269
Bonners Ferry, Idaho 83805
Telephone (208) 267-3620
Fax (208) 267-1131

CHAIRPERSON	Velma Bahe
VICE CHAIRPERSON	Eileen Wheaton
SECRETARY	Dianne David
TREASURER	Raymond Abraham
COUNCIL MEMBER	Gary Aitken, Sr.
COUNCIL MEMBER	Mildred Aitken
COUNCIL MEMBER	Jennifer Bahe
FISHERIES BIOLOGIST/ADMINISTRATOR	Sue Ireland
HATCHERY MANAGER	Jack Siple



VICINITY MAP

APPROVAL

BY: _____

DATE: _____

INDEX OF SHEETS

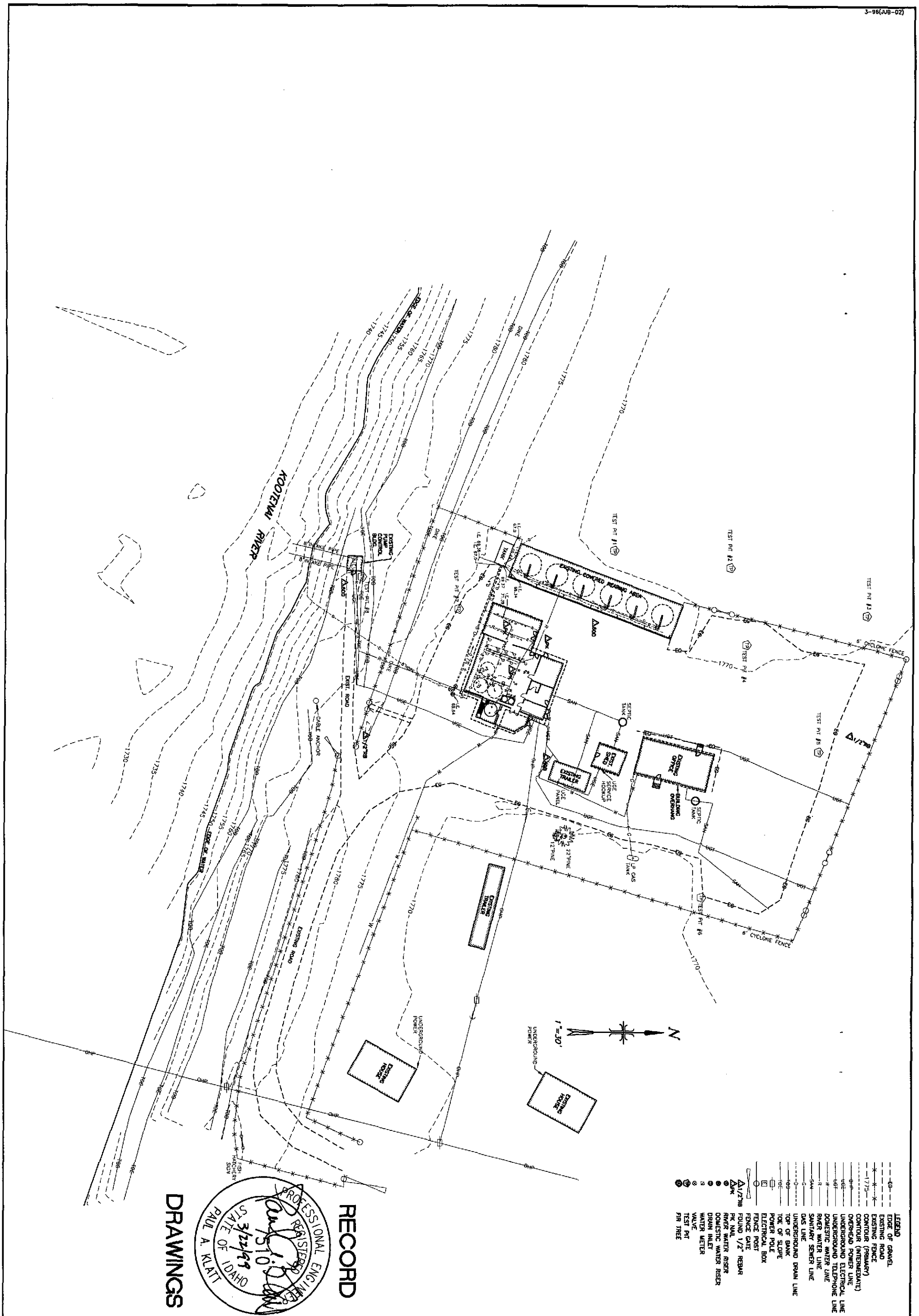
RC1	COVER SHEET
RC2	EXISTING SITE PLAN
RC3	NEW SITE PLAN
RC3A	RIVER INTAKE PLAN AND SECTIONS
RC4	PUMP STATION PLAN AND SECTIONS
RC5	PUMP STATION DETAILS
RC6	TREATMENT BUILDING MECHANICAL PLAN
RC7	TREATMENT BUILDING MECHANICAL SECTIONS
RC8	TREATMENT BUILDING ELEVATIONS AND DETAILS
RC9	TREATMENT BUILDING FOUNDATION PLAN
RC10	STEEL BUILDING STRUCTURAL DETAILS AND NOTES
RC11	SHOP/STORAGE BUILDING ELEVATIONS
RC12	SHOP/STORAGE BUILDING FOUNDATION PLAN
RC13	EXISTING HATCHERY MODIFICATIONS
RC14	TYPICAL DETAILS
RP1	PROCESS AND INSTRUMENTATION DIAGRAM
RP2	PROCESS CONTROL DESCRIPTION
RM1	INCUBATION WATER TEMPERATURE CONTROL SCHEMATIC
RM2	BOILER MECHANICAL AND CONTROL SCHEMATIC
RE1	ELECTRICAL SITE PLAN
RE2	GENERATOR AND PANEL ROOM
RE3	TREATMENT BUILDING ELECTRICAL AND HVAC
RE4	PANEL BOARD SCHEDULE AND ONE-LINE DIAGRAMS

RECORD DRAWINGS

F:\PROJECTS\20329\dwgs\RECORD\20329COV-R.dwg Fri Feb 26 09:41:40 1999 TLR

F:\PROJECTS\20329\dwgs\RECORD\20329R-EXB.dwg Fri Feb 26 09:43:34 1999 TLR

3-96(JUB-02)



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1	RECORD DRAWINGS	JW/TR	PAK	2.19.99

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY

PHASE 1 IMPROVEMENTS
EXISTING SITE PLAN

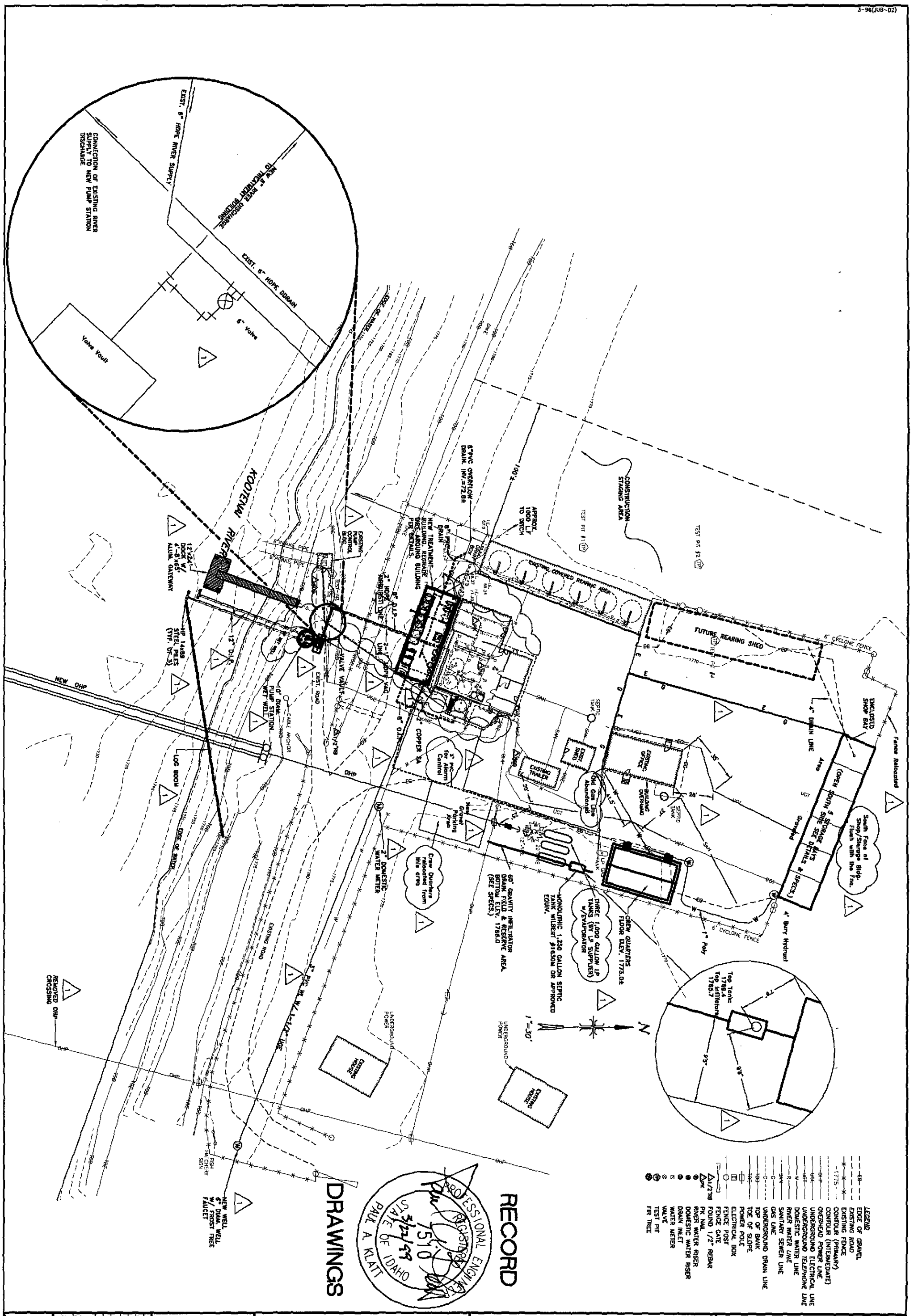
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ENGINEERS•SURVEYORS•PLANNERS
1250 IRONWOOD DRIVE
SUITE 220
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1574
FAX: 208-667-2176

DRAWN BY: TLR
DESIGN BY: PAK
CHECKED BY: PAK
ARCHIVE LOCALE:
PROJECT NO. 20329
DRAWING NO.
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ONE INCH
AT FULL SIZE IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET: 1"=30'
HOR SCALE: 1"=30'
VER SCALE: NONE

SHEET RC2 OF 22

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3-96(JUB-D2)



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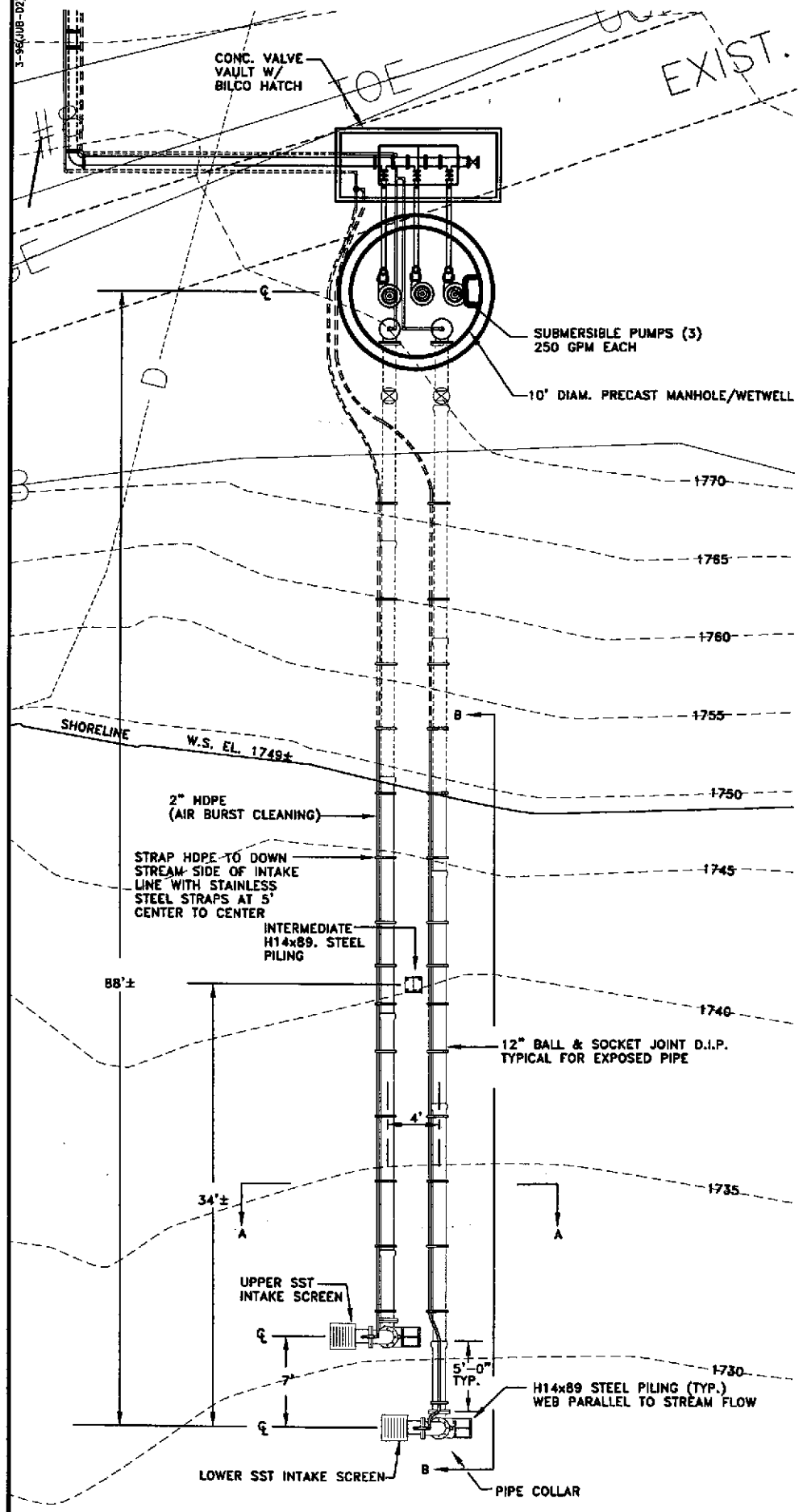
KOOTENAI TRIBE OF IDAHO WHITE STURGEON HATCHERY

NEW SITE PLAN

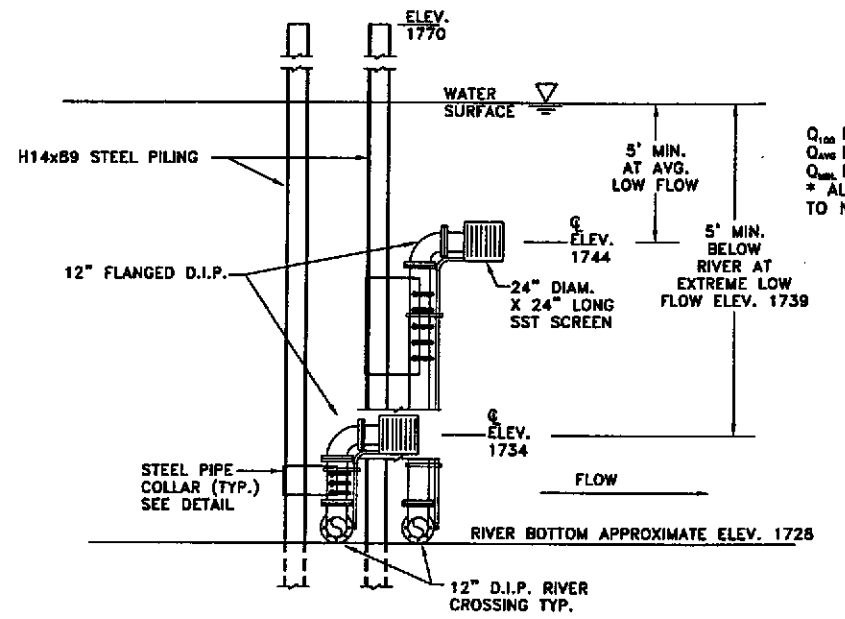
J-U-B ENGINEERS, Inc.
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1250 IRONWOOD DRIVE
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PHONE: 208-667-1574
FAX: 208-667-2176

DRAWN BY: TLR
DESIGN BY: PAK
CHECKED BY: PAK
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PROJECT NO. 20329
DRAWING NO.
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AT FULL SIZE. IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: 1"=30'
VER SCALE: NONE

SHEET RC3 OF 20

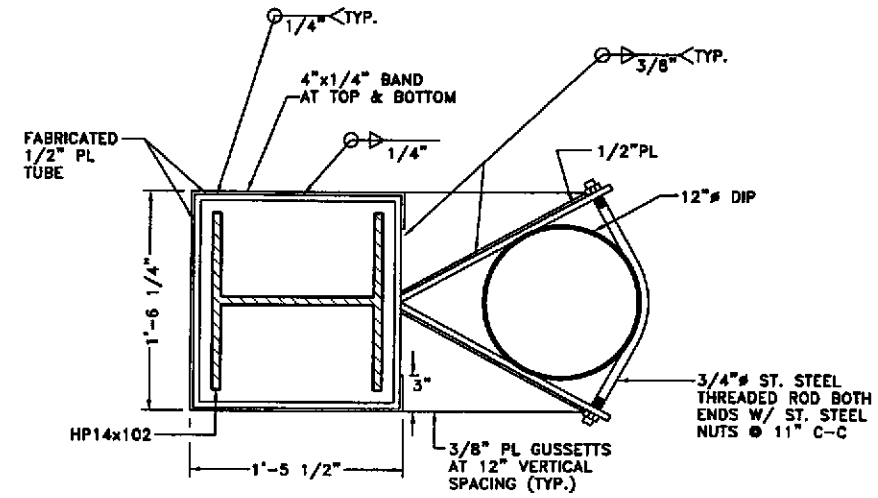


PUMP STATION PLAN VIEW
SCALE 1"=6'

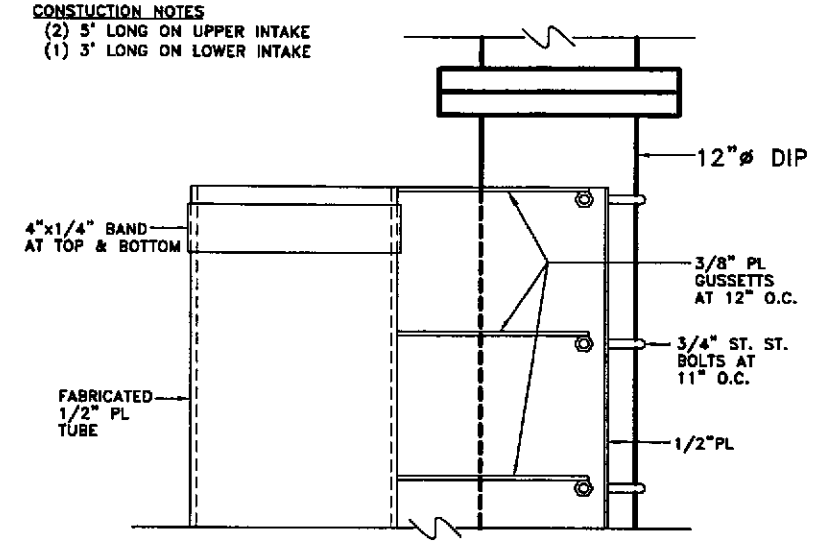


Q_{100} ELEV. = 1768*
Q_{AVG} ELEV. = 1747±*
Q_{MIN} ELEV. = 1739*
* ALL ELEVATION TO NGVD 1929 DATUM

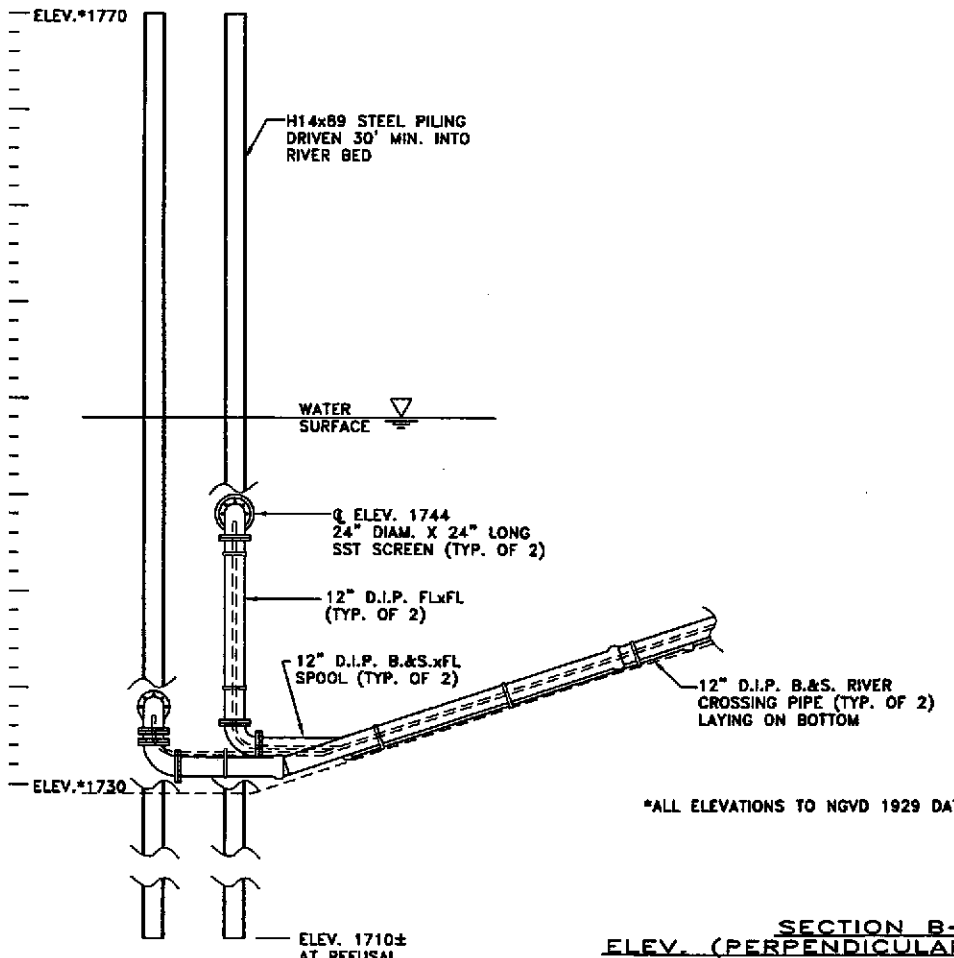
SECTION A–A
ELEV.(PARALLEL TO FLOW & SHORE)
SCALE 1"=5'
INSERT/PLOT 1=5



CONSTUCTION NOTES
(2) 5' LONG ON UPPER INTAKE
(1) 3' LONG ON LOWER INTAKE



VERTICAL INTAKE PIPE COLLAR
SCALE 1-1/2"=1'-0"
INSERT/PLOT 1=8
ACAD: COLLAR.DWG



*ALL ELEVATIONS TO NGVD 1929 DATUM

SECTION B–B
ELEV. (PERPENDICULAR TO SHORE)
SCALE 1"=5'
INSERT/PLOT 1=5
ACAD: WELL-SECBBA.DWG

RECORD

DRAWINGS

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

RIVER INTAKE PLAN AND SECTIONS

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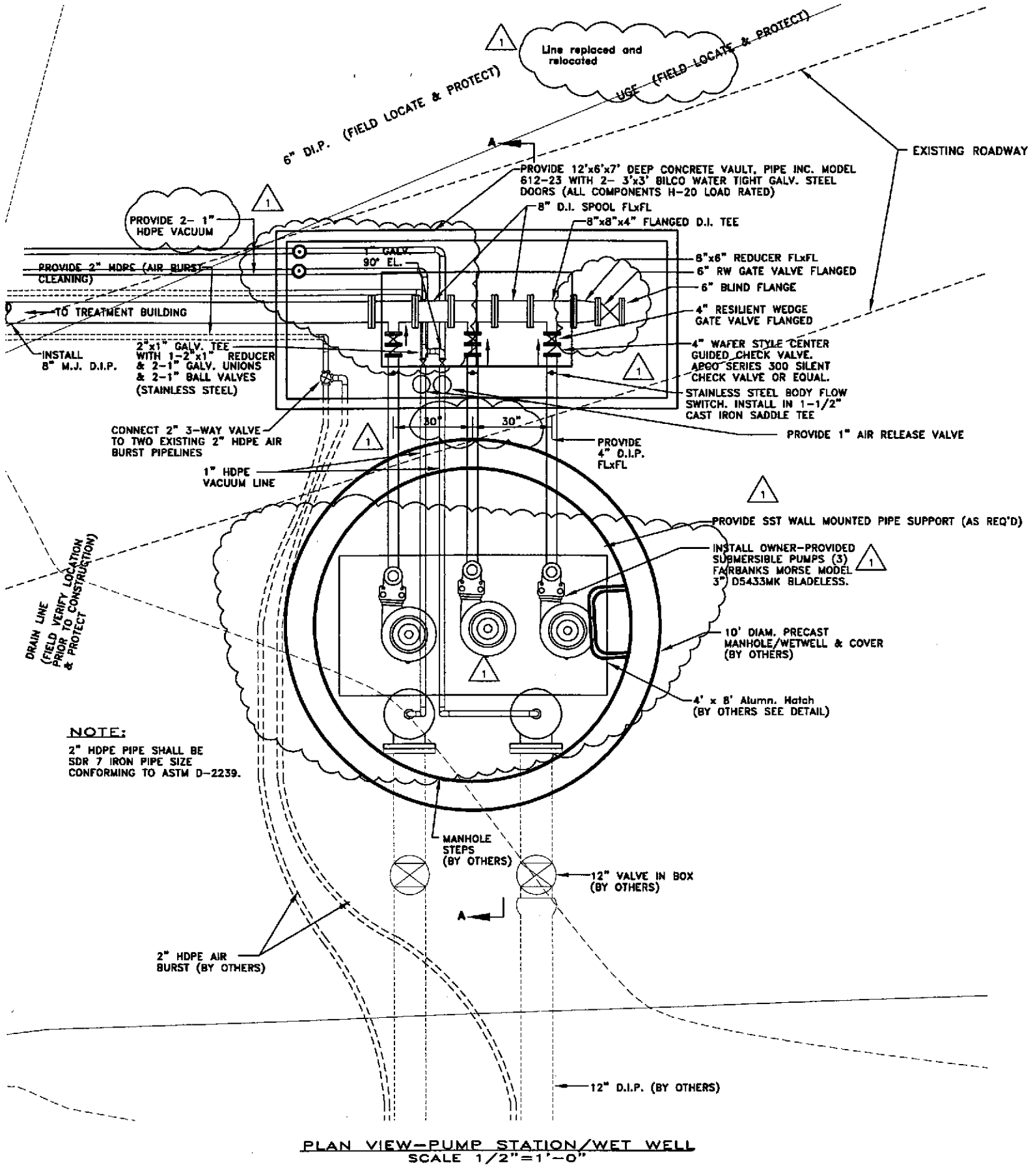
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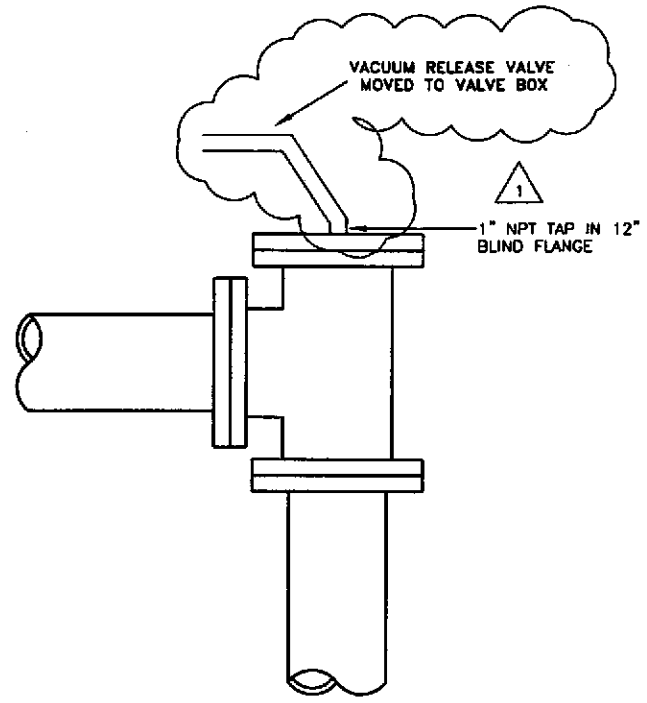
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PROJECT NO.	20329
DRAWING NO.	
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ONE INCH	
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY	
SCALE OF SHEET	
HOR SCALE:	x
VER SCALE:	NONE

SHEET RC3A OF 22

F:\PROJECTS\20329\dwgs\RECORD\20329DET1R.dwg Fri Feb 26 10:03:04 1999 TLR



PLAN VIEW-PUMP STATION/WET WELL
SCALE 1/2"=1'-0"



AIR VALVE DETAIL
NOT TO SCALE
INSERT/PLOT 1=1
ACAD: AIRVALVE.DWG

RECORD

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

PUMP STATION PLAN AND SECTIONS

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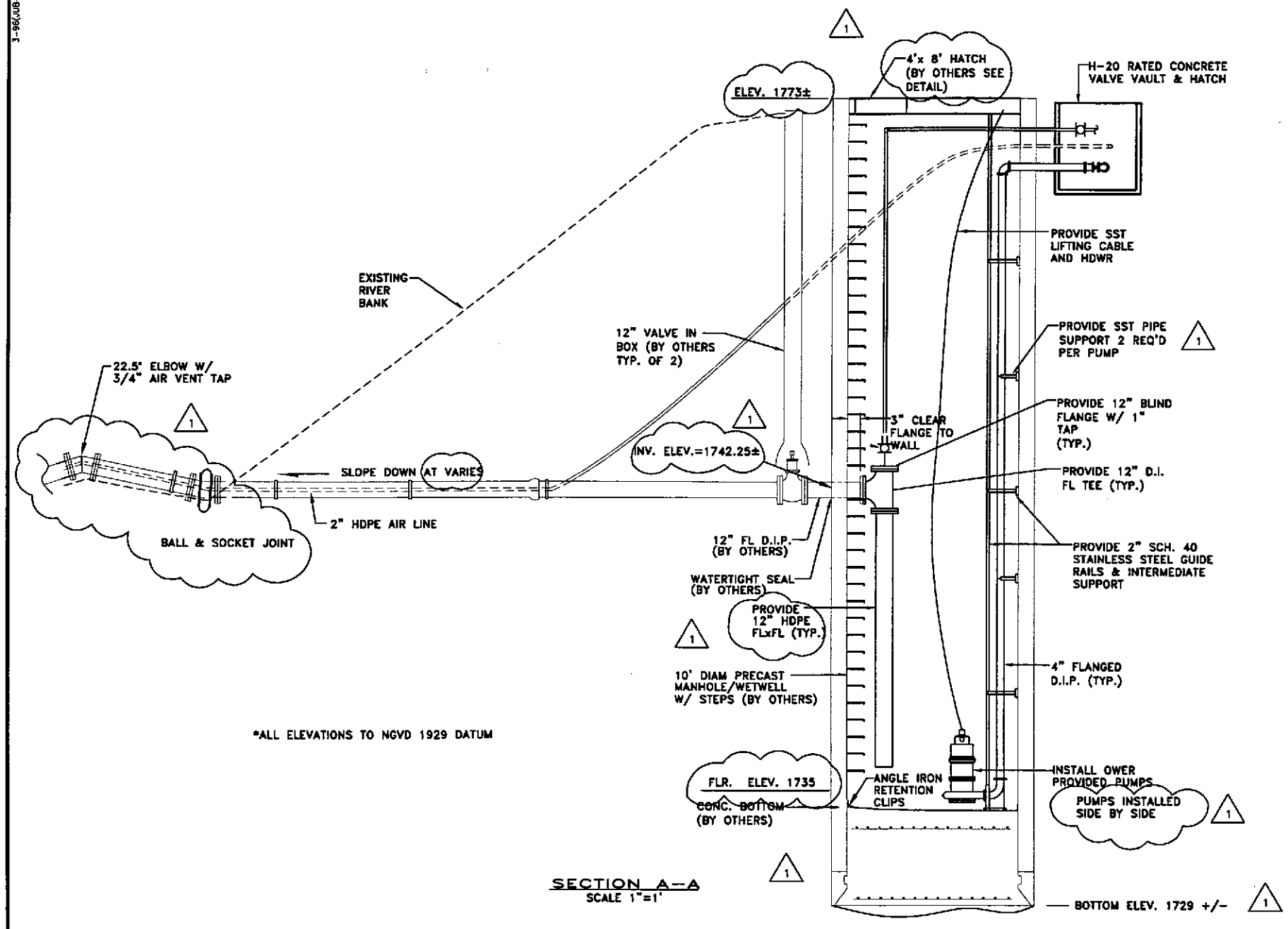
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PROJECT NO.	20329
DRAWING NO.	
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SCALE OF SHEET	
HOR SCALE:	x
VER SCALE:	NONE

SHEET RC4 OF 22

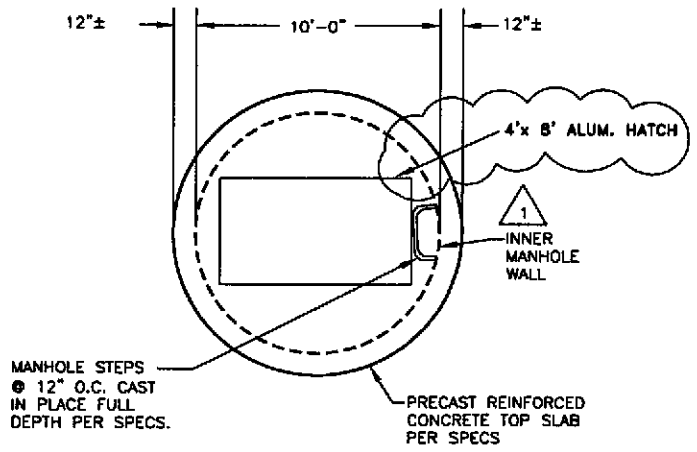
3-86(JUB-02)

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SECTION A-A
SCALE 1"=1'

*ALL ELEVATIONS TO NGVD 1929 DATUM



TOP SLAB DETAIL
SCALE: 1/4"=1'-0"

RECORD

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

PUMP STATION SECTIONS AND DETAILS

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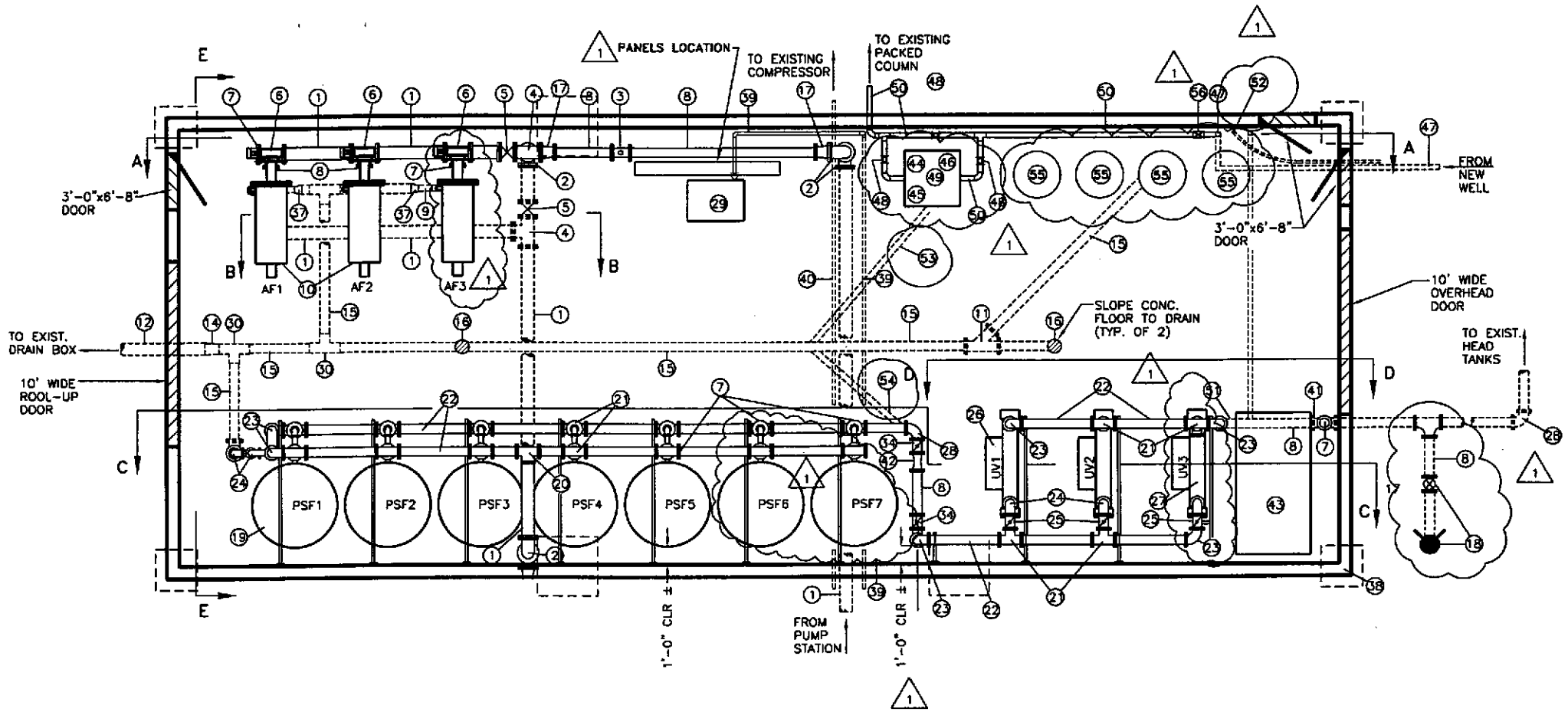
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3/22/99

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DRAWING NO.	
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ONE INCH	
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY	
SCALE OF SHEET	
HOR SCALE:	x
VER SCALE:	NONE

SHEET RC5 OF 22

3-96(JUB-D2)

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BUILDING LAYOUT PLAN VIEW

SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48
ACAD:BLDG-PLAN.DWG

EQUIPMENT LIST

ALL PIPE AND FITTINGS FLANGED SCH. 80 PVC UNLESS NOTED OTHERWISE.
CONSULT MANUFACTURERS DETAIL DRAWINGS FOR FINAL LAYOUT/DIMENSIONS.
CONSULT SPECIFICATIONS FOR EQUIPMENT AND MATERIAL REQUIREMENTS.
SEE SHEET M1 AND SPECS FOR BOILER/HEAT EXCHANGERS.

1. 8" D.I.P.
2. 8" D.I. 90° EL
3. 6" MAGNETIC FLOW METER W/ REPLACEMENT SPOOL PIECE
4. 8" D.I. TEE
5. 8" GATE D.I. VALVE (IN BOX WHEN BURIED)
6. 8"x8"x6" D.I. TEE
7. BLIND FLANGE
8. 6" D.I.P.
9. 4" PVC DRAIN PIPE
10. AMIAD PRESSURE FILTER (TYP. OF 3) 1
11. 6"x6"x6" WYE
12. 8" PVC DRAIN PIPE
13. 6"x6"x4" PVC WYE
14. 8"x6" PVC REDUCER
15. 6" PVC DRAIN PIPE
16. FLOOR DRAIN
17. 8"x6" D.I. REDUCER
18. FIRE HYDRANT ASSEMBLY W/ GATE VALVE
19. 55" PRESSURE SAND FILTER (TYP. OF 7) 1
20. 8"x6"x6" D.I. TEE
21. 6"x6"x4" TEE (TYP.)
22. 6" PVC (TYP.)
23. 6" PVC 90° EL
24. 4" PVC 90° EL
25. 4" MANUAL BUTTERFLY VALVE
26. ULTRAVIOLET DISINFECTION UNIT (TYP. OF 3) 1
27. 4" PVC
28. 6" D.I. 90° EL
29. DUPLEX VACUMM PUMP AND RECEIVER TANK
30. 6" PVC TEE
31. 4" MOTOR ACTUATED VALVE (TYP. OF 10)
32. UNISTRUT PIPE SUPPORTS @ 5'-0" O.C. MAX.
33. 6" AMIAD CHECK VALVE
34. 6" D.I. BUTTERFLY VALVE
35. 4" TEE
36. 6"x6"x4" D.I. TEE
37. 6"x4" REDUCER
38. PRE-ENGINEERED STEEL BUILDLING & FOOTINGS
39. 2" PVC VACUUM PIPING (IN 4" PVC SLEEVE WHEN UNDER SLAB)
40. 2" HDPE CA PIPING (IN 4" PVC SLEEVE WHEN UNDER SLAB)
41. 6" D.I. TEE
42. 6" FLOW CONTROL VALVE W/ REPLACEMENT SPOOL PIECE
43. DUPLEX AIR COMPRESSOR ON 200 GALLON TANK 1
44. WELL WATER HEAT EXCHANGER
45. BOILER WATER HEAT EXCHANGER
46. BOILER
47. 3" PIPE AND FITTINGS
48. 3" BALL VALVE
49. DUPLEX INCUBATION BOOSTER PUMP SKID
50. INSULATED 3" PIPE & FITTINGS
51. SADDLE TAP

1
52. 2" POLY - WATER DIST. SERVICE
53. HEAT EXCHANGER DRAIN
54. CLA-VALVE DRAIN
55. CHARCOAL FILTER
56. 2" FLOW METER

RECORD

PROFESSIONAL ENGINEER REGISTERED 7510 3/22/99 STATE OF IDAHO PAUL A. KLATT

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PHONE: 208-667-1574
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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

TREATMENT BUILDING
MECHANICAL PLAN

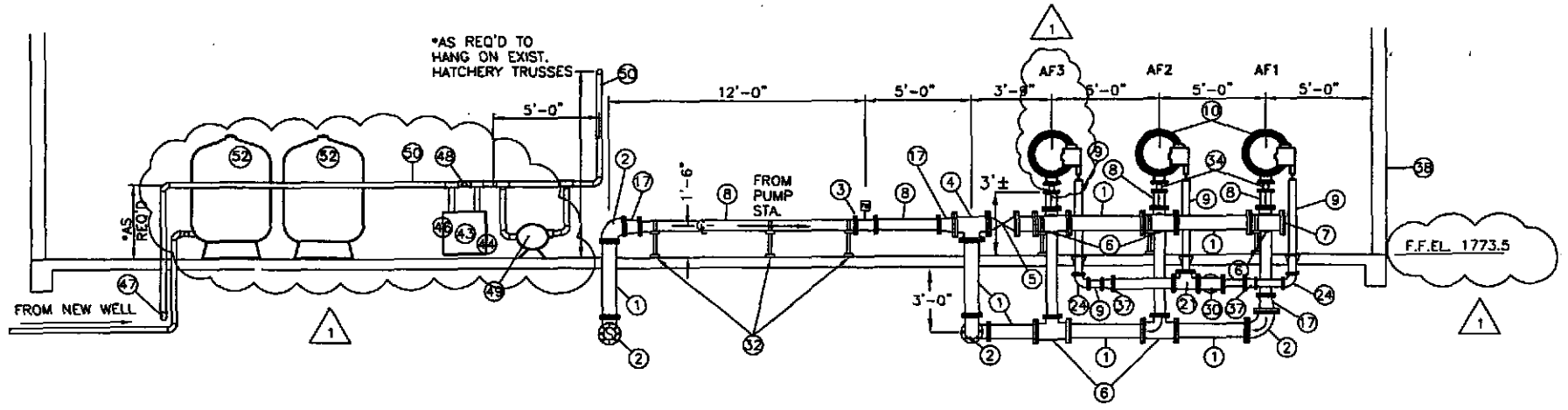
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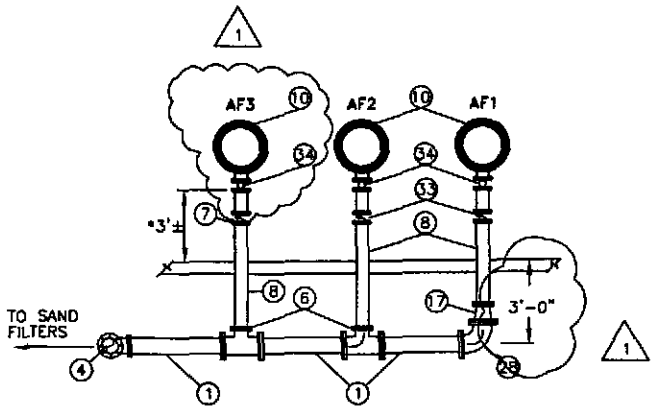
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AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RC6 OF 22

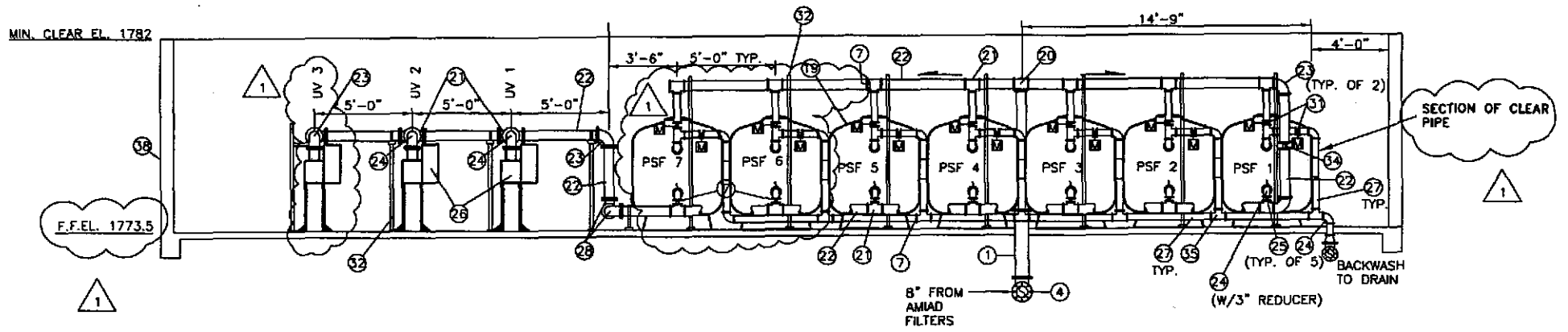
3-96(AUB-02)
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SECTION A-A
INLET SIDE (RAW WATER)
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48



SECTION B-B
OUTLET SIDE (SCREENED WATER)
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48

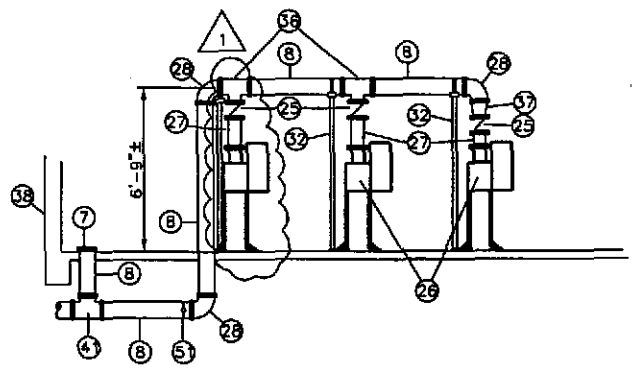


SECTION C-C
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48

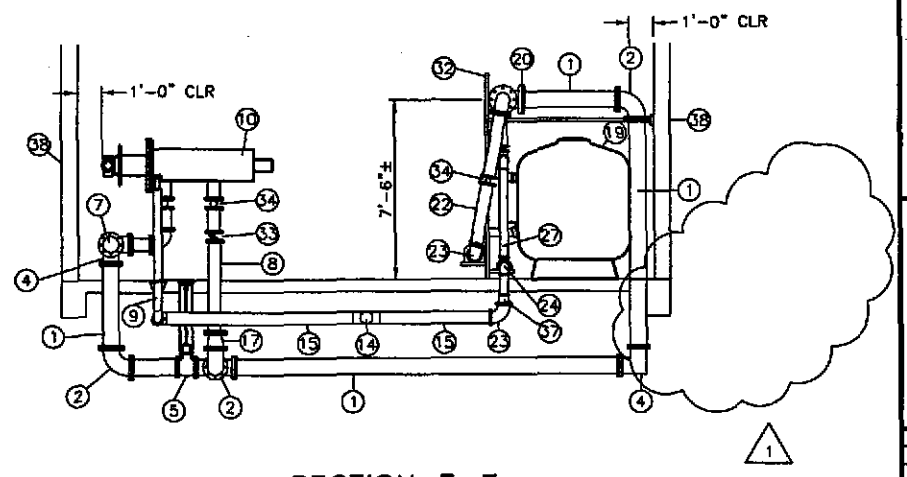
EQUIPMENT LIST

ALL PIPE AND FITTINGS FLANGED SCH. 80 PVC UNLESS NOTED OTHERWISE.
CONSULT MANUFACTURERS DETAIL DRAWINGS FOR FINAL LAYOUT/DIMENSIONS.
CONSULT SPECIFICATIONS FOR EQUIPMENT AND MATERIAL REQUIREMENTS.
SEE SHEET M1 AND SPECS FOR BOILER/HEAT EXCHANGERS.

1. 8" D.I.P.
2. 8" D.I. 90° EL
3. 6" MAGNETIC FLOW METER W/ REPLACEMENT SPOOL PIECE
4. 8" D.I. TEE
5. 8" GATE D.I. VALVE (IN BOX WHEN BURIED)
6. 8"x8"x6" D.I. TEE
7. BLIND FLANGE
8. 6" D.I.P.
9. 4" PVC DRAIN PIPE
10. AMIAD PRESSURE FILTER (TYP. OF 2)
11. 6"x6"x6" WYE
12. 8" PVC DRAIN PIPE
13. 6"x6"x4" PVC WYE
14. 8"x6" PVC REDUCER
15. 6" PVC DRAIN PIPE
16. FLOOR DRAIN
17. 8"x6" D.I. REDUCER
18. FIRE HYDRANT ASSEMBLY W/ GATE VALVE
19. 55" PRESSURE SAND FILTER (TYP. OF 5)
20. 8"x6"x6" D.I. TEE
21. 6"x6"x4" TEE (TYP.)
22. 6" PVC (TYP.)
23. 6" PVC 90° EL
24. 4" PVC 90° EL
25. 4" MANUAL BUTTERFLY VALVE
26. ULTRAVIOLET DISINFECTION UNIT (TYP. OF 2)
27. 4" PVC
28. 6" D.I. 90° EL
29. DUPLEX VACUMM PUMP AND RECEIVER TANK
30. 6" PVC TEE
31. 4" MOTOR ACTUATED VALVE (TYP. OF 10)
32. UNISTRUT PIPE SUPPORTS @ 5'-0" O.C. MAX.
33. 6" AMIAD CHECK VALVE
34. 6" D.I. BUTTERFLY VALVE
35. 4" TEE
36. 6"x6"x4" D.I. TEE
37. 6"x4" REDUCER
38. PRE-ENGINEERED STEEL BUILDLING & FOOTINGS
39. 2" PVC VACUUM PIPING (IN 4" PVC SLEEVE WHEN UNDER SLAB)
40. 2" HDPE CA PIPING (IN 4" PVC SLEEVE WHEN UNDER SLAB)
41. 6" D.I. TEE
42. 6" FLOW CONTROL VALVE W/ REPLACEMENT SPOOL PIECE
43. FUTURE HEAT EXCHANGER
44. WELL WATER HEAT EXCHANGER
45. BOILER WATER HEAT EXCHANGER
46. BOILER
47. 3" PIPE AND FITTINGS
48. 3" BALL VALVE
49. DUPLEX INCUBATION BOOSTER PUMP SKID
50. INSULATED 3" PIPE & FITTINGS
51. SADDLE TAP
52. CHARCOAL FILTER (TYP. OF 4)



SECTION D-D
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48
ACAD:SEC-DD.DWG



SECTION E-E
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48

RECORD DRAWINGS

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J-U-B ENGINEERS, Inc.
ENGINEERS•SURVEYORS•PLANNERS
1250 IRONWOOD DRIVE
SUITE 220
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1574
FAX: 208-667-2176

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

TREATMENT BUILDING
MECHANICAL SECTIONS

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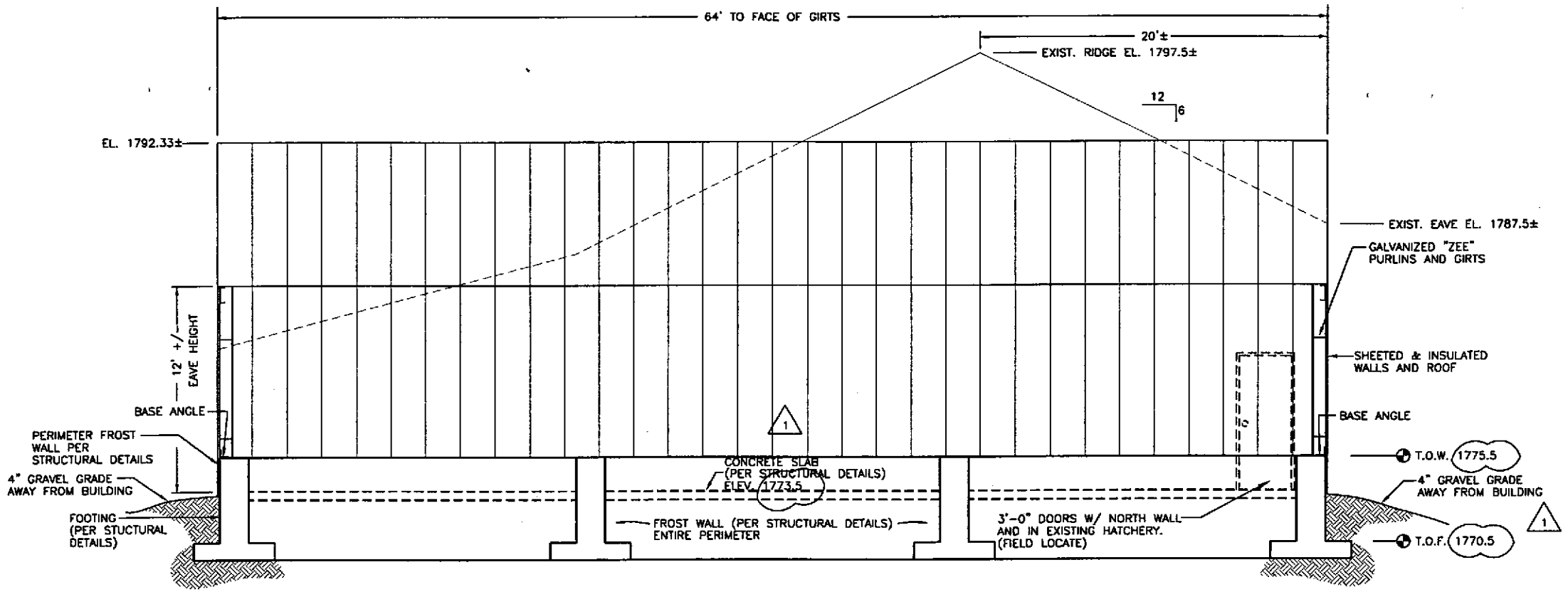
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1	RECORD DRAWINGS	2.19.99	JW/TR

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DESIGN BY: PAK/DE
CHECKED BY: PAK/DE
ARCHIVE LOCALE:
PROJECT NO. 20329
DRAWING NO.
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ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

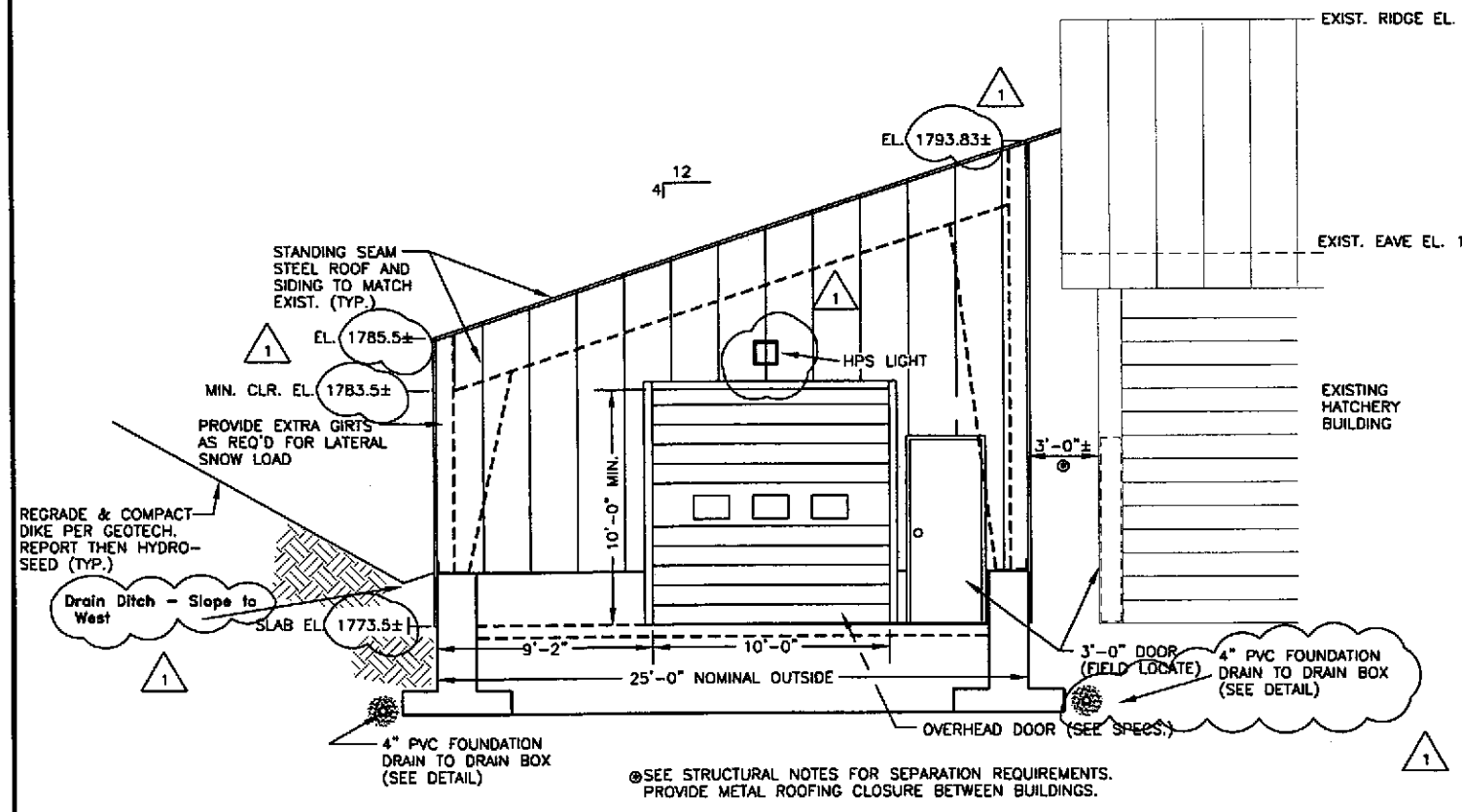
SHEET RC7 OF 22

3-96(JUB-132)

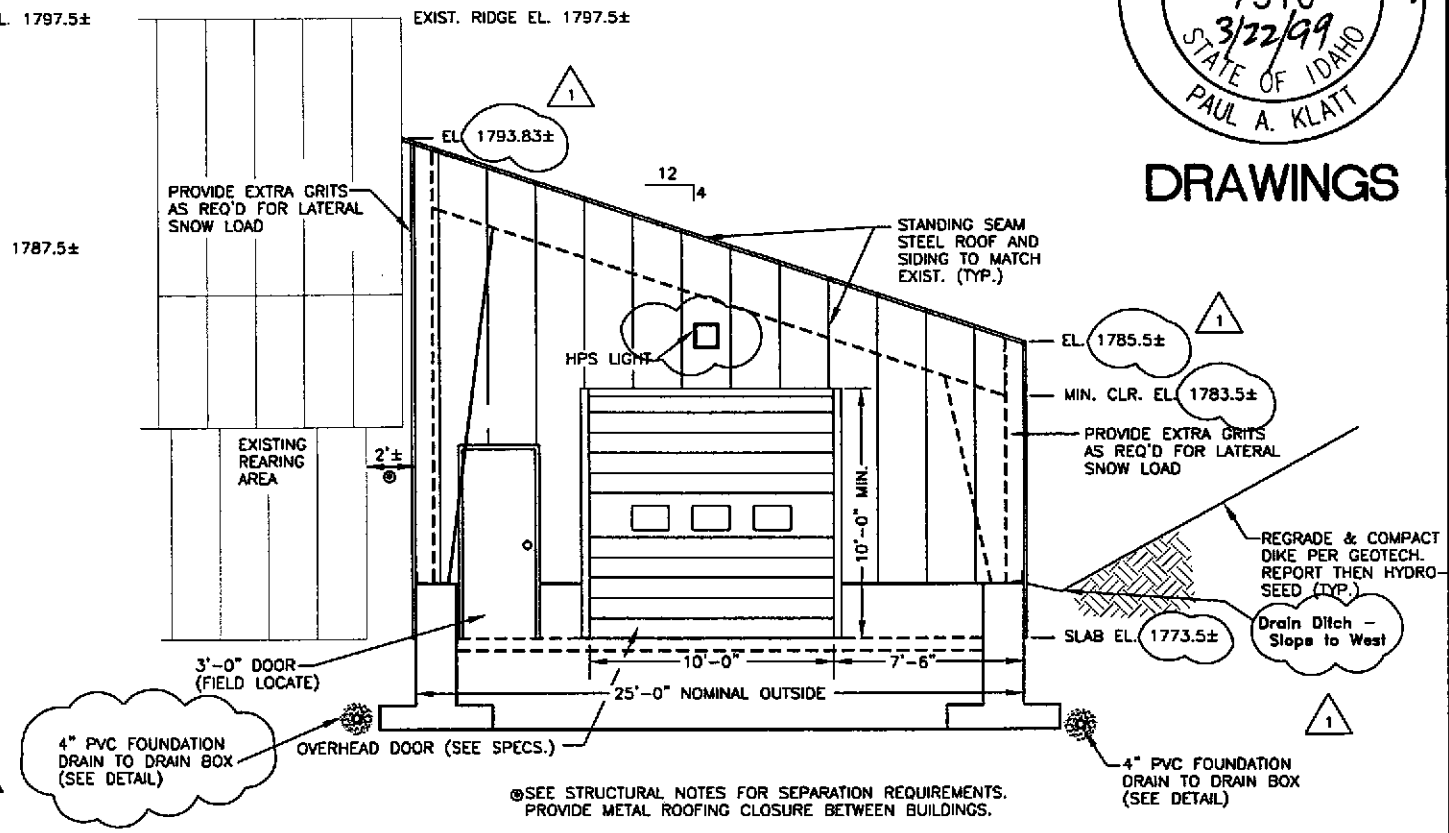
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TREATMENT BUILDING SOUTH ELEVATION
SCALE: 1/4" = 1'-0"
PLOT/INSERT 1=48



TREATMENT BUILDING - EAST ELEVATION
SCALE: 1/4" = 1'-0"
PLOT/INSERT 1=48



TREATMENT BUILDING - WEST ELEVATION
SCALE: 1/4" = 1'-0"
PLOT/INSERT 1=48

RECORD

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

TREATMENT BUILDING
ELEVATIONS AND DETAILS

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NO.	DESCRIPTION	BY	APP.	DATE
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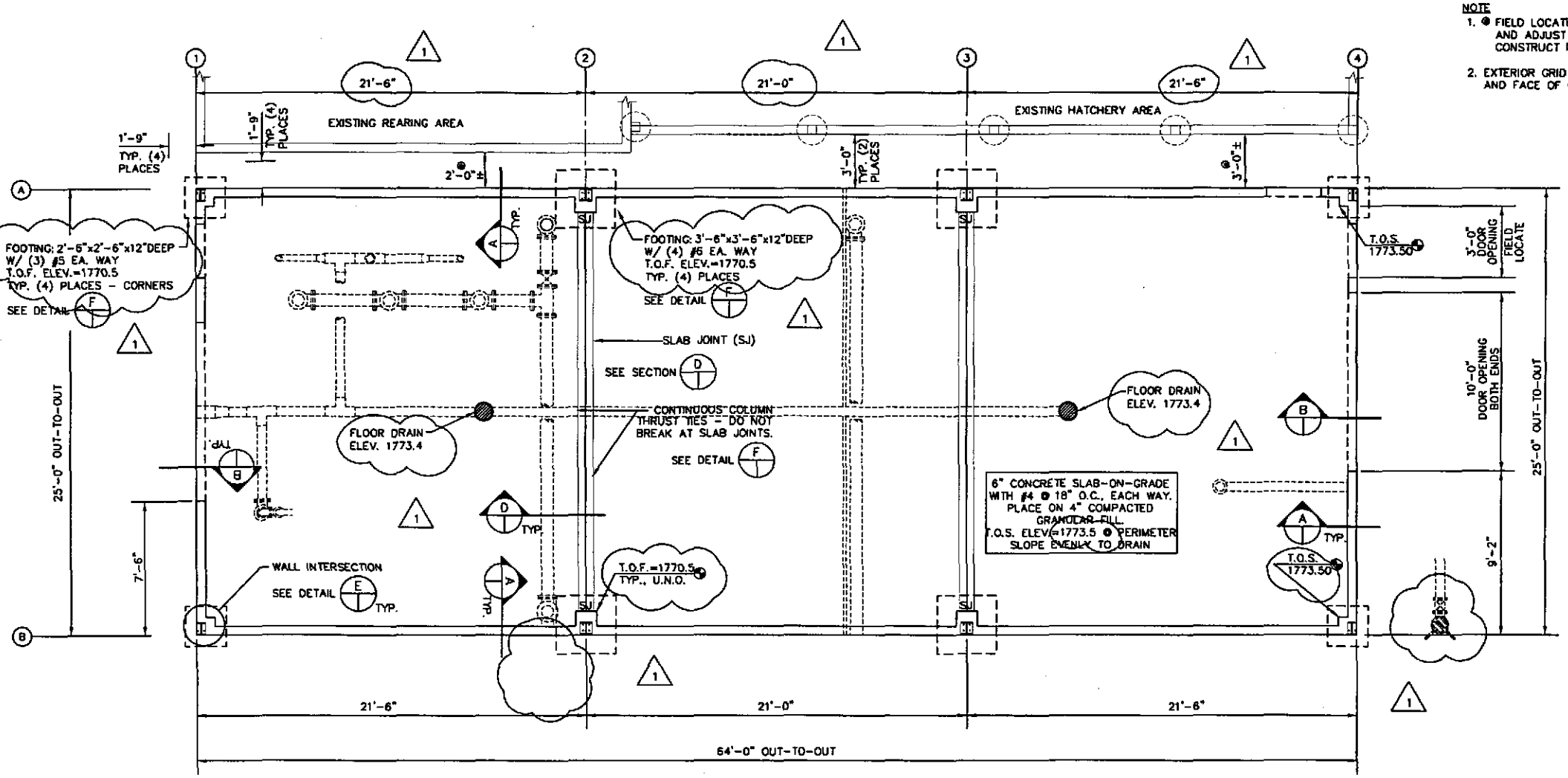
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DESIGN BY: PAK
CHECKED BY: PAK
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PROJECT NO. 20329
DRAWING NO.
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AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: N
VER SCALE: NONE

SHEET RC8 OF 22

3-95(JUB-02)
F:\PROJECTS\20329\dwgs\RECORD\329-BLD3R.dwg Fri Feb 26 10:10:14 1999 TLR

3-96(JUB-02)



NOTE
1. @ FIELD LOCATE EXISTING POLE BUILDING FOOTING AND ADJUST DIMENSION AS REQUIRED TO CONSTRUCT NEW FOOTINGS
2. EXTERIOR GRID LINES ARE ON FACE OF CONCRETE AND FACE OF GIRTS.

FOUNDATION PLAN
SCALE: 1/4"=1'-0"

RECORD

DRAWINGS

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

TREATMENT BUILDING
FOUNDATION PLAN

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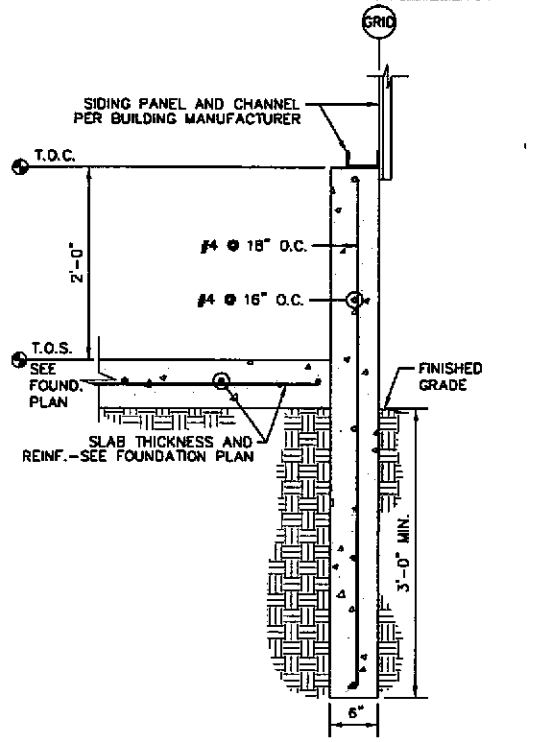
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DESIGN BY: PAK/DE
CHECKED BY: PAK/DE
ARCHIVE LOCALE:
PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=48
ONE INCH
AT FULL SIZE. IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

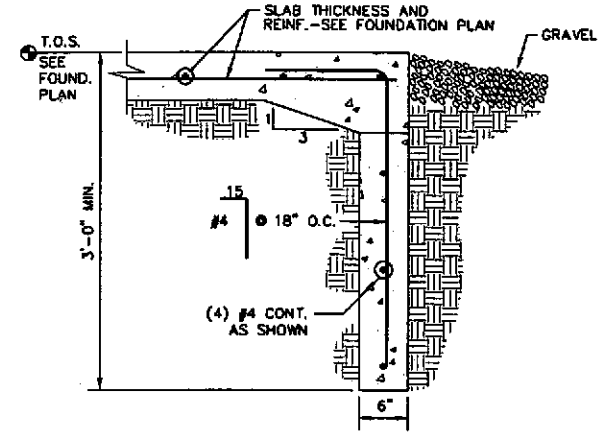
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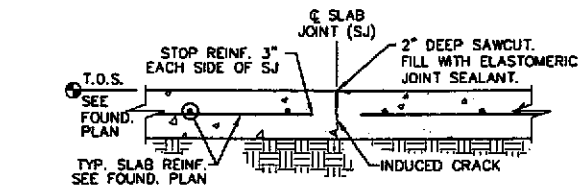
3-96(JUB-02)



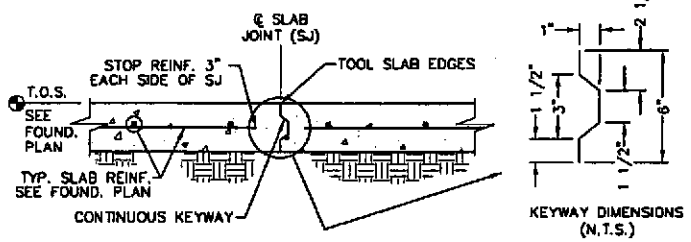
A TYP. FROST WALL DETAIL
SCALE: 1"=1'-0"



B FROST WALL AT OPENINGS
SCALE: 1"=1'-0"

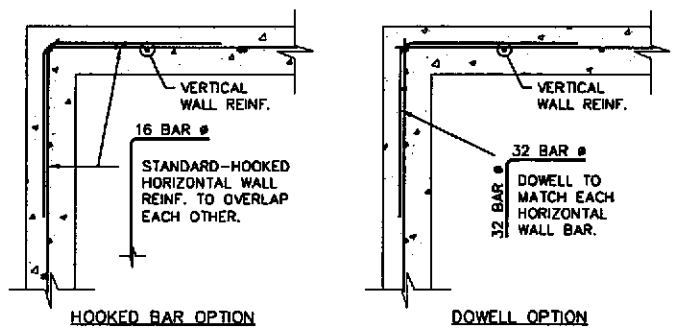


SAWCUT OPTION



KEYWAY OPTION

D TYP. SLAB JOINT SECTION
SCALE: 1"=1'-0"

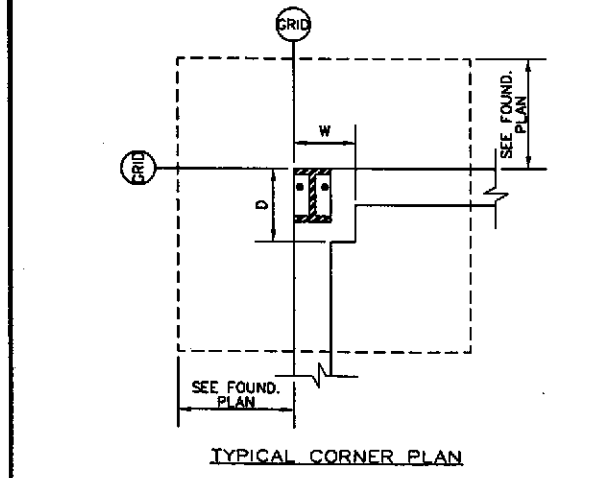


HOOKED BAR OPTION

DOWELL OPTION

NOTE:
TYPICAL FOR FROST WALL

E TYP. WALL INTERSECTION
NOT TO SCALE



TYPICAL PLAN-GRID 2

TYPICAL CORNER PLAN

TYPICAL SECTION

DATA TABLE				
COLUMN LOCATION	PILASTER SIZE W	PILASTER SIZE D	REINFORCEMENT DOWELS	REINFORCEMENT THRUST TIES
GRID 2	1'-5"	1'-2"	(4) #9	(2) #5
CORNERS	1'-5"	1'-4"	(4) #8	NONE

1

F TYP. COLUMN PILASTER AND FOOTING DETAIL
NOT TO SCALE

GENERAL STRUCTURAL NOTES

GENERAL
The General Contractor shall verify all dimensions and site conditions before starting work. The Engineer shall be notified of any discrepancy. Use details marked "Typical" wherever applicable. Changes, omissions or substitutions are not permitted without written approval of the Engineer. Refer to specifications for further requirements. All materials and workmanship shall conform to the latest edition of the Uniform Building Code. The design, adequacy and safety of erection bracing, shoring, temporary supports, etc., is the sole responsibility of the Contractor, and has not been considered by the Structural Engineer. The Contractor is responsible for the stability of the structure prior to the completion of all shear walls, roof and floor diaphragms and finish materials. The Contractor shall provide the necessary bracing to provide stability prior to the application of the above-mentioned components. Observation visits to the site by the Structural Engineer shall not include inspection of the above items.

SHOP DRAWINGS
Shop drawings are to be checked and approved by the General Contractor prior to submitting for Engineer review. General Contractor is responsible for verification and coordination of dimensions and details for each Subcontractor.

DESIGN LOADS
Snow Load . . . 60 PSF
Floor Live Load . . . 125 PSF
Basic Wind Speed per UBC . . . 70MPH, Exposure C, I_w=1.15
Seismic Loading per UBC . . . Zone 2B, I = 1.25
See plans for special mechanical unit loading.

FOUNDATION
Assumed design allowable soil bearing pressure = 2,000 PSF.
Bottom of all footings to bear on native, inorganic, undisturbed soil 1'-0" minimum below existing grade. Extend all exterior footings 3'-0" minimum below finished grade. No footing shall bear higher than a 1 vertical to 1.5 horizontal slope above any excavation, existing or planned. Contractor shall provide temporary shoring to prevent movement of walls if backfill is placed before floor system is in place. There shall be 95% compaction (ASTM D1557 Modified Proctor Density) of all backfill soil under slabs on grade.

CAST-IN-PLACE CONCRETE
COMPRESSIVE STRENGTH: 3,000 PSI minimum at 28 days.
MAXIMUM SLUMP: 3" for slabs & footings; 4" for walls, columns and beams.
Construction to be in accordance with ACI 381-83, "Part 2 - Standards for Tests and Materials" and "Part 3 - Construction Requirements." Location of construction pour joints must be approved by the Engineer, if different from that shown on plans. All concrete to contain 4-6% entrained air.

REINFORCING STEEL
WELDED WIRE FABRIC: ASTM A82 and A185.
DEFORMED BARS: ASTM A615, Grade 40 for #3; Grade 60 for #4 and larger. Securely tie in place with double-annealed 16-gauge iron wire or approved clips.
LAP SPLICES: Concrete 40 bar diameters, typical unless otherwise noted on drawing.
Unless otherwise noted on these drawings, provide clear embedment at reinforcing bars as follows:
Concrete cast against soil = 3"
Formed concrete against soil = 2"
Walls, columns and beams exposed to weather = 2"
Walls, columns and beams not exposed to weather = 1 1/2"
Slab on grade = 2"
Low hydrogen welding rods shall be used for all welding of reinforcing bars. Submit shop drawings of reinforcing steel for review by the Engineer prior to fabrication.

STRUCTURAL SHAPES AND MISCELLANEOUS STEEL
SHAPES, PLATES AND BARS: ASTM A36, Fy = 36 KSI.
PIPE: ASTM A53 or A501, Fy = 35 KSI minimum.
TUBING: ASTM A500, Grade B, Fy = 46 KSI.
BOLTS: ASTM A325 high-strength bolts (H.S.B.) unless noted as ASTM A307 machine bolts (M.B.). Where high-strength bolts are used, they shall be installed with load-indicator devices (load-indicator washers or snap-off heads).
ANCHOR BOLTS (A.B.): ASTM A 307. Provide double nut for leveling at columns or beam base plates or as provided by building manufacturer.
EXPANSION BOLTS (E.B.): "Hilti Kwik Bolt II" or approved equivalent. Expansion bolts in grouted masonry shall be sleeve-type.
ADHESIVE ANCHORS: "Hilti HVA" or approved equivalent.
HEADED ANCHOR STUD (H.A.S.) and Threaded Anchor Stud (T.A.S.): ASTM A108-69T, Fy=50 KSI, end-welded per manufacturer's recommendations.
DEFORMED BAR ANCHORS (D.B.A.): ASTM A706, Fy = 70 KSI, end-welded, per manufacturer's recommendations.
WELDING ELECTRODES OR WIRES: AWS A5.1 or A5.5, E70XX; AWS A5.18, E70S-X; AWS A5.20, E7XT-X.
Erection and fabrication in accordance with AISC "Specifications for Design, Fabrication and Erection of Structural Steel for Buildings." Welding shall conform to AWS "Code for Arc and Gas Welding in Building Construction." All welding shall be performed by AWS Certified Welders. All columns and beams to be from unspliced lengths unless noted otherwise on the drawings. Submit shop drawings showing sizes, dimensions and required connection details for review by the Engineer prior to fabrication.

GROUT AND EPOXY RESIN
NON-SHRINK GROUT: "Masterflow 928" as manufactured by Master Builders Inc. or approved equivalent.
EPOXY ANCHORS: For anchoring deformed or smooth rebars into existing or hardened concrete or solid grouted masonry, use Hilti HVA system or approved equivalent.

SPECIAL STRUCTURAL INSPECTIONS
REINFORCED CONCRETE: Inspection required for reinforcement and placement for footings.
BOLTS INSTALLED IN CONCRETE: Inspection as required per building manufacturer.
WELDING: Periodic inspection required; 50% allowable stresses used for weld design. Provide other special testing/inspection as noted on drawings.

PREFABRICATED METAL BUILDING STRUCTURE
Metal building framing, including rigid frames, rafter beams, columns, purlins, girts, lateral bracing and metal roofing and siding shall be designed by the manufacture for the structure dead load and the loads indicated on these drawings. All design shall be completed in accordance with the 1994 UBC by a Professional Engineer registered in the State of Idaho. Provide structural members as required by design and consistent with locations shown on these drawings. Provide full load expandable and frames. Modifications of building configuration will be permitted only with written approval of the Engineer. Submit design calculations and framing/erection plan for Engineer review prior to fabrication. As a minimum, the submittal shall include foundation reactions, anchor bolt placement and sizes, column bearing area requirements, member sizes and spacing, and all connection details. The Engineer will verify that the footings as designed will transfer the loads to the soil without exceeding the stated allowable soil bearing pressure. There will be no adjustment of contract price based on any required change of footing size or reinforcement.

RECORD

PROFESSIONAL ENGINEER REGISTERED 7510 3/22/99 STATE OF IDAHO PAUL A. KLATT

DRAWINGS

J-U-B ENGINEERS, Inc.
ENGINEERS • SURVEYORS • PLANNERS
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PHONE: 208-667-1574
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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

STEEL BUILDING STRUCTURAL DETAILS AND NOTES

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CHECKED BY: PAK
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PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=1
ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RC10 OF 22

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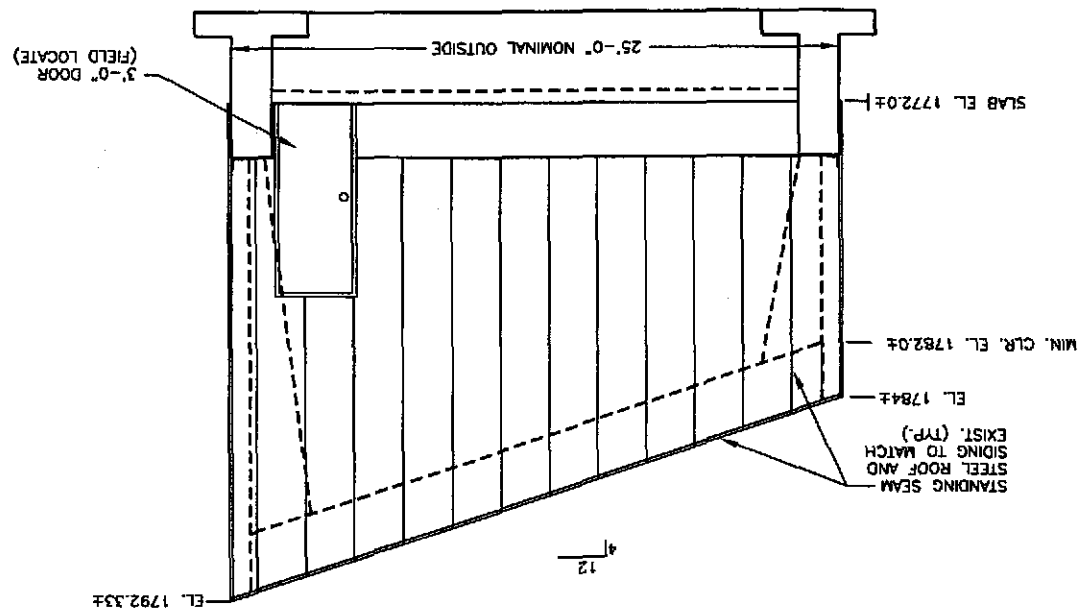
DRAWINGS

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STATE OF IDAHO
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PROFESSIONAL ENGINEER
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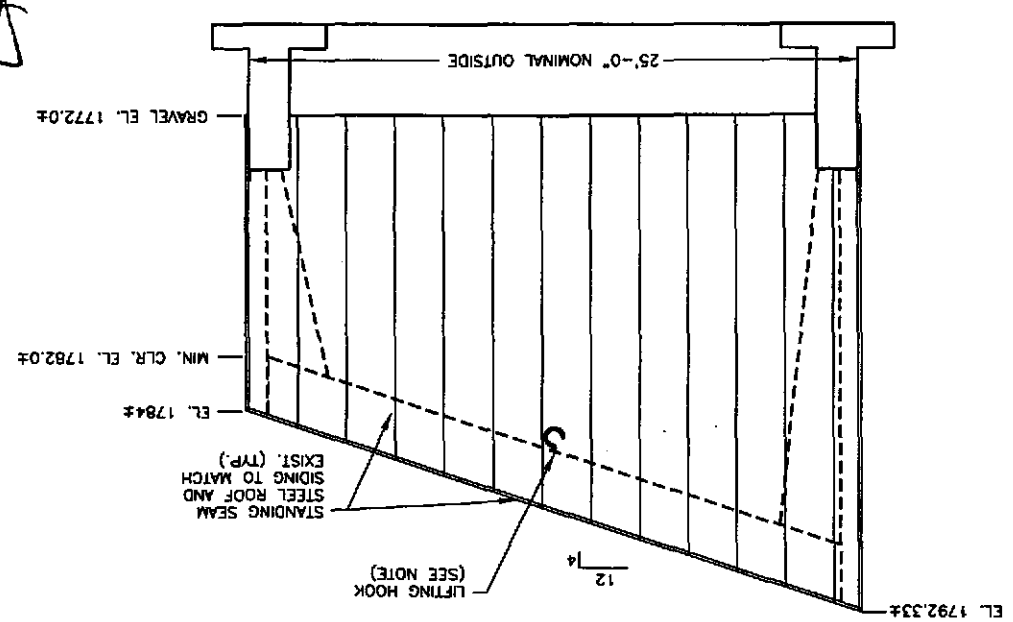
SHOP/STORAGE BUILDING – WEST ELEVATION

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ACAD: SBLDG-ELEV2.DWG
PLOT/INSERT 1=48



SHOP/STORAGE BUILDING – EAST ELEVATION

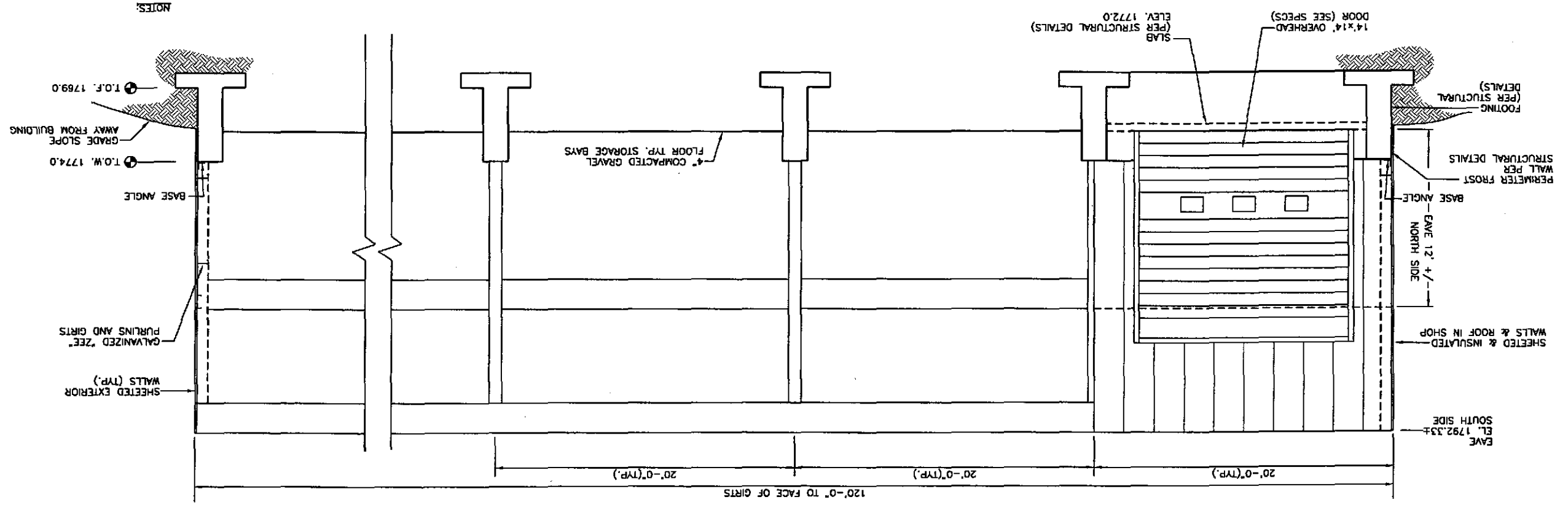
SCALE: 1/4" = 1'-0"
ACAD: SBLDG-ELEV2.DWG
PLOT/INSERT 1=48



NOTES:
1. 4" DIAM. 1,000-POUND CAPACITY LIFTING HOOK CENTERED ON EACH OF 4 INTERIOR SPAN AND PERMANENTLY LABELED.
2. EXTERIOR GRID LINES ARE ON FACE OF CONCRETE AND FACE OF GIRTS.

SHOP/STORAGE BUILDING – SOUTH ELEVATION

SCALE: 1/4" = 1'-0"
ACAD: SBLDG-XSECT.DWG
PLOT/INSERT 1=48



3-96(JUB-02)

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ARCHIVE LOCALE:
PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=1
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VER SCALE: NONE

SHEET RC11 OF 22

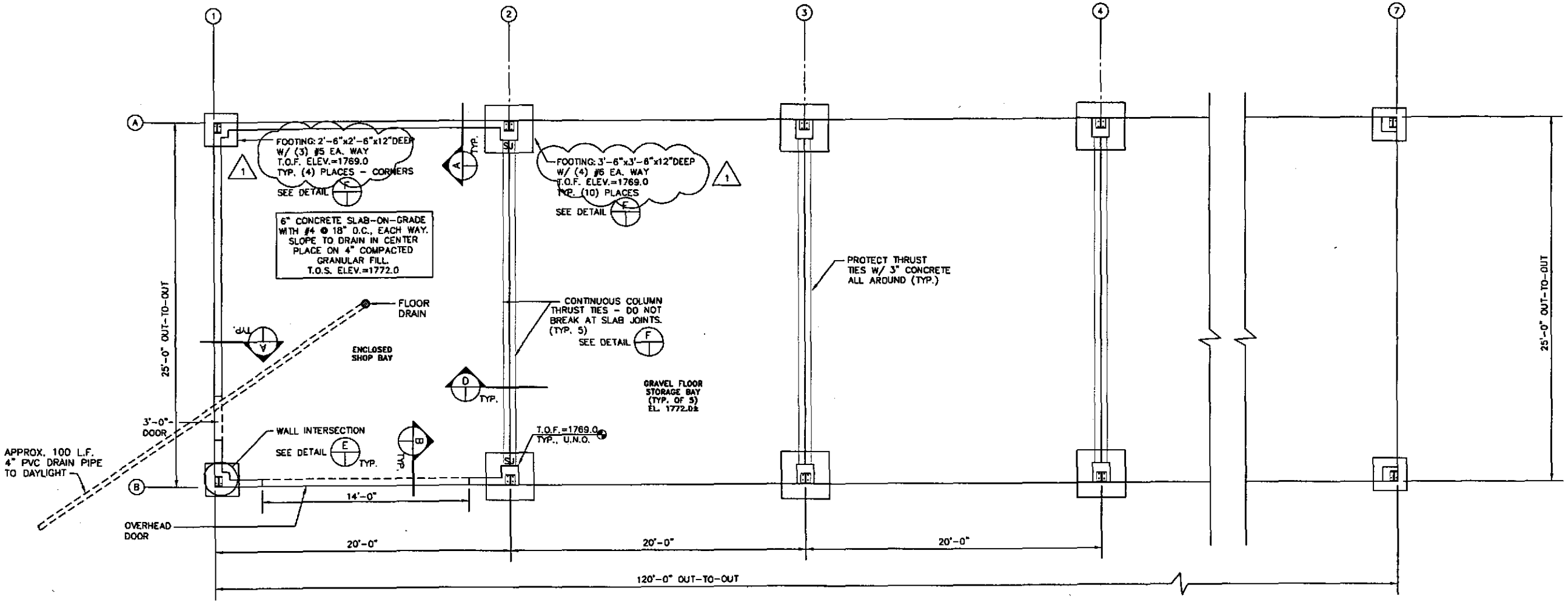
KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

SHOP/STORAGE BUILDING ELEVATIONS AND DETAILS

J-U-B ENGINEERS, Inc.
ENGINEERS•SURVEYORS•PLANNERS
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FAX: 208-667-2176

3-96(JUB-D2)

NOTE:
1. EXTERIOR GRID LINES ARE ON FACE OF CONCRETE AND FACE OF GIRTS.



FOUNDATION PLAN
SCALE: 1/4"=1'-0"

RECORD

PROFESSIONAL ENGINEER REGISTERED 7510 3/22/99 STATE OF IDAHO PAUL A. KLATT

DRAWINGS

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

SHOP/STORAGE BUILDING
FOUNDATION PLAN

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NO.	DESCRIPTION	BY	APR. DATE
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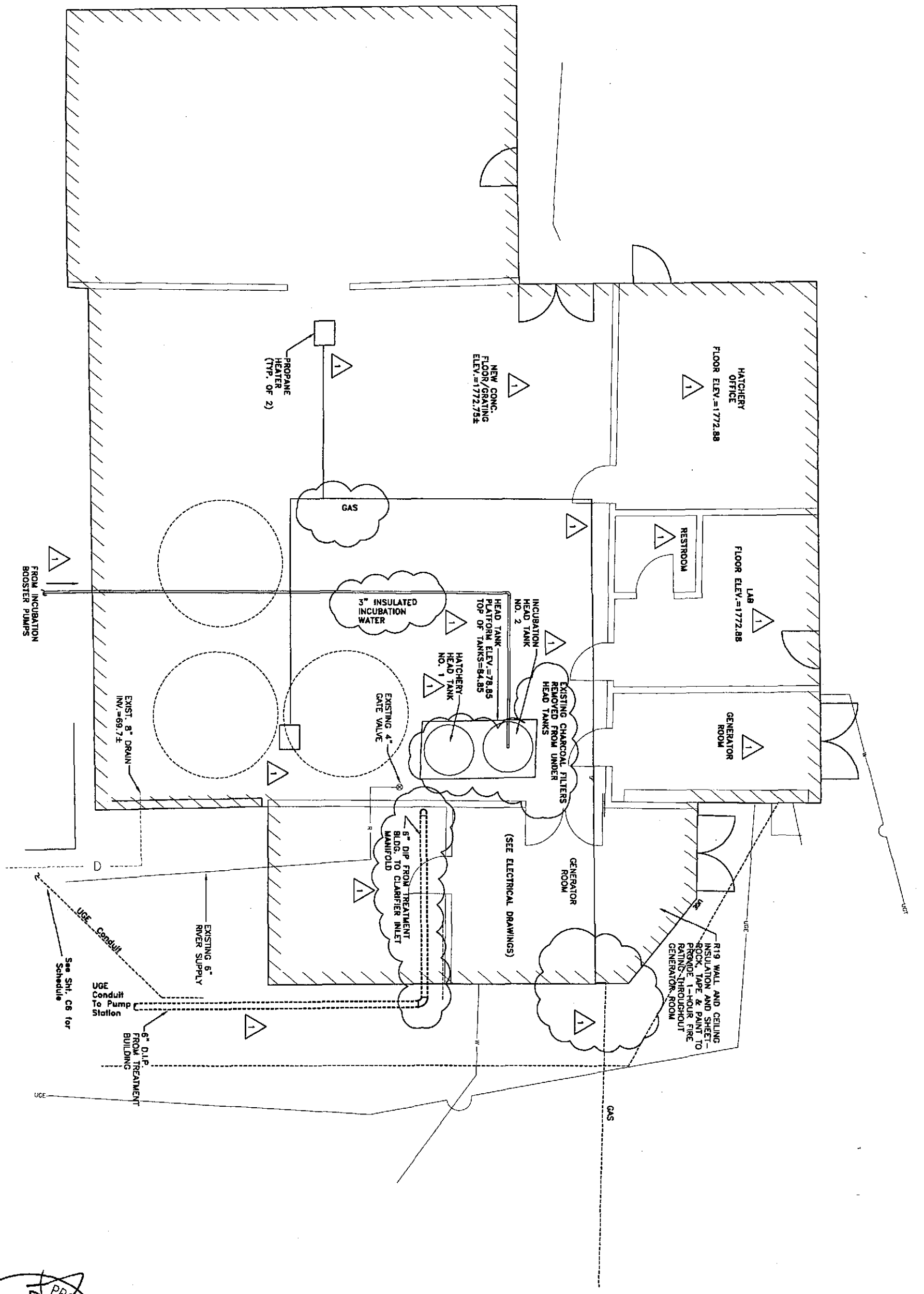
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HOR SCALE:	x
VER SCALE:	NONE

SHEET RC12 OF 22

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J-96(JUB-D2)



PLAN VIEW
SCALE: 1/4"=1'-0"
INSERT/PLOT 1=48
ACAD:EX-HBLDG.DWG

RECORD DRAWINGS

PROFESSIONAL ENGINEER REGISTERED STATE OF IDAHO PAUL A. KLATT 5718
3/22/99

SHEET RC13 OF 22

DRAWN BY: TLR
DESIGN BY: PAK/DE
CHECKED BY: PAK/DE
ARCHIVE LOCALE:
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DRAWING NO.
ACAD PLOT SCALE: 1=48
ONE INCH
AT FULL SIZE. IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

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REVISION

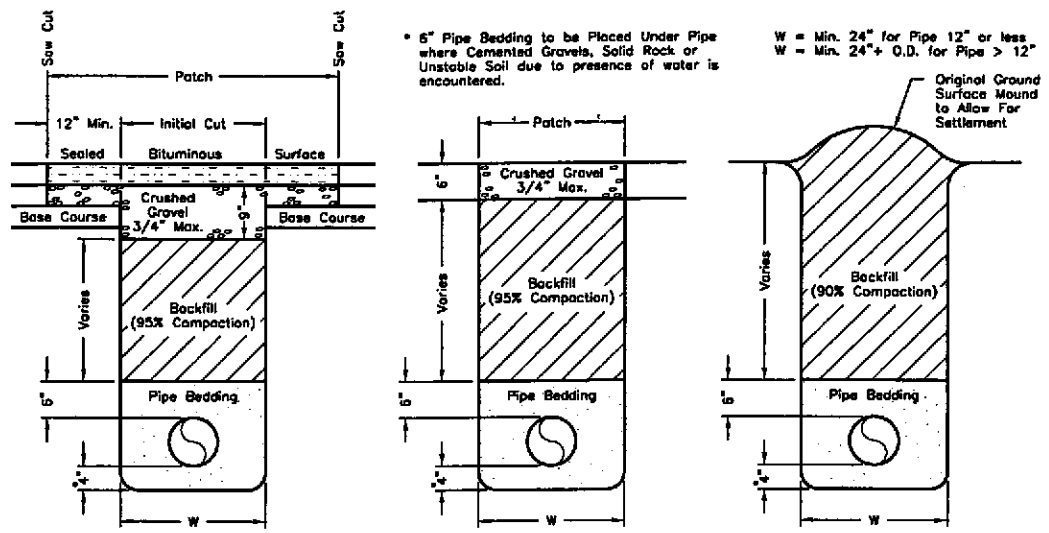
NO.	DESCRIPTION	BY	APR.	DATE
1	RECORD DRAWINGS	JW/TR	PAK	2.19.99

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

EXISTING HATCHERY MODIFICATIONS

J-U-B ENGINEERS, Inc.
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3-96(JUB-92)



TYPE "A" SURFACE REPAIR
(Existing Bituminous Surface)

TYPE "B" SURFACE REPAIR
(Existing Gravel Surface)

TYPE "C" SURFACE REPAIR

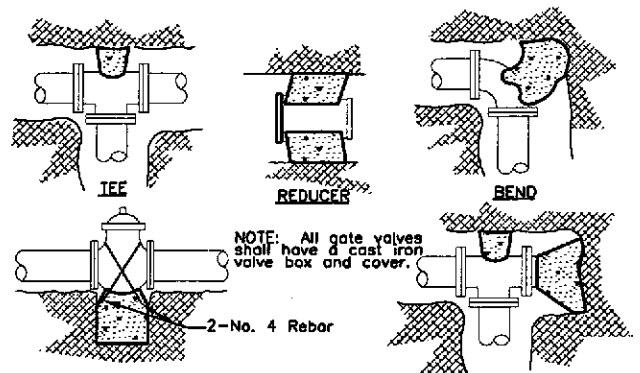
NOTES

1. All loose and foreign material shall be removed from the face of the existing bituminous surface-cut.
2. Any fractured bituminous surface beyond the face of the surface-cut shall be removed.
3. The face of the bituminous surface-cut must be primed before applying patch.
4. Patch shall not overlap the existing bituminous surface.
5. The patch thickness shall be four (4) inches or equal to the existing asphalt thickness, whichever is greater.

TRENCH BACKFILL & SURFACE REPAIR

NOT TO SCALE

DISK: "SEWER-1"
ACAD: BCK-SURF.Dwg
(plot/insert 1=16)



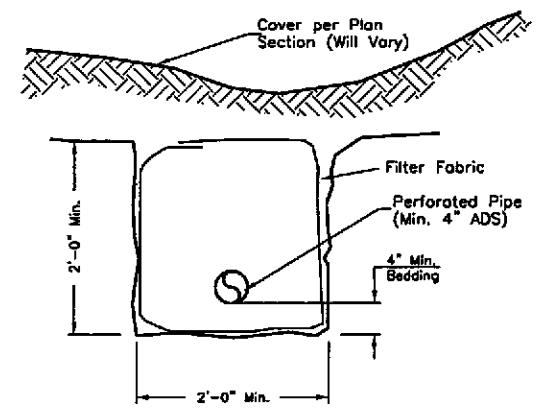
*Soil Bearing Pressure= 2000 PSF
*Working Pressure Rating= 150 PSI
*Safety Factor= 1.5

PIPE SIZES	TEES & PLUGS	90° BEND	45° BEND	22-1/2° & 11-1/2° BEND & REDUCER	GATE VALVES
3"	0.8	1.1	0.6	0.3	0.8
4"	1.4	2.0	1.1	0.6	1.4
6"	3.2	4.5	2.4	1.2	3.2
8"	5.7	8.0	4.3	2.2	5.7
10"	8.8	12.5	6.8	3.4	8.8
12"	12.7	18.0	9.7	5.0	12.7
14"	17.3	24.5	13.3	6.8	17.3

NOTES:
Thrust block area in square feet as a function of pipe size and type of fitting and bearing on undisturbed soil. (Soil bearing at 2000psf) Based on a working pressure of 150psi.

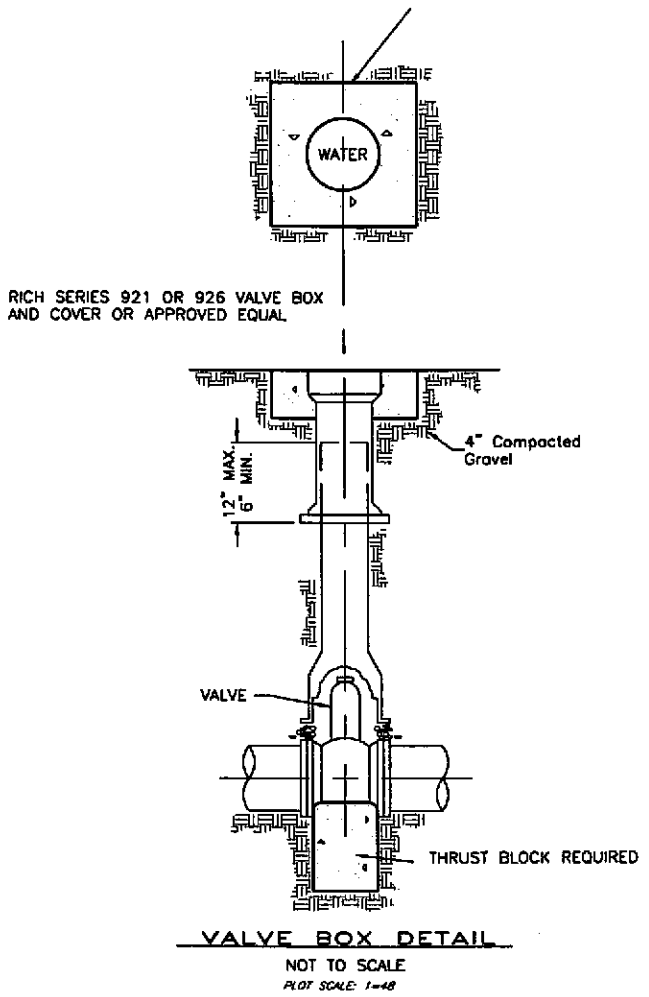
THRUST BLOCK DETAIL

Not To Scale



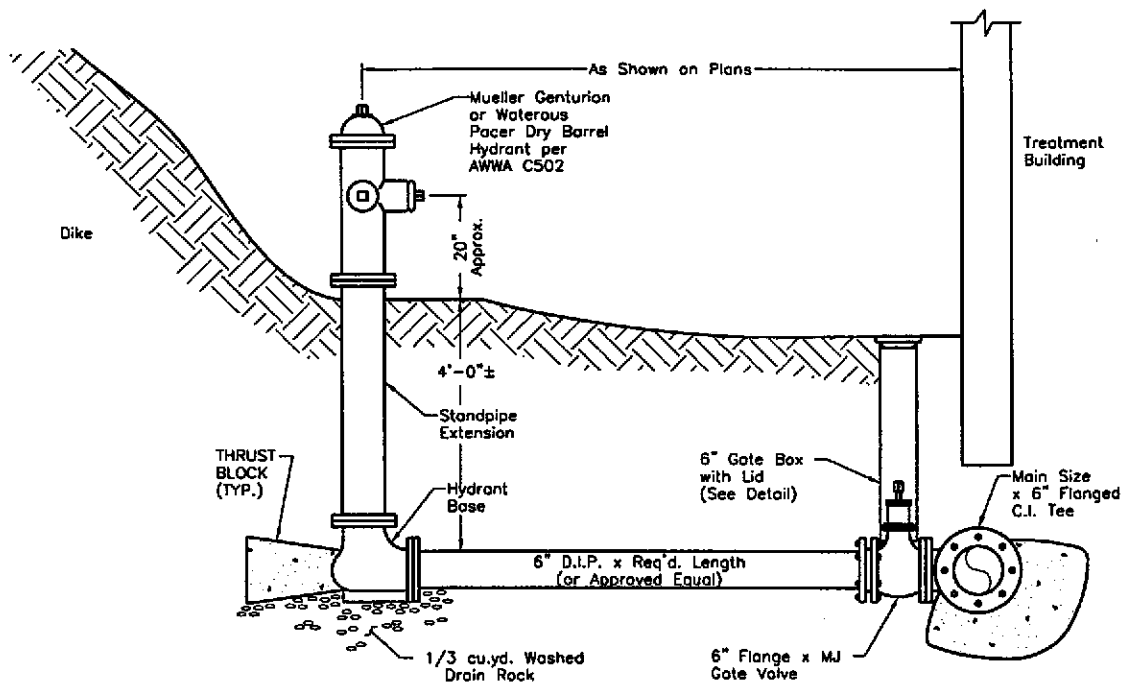
FRENCH DRAIN

SCALE: 1"=1'-0"
DISK: "STREET-1"
ACAD: FRENCH.DWG
(PLOT/INSERT 1=12)



VALVE BOX DETAIL

NOT TO SCALE
PLOT SCALE: 1=48



TYPICAL 6" FIRE HYDRANT SETTING

Not to Scale
ACAD: HYDRANT.Dwg
(plot/insert 1=18)

RECORD

DRAWINGS

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

TYPICAL DETAILS

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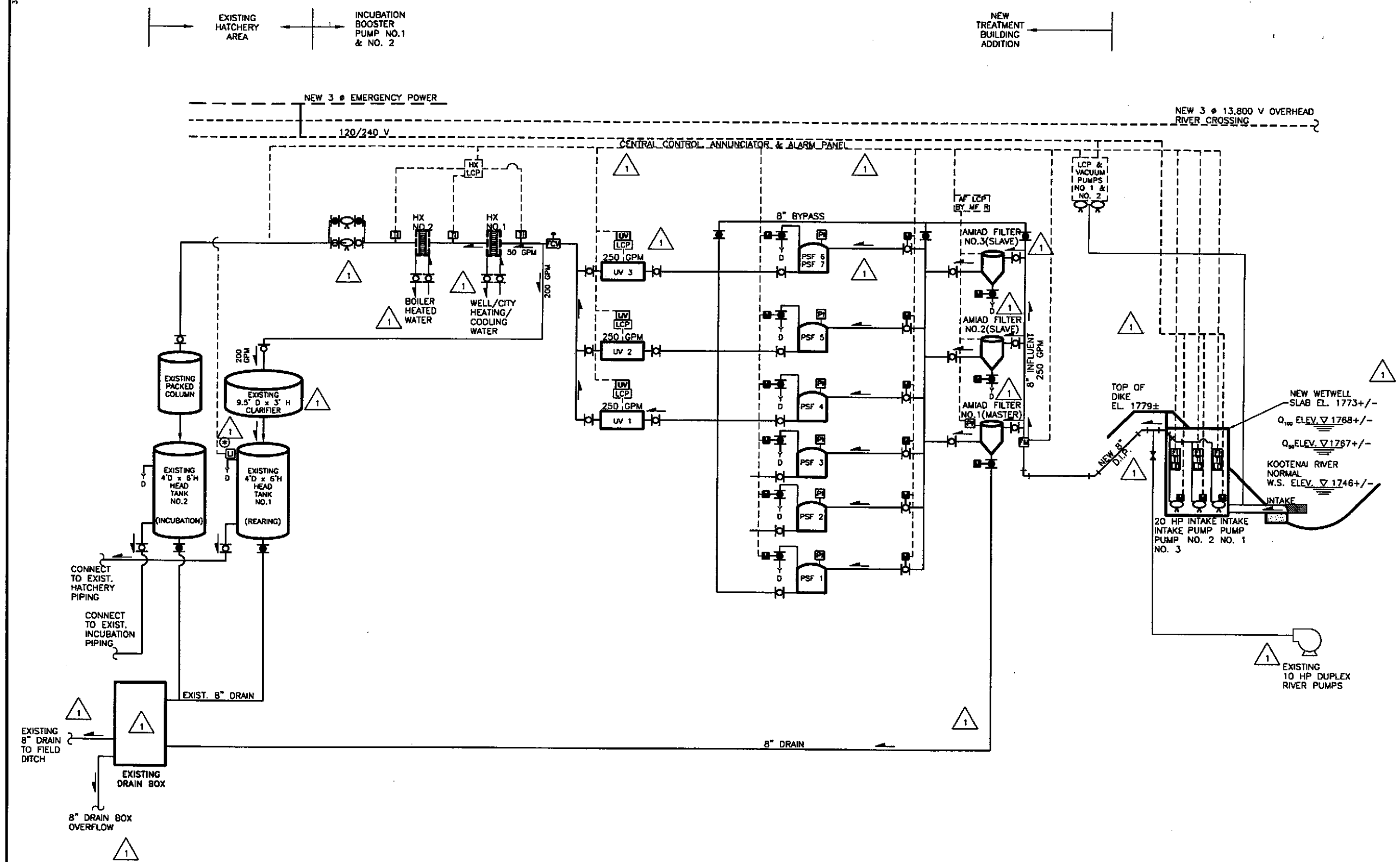
REVISION

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CHECKED BY: PAK/DE
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PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=1
ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RC14 OF 22

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

PHASE 1
PROCESS & INSTRUMENTATION DIAGRAM

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HOR SCALE:	x
VER SCALE:	NONE

SHEET RP1 OF 22

3-96(JUB-02)
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J-95(JUB-02)

PUMPING AND WATER TREATMENT CONTROL DESCRIPTION

The general nature of the process as well as methods for process control are described below. This description is intended for use in conjunction with the Process and Instrumentation Diagrams (PID) to assist with understanding of the overall project intent and operation. The equipment type, requirements, location, size, and quantity is shown on the plans and specifications. Refer to the contractor-provided Operations and Maintenance Manual for specific requirements of each component.

Beginning at the Kootenai River, water is withdrawn through a pair of 12" intake pipes coupled to 24" diameter by 24" long stainless steel wedge-wire intake screens. Through-screen velocity is limited to 0.4 feet per second. One intake screen is installed 5 feet above the bottom of the river at an elevation of 1734.0. The other intake screen is installed approximately 15 feet above the bottom of the river. The lower intake valve should be open primarily during low flow conditions to avoid poorer water quality near the riverbed. The upper intake will be used most of the time, since "average" river elevations should provide a minimum of three feet of submergence. Screen construction include an air scour connection which will be piped to the new compressed air system in the Treatment Room and operated manually through a 3-way valve, as required, to keep debris from plugging the openings in the screens.

At low river levels, water is siphoned up the intake pipes by introducing a vacuum through air/vacuum valves located on each pipe inside the on-shore wet well. The vacuum pumps, No. 1 and No. 2, will operate in the active and standby mode with an alternating switch and receiver tank provided by the manufacturer. One vacuum pump will run 100% of the time and failure of a vacuum pump to operate will initiate and alarm to the annunciator panel. The vacuum pumps will be located in the Treatment Building.

The three river, 20 hp, intake pumps are solids handling submersible types, operating on an active and standby basis. Under normal conditions, a single pump will operate producing 250 gallons per minute, at approximately 125 feet of total dynamic head. Each pump motor contains an integral thermistor that will automatically shut the motor off if the windings become overheated, such as in a running-dry condition. The motors also contain a moisture sensor switch, which will be routed to a Contractor-designed main control panel, located in the Treatment Building. Failure of a pump, due to either of these conditions will initiate an alarm light on the exterior surface and an alarm in the main panel indicating intake pump failure. The discharge of each pump shall include a flow indicator such that if the pump is activated, but fails to produce water flow, the pump failure light will be displayed at the main control panel.

Water is delivered to the new Treatment Building through an 8" ductile iron underground pipe and is screened by the Amiad Filters AF 1, AF 2 and AF3. Either 50 micron or 25 micron screens can be installed depending on river water characteristics and frequency of cleaning that results. The pressure screens each have a capacity greater than 250 gpm when dirty. The Amiads operate in a parallel fashion and will be automatically washed clean with an internal rotating backwash system. During cleaning and waste to drain, the forward flow will be reduced by the water volume required to clean the strainer, approximately 70 gpm. This will cause a falling water level in the existing head tanks. The corresponding water volume will be recovered over time, generally without running a second river intake pump. If the water level falls to the low level setting in the Rearing Head Tank No. 1 (HT1), the second pump will be started until the head tank elevation is raised to normal operating level. During clean water times, these microstrainers may not be needed and the bypass piping arrangement can be utilized. The strainers will be controlled by a manufacturer-provided local control panel, labeled AF LCP. Backwashing is initiated by a factory set pressure loss differential of approximately 7 psig across the Master Unit (AF1) or an operator-set timer, or both. Backwashing can also be initiated manually at the LCP. AF2 and AF3 will operate as slave units and will be sequentially cleaned after the Master Unit. Backwash cycles are counted by the LCP. Greasing and screen cleaning should be performed monthly or as recommended by the manufacturer. Unit failure will be sent to the annunciator panel by the LCP.

Following the Amiad filters, seven 55-inch diameter pressure sand filters in parallel provide a higher degree of treatment of the influent water. Initiation of the backwash mode for the pressure sand filters will be in response to an adjustable 5 to 15 psig (10 psig recommended) pressure differential across the sand filters or a selected percent open of the flow control valve, whichever occurs first. The Contractor-designed main control panel will first start a second river pump and then will initiate the backwash sequence on each filter. Each filter will be allowed to backwash for an adjustable period from three to ten minutes and at a flow rate of 15 gallons per square foot (238 gpm). Backwash water clarity can be observed at each filter through the section of clear PVC pipe and backwash time adjusted accordingly. The backwash sequence first closes the selected filters influent motor actuated valve and then opens its motor actuated drain valve. The additional flow through the remaining sand filters will be routed backwards through the filter being cleaned. The forward flow volume will be controlled through the downstream flow control valve. After the operator-selected backwash time, the inlet valve will be opened after the drain valve is closed. The cycle will be repeated for each subsequent filter. If the rearing head tank level falls to a "low" level, a third pump will be initiated and an alarm will appear on the central annunciator panel for "low" water level. Bypass piping has also been provided around the sand filter arrangement. Sand filter differential pressure should be manually observed daily. Sand media depth should be checked annually and replenished with #20/30 silica sand to an approximate depth of 1.5 feet above gravel subdrain/laterals. So long as sand remains loose and not cemented, it is generally acceptable. Replacement is not expected for at least 3-5 years. Sand filters should be backwashed and drained when not in use.

Following the sand filters, the flow passes through a flow control valve to maintain the rearing head tank water level between the selected depths. Generally 48-inches deep is "low low" level (3 pumps on and alarm), 54-inches deep is "low" level (2 pumps on) and 64-inches deep is maximum depth at the internal tank overflow. The system capacity is operator adjustable to a maximum of about 500 gallons per minute. Municipal water hydraulically actuates the opening and closing of the diaphram-type valve. The valve modulates in response to a 4-20 mA signal from the rearing head tank pressure transducer fed through the main control panel to the valve's independent controller. A bypass spool pipe has been provided if the valve must be removed for service.

Three ultraviolet disinfection units follow the flow control valve and are piped in parallel, each with the capacity of 250 gallons per minute and a 50,000 micro-watt per centimeter squared dosage rate, assuming a 90% ultraviolet transmission efficiency. The transmission efficiency shall be monitored by the factory provided sensor and the UV units shall each be controlled by an integral local control panel. The manually operated wiper mechanism will clean the UV lamps if they become fouled over time. The wiper should be operated at least weekly. Over temperature shut-down shall also be provided on each unit with alarms from each local control panel sent to the central annunciator panel indicating UV failure. UV lamps should be replaced after each year of continuous operation to maintain full disinfection capabilities.

Following UV disinfection a portion of the treated water flow is then diverted through use of a manually adjusted ball valve at a rate of approximately 50 gallons per minute to the existing Head Tank No. 2 (HT2) to feed incubation and hatching operations. Incubation water passes through a packed column prior to the head tank and its level is alarmed to the central annunciator panel in similar manner to the rearing HT 1. In order to assure control of the temperature of incubation water, a separate duplex booster pump system will be constructed to pass water through a cooling heat exchanger and a separate propane fired boiler and heat exchange unit. Booster pump discharge pressure loss, along with over temperature and under temperature alarms, are provided to the central annunciator panel alarm system.

It is the objective of the heat exchange system to temper river water (T1), which ranges from 1 Deg. C to 18 Deg. C. The final water temperature is expected to be 14 Deg. C to 16 Deg. C in the incubation head tank (HT2). Sheets M1 and M2 of the contract drawings show schematics of these controls. The on-site groundwater well is expected to provide 50 gpm ranging from 7 Deg. C to 13 Deg. C (T4). In no case will the tempering source be blended with the river water. Heat exchange is accomplished by two stainless steel flat plate heat exchangers. All cooling will be provided by the municipal or well water source. Heating will be provided by a propane fired boiler system utilizing a second, identical, heat exchanger. The temperature of the intermediate water leaving the first heat exchanger (T2) will be adjusted by a pneumatic modulating valve controlling the flow of city/well water through the primary side of the heat exchanger. If river water is between 14.5 Deg. C and 15.5 Deg. C, the cooling system will be idle. If river water (T1) exceeds these limits, the cooling system will operate to bring the intermediate water temperature (T2) to 15 Deg. C +/- 0.5 Deg. If intermediate water temperature (T2) falls below 14 Deg. C. and river water is also below 14 Deg. C, the supplemental propane fired heating system will be activated. This system will consist of a primary loop circulating fluid at 71 Deg. C (160 Deg. F) through the boilers at a constant flow rate, a second loop circulating fluid at a nearly constant rate of 34 gpm through the primary side of the heat exchanger at 24 Deg C (75 Deg. F), and a variable flow injection pump (BP2) moving fluid between the primary and secondary loops to achieve energy transfer.

Two propane-fired boilers are provided and can be operated in the active/standby or series mode. Each 215 kbtu boiler is capable of raising 50 gpm of river water a minimum of 15 Deg. C. The boilers are to be staged based upon intermediate water temperature (T2). The injection pump speed is to be controlled so that the incoming fluid temperature at the secondary loop (T5) is maintained at 75 Deg. F. A pneumatic modulating valve at the heat exchanger primary side will vary heat exchanger flow to maintain incubator water (T3) at 15 Deg. C +/- 0.5 Deg. A manual by-pass valve will allow flow to be maintained in 75 Deg loop when the heat exchanger is not calling for heating. A two pen chart recorder will continuously monitor river water temperature (T1) and City water temperature (T4). A second two pen chart recorder will continuously monitor intermediate water temperature (T2) and incubator water temperature (T3). All set points are manually adjustable. Provision have also been made to manually control all modulating valves and the injection pump.

Following these systems, water will flow to the existing operation as it has in past years.

RECORD

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DRAWINGS

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KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

PHASE 1
PROCESS CONTROL DESCRIPTION

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PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=1
ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RP2 OF 22

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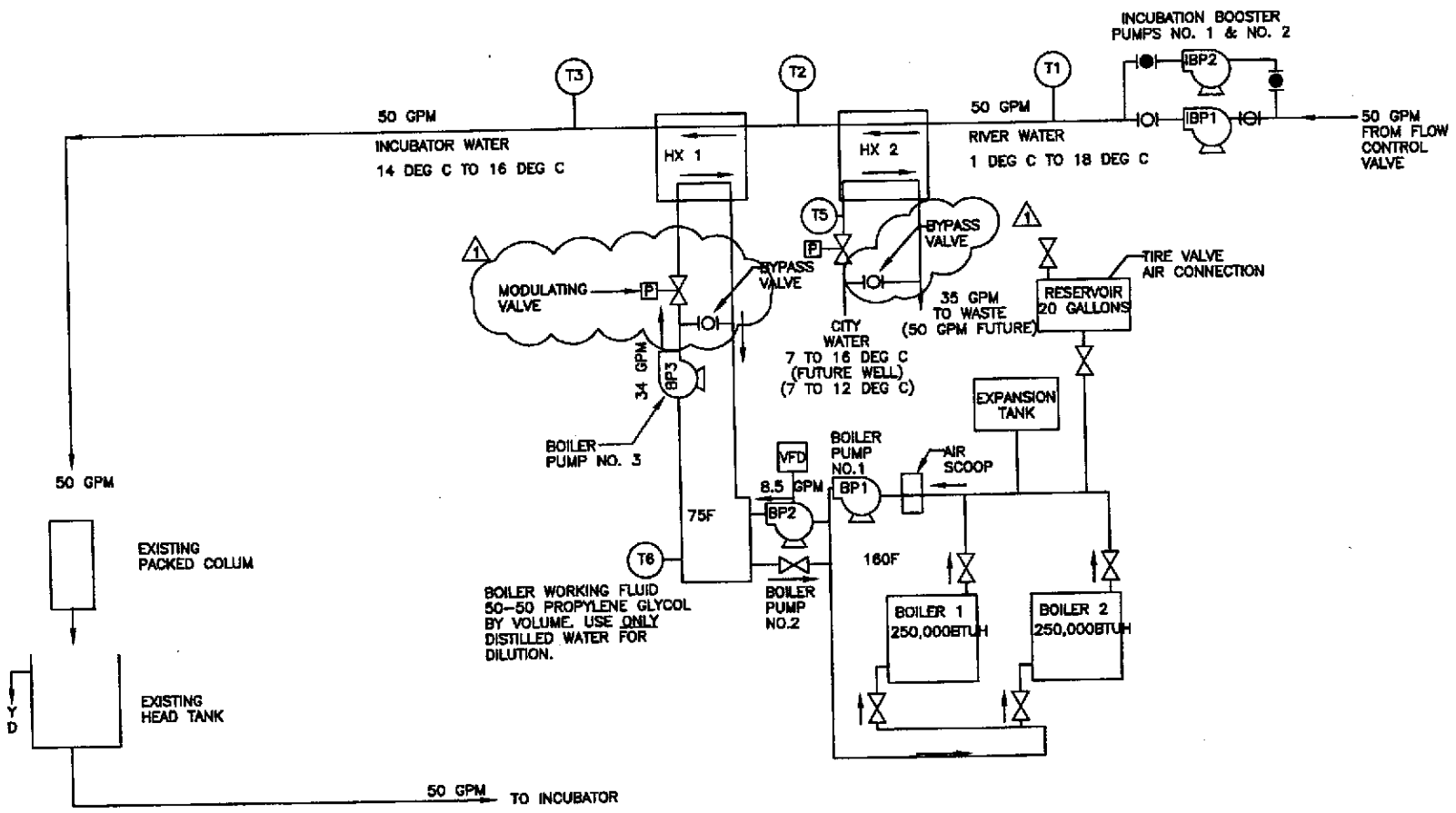
3-96(JUB-02)

LEGEND

- (T#) THERMOSTAT #
- BALL VALVE (NORMALLY OPEN)
- BALL VALVE (NORMALLY CLOSED)
- [P] PNEMATIC OPERATOR
- [M] MOTOR OPERATOR
- NEEDLE VALVE
- BRONZE ISOLATION VALVE

MECHANICAL LEGEND:

1. EXPANSION TANK: AMTROL SX40V.
2. AIR SCOOP: SPIROVENT SENIOR 2"
3. BP1,BP3: GRUNDFOS UPS 40-80/4 THREE PHASE 240. WITH ISOLATING BALL VALVE FLANGES. INCLUDE 1 SPARE PUMP.
4. BP2: GRUNDFOS UPS 15-42F 120V. WITH ISOLATING BALL VALVE FLANGES. INCLUDE 1 SPARE PUMP.
5. V1,V2: MASONELIAN 35-35-1-1-2 WITH 4612B POSITIONER. VALVE BODY SIZE TO BE DETERMINED.
6. BYPASS: BALL VALVE.
7. FILTER/REGULATOR: WILKERSON MODEL C86-02-00. CONNECT TO EXISTING COMPRESSED AIR SUPPLY TO REDUCE TO 20 PSIG +/-2PSI.



RECORD

DRAWINGS

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FAX: 208-667-2176

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

INCUBATION WATER TEMPERATURE CONTROL SYSTEM SCHEMATIC

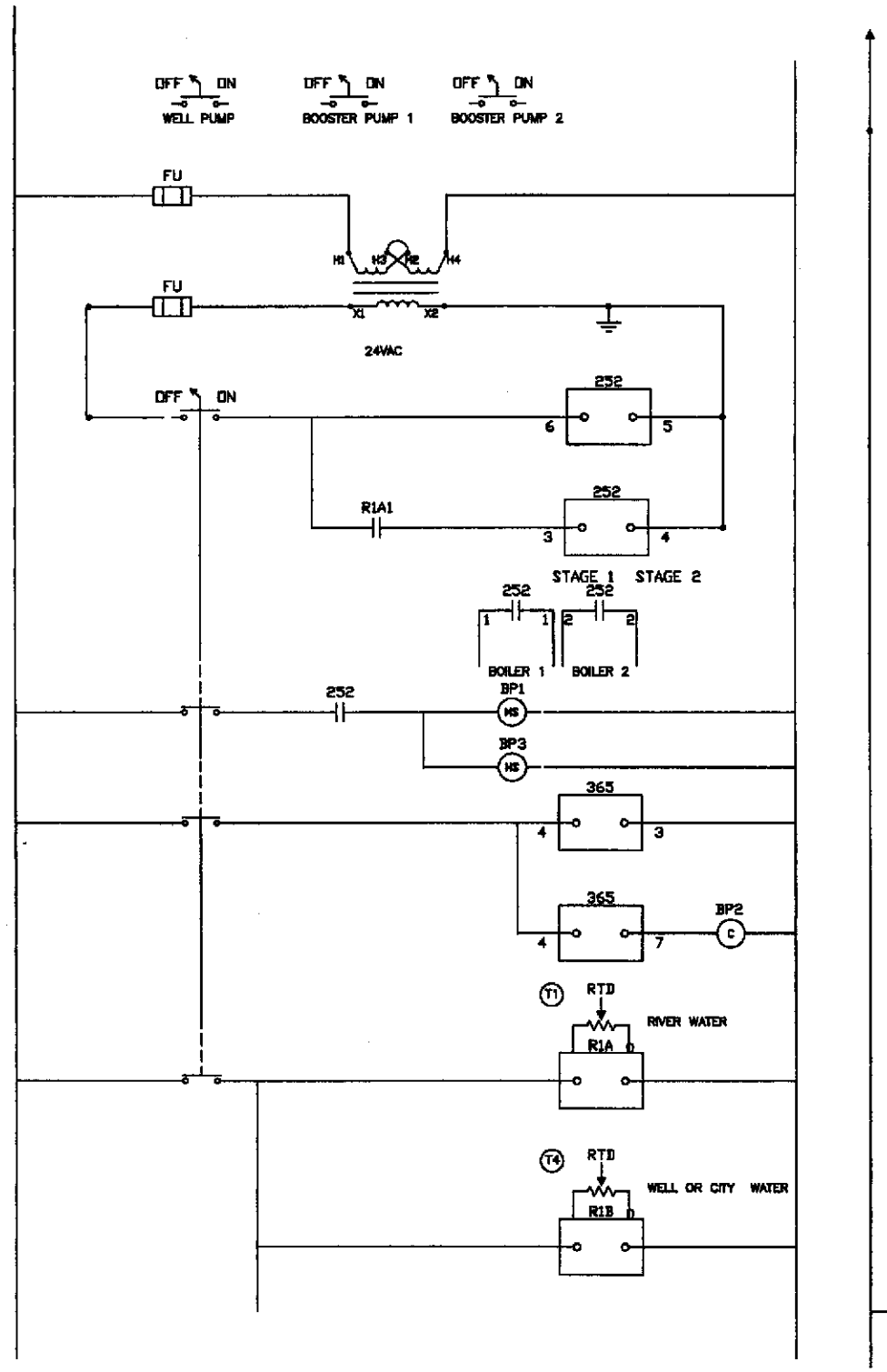
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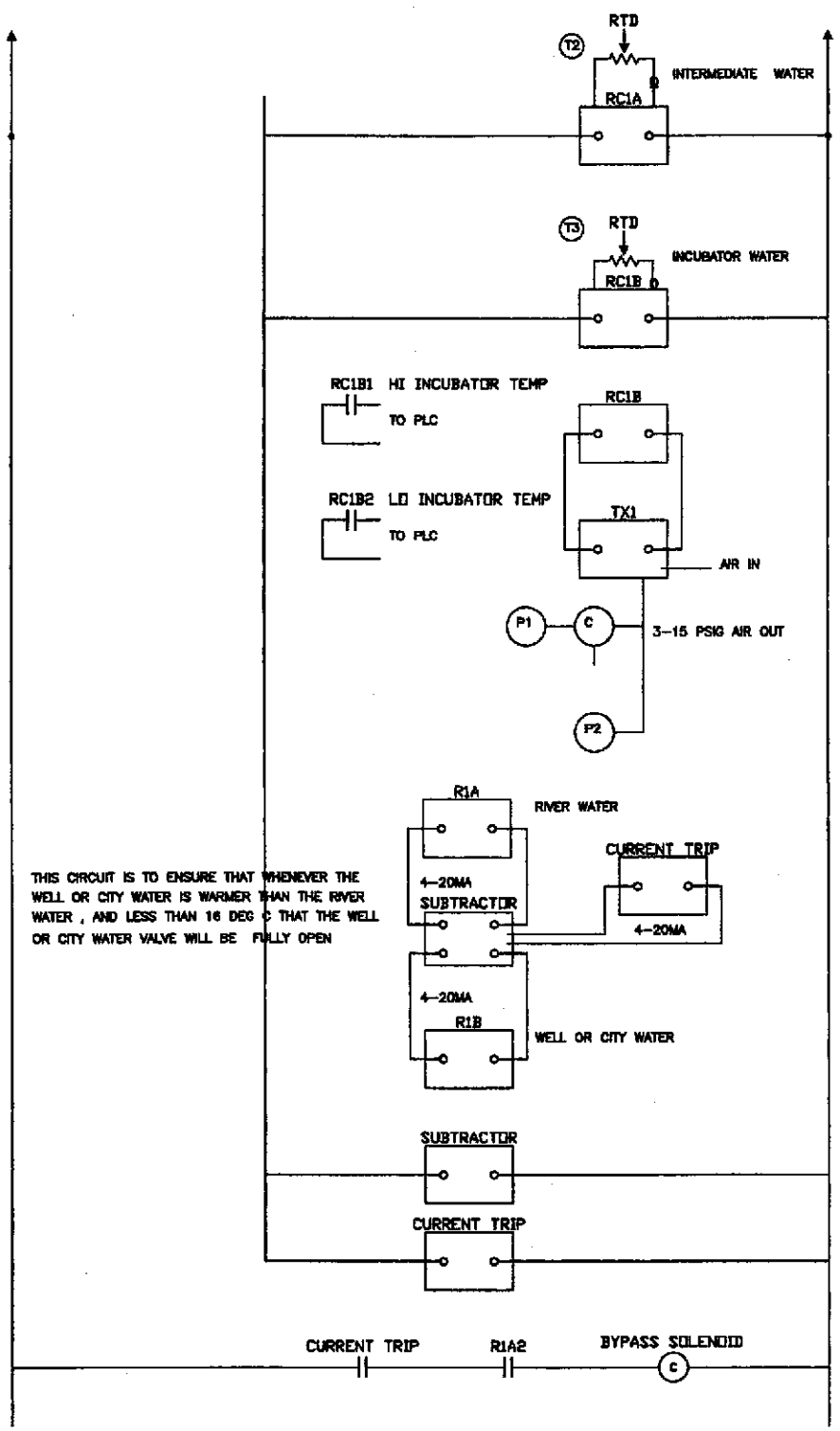
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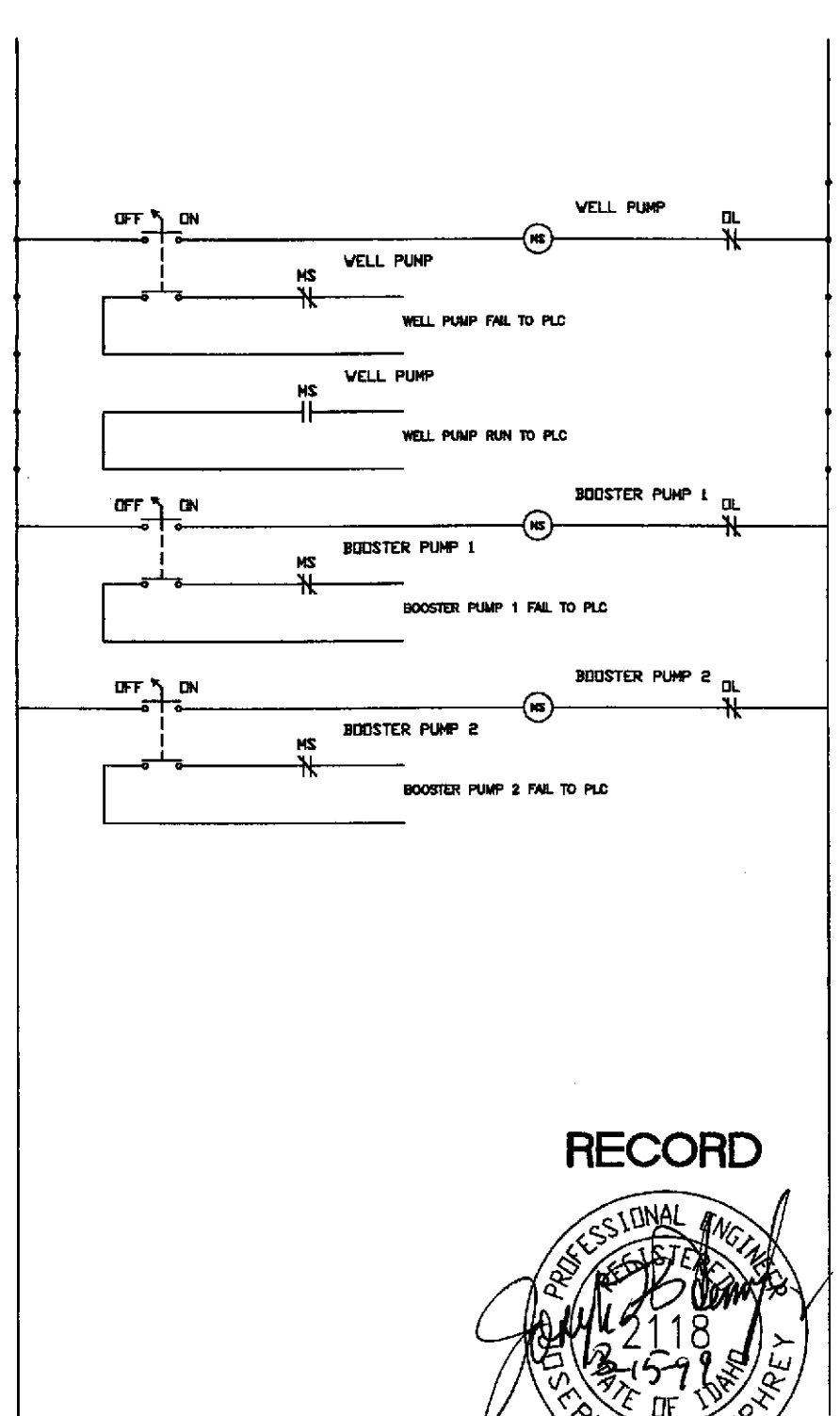
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ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RM1 OF 22

R1	PARTLOW MR7-2-2-2-0-2-0-0-0-0-2-1 TWO PEN 10 INCH CHART RECORDER/CONTROLLER
RC1	PARTLOW MR7-2-2-2-0-1-0-0-0-0-2-1 TWO PEN 10 INCH CHART RECORDER/CONTROLLER
TRANSDUCER-TX1	DAHL #P600
VALVE POSITIONER	MASONEILAN #46128
VALVES	MASONEILAN #3535112/3535212
SUBTRACTOR	AGM PTA 4005-1
CURRENT TRIP	AGM PTA 4034-17
BYPASS SOLENOID	ASCO 3-WAY
252	TEKMAR #252 TWO STAGE BOILER CONTROL
365	TEKMAR #365 INJECTION PUMP CONTROL







RECORD

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WHITE STURGEON HATCHERY UPGRADE

BOILER MECHANICAL AND CONTROL SCHEMATIC

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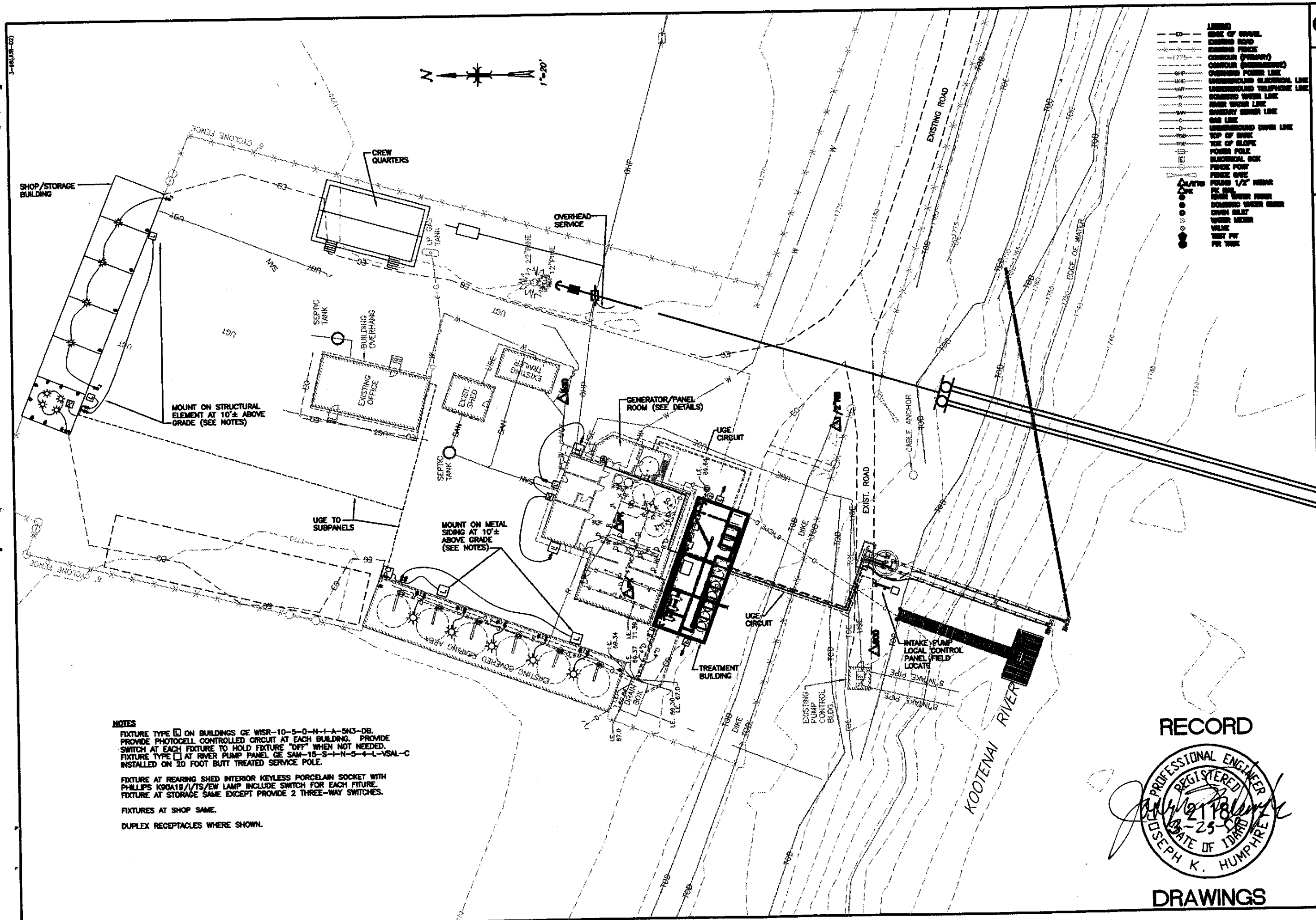
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SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RM2 OF

PROFESSIONAL ENGINEER
REGISTERED
2118
STATE OF IDAHO
JOSEPH K. HUMPHREY



NOTES

FIXTURE TYPE [L] ON BUILDINGS GE WISR-10-5-0-N-I-A-5N3-DB. PROVIDE PHOTOCELL CONTROLLED CIRCUIT AT EACH BUILDING. PROVIDE SWITCH AT EACH FIXTURE TO HOLD FIXTURE "OFF" WHEN NOT NEEDED. FIXTURE TYPE [ ] AT RIVER PUMP PANEL GE SAM-15-S-I-N-5-4-L-VSAL-C INSTALLED ON 20 FOOT BUTT TREATED SERVICE POLE.

FIXTURE AT REARING SHED INTERIOR KEYLESS PORCELAIN SOCKET WITH PHILLIP'S K90A19/I/TS/EW LAMP INCLUDE SWITCH FOR EACH FITURE. FIXTURE AT STORAGE SAME EXCEPT PROVIDE 2 THREE-WAY SWITCHES.

FIXTURES AT SHOP SAME.

DUPLEX RECEPTACLES WHERE SHOWN.

RECORD

DRAWINGS

J-U-B ENGINEERS, Inc.
1500 IRONWOOD DRIVE
SUITE 220
COEUR d'ALENE, IDAHO 83814
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FAX: 208-667-2175

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY

ELECTRICAL SITE PLAN

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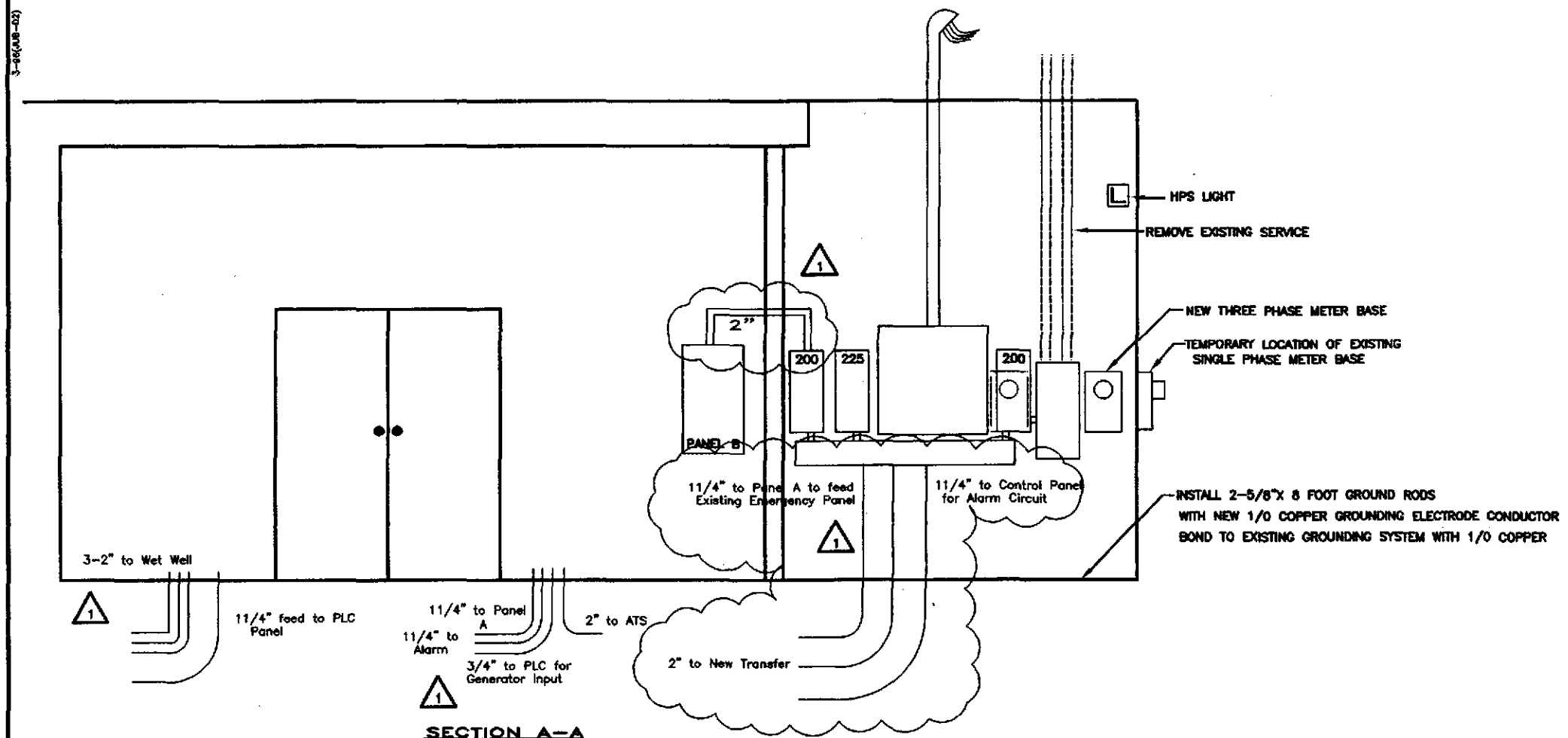
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REVISION

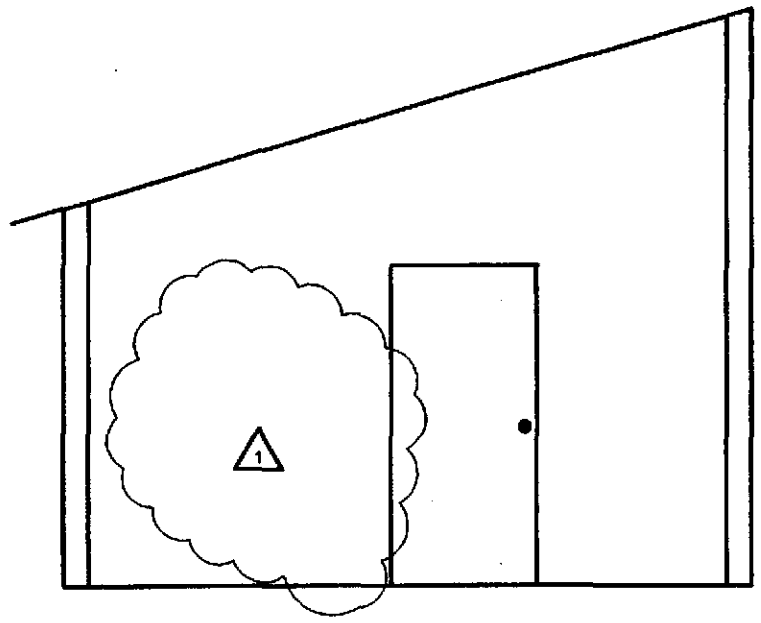
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SHEET
RE1
OF 22

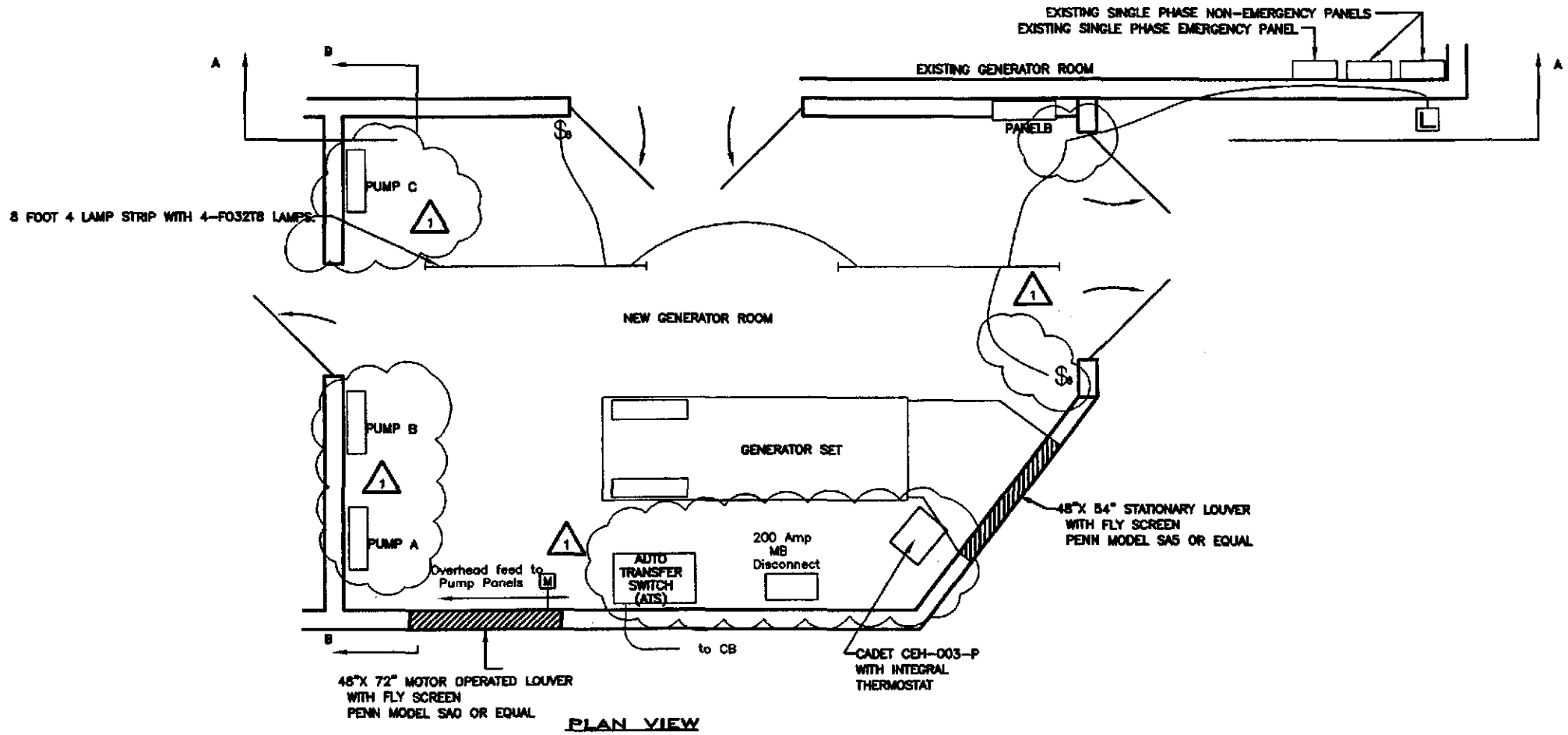
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21768
5-25-06
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JOSEPH K. HUMPHREY



SECTION A-A

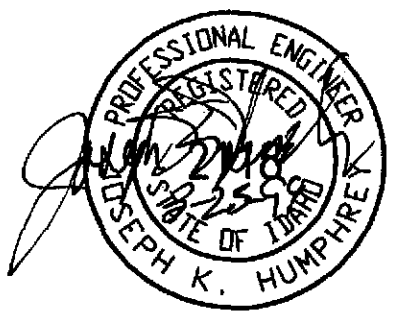


SECTION B-B



PLAN VIEW

RECORD



DRAWINGS

J-U-B ENGINEERS, Inc.
1389 WOODWOOD DRIVE
SUITE 203
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1214
FAX: 208-667-2178

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

GENERATOR AND PANEL ROOM

REUSE OF DRAWINGS
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NO.	DESCRIPTION	BY	APP'D	DATE
	RECORD DRAWINGS	LW/JTR	PAK	2.19.88

REVISION

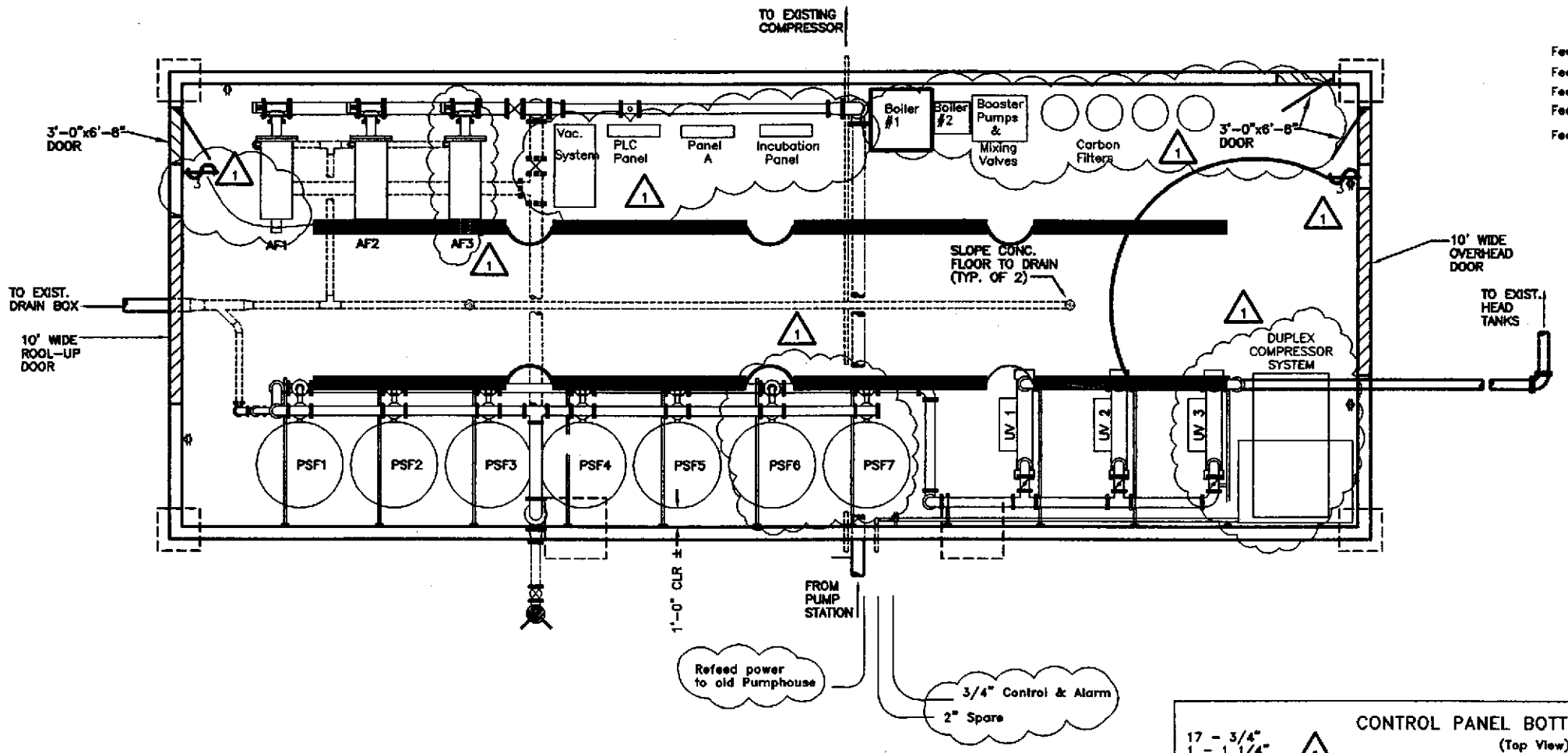
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DESIGN BY: PAK/DE
CHECKED BY: PAK/DE
ARCHIVE LOCALE:
PROJECT NO. 20329
DRAWING NO.
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AT FULL SIZE. IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

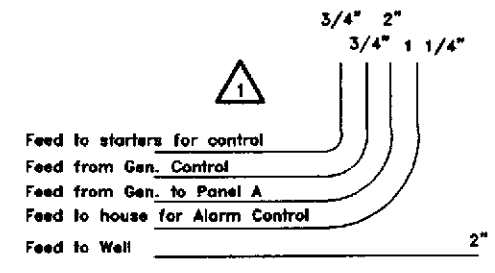
SHEET RE2 OF 22

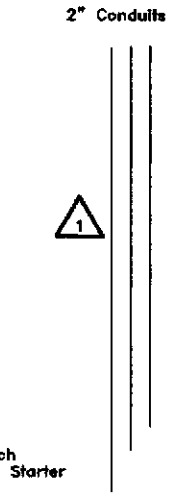
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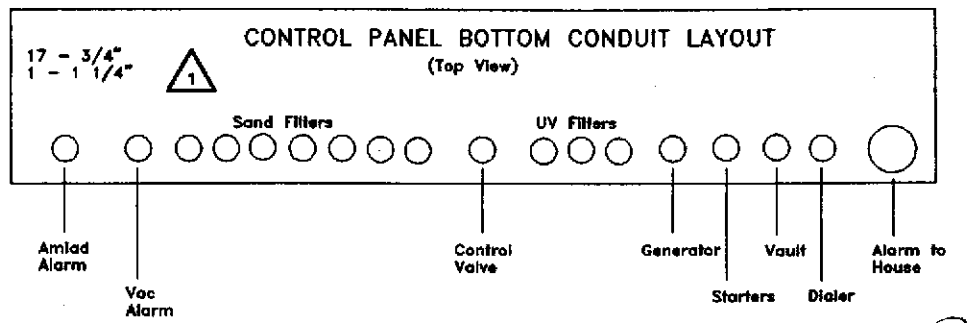
LEGEND

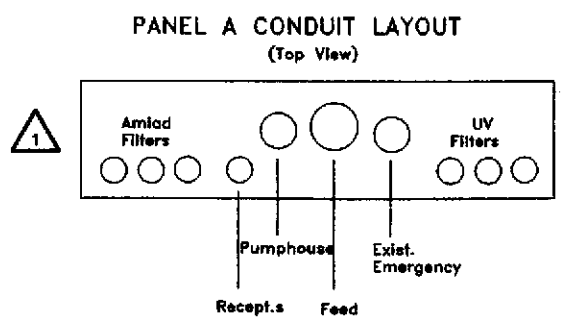
8 FOOT VAPORLUMEWITH 4 F032T8



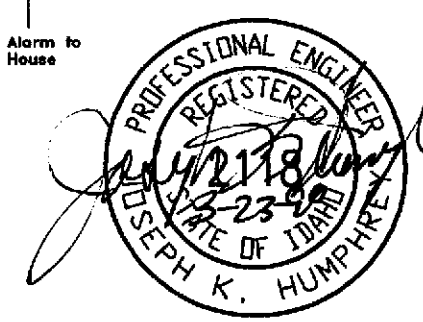








RECORD DRAWINGS



J-U-B ENGINEERS, Inc.
12269 ROSWOOD DRIVE
SUITE 220
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1574
FAX: 208-667-2178

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

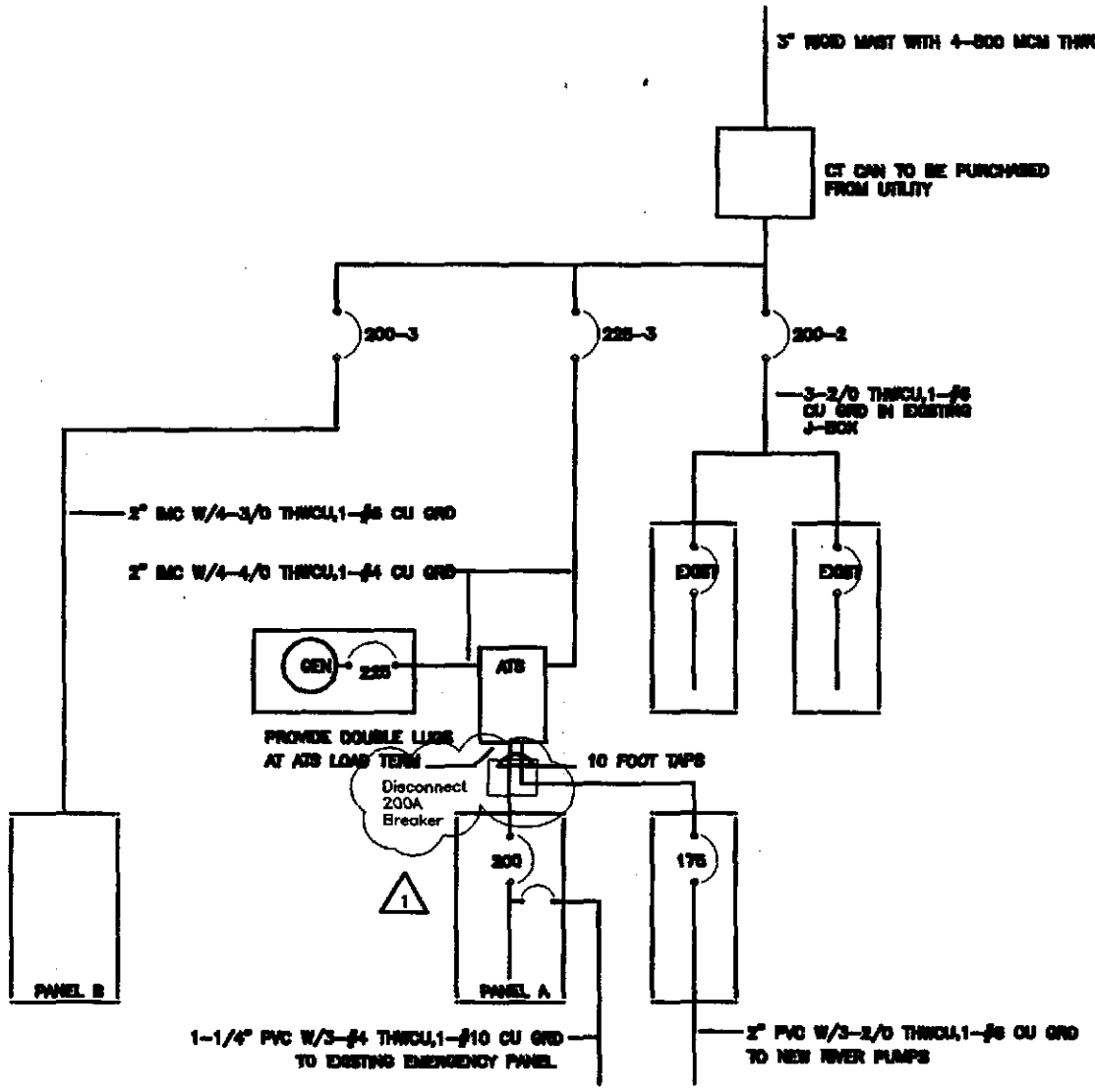
TREATMENT BUILDING
ELECTRICAL PLAN

REUSE OF DRAWINGS
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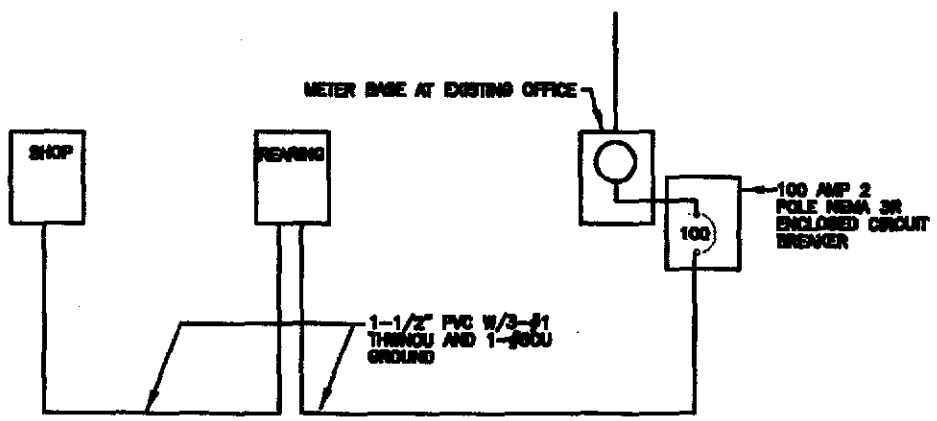
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CHECKED BY: PAK/DE
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PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=48
ONE INCH
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: x
VER SCALE: NONE

SHEET RE3 OF 22



SINGLE LINE DIAGRAM-NTS



SINGLE LINE DIAGRAM-REARING SHED AND SHOP AREA

PANELBOARD SCHEDULE

PANEL A TYPE 3 ø 4 W 120/240 VOLTS
MOUNTING ☐ FLUSH ☒ SURFACE 175 AMP. MAINS: ☐ LUGS ☒ BREAKER

BRANCH BREAKERS

ITEM	AMP. RATING	POLE	CIR. NO.	PHASE LOADING A	PHASE LOADING B	PHASE LOADING C	CIR. NO.	AMP. RATING	POLE	ITEM
EMERGENCY PANEL	60	2	1				2	30	3	VACUUM PUMP
			3		XXX		4			
ULTRA-VIOLET #1	20	1	5				6			
ULTRA-VIOLET #2	20	1	7				8	30	3	AIR COMPRESSOR
			9		XXX		10			
FUTURE ULTRA-VIOLET	20	1	11				12			
FUTURE UNIT HEATER	20	1	13				14	15	3	AMMO FILTER #1 & #2
			15		XXX		16			
HEAT SEAL LPS & GASLOCK	20	1	17				18			
GENERATOR ROOM LIGHTS	20	1	19				20	15	3	AMMO FILTER #3
			21		XXX		22			
GENERATOR CONTROLS	20	1	23				24			
BOILER CONTROLS	20	1	25				26	15	3	PUT AMMO FILTER #3
BOILER	30	3	27		XXX		28			
BOILER			29				30			
			31				32	15	3	WELL PUMP
SPARE	20	1	33		XXX		34			
			35				36			
			37				38	20		SPARE
			39		XXX		40			
			41				42			

FEEDER: ☐ TOP ☐ BOTTOM _____ AWG OR MCM TOTAL CONNLOAD _____ WATTS
INTEGRATED EQUIPMENT RATING: 22000 AMPS RMS SYM. BOLT-IN BREAKERS

PANELBOARD SCHEDULE

PANEL B TYPE 3 ø 4 W 120/240 VOLTS
MOUNTING ☐ FLUSH ☒ SURFACE 200 AMP. MAINS: ☒ LUGS ☐ BREAKER

BRANCH BREAKERS

ITEM	AMP. RATING	POLE	CIR. NO.	PHASE LOADING A	PHASE LOADING B	PHASE LOADING C	CIR. NO.	AMP. RATING	POLE	ITEM
FRANK BLOCK HTR	20	1	1				2	15	3	GENERATOR ROOM
FURNACE-LABORATORY	20	1	3				4			HEATER
FURNACE-BOOM-GARAGE	20	1	5				6			
SPARE			7				8	20	1	SPARE
			9				10			
			11				12			
			13				14			
			15				16			
			17				18			
			19				20			
			21				22			
			23				24			
			25				26			
			27				28			
			29				30			
			31				32			
			33				34			
			35				36			
			37				38			
			39				40			
			41				42			

FEEDER: ☐ TOP ☐ BOTTOM _____ AWG OR MCM TOTAL CONNLOAD _____ WATTS
INTEGRATED EQUIPMENT RATING: 22000 AMPS RMS SYM.

LOAD CENTER SCHEDULE

PANEL REARING TYPE 1 ø 3 W 120/240 VOLTS
MOUNTING ☐ FLUSH ☒ SURFACE 100 AMP. MAINS: ☐ LUGS ☒ BREAKER

BRANCH BREAKERS

ITEM	AMP. RATING	POLE	CIR. NO.	PHASE LOADING A	PHASE LOADING B	PHASE LOADING C	CIR. NO.	AMP. RATING	POLE	ITEM
OUTLETS	20 GFCI	1	1				2	20	1	INTERIOR LIGHTING
EXTERIOR LIGHTING	20		3				4			SPARE
SPARE			5				6			
			7				8			
			9				10			
SPACE			11				12			SPACE
			13				14			
			15				16			

FEEDER: ☐ TOP ☐ BOTTOM _____ AWG OR MCM TOTAL CONNLOAD _____ WATTS
INTEGRATED EQUIPMENT RATING: 10000 AMPS RMS SYM.

LOAD CENTER SCHEDULE

PANEL SHOP TYPE 1 ø 3 W 120/240 VOLTS
MOUNTING ☐ FLUSH ☒ SURFACE 100 AMP. MAINS: ☐ LUGS ☒ BREAKER

BRANCH BREAKERS

ITEM	AMP. RATING	POLE	CIR. NO.	PHASE LOADING A	PHASE LOADING B	PHASE LOADING C	CIR. NO.	AMP. RATING	POLE	ITEM
OUTLETS	20 GFCI	1	1				2	20	1	STORAGE BAY LIGHTING
EXTERIOR LIGHTING	20		3				4			SHOP OUTLETS
SHOP LIGHTS			5				6			SHOP OUTLETS
SPARE			7				8			SPARE
SPARE			9				10			SPARE
SPACE			11				12			SPACE
			13				14			
			15				16			

FEEDER: ☐ TOP ☐ BOTTOM _____ AWG OR MCM TOTAL CONNLOAD _____ WATTS
INTEGRATED EQUIPMENT RATING: 10000 AMPS RMS SYM.

RECORD

PROFESSIONAL ENGINEER REGISTERED 6-23-99 STATE OF IDAHO JOSEPH K. HUMPHREY

DRAWINGS

J-U-B ENGINEERS, Inc.
1309 BOONWOOD DRIVE
SUITE 200
COEUR d'ALENE, IDAHO 83814
PHONE: 208-667-1571
FAX: 208-667-2178

KOOTENAI TRIBE OF IDAHO
WHITE STURGEON HATCHERY UPGRADE

PANEL BOARD SCHEDULES AND ONE-LINE DIAGRAMS

REUSE OF DRAWINGS
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NO.	DESCRIPTION	BY	DATE
	RECORD DRAWINGS	LW/TR	PAK 2-13-99

DRAWN BY: TLR
DESIGN BY: PAK/DE
CHECKED BY: PAK/DE
ARCHIVE LOCALE:
PROJECT NO. 20329
DRAWING NO.
ACAD PLOT SCALE: 1=2
|-ONE INCH-|
AT FULL SIZE, IF NOT ONE INCH, SCALE ACCORDINGLY
SCALE OF SHEET
HOR SCALE: =
VER SCALE: NONE

SHEET RE4 OF 22

FOR OFFICE USE ONLY
Amt. of Fee $: 100.00
Receipt No. C032572
Receipt By: SWK
Date Receipted: 5-3-95

RECEIVED
MAY 0 3 1995
Department of Water Resources

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

PROOF OF BENEFICIAL USE

The Idaho Department of Water Resources considers this form a statement that the permit holder(s) has/have completed all development that will occur under this permit and that water has been applied according to the provisions of the permit for the beneficial use(s) described below. This form must be accompanied by a license examination fee, when necessary, or be accompanied by a completed field examination report prepared by a certified water right examiner who has been appointed by the department.

1. Permit No. 98-07684 Telephone No. 208-267-3519

2. Name(s) of Permit Holder(s): Kootenai Tribe of Idaho

3. Mailing Address: P.O. BOX 1269 Bonners Ferry Id, 83805

4. Source of Water: Kootenai River If **GROUNDWATER** (well), Date Drilled: mo._____ / yr._____

a. Well Driller: _____ Drilling Permit Number: ____ - ____ - ____ - ____

b. ***OPTIONAL:***
Pump Horsepower: _____ Pressure (psi): _____ Dynamic pumping level (ft): _____

5. Use(s) (as authorized by the water right permit):

Domestic (No. of households): _____ Stockwater (No. and type of stock): _____

Irrigation (No. of acres): _____ Other: White Sturgeon Hatchery

6. Total rate of diversion and/or volume for which proof is submitted: 0.45 cfs **OR** _____ acre feet

7. Measuring Device Requirement: **(refer to the approval conditions on your permit and respond accordingly)**
*(This question is **not optional**. Please check either yes or no. Proofs returned not checked accordingly, will be considered incomplete)*

Measuring Device:	Is a measuring device required?	Yes ____ or	No X
	Has the measuring device been installed?	Yes ____ or	No X
Flow Measurement Port:	Is a flow measurement port required?	Yes ____ or	No X
	Has the measurement port been installed?	Yes ____ or	No X

8. Fee Enclosed: $ 100.00 (See Fee Schedule on back of the instructions for filing proof of beneficial use)

9. Person to contact to accompany the Department representative during field examination of the water system.

Name: John Siple or Paul Anders Telephone Number: 208-267-3519

Address: Same as above Permit Holder address

10. The information given on this form is my true statement of the extent to which the above numbered permit has been developed and I relinquish any undeveloped portion of the permit to the State of Idaho.

JUN 1 4 1995

Signature of permit holder: Paul Anders, Fishery Biologist Date: 4/13/95
(include your title, if on behalf of company of organization)

BEFORE THE DEPARTMENT OF WATER RESOURCES

OF THE

STATE OF IDAHO

IN THE MATTER OF PERMIT NO. 98-07684	)	
	)	**ORDER OF**
IN THE NAME OF KOOTENAI TRIBE OF IDAHO	)	**REINSTATEMENT**
	)	

WHEREAS, the Department issued the above-captioned permit with the condition that proof of construction of works and application of water to beneficial use (proof of beneficial use) be submitted on or before May 1, 1995; and,

WHEREAS, the Department notified the permit holder on February 28, 1995, by certified mail that proof was due and instructed the permit holder of the steps to be taken to submit the proof of beneficial use; and,

WHEREAS, on May 2, 1995, the permit lapsed since the department had not received an acceptable proof of beneficial use or extension of time; and,

WHEREAS, Section 42-218a, Idaho Code, provides that a permit may be reinstated upon a showing of reasonable cause within sixty days of the date of the notice of lapsing; and,

WHEREAS, the permit holder has provided a reasonable showing why the permit should be reinstated by submitting an acceptable proof of beneficial use on May 3, 1995;

IT IS, THEREFORE, HEREBY ORDERED that Permit No. 98-07684 be **REINSTATED** with an advance in priority to February 24, 1991.

Dated this 18th day of May, 1995.

L. GLEN SAXTON
Chief, Water Allocation Bureau

JUN 14 1995

State of Idaho
Department of Water Resources

Permit To Appropriate Water

NO. 98-07684

Proposed Priority: February 22, 1991 Maximum Diversion Rate: 0.56 CFS

This is to certify, that **KOOTENAI TRIBE OF IDAHO**
P.O. BOX 1269
BONNERS FERRY, ID 83805
has applied for a permit to appropriate water from:

KOOTENAI RIVER tributary of **COLUMBIA RIVER**

and a permit is **APPROVED** for development of water as follows:

BENEFICIAL USE	PERIOD OF USE	RATE OF DIVERSION
FISH PROPAGATION	01/01 to 12/31	0.56 CFS

LOCATION OF POINT(S) OF DIVERSION: NESWSW Sec. 20, Township 62N, Range 01E
BOUNDARY County

PLACE OF USE: FISH PROPAGATION

TWN	RGE	SEC	
62N	01E	20	SWSW

CONDITIONS/REMARKS:

1. Proof of construction of works and application of water to beneficial use shall be submitted on or before **May 1, 1995.**
2. Subject to all prior water rights.
3. Project construction shall commence within one year from the date of permit issuance and shall proceed diligently to completion unless it can be shown to the satisfaction of the Director of the Department of Water Resources that delays were due to circumstances over which permit holder had no control.
4. In the event that water used under this permit should be discharged into a natural channel, settling ponds will be required which are capable of reducing the silt load to such a level that the quality of the water would not be impaired for other beneficial uses.
5. Water used under this permit if discharged into a natural channel or subsurface system shall meet Idaho Water Quality Standards.
6. The permit holder shall be required to provide the Department, upon request, information showing volume changes per hour necessary to maintain an adequate environment for the fish propagation facility. Volume changes per hour shall be based upon actual fish production.
7. The issuance of this permit in no way grants any right-of-way or easement across the land of another.

AUG 09 1991

State of Idaho
Department of Water Resources

Permit To Appropriate Water

NO. 98-07684

This permit is issued pursuant to the provisions of Section 42-204, Idaho Code.
Witness the seal and signature of the Director, affixed at Boise, this

16th day of April, 1991.

for R. Glen Saxton
R. Keith Higginson, Director

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APR 09 1991

Form 202
6/85

Ident. No. 98-7684

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
APPLICATION FOR PERMIT

To appropriate the public waters of the State of Idaho

1. Name of applicant Kootenai Tribe of Idaho, Raymond Abraham, Chief Phone (208) 267-3519
   Post office address P.O.Box 1269, Bonners Ferry, Idaho 83805

2. Source of water supply Kootenai River which is a tributary of Columbia River

3. Location of point of diversion is NE ¼ of SW ¼ of SW ¼, Govt. Lot _____
   Sec. 20 Township 62N Range 1E B.M. Boundary County; additional points of diversion if any: A Portion of Tribal Allotment 11

4. Water will be used for the following purposes:

   Amount 0.56 (cfs or acre-feet per annum) for Fish Prop. purposes from Jan. 1 to Dec. 31 (both dates inclusive)

   Amount _____ (cfs or acre-feet per annum) for _____ purposes from _____ to _____ (both dates inclusive)

   Amount _____ (cfs or acre-feet per annum) for _____ purposes from _____ to _____ (both dates inclusive)

   Amount _____ (cfs or acre-feet per annum) for _____ purposes from _____ to _____ (both dates inclusive)

5. Total quantity to be appropriated is (a) 0.56 cubic feet per second and/or (b) _____ acre feet per annum

6. Proposed diverting works:

   a. Description of ditches, flumes, pumps, headgates, etc. 6" Diam. HDPE supply pipeline will be held in place by 3 concrete anchors and attached to 8" diam. x 5' lg. D.I. pipe that encases a submersible pump, 5 hp stainless steel impellers, 1 phase Franklin 230 volt motor. D.I. pipe attaches to 18" diam. 60 slot stainless steel wedge wire screen.

   b. Height of storage dam _____ feet; active reservoir capacity _____ acre-feet; total reservoir capacity _____ acre-feet; period of year when water will be diverted to storage: _____ to _____ inclusive.

   c. Proposed well diameter is _____ inches; proposed depth of well is _____ feet.

   d. Is ground water with a temperature of greater than 90°F being sought? _____

7. Time required for the completion of the works and application of the water to the proposed beneficial use is 5 years (*minimum 1 year*).

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8. Description of proposed uses (*if irrigation only, go to item 9*):

a. Hydropower; show total feet of head and proposed capacity in KW. _____

b. Stockwatering; list number and kind of livestock. _____

c. Municipal; show name of municipality. _____

d. Domestic; show number of households. _____

e. Other; describe fully. Fish Propagation--18,000 lbs. white sturgeon & cold water fish species annually. Facility contains 4-10' diam. FRP circ. ponds and 10-5' diam. FRP circ. ponds.

9. Description of place of use:

a. If water is for irrigation, indicate acreage in each subdivision in the tabulation below.

b. If water is used for other purposes, place a symbol of the use (*example: D for Domestic*) in the corresponding place of use below. See instructions for standard symbols.

TWP	RANGE	SEC.	NE¼				NW¼				SW¼				SE¼				TOTALS
			NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	NE¼	NW¼	SW¼	SE¼	
62N	1E	20											H						

Total number of acres to be irrigated _____

10. Describe any other water rights used for the same purposes as described above. NONE / SEE REMARKS

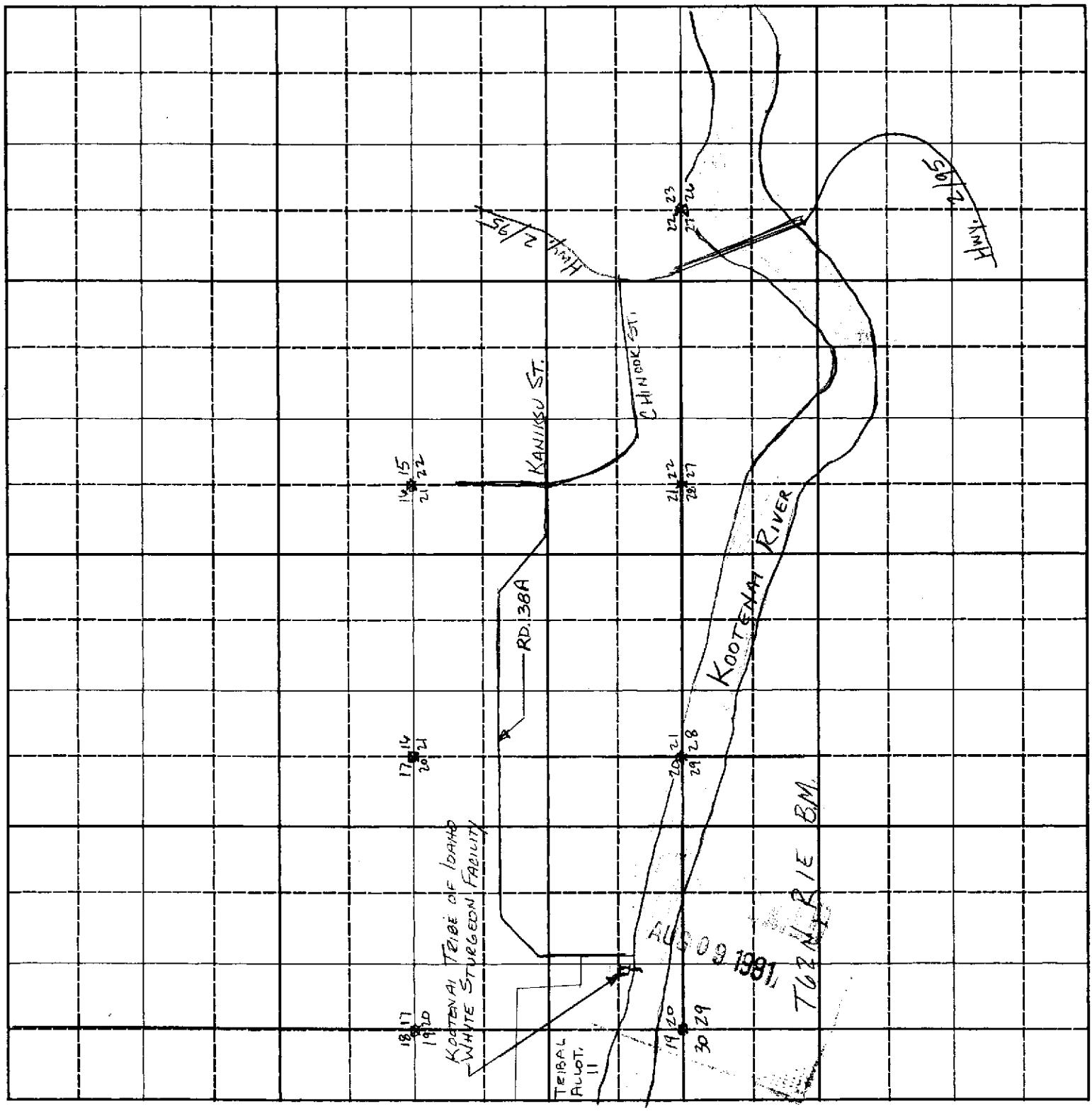
11. a. Who owns the property at the point of diversion? Kootenai Tribe of Idaho & Individual Co-tenants & Held in Trust by U.S.

b. Who owns the land to be irrigated or place of use? Kootenai Tribe of Idaho & Individual Co-tenants & Held in Trust by U.S.

c. If the property is owned by a person other than the applicant, describe the arrangement enabling the applicant to make this filing. ~~Revocable permit~~ issued by the U.S. Dept. of Interior

12. Remarks: This application is submitted solely for the purpose of appropriating water in addition to reserved water rights held by the Kootenai Tribe of Idaho, pursuant to the 1855 Treaty of Hellgate. Neither this application nor any permit issued pursuant hereto shall be interpreted as affecting in any manner the above described reserved rights.

13. Map of proposed project: show clearly the proposed point of diversion, place of use, section number, township and range number.



Scale: 2 inches equal 1 mile.

BE IT KNOWN that the undersigned hereby makes application for permit to appropriate the public waters of the State of Idaho as herein set forth.

Raymond Abraham
(Applicant)

Chief, Kootenai Tribe of Idaho

Received by [signature] Date 2/22/91 Time 2:00 PM Preliminary check by TDK

Fee $ 45.00 Receipted by [signature] # N4349 Date 2/22/91

Publication prepared by [signature] Date 2/27/91 Published in Commerce Jerry Herald 3/6 & 3/13/91

Publication approved [signature] Date 3/28/91

ACTION OF THE DIRECTOR, DEPARTMENT OF WATER RESOURCES

This is to certify that I have examined Application for Permit to appropriate the public waters of the State of Idaho No. _____, and said application is hereby _____.

1. Approval of said application is subject to the following limitations and conditions:

   a. SUBJECT TO ALL PRIOR WATER RIGHTS.

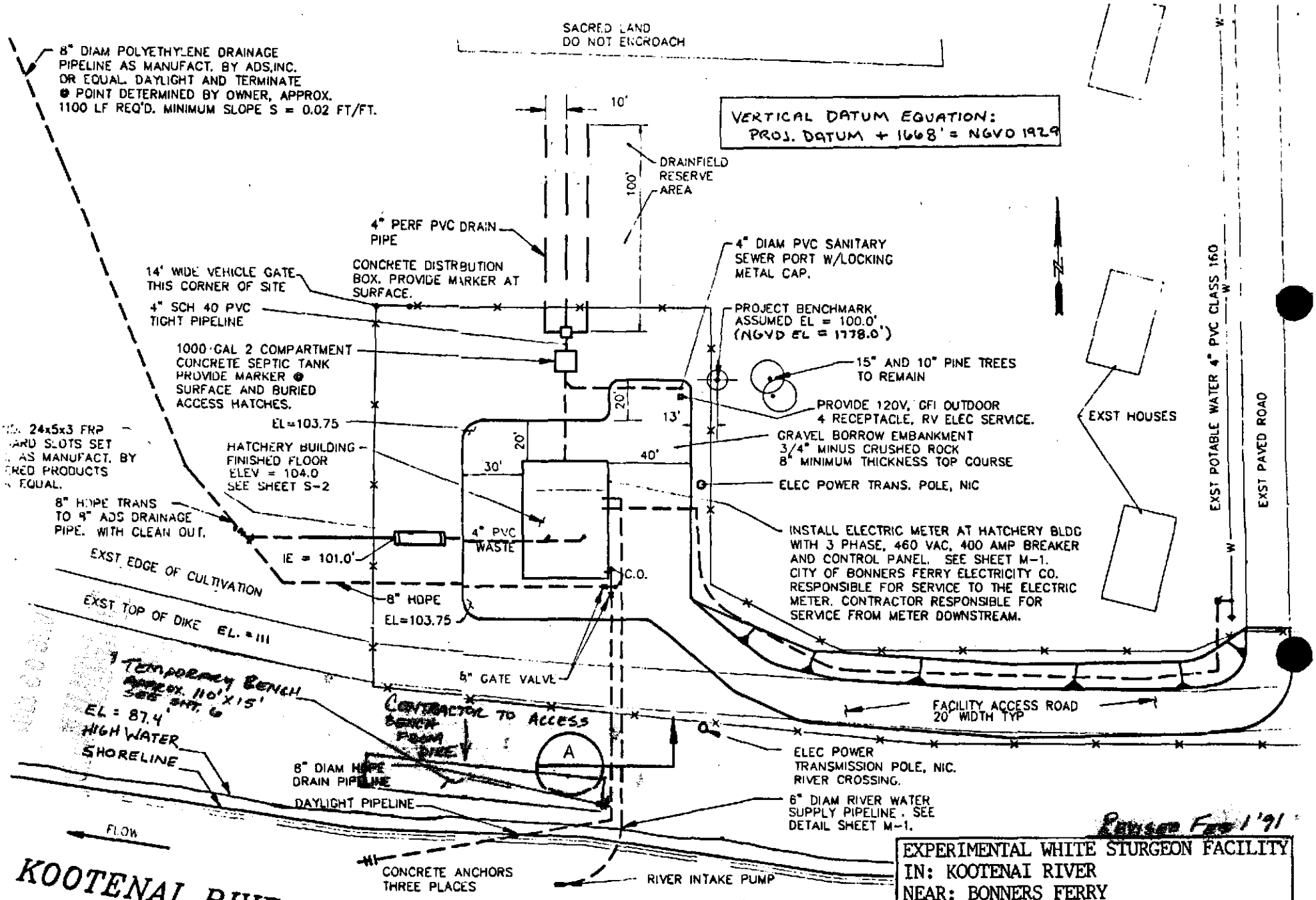
   b. Proof of construction of works and application of water to beneficial use shall be submitted on or before _____, 19____.

   c. The rate of diversion, if water is to be used for irrigation under this permit, when combined with all other water rights for the same land shall not exceed 0.02 cubic feet per second for each acre of land.

   d. The water right acquired under this permit if for hydropower purposes shall be junior and subordinate to all rights to the use of water, other than hydropower, within the State of Idaho that are initiated later in time than the priority of this permit and shall not give rise to any right or claim against any future rights to the use of water, other than hydropower, within the State of Idaho initiated later in time than the priority of this permit.

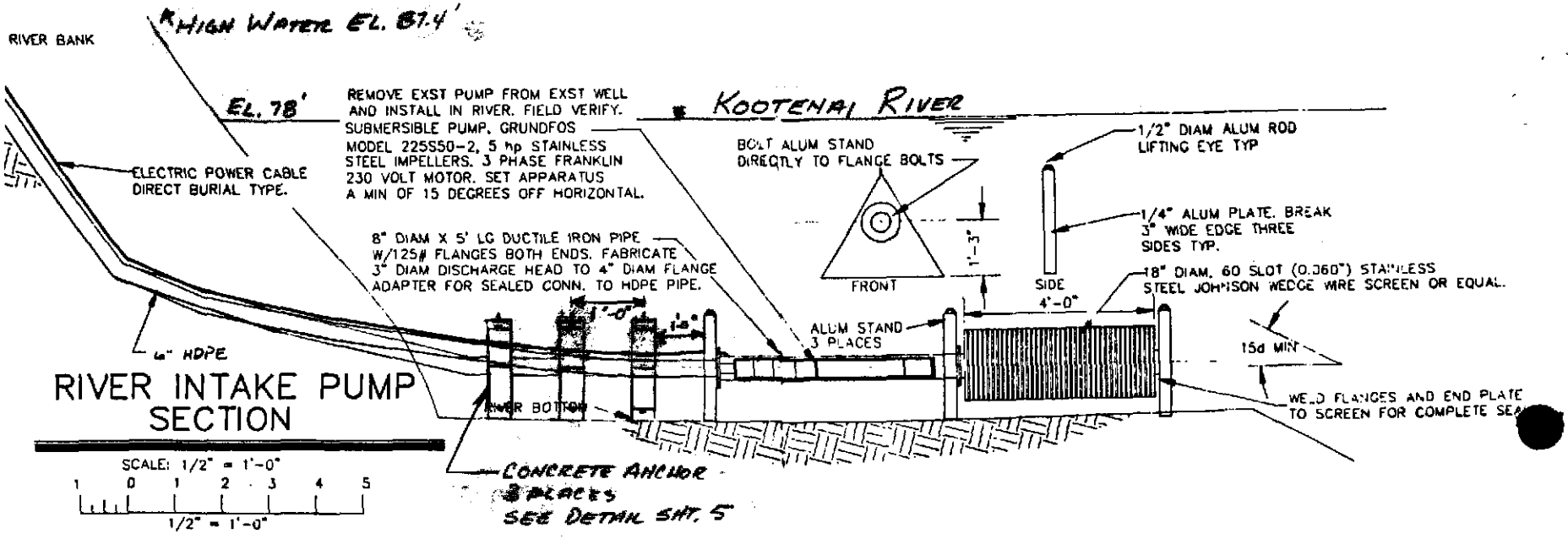
   e. Other:

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MAR 29 1991



Revised Feb 1 '91

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 2 OF 16



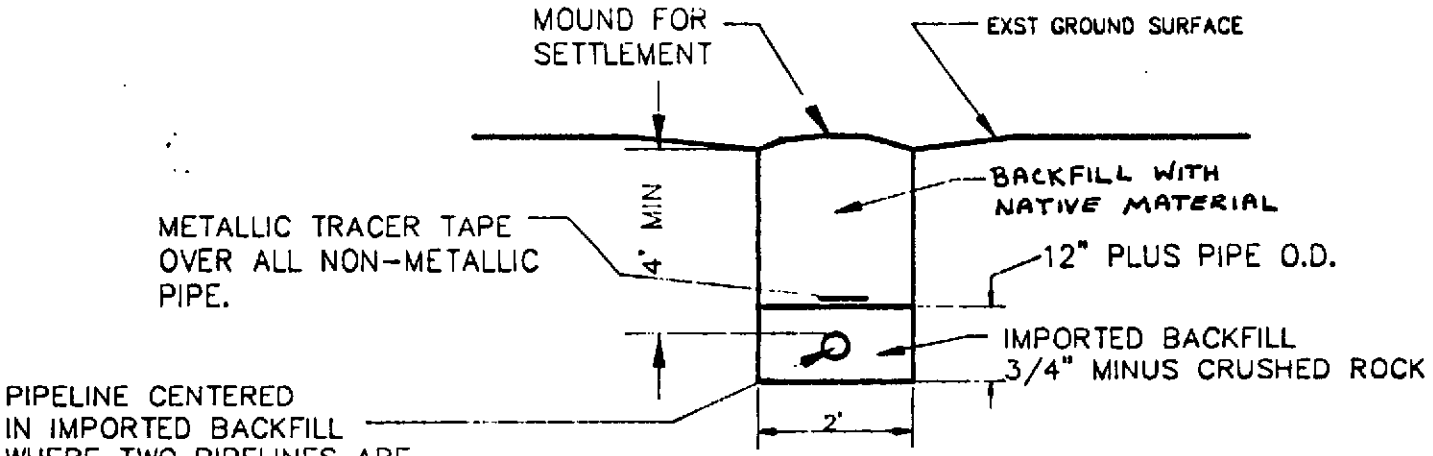
Note:
PROJECT DATUM + 166.8' = NGVD 1929

RIVER INTAKE PUMP SECTION

SITE PROFILE

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 3 OF 6

AUG 09 1991



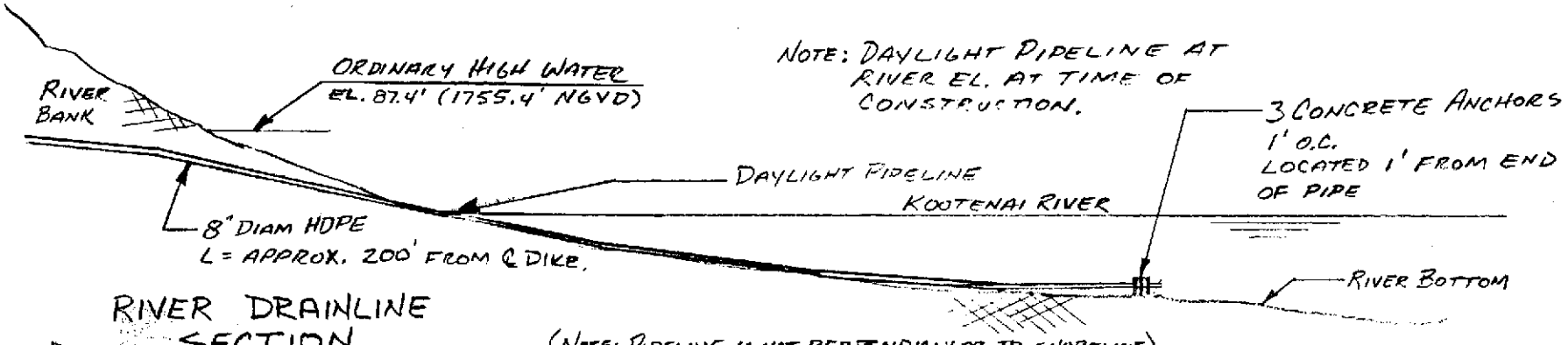
A

TYPICAL TRENCH SECTION

SCALE: NONE

Revised Feb 1, '91

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 4 OF 16



RIVER DRAINLINE SECTION

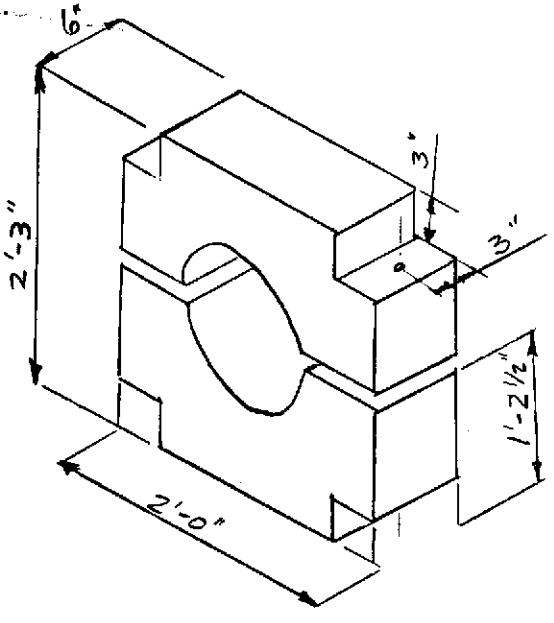
SCALE 1/2" = 10'-0"

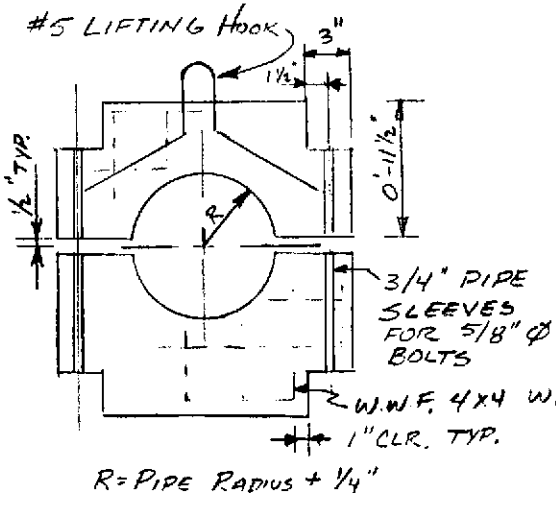
10 0 10 20 30

1/2" = 10'

(NOTE: PIPELINE IS NOT PERPENDICULAR TO SHORELINE.) SEE FACILITY SITE PLAN

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 1 FEB 1991 SHEET 5 OF 6



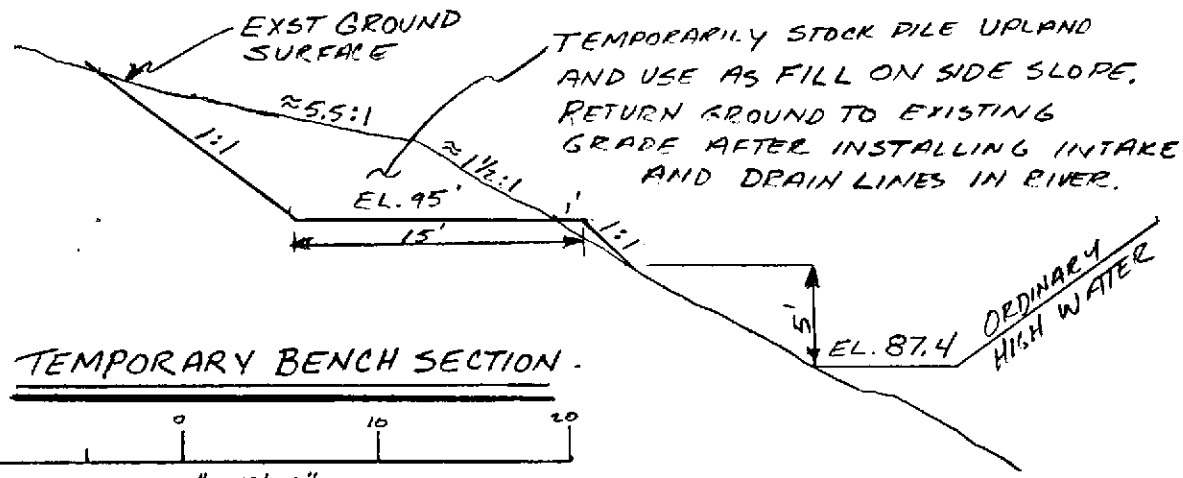


CONCRETE ANCHOR DETAIL

NO SCALE

NOTES:

1. POLYETHYLENE PIPE SHALL BE WRAPPED W/ 1/4" THICK NEOPRENE SPONGE ALL AROUND. THE WRAPPING SHALL EXTEND AT LEAST ONE INCH BEYOND BOTH EDGES OF CONCRETE ANCHOR.
2. CLOSED CELL NEOPRENE SPONGE SHALL BE FURNISHED WITH "SKIN" ONE SIDE, SIMILAR TO BOYD INDUSTRIAL RUBBER TYPE R-421-N.
3. BOLTS FOR CONCRETE ANCHORS SHALL BE ASTM A307 MATERIAL, HOT DIP GALVANIZED. NUT SHALL BE FURNISHED W/ SELF LOCKING NYLON PELLET. WASHERS BEARING ON CONCRETE SHALL BE 2 7/8" DIA. X 3/16" THICK, GALVANIZED. WASHERS BEARING ON STEEL SHALL BE MFG. STANDARD GALVANIZED.

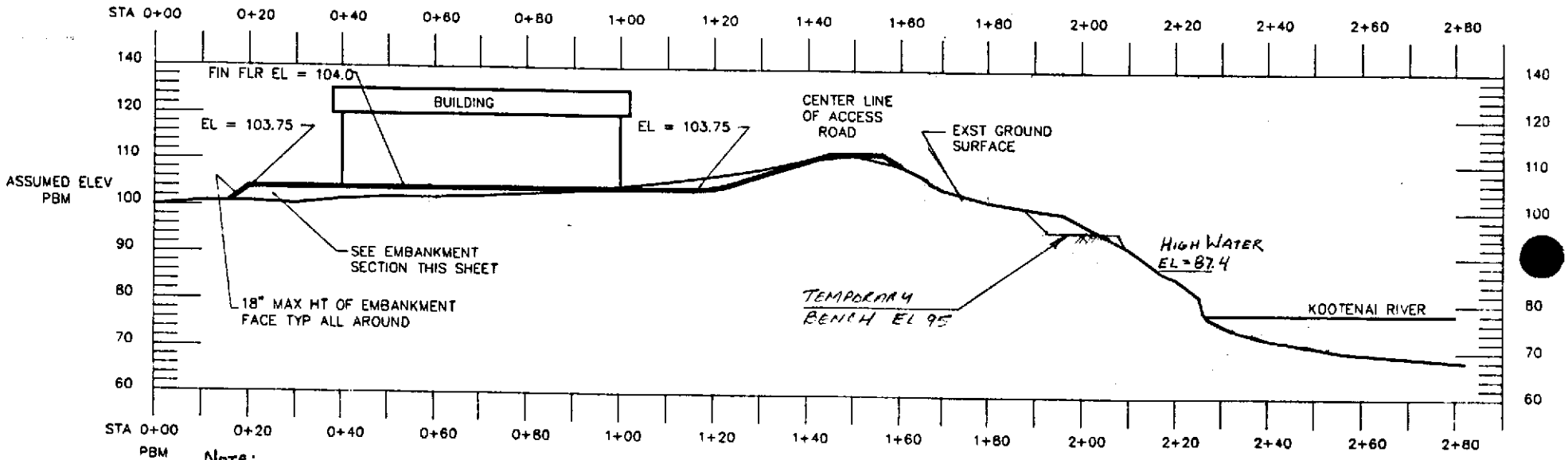


TEMPORARY BENCH SECTION.

10 0 10 20

1" = 10'-0"

AUG 09 1991



Note:
PROJECT DATUM + 166.8' = NGVD 1929

SITE PROFILE

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 1 FEB 1991 SHEET 6 OF 6

NOTICE OF APPLICATION
FOR WATER RIGHT

The Following application(s) have been filed to appropriate the public waters of the State of Idaho:

98-07684
KOOTENAI TRIBE OF IDAHO
P.O. BOX 1269
BONNERS FERRY, ID 83805
Source: KOOTENAI RIVER
Tributary: COLUMBIA RIVER
Diversion Pt: NESWSW Sec 20 T 62N R 01E
Use: FISH PROPAGATION (.560 CFS)
TOTAL DIVERSION: (.560 CFS)
Date Filed: 2/22/1991
In: T62N R01E S20 SWSW

For additional information concerning the property location, call the Northern Regional Office at 765-4639.

The permit(s) will be subject to all prior water rights. Protests must be filed with the Director, Dept. of Water Resources, Northern Region, 1910 Northwest Blvd., Suite 210, Coeur d'Alene, Idaho 83814 on or before MARCH 25, 1991.

R. KEITH HIGGINSON,
Director

BFH #1826 March 6, 13, 1991

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R. KEITH HIGGINSON,
Director

BFH #1826 March 6, 13, 1991

AFFIDAVIT OF PUBLICATION

RECEIVED
MAR 1 8 1991
NORTHERN REGION
I D W R

State of Idaho

ss.

County of Boundary,

Carol Arthur being first duly sworn on oath deposes and says that he/she is Manager of the Bonners Ferry Herald, a newspaper printed and published at Bonners Ferry, Boundary County, Idaho; that the said newspaper has been continuously and uninterruptedly published in said Boundary County during a period of 12 months prior to the first publication of the hereto attached notice of publication in the case of:

#18216

Water Right 98-07684

as it was published in the regular and entire issue of the said paper for a period of 2 consecutive weeks, commencing on 6 day of March, 1991 and ending on the 13 day of March, 1991 and that said notice was published in said newspaper.

3/20/91

Dated: March 13, 1991

Carol A. Arthur

Subscribed and sworn to before me this 13 day of March, 1991.

Anne Thomas

Notary Public for Idaho

Residing at Bonners Ferry

My Commission expires: 12-1-1994

MICROFILMED

AUG 0 9 1991

Form 219
6/92

RECEIVED
OCT 18 1999
Department of Water Resources

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES

BENEFICIAL USE FIELD REPORT

Permit No. 98-07684

A. GENERAL INFORMATION

1. Owner: Kootenai Tribe of Idaho Phone No. (208) 267-3519
   Current Address: P.O. Box 1269, Bonners Ferry Id. 83805
2. Accompanied by: John Siple EXAM DATE: 7-22-99
   Address: Same as above Phone No.
   Relationship to Permit Holder: employee
3. Source: Kootenai River tributary to Columbia River

B. OVERLAP REVIEW

1. Other water rights with the same place of use:
2. Other water rights with the same point of diversion:

C. DIVERSION AND DELIVERY SYSTEM

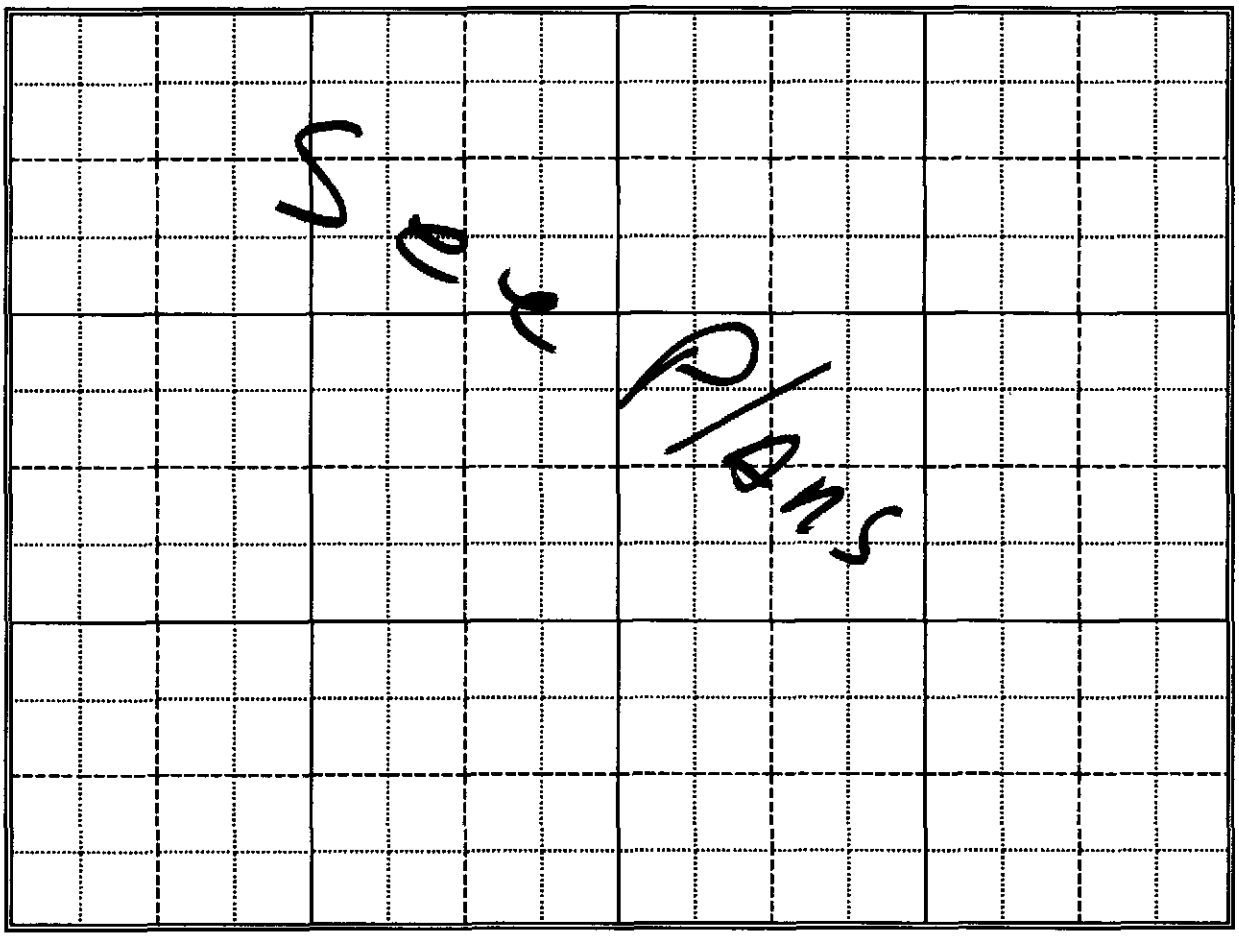
1. **Point(s) of Diversion:**

Ident No.	Gov't Lot	¼	¼	¼	Sec.	Twp.	Rge.	County	Method of Determination/Remarks
		NE	SW	SW	20	62N	01E	Boundary	USGS 7.5 min Quad

2. **Place(s) of Use:** Indicate Method of Determination

TWP	RGE	SEC	NE				NW				SW				SE				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
62N	01E	20											F						

3. **Delivery System Diagram**: Indicate all major components and distances between components. Indicate weir size/ditch size/pipe i.d. as applicable.



Scale: 1" = _____.

✓ Copy of USGS Quadrange Attached Showing location(s) of point(s) of diversion and place(s) of use (required).

____ Aerial Photo Attached (required for irrigation of 10+ acres)

____ Photo of Diversion and System Attached

4.

Well or Diversion Identification No.*	Motor Make	Hp	Motor Serial No.	Pump Make	Pump Serial No. or Discharge Size
	FAIRBANKS				
	MORSE				

**Code to correspond with No. on map and aerial photo*

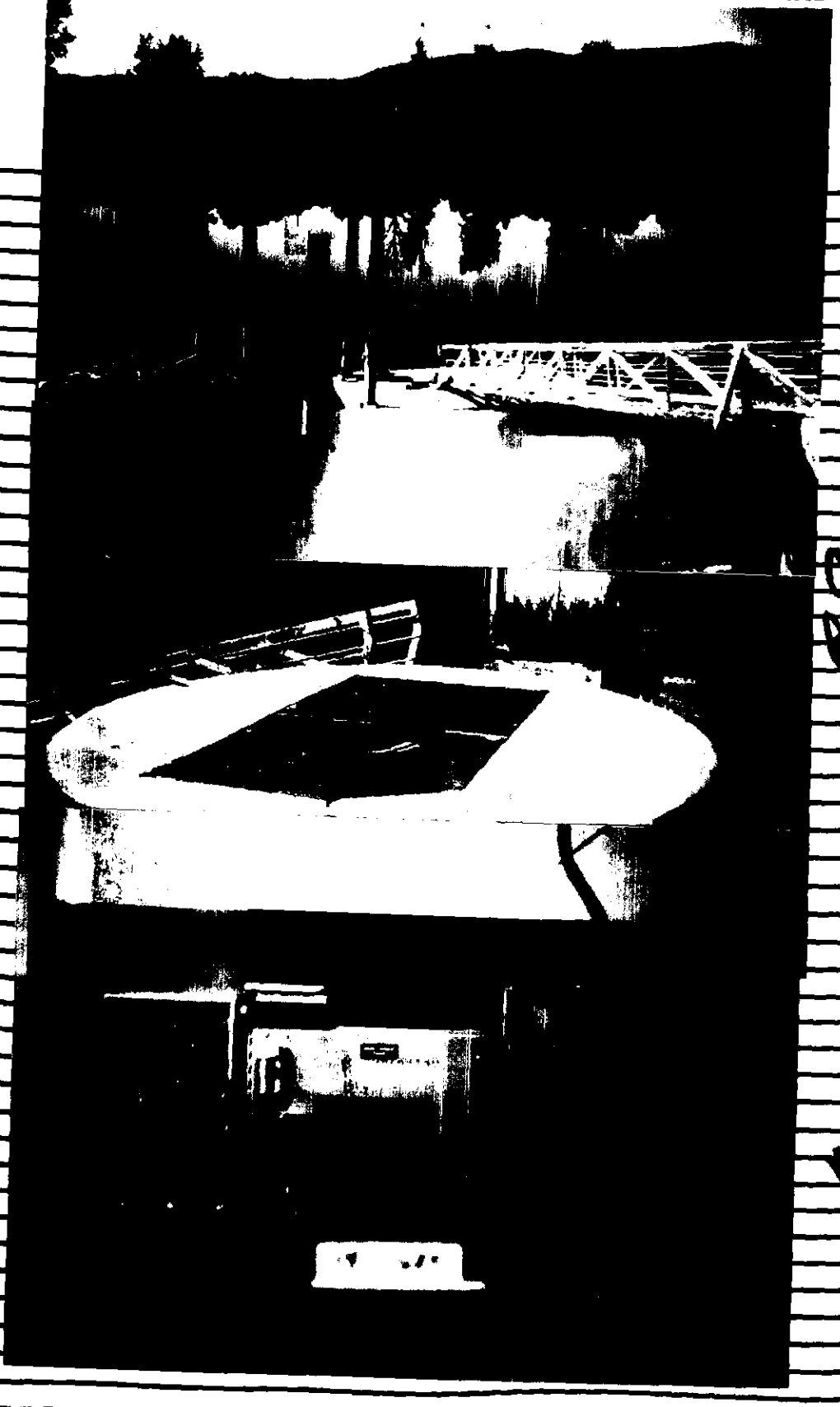
D. FLOW MEASUREMENTS

1.

Measurement Equipment	Type	Make	Model No.	Serial No.	Size	Calib. Date

2. **Measurements:** _____

PERMIT # 98-07684



RP

monitors

OVER

PERMIT # 98-07684



RP

Flow Constrictor to Pump Tank

Monitor

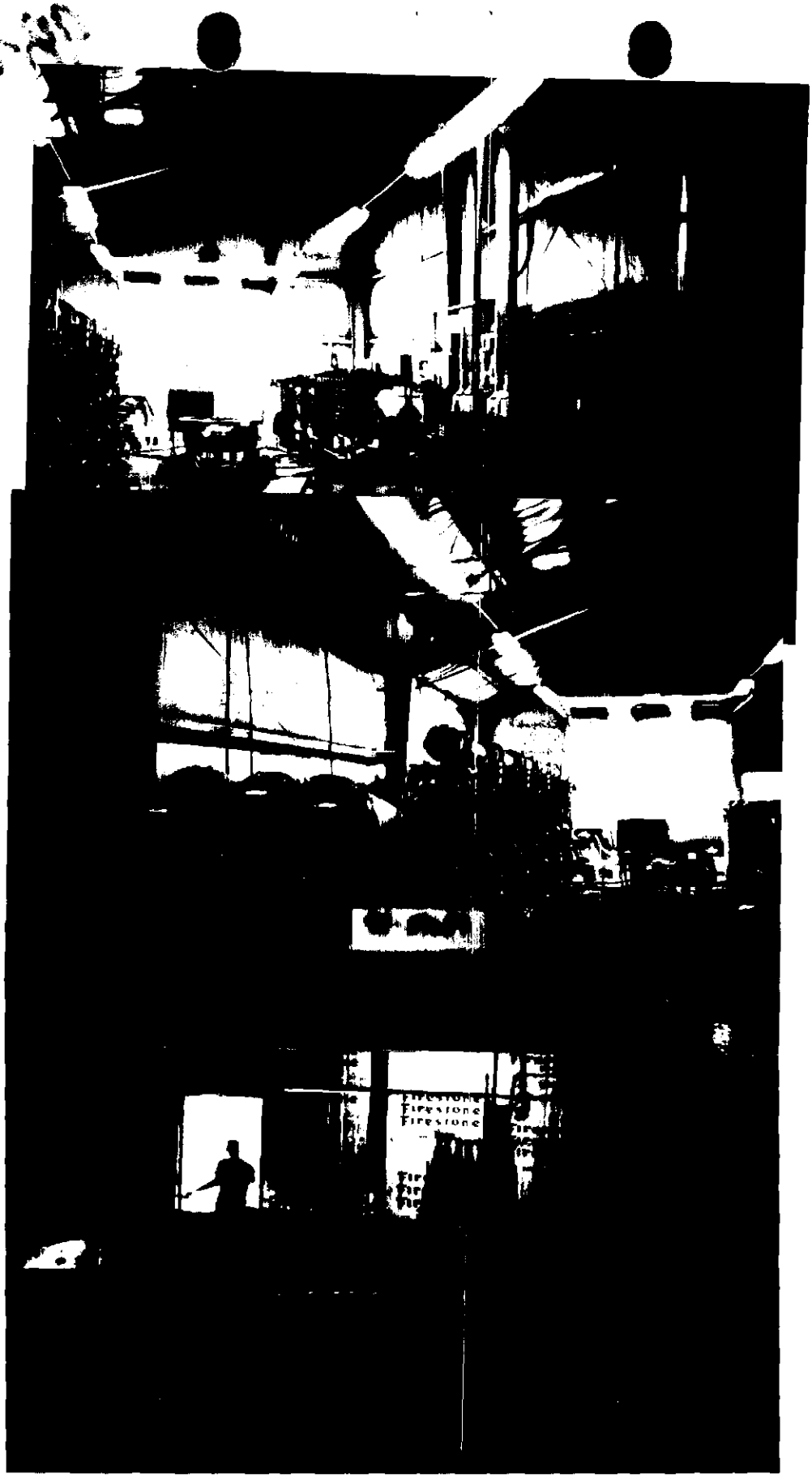
OVER ↘



Filters

Filters

Tanks



Filters

Filters

Tanks

PERMIT # 98-07684

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
FIELD REPORT SUPPLEMENT



TANKS

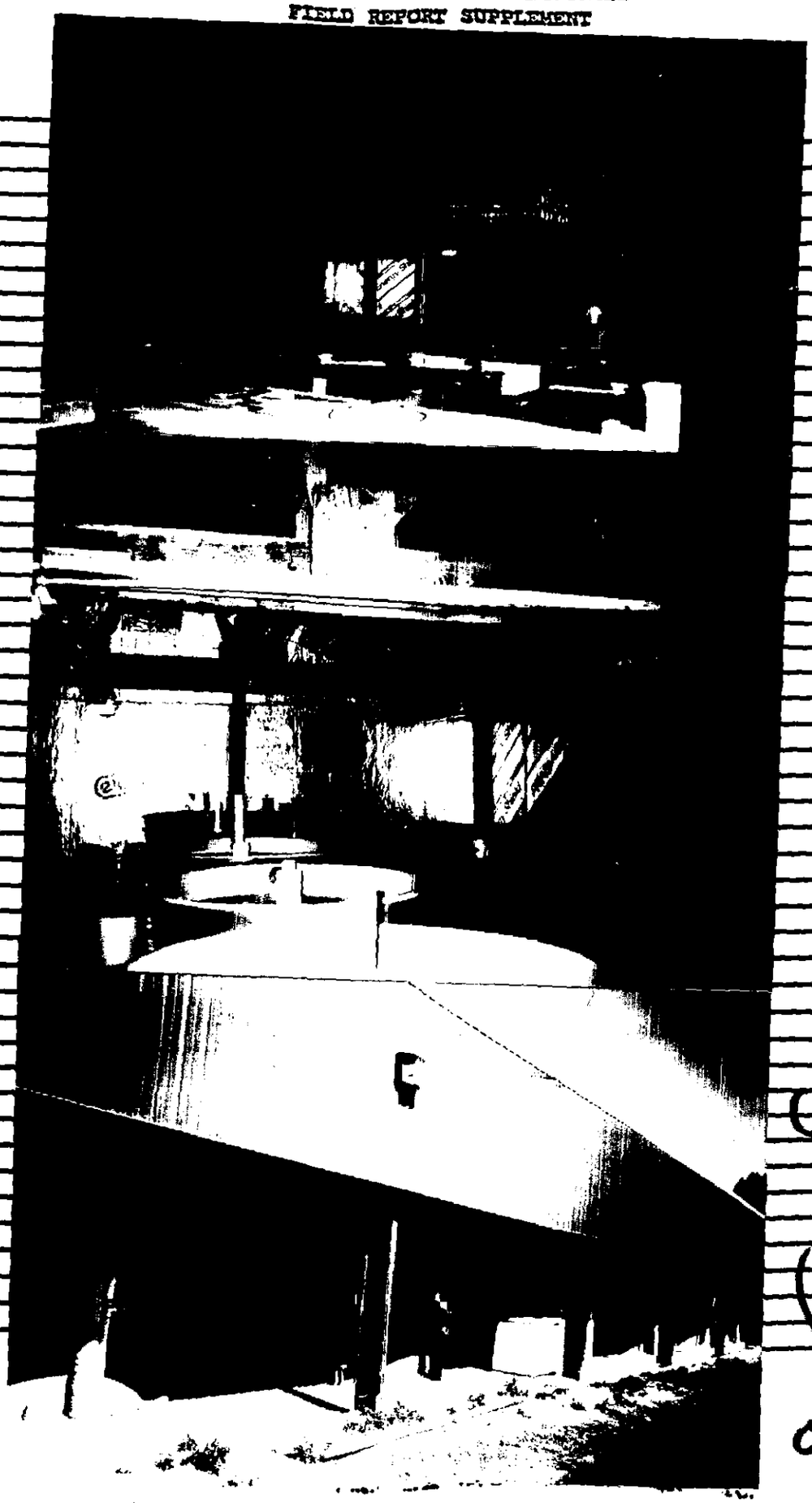
TANKS

CUTTING TANKS (Removing)

OVER

PERMIT # 98-07684

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
FIELD REPORT SUPPLEMENT



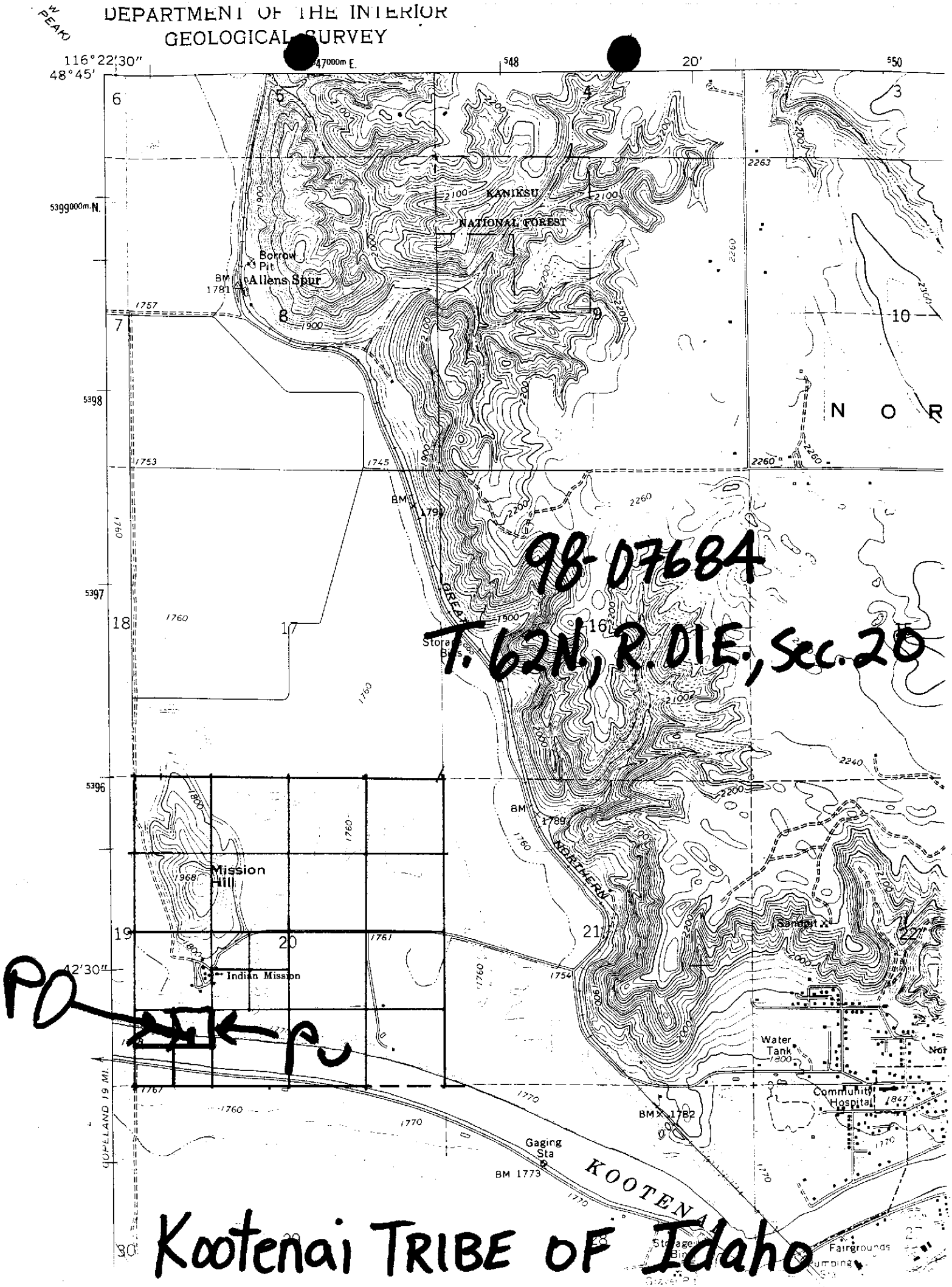
Tanks

Tanks

Coffee Tanks (Remains)

OVER




DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
116°22'30"
48°45'
547000m E.
548
20'
550
5399000m N.
5398
5397
5396
42'30"
KANIKSU
NATIONAL FOREST
Borrow Pit
Allens Spur
BM 1781
Mission Hill
1968
Indian Mission
BM 1799
BM 1789
Storage Bin
Sandpit
Water Tank
1800
Communities Hospital
1867
BM 1782
Gaging Sta
BM 1773
KOOTENAI
HOPELAND 19 MI.
Fairgrounds
Pumping
N O R
98-07684
T. 62N., R.01E., Sec. 20
PO
Kootenai TRIBE OF Idaho

E. NARRATIVE/REMARKS/COMMENTS

This is basically non consumptive. The volume calculations I did on the other page is an annual diversion volume. Volume based on actual fuel production must be provided to the department as outlined in the conditions of approval -042

Have conditions of permit approval been met? ✓ yes ___ no

F. FLOW CALCULATIONS

____ Additional Computation Sheets Attached

Measured Method: Flow meter (Krohne)

250 gpm x .1336 cf/ = .557

60 .56 cfs

G. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation:

$V_{I.R.}$ = (Acres Irrigated) x (Irrigation Requirement) = _____

$V_{D.R.}$ = [Diversion Rate (cfs)] x (Days in Irrigation Season) x 1.9835 = _____

V = Smaller of $V_{I.R.}$ and $V_{D.R.}$ = _____

2. Volume Calculations for Other Uses:

250 gpm x 1440 min x 365 days = 403.3 AFA Diversion Volume

325,850

H. RECOMMENDATIONS

1. Recommended Amounts

Beneficial Use	Period of Use From	Period of Use To	Rate of Diversion Q (cfs)	Annual Volume V (afa)
Fish Propagation	01-01	12-31	.56	
		Totals:	.56	

2. Recommended Amendments

___ Change P.D. as reflected above ___ Add P.D. as reflected above ___ None

___ Change P.U. as reflected above ___ Add P.U. as reflected above ___ Other

I. AUTHENTICATION

Field Examiner's Name Wayne Baldwin Date 9-14-99

Reviewer _____ Date _____ SEAL

ANALYSIS SHEET
FOR
PROOF OF BENEFICIAL USE

Permit No. 98-07684 Reviewed by [illegible] Date 5-15-95

GENERAL CONSIDERATIONS

yes Name same as permit?

yes Address same as permit?

no Proof timely received?

If not, complete calculation below.

TYPES OF USE

fish prop.

Correct Uses? yes

SOURCE OF WATER

✓ Surface water source

____ Ground water source

____ Drilling permit required?

____ Copy in the file? Drilling Permit No. ____

____ Amount paid for permit ____ Correct?

____ Well log in the file?

LICENSE EXAMINATION FEE

yes Required?

100.00 Amount Submitted

yes Correct?

MEASURING DEVICE

no Required?

____ Installed?

____ Waiver requested?

PRIORITY CALCULATION

Date proof received	5-3-95	
Date proof due	5-1-95 -	
No. of days late	2 =	2
Priority Date	2-22-91 +	
New Priority Date	2-24-91	

72/24/91

DEFICIENCIES OR ACTION ITEMS

Reinstate + advance Priority to Feb. 24, 1991.

Proof acceptable

DATA ENTRY

New Address ____ Proof Made 5-3-95

State of Idaho
DEPARTMENT OF WATER RESOURCES
1301 North Orchard Street, Statehouse Mail, Boise, Idaho 83720-9000
Phone: (208) 327-7900 FAX: (208) 327-7866

PHILIP E. BATT
GOVERNOR

KARL J. DREHER
DIRECTOR

May 17, 1995

KOOTENAI TRIBE OF IDAHO
P O BOX 1269
BONNERS FERRY ID 83805

PROOF ACKNOWLEDGEMENT LETTER

RE: PERMIT NO. 96-07684

Dear Permit Holder:

The department acknowledges receipt of the proof of beneficial use form submitted for the above referenced permit.

Enclosed is an order reinstating your permit since proof of beneficial use was received after the proof due date. Please note that the priority date has been advanced to February 24, 1991.

The next step in the process of developing a water right is for the department to conduct a field examination to determine and confirm the use being made of the water.

If you have questions concerning the field examination, please feel free to contact the NORTHERN Regional Office in Coeur d'Alene, at (208) 769-1450.

Sincerely,

Julie L. Yarbrough

JULIE L. YARBROUGH
Senior Secretary

Enclosure

c: IDWR - Region

JUN 14 1995

KOOTENAI RIVER WHITE STURGEON STUDIES

REPORT B

KOOTENAI WHITE STURGEON HATCHERY ANNUAL REPORT

Funded by:

Bonneville Power Administration
Project No. 88-64

Prepared by:

John Siple, Fish Hatchery Superintendent I
Idaho Department of Fish and Game

Paul Anders, Fishery Biologist, Kootenai Tribe of Idaho

December, 1994

JUN 14 1995

TABLE OF CONTENTS

	Page
Introduction	3
Fish Production	4
White sturgeon	
1992 broodyear	4
1993 broodyear	4
Rainbow trout	4
Hatchery Improvements	5
Fish health	5
White sturgeon	
1992 broodyear	5
1993 broodyear	5
Rainbow trout	6
Fish stocked and transferred	7
Fish spawning	7
Fish feed	7
Public relations	8
Hatchery design	8
Water supply	8
Utility failures	10
Recommendations	11
Literature cited	12
Acknowledgments	12
Appendices	13

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INTRODUCTION

The Experimental Kootenai White Sturgeon Hatchery (Kootenai Hatchery) is located in Boundary County, Idaho, approximately three miles west of Bonners Ferry, in extreme northeast Idaho (Figure 1). Construction of the facility was completed during the spring of 1991, as a resident fish mitigation measure under the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program [Section 900 (g) (1) 1987 (H); Action Plan, section 1403 (7.5)]. Funding for this facility was provided by Bonneville Power Administration (BPA) under the auspices of the Northwest Power Planning and Conservation Act (P.L. 96-501,1980).

Staff at the Kootenai Hatchery during 1994 included a hatchery superintendent(Idaho Fish and Game), and three permanent Kootenai tribal fisheries personnel. During 1994, the Kootenai Hatchery staff reared one and two year white sturgeon from the 1992 and 1993 broodyears, and incubated and hatched approximately 10,000 certified disease free rainbow trout eggs. The Kootenai Hatchery was established for experimental rearing of Kootenai River white sturgeon as part of a BPA project evaluating the status and reproductive viability of white sturgeon in the Kootenai River. Two year old white sturgeon hatched and reared in the Kootenai hatchery were released into the Kootenai River during the fall of 1994. Ninety-one age 2 white sturgeon(> 70 cm TL(Total Length)) were PIT tagged, marked with a scute removal pattern, and an external Floy dart tag prior to release. Eighteen of these 91 fish were also fitted with radio or sonic transmitters. Collection of habitat use, movement, and migration data is ongoing during the fall of 1994 and winter, 1995. Results of juvenile telemetry work will be published in the 1995 annual report for this project.

From May through August of 1994, all the Kootenai Hatchery personnel contributed considerable time and effort to the monitoring and evaluation of natural spawning of white sturgeon in the Kootenai River. The Hatchery staff was also responsible for collecting habitat use, movement and migration data using sonic telemetry gear in the Kootenai River in Idaho and British Columbia, as well as in Kootenai Lake, BC from August through December 1994.

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TABLE OF CONTENTS

	Page
Introduction	3
Fish Production	4
White sturgeon	
1992 broodyear	4
1993 broodyear	4
Rainbow trout	4
Hatchery Improvements	5
Fish health	5
White sturgeon	
1992 broodyear	5
1993 broodyear	5
Rainbow trout	6
Fish stocked and transferred	7
Fish spawning	7
Fish feed	7
Public relations	8
Hatchery design	8
Water supply	8
Utility failures	10
Recommendations	11
Literature cited	12
Acknowledgments	12
Appendices	13

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FISH PRODUCTION

I) White sturgeon

1992 Broodyear

During 1994, from 1 to 401 age two (1992 broodyear) white sturgeon were held in the Kootenai Hatchery. Large decreases in fish numbers between months (Kootenai Hatchery: 4/94, 7/94, 8/94, Sandpoint Hatchery 5/94) are due to fish transfers and releases (Following sections, this report). Percent monthly mortality at the Kootenai Hatchery is parenthetically presented following numbers in Appendix A. See Appendix B for white sturgeon production data.

1993 Broodyear

During 1994 from 2,052 to 2,132 age 1 white sturgeon (1993 broodyear) were held in the Kootenai Hatchery. During April, 1994, all 1993 broodyear fish were moved out of the Kootenai Hatchery to make room for anticipated spawning and rearing activities during 1994 (See Fish Transfer section). Percent monthly mortality at the Kootenai Hatchery is parenthetically presented following numbers in Appendix A. See Appendix B for white sturgeon production data.

II) Rainbow trout (Kootenai Hatchery only)

On November 27, 1994 approximately 10,000 certified disease-free rainbow trout eggs (House Creek stock) were brought to the Kootenai Hatchery. Eggs from this stock of rainbow trout were acquired becasue they were the only federally certified disease-free trout eggs available in Idaho. Eggs were attained from the College of Southern Idaho, where this stock has been annually certified as disease free since 1978. The Kootenai Hatchery provides an opportunity for aquaculture training for tribal members. Rainbow trout eggs were acquired to provide such aquaculture training opportunities. Eggs began hatching during late December.

JUN 14 1995

HATCHERY IMPROVEMENTS

During December 1994, two freestanding raceways (30' X 5' X 4') were installed outdoors at the Kootenai Hatchery to increase holding area for white sturgeon and rainbow trout. No other hatchery improvements occurred during 1994 at the Kootenai Hatchery.

FISH HEALTH

I) White sturgeon

1992 Broodyear

Kootenai Hatchery

Health of 1992 broodyear in the Kootenai Hatchery was very good during the entire year. No symptoms of bacterial, fungal, or viral diseases were observed with the 1992 broodyear. No fish of the 1992 broodyear were tested for presence of WSIV because no symptoms were never observed, and testing required sacrificing fish.

University of Idaho hatchery

No fish from the 1992 broodyear were taken to the University of Idaho hatchery during 1994.

Sandpoint Hatchery

During 1994, no symptoms of bacterial, fungal, or viral diseases were observed with the 1992 broodyear held at the Sandpoint Hatchery. No fish of the 1992 broodyear reared in the Sandpoint Hatchery during 1994 were tested for presence of WSIV because no symptoms were never observed, and testing required sacrificing fish.

1993 Broodyear

Kootenai Hatchery

Health of 1993 broodyear in the Kootenai Hatchery was very good during all of 1994. No symptoms of bacterial, fungal, or viral diseases were observed with the 1993 broodyear. On 3/7/94 5 fish were tested for WSIV. On 6/23/94, we received a report of the test result: the 5 fish tested negative for WSIV.

JUN 14 1995

University of Idaho hatchery

During May, 1994, a WSIV outbreak occurred at the University of Idaho hatchery. Since WSIV outbreaks are stress mediated, fish transport and handling, and acclimation to a new water source may have contributed to this outbreak. However, no mortality and no evidence of WSIV were observed with 112 age 2 white sturgeon held separately in the same hatchery after being brought in from Clear Springs Research Labs (Buhl, Idaho), where an intentional outbreak of WSIV occurred to study the pathenogenicity of WSIV.

The fact that the 112 fish brought to the University of Idaho hatchery from Clear Springs (survivors of documented WSIV outbreak) all survived at the University hatchery following transport is consistent with WSIV literature suggests resistance or some form of immunity resulting from WSIV exposure. No evidence has been presented, published or unpublished, of survivors of a WSIV outbreak ever subsequently displaying any lethal or non-lethal symptoms of WSIV.

Sandpoint Hatchery

During 1994, no symptoms of bacterial, fungal, or viral diseases were observed with the 1993 broodyear held at the Sandpoint Hatchery. No fish of the 1993 broodyear reared in the Sandpoint Hatchery during 1994 were tested for presence of WSIV because no symptoms were never observed, and testing required sacrificing fish.

For a more detailed presentation of white sturgeon health refer to Appendices.

II) Rainbow trout

Health of rainbow trout (Kootenai Hatchery only) was very good during December 1994. No evidence of any bacterial, fungal, or viral diseases was observed for rainbow trout during 1994.

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FISH STOCKED AND TRANSFERRED

FISH STOCKED

On July 29, 1994, 41 fish from the 1992 broodyear were released at Ambush Rock and at the Kootenai Hatchery site(Appendix E).

On August 4, 1994, 40 fish from the 1992 broodyear were released at Smith Island (Appendix F).

On September 29, 1994, 10 fish from the 1992 broodyear were released at two sites on the Kootenai River in Montana (Appendix G).

During 1994, no other releases of Kootenai River white sturgeon occurred.

FISH TRANSFERRED

On April 20, 1994, 1,837 93 broodyear were transferred from the Kootenai Hatchery to the University of Idaho hatchery in Moscow. One fish died as a result at the time of transport.

On April 18-19 400 fish from the 1992 broodyear and 175 fish from the 1993 broodyear were transferred from the Kootenai Hatchery to the Sandpoint Hatchery.

On 18 May, 100 of 92 broodyear were transferred back to the Kootenai Hatchery from the Sandpoint Hatchery for experimental release into the Kootenai River. (See Fish Releases)

During 1994, no other transfers of Kootenai River white sturgeon occurred.

FISH SPAWNING

No fish were spawned at the Kootenai Hatchery during 1994.

FISH FEED

Rangen soft moist fish feed was used at the Kootenai Hatchery for rearing white sturgeon (Appendix H).

Rangen Swim-up trout and salmon started feed was fed to rainbow trout in the Kootenai Hatchery during December 1994.

JUN 14 1995

PUBLIC RELATIONS

Thirty-one documented tours of the Kootenai Hatchery were given to public and private groups during 1994. Of the 28 tours, 2 were school groups, one was a group of BPA employees, and the rest were private citizens. Tours were given to people from 3 countries and 8 states: Canada, Brazil, and the United States: Idaho, Montana, Washington, Oregon, California, Colorado, Ohio, and Georgia.

Additional undocumented tours also occurred during 1994. More tours were requested during 1994, but since only 5 white sturgeon were held in the Kootenai Hatchery since September 1994, many were canceled.

HATCHERY DESIGN

The Kootenai Experimental Hatchery is a metal pole building, 17.8 m long and 12.5 m wide, housing egg incubation jars, a variety of rearing tanks, an office, laboratory space, a backup diesel generator (to maintain electricity during utility failure), and a water level activated alarm siren/phone dialer. Rearing tanks consist of : two rectangular tanks 3.66 m in length by 0.36 m wide by 0.45 m high; one rectangular tank 3.66 m in length by 0.56 m wide by 0.30 m high; one rectangular tank 3.09 m in length by 0.37 m wide by 0.47 m high; ten rectangular tanks 1.20 m in length by 0.60 m wide by 0.40 m high; three rectangular tanks 1.20 m in length by 0.45 m wide by 0.57 m high; three circular tanks 3.06 m in diameter by 1.53 m high and three 1.53 m diameter circular tanks and 1.22 m high.

WATER SUPPLY

The facility has two water supply systems, Kootenai River water and Bonners Ferry city water. A new double primary pump system was designed for the Kootenai Hatchery, and installed during may of 1993 (Siple and Anders, 1993). The intake system contains two electric 7.5 hp submersible pumps, each in a separate 8" diameter steel pipe. One pump runs for 24 hours before the system automatically switches to the second pump for the next 24 hours. A third pump (portable gas 8 hp) was also purchased for further water reliability, in the event that both primary electrical pumps fail simultaneously, or in case of generator failure during a power outage. This gas powered pump can deliver up to 190 gpm depending on river surface elevation.

8

JUN 14 1995

Kootenai River water is pumped into a head-box at approximately 947 l/min. and is distributed for egg incubation, larval and juvenile rearing, and holding pre and post spawning broodstock. The gravity fed city water is first dechlorinated through two activated charcoal canisters. Then the water goes through a column packed with aeration media [shot shell wads] and then into a head-box for distribution.

Kootenai River water temperature varies by season from a low of 1° C in the winter and as warm as 23° C in the summer (Anders, 1991). The city water temperature also varies seasonally (Siple and Anders, 1993). During 1994, Kootenai River water temperature (Celsius)in the hatchery ranged from 1 to 19 degrees.

Daily river water temperature ranges in the Kootenai Hatchery included:

Month	Temperature ranges (Celsius)
January	5-8
February	1-5
March	5-8
April	6-9
May	9-12
June	11-16
July	10-16
August	16-19
September	15-17
October	7-11
November	5-7
December	4-6

City water was not used in the hatchery during 1994 as this water source is only used to incubate eggs and rear early life stages, neither of which were produced in the hatchery during 1994.

An electric water heater can be used for city and river water in the winter, increasing the water temperature to 17° C in three rearing tanks. An additional heat pump (heater/chiller) can be used for additional control of water temperature in the hatchery. However, this chiller has a limited capacity: heating or chilling 3-4 gpm or 2 rearing tanks using a recirculation system.

JUN 1 4 1995

UTILITY FAILURES

Power outages at the Kootenai Hatchery during 1994:

Date	Cause
3/17/94	Electrical storm
3/24/94	Electrical storm
5/25/94	Electrical storm
6/13/94	Electrical storm
7/3/94	Generator check
7/14/94	Generator check
7/25/94	Electrical storm
8/4/94	Unknown
10/30/94	Utility work (predicted outage)
11/30/94	Generator check

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RECOMMENDATIONS

General aquaculture recommendation for 1995 include:

Increase capacity to control water temperatures in the facility to improve survival at critical life stages.

Further refine hand stripping egg removal techniques using females with normally developed ovaries.

Broodstock collected should be transported to the facility as soon as possible to reduce stress.

Conduct aquaculture operations consistent with the USFWS Breeding Plan to Preserve Genetic Variability of the Kootenai River White Sturgeon (Kincaid, 1993).

Minimize all unnecessary transfers of fish to and from the Kootenai Hatchery.

Fish health recommendations for 1995 include:

Continue cooperate disease work with Eagle, Clear Springs, and U.C. Davis Fish Pathology Laboratories in testing for and researching effects of white sturgeon iridovirus.

Notify pathologists when adult broodstock are to be captured so that disease samples may be collected from the wild population.

JUN 14 1995

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ACKNOWLEDGMENTS

During 1994, the Kootenai Experimental White Sturgeon Facility crew included John Siple, Larry Aitken, Robert Aitken, and Ron Tenas.

The Kootenai Tribe Fisheries Program also thanks the Bonneville Power Administration for funding this project and operations of the Kootenai Hatchery.

JUN 14 1995

APPENDIX

JUN 14 1995

Appendix A: White sturgeon production and mortality data at Kootenai and Sandpoint hatcheries.

Large decreases in fish numbers between months (Kootenai Hatchery: 4/94, 7/94, 8/94, Sandpoint Hatchery 5/94) are due to fish transfers and releases (Following sections, this report).Percent monthly mortality at the Kootenai Hatchery is parenthetically presented following numbers in the Appendix Tables.

Broodyear 1992

	Hatchery	
Month	Kootenai	Sandpoint
1/94	401	
2/94	401(0)	
3/94	401(0)	
4/94	1(0)	400
5/94	101(0)	300
6/94	101(0)	
7/94	63(62)	
8/94	16(25)	
9/94	5(31)	
10/94	5(0)	
11/94	5(0)	
12/94	5(0)	132

1993 Broodyear

	Hatchery			
Month	Kootenai	Sandpoint	U of I.	
1/94	2,132		0	
2/94	2,101(1.5)		0	
3/94	2,053 (2.3)		0	
4/94	0	175	1,787	
5/94	0		1,054	
6/94	0		733	
7/94	0		546	CSF*
8/94	0		184	112
9/94	0		158	112
10/94	0		134	112
11/94	0		125	112
1/94	0		20	

JUN 1 4 1995

* CSF represents white sturgeon reared at Moscow following transfer from Clear Springs, Buhl Idaho (See fish transfer section of this report).

Appendix B. Production and mortality data for Kootenai River white sturgeon held at the Kootenai, Sandpoint, and University of Idaho Hatchery, including fish from Clear Springs Fish Hatchery (CSF) transferred to the U of I Hatchery.

Beginning Numbers	Beginning Weight (lbs)	Ending Numbers	Ending Weight	Number Stocked	Lbs. Stocked
Kootenai Hatchery					
1992 Broodyear					
92	401	5*	16.21	91	63.9
1993 Broodyear					
3,958	.017	0*	0	0	0

(* Fish transferred from these hatcheries; see Fish Transfer Section)

Sandpoint Hatchery					
1992 Broodyear					
400	270.11	A	0	0	
1993 Broodyear					
175	3.95	20	A	0	0

A: No data available

University of Idaho Hatchery					
1,837	0.0065	125	0.313	0	0
CSF Fish:					
112	0.27	112	0.626	0	0

JUN 14 1995

Veterinary Medical Teaching Hospital
University of California, Davis

26Aug94 at 4:12pm.

PATHOLOGY SPECIAL
FINAL REPORT

CLINIC NO.:
SPECIES: FISH
BREED: STURGEON
SEX:
NAME: NO NAME
CLINICIAN: NO DOCTOR #
OWNER: CLEAR SPRINGS TROUT COMP. DR. SCOTT LA PATRA
ADDRESS: PO BOX 712
BUHL, ID 83316

PATHOLOGY NO.: 94A 2012
DATE REQUESTED: AUG 4, 1994
PATHOLOGIST: J. GROFF, VMD

****

SPECIMEN: BIOPSY TISSUE PRESERVATIVE: FORMALIN DATE REPORTED: AUG 24, 1994

****

PATHOLOGIC DIAGNOSIS:
1) NORMAL WHITE STURGEON
2) NO EVIDENCE OF WHITE STURGEON IRIDOVIRUS INFECTION

CLINICAL ABSTRACT:

Yearling Kootenai white sturgeon maintained at Clear Springs Research were submitted for histological examination. The fish were fixed in Bouin's solution and transferred to 70% methanol prior to processing.

GROSS DESCRIPTION:

Post fixed white sturgeon were considered grossly normal.

HISTOPATHOLOGICAL SUMMARY:

Sagittal sections of yearling white sturgeon were examined microscopically (T1-T9). The significant findings were as follows:

There was no evidence of white sturgeon iridovirus infection or other infectious diseases in these fish. There was dilatation of the gastric glands in two fish (T1, T4). There was also dilation of the proximal renal tubules in two fish (T2, T6). The splenic stroma was prominent in two fish (T4, T6) and was associated with a decreased prominence of splenic periarteriolar lymphoid sheaths in one fish (T4). There was also a mild condensation and atrophy of the hepatocytes in one fish (T5). These findings were not considered significant.

COMMENT:

There was no evidence of infectious disease, including white sturgeon iridovirus infection in these fish.

mjj

J. GROFF, VMD

Appendix C. University of California Davis Pathology report for Kootenai River white sturgeon, held at Clear Springs Research Labs, Buhl, Idaho.

JUN 14 1995

Appendix D. Additional production/mortality data for Kootenai River white sturgeon held at the Sandpoint Hatchery.

FAX TRANSMISSION

IDAHO DEPT OF FISH AND GAME
2100 LAKESHORE DRIVE
SAGLE, ID 83860
208-265-7228
Fax: 208-265-7228

To: PAUL ANDERS **Date:** February 2, 1995

Fax #: 208-267-2960 **Pages:** ONE, including this cover sheet

From: JOHN R. THORPE

Subject: SANDPOINT STURGEON DATA

COMMENTS:

I reviewed the records and discovered substantially more information than you received from Jack. Considering the physical condition of the mortality sheets, I am going to transcribe the data rather than hunt down a photo copy machine and fax the results.

MORTALITY DATA

	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN
BDYR93	36	41	43	35	14	46*	0	0	0
BDYR92	4	0	0	5	2	0	0	2	0

total morts BDYR93--215
BDYR92--13

*mortality of 45 BDYR93 fish on 12OCT94

JUN 14 1995

Appendix E. Tag, length, and weight data for white sturgeon (92 broodyear) released into the Kootenai River.

FOLLOWING DATA ARE FROM FISH RELEASED AT THE HATCHERY 7/29/94, 9 AM

PIT Tag #	FLOY #	FL	TL	WT
7F7E6A3C11	210	335	385	213.4
7F7D376135	220	312	363	207.4
7F7E6A3C0B	221	328	378	221.3
7F7D402C38	223	226	312	132.8
7F7D402C23	225	350	406	265.6
7F7D27007F	226	312	364	169.4
7F7E6A45 0D	228	319	365	211.2
7F7D403A3D	231	278	292	140.7
7F7D39445F	233	349	394	255.8
7F7D266672	236	282	320	139.9
7F7D315841	243	371	423	318.2
7F7E6A3D42	247	373	439	304.2
7F7D315F58	259	347	404	247
7f7d435242	238	305	351	180.1

FOLLOWING DATA ARE FROM FISH RELEASED AT AMBUSH ROCK ON 7/29/94 4PM

PIT Tag #	FLOY #	FL	TL	WT	Sonic #
7F7D3F6F5F	235	269	308	120.7	
7F7D31431C	237	311	352	198.2	
7F7D3F712E	214	310	356	158.2	
7F7D424B72	230	318	364	197.4	
7F7D31421F	222	323	366	194.3	
7F7D382D62	254	315	368	196.7	
7F7D37570D	227	322	370	190.8	
7F7D376174	219	330	372	222.2	
7F7D315243	211	330	376	217.8	
7F7D314E7D	232	328	378	236.3	
7F7D406576	217	332	379	229.9	
7F7E6A4171	234	332	383	231.1	
7F7D382D6F	239	335	386	215.5	
7F7D31657E	212	338	390	228.4	
7F7E686046	257	337	393	229.4	
7F7D403B75	216	350	402	256.6	
7F7D315158	259	347	404	247	
7F7D310605	264	349	405	264.4	
7F7D31566C	262	367	425	295.3	
7F7D3F6468	241	372	428	315.4	
7F7D375619	261	370	428	294.2	
7F7D315509	263	366	432	336.7	
7F7D315161	202	406	472	360.6	
* currently					2272
* missing					2353
* data					2344

JUN 1 4 1995

Appendix F. Tag,length, weight, and transmitter data for 40 age 2 white sturgeon released into the Kootenai River, (Ferry Island, rkm 208, 48/4/94)						
	PIT TAG #	FLOY #	FL	TL	WEIGHT	SONIC #
1	7F7D37603B	42	384	425	349.2	
2	7F7D381021	78	410	469	428.7	
3	7F7D375249	145	402	468	417.6	
4	7F7D364673	149	420	484	415.2	
5	7F7D40754F	150	406	487	439.1	
6	7F7D4D644C	166	405	465	410.2	
7	7F7E6A400B	197	412	478	401.1	
8	7F7D410314	212	600	710	1750	2245
9	7F7D327E0D	213	348	411	266.3	
10	7F7D37S062	215	294	333	121.2	
11	7F7D40394F	224	363	421	288.6	
12	7F7D3944113	229	349	403	268.6	
13	7F7D376213	242	405	462	405.4	
14	7F7D403B5E	244	423	494	440.2	
15	7F7D3F6770	245	369	425	302.2	
16	7F7D3830LC	246	378	441	296.4	
17	7F7D37186C	248	570	670	1250	2425
18	7F7D267958	249	354	412	282.7	
19	7F7D36SA53	251	379	428	279.5	
20	7F7D440101	252	406	470	359	
21	7F7D3F6304	253	365	420	294.2	
22	7F7D371BOE	255	368	434	311.7	
23	7F7D3FS44A	256	381	438	349.4	
24	7F7D3FS44A	256	381	438	349.4	
25	7F7D402B1F	266	432	510	536.2	
26	7F7D424E2A	267	396	458	348	
27	7F7D3582072	268	409	482	1750	2335
28	7F7D3582072	268	409	482	468.2	
29	7F7D315005	269	418	482	1750	2326
30	7F7D315005	269	418	482	438.3	
31	7F7D39481A	271	356	426	381.1	
32	7F7D39481A	271	356	426	381.1	
33	7F7D37613A	272	383	450	358	
34	7F7D37613A	272	383	450	358	
35	7F7D402F62	273	416	485	416.5	
36	7F7D376114	274	412	478	453.5	
37	7F7D376114	274	412	478	453.5	
38	7F7E6A3C30	276	355	410	424.5	
39	7F7D31SE41	277	370	429	293.6	
40	7F7D44000C	283	580	670	1250	2263

JUN 14 1995

Appendix G. Data for 10 age 2 white sturgeon from the Kootenai Hatchery (1992 broodyear) released into the Kootenai River in Montana, downstream from Kootenai Falls on September 29, 1994. Each fish carries both a radio and a sonic transmitter. Here are the vital statistics: (Release locations: Jim Slaven's "big rock island" 5, other 5 at "Sturgeon Hole")

Fish #	PIT tag #	TL	Weight (kilos)	Transmitter ID Radio	Sonic	Floy tag #
1	7F7D314E5F	760	1.0	30.170	2363	00289
2	7F7D42491A	730	1.5	30.1	2345	00290
3	7F7D372756	700	2.25	30.150	2426	00291
4	7F7F44424A	736	1.75	30.070	2444	00292
5	7F7BO97648	764	2.0	30.090	2354	00293
6	7F7BOF6856	683	1.5	30.010	2273	00294
7	7F7BO91267	726	1.75	30.190	2336	00295
8	7F7F43602C	693	1.50	30.030	2255	00296
9	7F7F427372	735	1.50	30.130	2264	00297
10	7F7F440272	731	1.50	30.050	2327	00298

File:C:mtjuv94

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Appendix H. Fish feed used at the Kootenai Hatchery during 1994.				
SIZE	SOURCE	POUNDS	COST/POUND	TOTAL COST
Rangen Soft Moist 1/32	Rangen	50	0.7676	38.38
Rangen Soft Moist 3/64	Rangen	150	0.7135	107.03
Rangen Soft Moist 3/16	Rangen	200	0.7019	140.38
Rangen Soft Moist 3/32	Rangen	100	0.6595	65.95
Rangen Soft Moist 1/8	Rangen	250	0.6595	164.88
Rangen Soft Moist 5/32	Rangen	300	0.6595	197.85
TOTAL		1050	4.1615	714.47

APPENDIX I. COMBINED FISH PRODUCTION COSTS AT KOOTENAI, SANDPOINT AND UNIVERSITY OF IDAHO HATCHERIES.					
SPECIES	ACTUAL PRODUCTION	WEIGHT (LBS)	COST TO REAR AND STOCK	COST/1000	COST/LB.
WHITE STURGEON					
1992 BROODYEAR	401	400	11,458	28.65	18.09
1993 BROODYEAR	2132	70.5	34,375	487.5	491.1

Cost Estimates for Appendices H and I were determined according to IDFG protocol (Memo from Tom Frew to Resident hatchery Managers, 11/20/94).

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Rangen Soft Moist 3/32	Rangen	100	0.6595	65.95
Rangen Soft Moist 1/8	Rangen	250	0.6595	164.88
Rangen Soft Moist 5/32	Rangen	300	0.6595	197.85
TOTAL		1050	0.777	714.47

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KOOTENAI RIVER WHITE STURGEON STUDIES

EXPERIMENTAL CULTURE

Annual Hatchery Report FY 1993
Report B

Prepared by

John T. Siple, Hatchery Superintendent
Idaho Department of Fish and Game

Paul J. Anders, Fishery Biologist
Kootenai Tribe of Idaho

January 1994

JUN 14 1995

TABLE OF CONTENTS

	Page
Introduction	3
Water supply	3
Facility design	4
Production	5
Incubation and early fry rearing	5
Survival	6
Hatching	6
Fry	6
Fingerling	6
1992 broodyear	7
Fish health	7
Fish transfers	8
Broodstock capture	8
Staging broodstock	9
Spawning procedures	9
Egg removal methods	10
Hand stripping	10
Cesarian surgery	11
New construction	12
Public relations	12
Recommendations	13
Research	13
Production	13
Facility design	14
Facility failures	14
Literature cited	15
Acknowledgements	15

2

JUN 14 1995

INTRODUCTION

The Kootenai Experimental White Sturgeon *(Acipenser transmontanus)* Aquaculture Facility is located in Boundary County, Idaho, approximately three miles west of Bonners Ferry, in extreme northeast Idaho (Figure 1). Construction of the facility was completed in the spring of 1991, as a resident fish mitigation measure under the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program [Section 900 (g) (1) 1987 (H) ; Action Plan, section 1403 (7.5)]. Funding for this facility was provided by Bonneville Power Administration (BPA) under the auspices of the Northwest Power Planning and Conservation Act (P.L. 96-501,1980).

Staffing at the facility includes an Idaho Fish and Game (IDFG) facility manager and three permanent Kootenai tribal personnel. This facility produces one and two year old white sturgeon for laboratory and field research including experimental releases into the Kootenai River. This research facility was established for experimental rearing of Kootenai River White Sturgeon as part of a BPA project evaluating White Sturgeon in the Kootenai River. The facility will release one and two year old sturgeon during the spring to fall period as directed to meet research objectives. Representative numbers of fish > 70 cm TL (Total Length) will be PIT tagged, marked with a scute removal pattern and fitted with radio and sonic transmitters to be tracked after release into the river during 1994.

WATER SUPPLY

The facility has two water supply systems, Kootenai River water and Bonners Ferry city water. A new double primary pump system was designed for the facility (Figures 2,3), and installed during the first week of May. The intake system contains two electric 7.5 hp submersible pumps, each in a separate 8" diameter steel pipe. One pump runs for 24 hours before the system automatically switches to the second pump for 24 hours. A third pump (portable gas 8 hp) was also purchased for further water reliability, in the event that both primary electrical pumps fail at the same time, or in case of generator failure during a power outage. This gas powered pump can deliver up to 190 gpm depending on river elevation.

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Kootenai River water is pumped into a head-box at approximately 947 l/min. and is distributed for egg incubation, juvenile rearing, adult holding and recovery of female spawners. The gravity fed city water is first dechlorinated through two activated charcoal canisters. Then the water goes through a column packed with aeration media [shot shell wads] and then into a head-box for distribution.

The Kootenai River water temperature varies by season from a low of 1° C in the winter and as warm as 20° C in the summer. The city water temperature also varies seasonally. Following spawning in 1993, city water temperatures in the facility ranged from 13-16° C (Table 1).

An electric water heater can be used for city and river water in the winter, increasing the water temperature to 17° C in three rearing tanks. A heat pump (chiller) was installed in June to chill river water. This chiller was used for incubation and early larval rearing. However, this chiller has a limited capacity: heating for chilling 3-4 gpm or 2 rearing tanks using a recirculation system.

FACILITY DESIGN

The Kootenai Experimental Facility is a metal pole building, 17.8 m long and 12.5 m wide, housing rearing ponds, an office, laboratory space, and a backup diesel generator. Rearing ponds consist of : two rectangular tanks 3.66 m in length by 0.36 m wide by 0.45 m high; one rectangular tank 3.66 m in length by 0.56 m wide by 0.30 m high; one rectangular tank 3.09 m in length by 0.37 m wide by 0.47 m high; ten rectangular tanks 1.20 m in length by 0.60 m wide by 0.40 m high; three rectangular tanks 1.20 m in length by 0.45 m wide by 0.57 m high; three circular tanks 3.06 m in diameter by 1.53 m high and three 1.53 m diameter circular tanks and 1.22 m high.

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PRODUCTION

INCUBATION AND EARLY FRY REARING

On June 26 at 1700 hours, twelve hours post fertilization, random egg samples were taken from the bottom, middle and top of the MacDonald jars from each water source. We then recorded number of eggs sampled and their embryonic stage under a dissecting microscope (Table 3 a-c).

Water flow was increased 48 hours post fertilization, to roll the eggs and reduce fungus infection and clumping. Ambient city water temperature was approximately 15° C, with better survival to hatch (Table 4). Hatching began 4.5-5 days post fertilization on Kootenai River water and heated city water. On city, ambient river, and chilled river water hatching began 7 days post fertilization, and lasted up to 3 days.

The late hatching larvae in all water sources showed a high incidence of deformity, mainly in the form of crooked backs which rendered the post yolk sac fry unable to feed. For a more detailed description of these deformities, see Siple and Aitken 1991. Total hatching produced 14,217 larvae on ambient city water, heated city water produced 527 larvae and 1,264 were produced on Kootenai River water; chilled river water jars produced 937 larvae (Table 5). Larvae were allowed to swim out of the MacDonald jars directly into emergence tanks or rectangular rearing tanks.

Larvae hatched in ambient city water were split up, weighed and moved to respective rectangular rearing tanks. All larvae hatched in heated and ambient city water males were switched over to ambient river water on July 21. Feed initiation began 10 days post hatch. The larvae were not actively feeding at first, but the exposure to feed seemed to help stimulate feeding in the larvae in time.

JUN 14 1995

SURVIVAL

Hatching

As in past years at the facility, a certain percentage of post yolk-sac larvae never began to feed on processed feed. This is represented by mortality between July and August (Table 5).

Hatching success was substantially higher for eggs collected by hand stripping (mean 30.4% hatch, range 9.2-40.8%) than for eggs collected by cesarian surgery (mean 7.1% hatch, range 3.9-11.4%)(Table 5). The low percent hatch of eggs surgically collected may be largely explained by the following two factors:

1) Blood and white eggs (already dead) were found in the ovarian fluid at the onset of and throughout the surgical process. No blood or white eggs were seen in ovarian fluid expressed during the earlier hand stripping. Blood in the ovarian fluid may have resulted from the fish's unusual movement in the stretcher. However, in past years, blood has been observed in ovarian fluid during surgery with fish that were not previously hand stripped, and did not exhibit any motion in the stretcher.

2) Eggs collected by cesarian surgery were the last lots to be transferred into MacDonald hatching jars. Therefore, egg loss may have also been due to anoxia or clumping to a greater extent than seen with eggs transferred to jars previously.

Fry

The highest monthly fry mortality occurred between July and August (Table 5) when larvae must begin exogenous feeding on processed feed. In addition to egg mortality before hatching, the onset of exogenous feeding constitutes another critical period for survival.

Fingerlings

No major mortality episodes occurred with fish from the 1993 broodyear. However, small numbers of fingerlings routinely died throughout the 1993 rearing period beginning in early fall. The cause or causes of chronic mortality are not understood. No evidence of bacterial gill disease or WSIV (White Sturgeon Iridovirus) was observed with fish from the 1993 broodyear.

JUN 14 1995

However, measuring condition factors of dead and live fish may provide some insight into this low level chronic mortality.

1992 BROODYEAR

In January 1993, approximately 1600 age 1 (1992 broodyear) fish were held in the facility. Due to multiple and finally terminal pump failure at the facility on February 18, all but four of these fish were moved to the Sandpoint Hatchery. On May 28, 450 of these fish were brought back to the Kootenai facility (Figure 4) Percent monthly survival of these fish ranged from 89 to 100%.

FISH HEALTH

1993 Broodyear

No major mortality episodes occurred during 1993. There are no evidence of, bacterial gill disease or WSIV. To further investigate the nature and treatment of WSIV 1,204 fish from the 1993 broodyear were transported to a research facility at Clear Springs (Buhl, ID.). Only one fish was killed during the unloading process at Clear Springs.

The following report of fish health from the Eagle Fish Health Laboratory (IDFG) was reported for the Kootenai Facility in 1993: Fish health at the Kootenai Facility was excellent in 1993. Two minor outbreaks of bacterial gill disease occured in the BY92 fish and were controlled with salt baths at 3% concentration. No visits were made by Eagle Laboratory pathologists in 1993, but routine contact was maintained over the telephone. Recommendations for 1994 include:

1) Cooperate with Eagle and Clear Springs Laboratories in testing for white sturgeon iridovirus.

2) Notify pathologists when adult broodstock are to be captured so that disease samples may be collected from the wild population.

DOCUMENT SCANNED

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1992 Broodyear

Health of fish from the 1992 broodyear was also very good during 1993. Monthly survival ranged from 89-100%, with the exception of one rearing tank in which a mild infection of bacterial gill disease caused the loss of 294 fish between July 21 and September 6.

FISH TRANSFERS

During the third week of February, all but four of the 1992 broodyear fish were moved to the Sandpoint Hatchery following terminal pump failure on February 18 (See power/pump failure section of report). On May 28, 450 fish from the 1992 broodyear (21 fish/lb. average TL 6.5") were returned to the Kootenai Experimental Facility following proven success of the new water intake system (See new construction section of this report). On December 13, 40 fish from the 1992 broodyear and 199 fish from the 1993 broodyear were transferred from the Kootenai Experimental White Sturgeon Facility to Sandpoint State Hatchery. On December 21, 1,204, 1993 broodyear fish were transferred to Clear Springs research labs to investigate the effects of rearing density on white sturgeon iridovirus.

BROODSTOCK CAPTURE

From April through June of 1993, 66 white sturgeon were captured from the Kootenai River by angling between Rock Creek and Ambush Rock (Table 2). Of the 66 fish captured only 4 (6.6%) were females (Table 2). Captured fish were placed upside down in a stretcher suspended across the boat gunwales, with river water added as needed. Fish were then sexed in the field either by making a 1 cm abdominal incision and viewing gonadal tissue with a veterinarian otoscope or by inserting a flexible plastic tube and extracting developing oocytes (eggs) by suction. Once the sex and stage of sexual maturation were determined, fish were either brought to the facility by boat or truck, or released back into the river.

Of the 66 fish captured, 16 sexually mature fish (4 females and 12 males) were transported to the facility; no more than three females and six males were held at one time in the facility during 1993. All fish captured were checked for the presence of PIT and Floy tags. Fish captured without a PIT tag were PIT tagged on the

JUN 1 4 1995

right lateral surface below the dorsal fin. During broodstock collection fish captured were weighed (kg), measured (TL cm), and marked with the removal of the second left lateral scute (Table 2).

STAGING BROODSTOCK

On June 19, 1993, eggs from three female white sturgeon held in the facility were tested for GVBD with the following results:

Female (PIT tag #)	Control (n=10 eggs)	% GVBD (n=10 eggs)
3775A	flattened GV	100
3552E	rounded GV 8 rounded 2 flattened	70
2705A	rounded GV 10 rounded 0 flattened	80

On June 25,1993, sperm samples from five male white sturgeon were tested for motility with the following results:

Males PIT #	Sperm motility (min.)	Sperm sample volume (ml) 6/24	6/25
5360	no sperm visible	-	-
5079	> 2 minutes	8	30
5326	> 2 minutes	30	70
7856	no sperm visible	-	-
0863	no sperm visible	-	-

For a detailed description of male and female broodstock staging criteria and techniques, see Siple (1992).

SPAWNING PROCEDURES

One female white sturgeon (PIT tag #3775A) was spawned with two males (PIT tag # 5079, 5326) in the Kootenai Experimental Facility in 1993. The female was captured on May 17 and transported to the facility where she was staged with an egg diameter of 3.2-

JUN 14 1995

3.3 mm and a GV position of stage 4. A progesterone assay was performed on the eggs on June 3, with only 60% exhibiting GVBD. On June 19, the female was staged again with more favorable results. The eggs had a diameter of 3.5 mm and the GV position was stage 5 with 100% of 10 eggs exhibiting GVBD. It appeared that this fish could be induced to ovulate.

Hormone injections to induce spawning began on June 23. The female was injected with a primary dose of 10% of a 0.1 mg/kg body weight dose of luteinizing hormone releasing hormone analogue (LHRHa) at 2000 hours. Twelve hours later, she was given a resolving dose of 90% of the 0.1 mg/kg body weight LHRHa. Prior to the induction injections she was placed by stretcher into a 1.0 X .67 X 3.0 meter covered fiberglass spawning tank. This spawning tank allowed the fish to be injected under water which reduces stress and handling. This also makes for easier observation while waiting for ovulation.

Sperm from two males (PIT tag # 5079, 5326) was checked for motility at 0030 hours on June 25. Thirty-eight ml of sperm was collected from male #5079 and 100 ml was collected from male # 5326. A sperm sample from each male was checked by microscope for motility and time of death. Remaining sperm was placed in ziplock plastic bags with pure oxygen and stored in a refrigerator. Care was taken to keep the tubing, syringe and surface area of the fish dry when collecting sperm.

Ovulation was expected between 24 to 48 hours post resolving injection on June 24. Twenty to 30 dark eggs were observed approximately 37 hours post resolving dose injection, near the bottom of the spawning tank. This was a good sign as viable eggs stick to the bottom of the tank. We continued to observe her until 0200 hours on June 26. At this time several hundred eggs were observed clumped and stuck to the bottom of the spawning tank.

EGG REMOVAL TECHNIQUES

Hand stripping

On June 26, at approximately 0310 hours egg removal began by hand stripping. The hand stripping technique involves massaging the ventral side of the fish while holding the ventral side up in a stretcher. Massaging the eggs out of the body cavity was done by applying pressure with the ball of the hand on the ventral midline of the fish and gently moving the hand posteriorly on the midline

JUN 14 1995

from approximately one foot anterior of the oviduct to the oviduct. During the first 40 minutes of hand stripping 51,690 eggs were collected (Table 4). However, the one female that was spawned this year had deformed ovaries which may have contributed to the success of hand stripping. Rather than the ovaries being parallel to the fish's midline, the ovaries resembled a letter X, crossing the midline. Regardless of this abnormality, the success of hand stripping indicates that cesarian surgery may become obsolete at the facility in the future.

Cesarian surgery

On June 26, at 0334 hours cesarian surgery began. In 1993, 34,620 eggs were removed by cesarian surgery (Table 4). The ventral side was disinfected with 4% nitrofurazone. A 10 cm incision was made along the midline to expose the egg mass, then the eggs were gently removed with a disinfected plastic spoon from the body cavity. The eggs were placed into nine stainless steel bowls to await fertilization. This process took approximately 60 minutes. Three, 10 g egg samples were collected and counted later to determine fecundity. The female was thoroughly disinfected with 4% nitrofurazone and the incision was closed with Ethicon's PDSII violet monofilament (polydioxanone) suture swedged to a reverse cutting CP-1 curved, surgical needle. A continuous suture of both the inside and outside body cavity wall was used. She was placed back into the holding tank at 0500 hours. After 24 hours she was checked and then transferred to the recovery tank.

Egg fertilization and processing began at 0500 hours. The coelomic fluid was removed from the eggs. A 10 ml sperm sample was poured into a bowl of 2,000 ml of water. This mixture was then stirred and added to the eggs and gently stirred with feathers until the eggs began to stick to the feathers, approximately two minutes later. This process was performed with sperm from each male and for each of the three water experiments, for a total of nine samples that were kept separate. The bowls were drained off and a de-adhesive solution of Fullers Earth (diatomaceous earth) was mixed with water, and set in flowing water for tempering, then has added to the eggs. Again eggs were gently stirred until they were no longer adhesive. Constant monitoring of the egg temperature was done so when the egg mixture increased more than 5° C it was poured off and new tempered mix was added. This process lasted 75 minutes. The eggs were thoroughly rinsed to remove excess material and placed into 24 MacDonald jars, 18 on ambient city water, 2 on heated city water, 2 on ambient river water, and 2 on chilled river water.

JUN 11 4 1995

Egg densities per MacDonald jar were established as follows:

Jar number	Number of eggs per jar	Total number of eggs
1-12	2,865	34,380
13-16	2,925	11,716
17-22	5,730	34,380
23,24	2,925	5,850
	Total egg take	86,326

Flow was set at 3.79 l/min/jar. This flow rate kept the eggs suspended but not rolling. The difference between the initial and subsequent egg take estimates (0.06%) was caused by error inherent to extrapolating egg numbers from volumetric measurements.

NEW CONSTRUCTION

During Fiscal Year 1993, the following improvements were made at the Kootenai Facility:

1) Entire fish rearing area was insulated
2) Wood stove installed in fish rearing area
3) Water heater/chiller unit purchased and installed
4) Self contained on-site living facility (29' travel trailer)
5) Small portable transport/holding tank purchased
6) The facility water intake pumphouse received a heater and was insulated

PUBLIC RELATIONS

More than 500 people visited the Kootenai Experimental Facility during 1993. Approximately 90 groups of people toured the facility. These groups, usually numbering 1 to 5 people, visited the facility from Idaho, Montana, Washington, Oregon, Alaska, South Dakota, Iowa, Pennsylvania, Massachusetts, Florida, and British Columbia, Canada. Approximately 10 additional groups visited the facility from schools in Idaho and Montana.

JUN 14 1995

RECOMMENDATIONS

Research

1) Increase capacity to control water temperatures in the facility to improve survival at critical life stages.

2) Incubate, hatch and rear eggs, larvae, and fingerlings on ambient river water to assess potential survival of naturally produced early life stages of white sturgeon in the river. Additional eggs, larvae and juveniles will be reared in thermally altered river water.

3) Further refine hand stripping techniques using females with normally developed ovaries.

4) Investigate the feasibility of discontinuing cesarian surgery for egg collection in favor of hand stripping.

5) Except for during major fish loss episodes, document the condition factors of live and dead fish in the facility to better understand chronic low mortality seen at the facility.

Production

Broodstock:

1) Broodstock collected should be transported to the facility as soon as possible to reduce stress.

2) Fish should be checked regularly to determine degree of maturation.

3) At least three females should be at the facility one month prior to spawning.

4) One spawning female should be old enough to have spawned naturally at least once before in it's life.

JUN 14 1995

Spawning:

1) Have a male to female ratio of 3:1.

2) Keep eggs sorted by the male's number from incubation through stocking or until overcrowding becomes a problem.

3) Transfer a portion of the larvae and fingerlings to Sandpoint State Hatchery to hatch and rear on heated spring water not to exceed 10° C.

4) Attempt to spawn a female 142-172 cm TL and one >213 cm TL to compare contaminant levels in eggs from each fish.

Incubation:

1) **Do not** use water warmer than 16° C for incubation.

Facility design

Due to the following pump and power failures at the Facility during 1993, a facility site with thermally correct reliable gravity flow water source would be beneficial.

Date	Power failure	Pump failure
1/4		X
2/11		X
2/12		X
2/17		X (terminal failure)
2/18		
8/1	X	
8/12	X	
8/29	X	
10/20	X	
12/16	X	
12/17	X	
12/29	X	
Total	7	4

JUN 14 1995

LITERATURE CITED

Northwest Power Planning Council Columbia River Basin Fish and Wildlife Program. 1987.

Siple, J. 1992. Kootenai River Fisheries Investigations and Experimental Culture. Annual Hatchery Report. BPA Project No. 88-65.

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The Kootenai Tribe Fisheries Program also thanks the Bonneville Power Administration for funding this research and facility.

JUN 14 1995

APPENDIX

JUN 14 1995

Table 1. Daily water temperatures of all water sources in the Kootenai Experimental Facility for the 1993 broodyear fish. Two temperature values for each date represent temperature at 8 AM and 4 PM.

DATE	HEATED CITY	AMBIENT CITY	RIVER	CHILLED RIVER
06-26-93*	18	15	15	15
06-27-93	18	15	14	15
06-28-93	18.5	15	14	15
06-29-93	19	14	15	14
06-30-93	18/18	14/14	14/13	14/14

*spawned fish

DATE	HEATED CITY	AMBIENT CITY	RIVER	CHILLED RIVER
07-01-93	18	14	14	13/13
07-02-93	19/19	13/13	15/14	14/14
07-03-93	18/18	14/14	14/15	14/14
07-04-93	18/19	14/14	15/16	14/15
07-05-93	18/20	13/14	15/16	14/15
07-06-93	18/19	14/15	15/16	14/14
07-07-93	19/19	14/15	15/16	14/14
07-08-93	19/19	14/15	14/16	14/14
07-09-93	19/19	14/15	14/16	14/14
07-10-93	19/19	14/15	14/16	14/14
07-11-93	18/19	14/15	16/17	14/15
07-12-93	18/19	14/14	15/15	14/14
07-13-93	17/18	14/15	14/16	14/14
07-14-93	18/19	14/15	14/16	14/15
07-15-93	18/19	14/15	14/16	14/15
07-16-93	18/19	14/15	14/16	14/15
07-17-93	18/18	14/14	15/15	14/14
07-18-93	18/19	14/15	14/16	14/14
07-19-93	18/18	14/15	14/15	14/14
07-20-93	18/19	14/16	15/15	14/15
07-21-93	18/19	a	15/15	14/15
07-22-93	19/19		16/15	14/15
07-23-93	19/19		16/15	14/15
07-24-93	19/19		16/15	14/15
07-25-93	19/19		16/16	14/14
07-26-93	20/20		16/16	14/15
07-27-93	19		16	14
07-28-93	19/20		16/17	15/16
07-29-93	19/20		17/17	15/16
07-30-93	19/20		17/17	15/16
07-31-93	19/20		17/17	15/16

a=All tanks using ambient city water were switched over to river water on 7/21.

JUN 14 1995

DATE	HEATED CITY	AMBIENT CITY	RIVER	CHILLED RIVER
08-01-93	19/20		17/17	15/16
08-02-93	19/20		17	15/16
08-03-93	19/20		16/17	15/16
08-04-93	19/20		16/17	15/16
08-05-93	19/20		17/18	15/16
08-06-93	19/20		17/18	16/16
08-07-93	19/20		17/18	16/16
08-08-93	19/20		17/18	17/16
08-09-93	19/20		18/18	14/17
08-10-93	19/19		17/18	14/17
08-11-93	19		17/18	14
08-12-93	19/21		17/18	14/16.5
08-13-93	18/18		17/19	15/16
08-14-93	16/18		17/19	14/16
08-15-93	17/18		17/19	15/16
08-16-93	20/19		17/17	15/15
08-17-93	20/21		16/16	14/14
08-18-93	21		15	14
08-19-93	19/18		16/17	14/16
08-20-93	17/18		18/18	14/16
08-21-93	18/18		17/17	14/15
08-22-93	17/18		16/16	14/15
08-23-93	18/19		14/14	14/14
08-24-93	18/18		13/14	13/14
08-25-93				
08-26-93				
08-27-93	18		15	14/14
08-28-93	20/19		13/14	19/15
08-29-93	18/18		13/14	14/14
08-30-93	18/19		13/14	13/14
08-31-93	19/19		13/14	13/14
09-01-93				
09-02-93				
09-03-93				
09-04-93				
09-05-93	18/19		15/16	15/15
09-06-93	18/19		15/16	14/14
09-07-93	19/19		15/16	15/14
09-08-93	18/19		15/16	14/14
09-09-93	18/19		14/16	14/14
09-10-93	18/20		14/15	13/14
09-11-93	19/18		14/14	14/14
09-12-93	18/19		13/13	14/14
09-13-93	18/19		13/14	14/14
09-14-93	18/19		13/17	14/15
09-15-93	18/19		13/13	14/15
09-16-93	19/19		12/13	14/15

APPROVED
JUN 14 1995

DATE	HEATED CITY	AMBIENT CITY	RIVER	CHILLED RIVER
09-17-93	18/19		13/14	14/15
09-18-93	18/19		13/14	14/15
09-19-93	19/19		13/13	14/14
09-20-93	19/19		13/13	14/14
09-21-93	19		13	14
09-22-93				
09-23-93	20/20		12/13	14/14
09-24-93	20/20		13/13	14/14
09-25-93	14/21		12/13	13/14
09-26-93	21/21		12/13	13/14
09-27-93	20/21		13/13	14/14
09-28-93	21/21		13/13	14/14
09-29-93	20/21		13/14	14/14
09-30-93	21/21		13/14	14/14
10-01-93	19		13	14
10-02-93	18			14
10-03-93	18/19		13/13	14/14
10-04-93	19		13	14/14
10-05-93	18/19		13/14	14/14
10-06-93	18/19		13/13	14/14
10-07-93	18/18		13	13
10-08-93				
10-09-93	17/18		11/13	11/14
10-10-93	18/19		12/12	12/14
10-11-93	17/18		11/12	12/13
10-12-93	18/18		12/12	13/14
10-13-93	17/18		12/12	14/14
10-14-93	17/18		12/12	14/14
10-15-93	17/18		12/12	14/14
10-16-93	17/17		12/12	12/13
10-17-93	17/17		12/12	12/14
10-18-93	17/17		12/12	13/13
10-19-93	17/13		11/12	12/13
10-20-93	14		12/11	12/12
10-21-93	15/16		11/12	11/12
10-22-93	15/16		11/11	12/13
10-23-93	17/17		11/12	12/13
10-24-93	16/16		11/12	11/13
10-25-93	16/16		11/12	11/12
10-26-93	14/13		12/12	12/13
10-27-93	13/13		11/12	12/13
10-28-93	12/12		12/12	12/13
10-29-93	11/11		12/12	12/13
10-30-93	heated		12/12	11/11
10-31-93	water turned off		11/11	12/12

JUN 14 1995

DATE	CHILLED RIVER	RIVER
11-1	11	12
11-2	11	12
11-3	11	12
11-4	10	11
11-5	10	11
11-6	10	11
11-7	10	11
11-8	9	10
11-9	9	10
11-10	9	10
11-11		
11-12	9	10
11-13		
11-14		
11-15	10	10
11-16	10	10
11-17	10	10
11-18	10	10
11-19	9	9
11-20	9	9
11-21	9	9
11-22	9	9
11-23	9	9
11-24	9	8
11-25	8	8
11-26	8	8
11-27	8	8
11-28	8	8
11-29	9	9
11-30		
12-1		
12-2		
12-3		
12-4		
12-5		
12-6		
12-7		
12-8	8	9
12-9	9	9
12-10	9	9
12-11	7	7
12-12	9	9
12-13	8	8
12-14	8	8
12-15	8	8
12-16	8	8
12-17	8	8
12-18	8	8
12-19	8	8
12-20	8	8
12-21	8	8

JUN 14 1995

DATE	CHILLED RIVER	RIVER
12-22	8	8
12-23	8	8
12-24	7	8
12-25	7	7
12-26	7	7
12-27	7	7
12-28	7	7
12-29	7	7
12-30	7	8
12-31	8	8

JUN 1 4 1995

Table 2. Catch data for adult white sturgeon captured in the Kootenai River during 1993.

DATE	SEX	LOCATION	TIME	WEIGHT	LENGTH	DEPTH	PIT TAG #	FLOY TAG #
05-10-93	UN	ROCK CREEK	1245	----	142 CM	32 FEET	7F7F43572C	-----
05-10-93	UN	ROCK CREEK	1450	----	229 CM	32 FEET	7F7F44524b	-----
05-11-93	M	ROCK CREEK	1250	14.0 KG	136 CM	35 FEET	7F7F427F2a	-----
05-11-93	M	SHORTY'S ISLAND	1640	17.0-24 KG	145 CM	35 FEET	7F7F426A34	-----
05-13-93	M	SHORTY'S ISLAND	1140	53.0 KG	183 CM	-----	7F7F443223	-----
05-13-93	M	-----	-----	19.0 KG	155 CM	-----	----------	00737
05-13-93	FE	SHORTY'S ISLAND	1900	51.0 KG	220 CM	36 FEET	7F7F43552E	------
05-13-93	M	SHORTY'S ISLAND	1400	----	136 CM	36 FEET	7F7F427A4D	------
05-14-93	M	SHORTY'S ISLAND	1221	----	-----	36 FEET	UNREADABLE	555 (SONIC)
05-15-93	M	SHORTY'S ISLAND	1456	15.0 KG	146 CM	36 FEET	7F7F117F46	01554
05-15-93	M	SHORTY'S ISLAND	1545	28.0 KG	167 CM	35 FEET	7F7F457949	------
05-15-93	M	SHORTY'S ISLAND	1737	15.0 KG	140 CM	35 FEET	7F7F426B49	------
05-16-93	UN	SHORTY'S ISLAND	1719	11.4 KG	126 CM	31 FEET	7F7F427123	------
05-16-93	UN	SHORTY'S ISLAND	1735	11.0 KG	132 CM	31 FEET	7F7F444420	01053
05-16-93	M	-----	-----	17.0 KG	149 CM	-----	7F7F12181F	------
05-16-93	M	SHORTY'S ISLAND	1751	21.0 KG	157 CM	31 FEET	7F7F644338	------
05-17-93	M	SHORTY'S ISLAND	1000	21.0 KG	159 CM	33 FEET	7F7F12113P	01596
05-17-93	M	CAUGHT ON 5-15-93	1424	----	----	-----	7F7F117F46	------
05-17-93	UN	-------	1119	----	----	-----	----------	------
05-17-93	M	SHORTY'S ISLAND	1600	18.0 KG	155 CM	31 FEET	7F7F426012	------
05-17-93	FE	SHORTY'S ISLAND	1700	70.0 KG	214 CM	31 FEET	7F7F43775A	------
05-17-93	UN	SHORTY'S ISLAND	1500	36.0 KG	192 CM	31 FEET	7F7F426826	------
05-16-93	M	CAUGHT ON 5-15-93		15.0 KG	146 CM		7F7F117F46	01554
05-13-93	M	SHORTY'S ISLAND	1004	45.0 KG	191 CM	-----	7F7E365326	------
05-13-93	M	SHORTY'S ISLAND	1740	33.5 KG	172 CM	-----	7F7F441E79	------
05-16-93	UN	SHORTY'S ISLAND	1010	-9 KG	130 CM	-----	7F7F402F5B	------
05-16-93	M	SHORTY'S ISLAND	1130	53.0 KG	210 CM	36 FEET	7F7F425F1F	------
05-18-93	FE	SHORTY'S ISLAND	1210	53.0 KG	199 CM	31 FEET	7F7F427916	RELEASED 5-28-93

JUN 14 1995

DATE	SEX	LOCATION	TIME	WEIGHT	LENGTH	DEPTH	PIT TAG #	FLOY TAG #
05-22-93	FE	UPPER SHORTY'S	1149	26.0 KG	170 CM	40 FEET	7F7F42705A	------
05-22-93	UN	SHORTY'S ISLAND	1123	7.0 KG	110 CM	40 FEET	7F7E357439	------
05-23-93	M	SHORTY'S ISLAND	1025	27.0 KG	175 CM	31 FEET	7F7F430B08	------
05-23-93	M	SHORTY'S ISLAND	0957	30.0 KG	175 CM	31 FEET	7F7F4277DE	------
05-23-93	M	SHORTY'S ISLAND	1630	24.0 KG	160 CM	31 FEET	7F7F44104D	------
05-23-93	M	SHORTY'S ISLAND	1700	17.0 KG	145 CM	31 FEET	7F7F436A3E	------
05-23-93	UN	SHORTY'S ISLAND	1645	7.5 KG	115 CM	-----	7F7F431D70	------
06-04-93	M	AMBUSH ROCK	1120	-----	172 CM	-----	7F7F443F16	------
06-04-93	M	AMBUSH ROCK	1250	-----	215 CM	-----	7F7F007039	01589
06-07-93	M	AMBUSH ROCK	1430	11.0 KG	125 CM	-----	7F7F437E56	
06-11-93	M	SHORTY'S ISLAND	1500	30.0 KG	185 CM	31 FEET	7F7F0E5942	------
06-11-93	M	SHORTY'S ISLAND	1409	32.5 KG	177 CM	31 FEET	7F7F435360	2+----
06-14-93	M	SHORTY'S ISLAND	1150	10.5 KG	129 CM	31 FEET	7F7F43723D	------
06-14-93	M	SHORTY'S ISLAND	1231	15.5 KG	144 CM	31 FEET	7F7F443E36	01492
06-14-93	M	SHORTY'S ISLAND	1300	21.5 KG	238 CM	31 FEET	7F7F436A22	------
06-14-93	M	SHORTY'S ISLAND	1430	18.5 KG	155 CM	31 FEET	7F7F427559	2+----
06-14-93	M	SHORTY'S ISLAND	1600	51.0 KG	215 CM	-----	7F7F44057F	------
06-14-93	M	SHORTY'S ISLAND	1618	-----	-----	31 FEET	7F7E357439	------
06-14-93	M	SHORTY'S ISLAND	1631	18.5 KG	152 CM	31 FEET	7F7F3D5079	------
06-15-93	M	SHORTY'S ISLAND	0957	38.0 KG	184 CM	31 FEET	7F7F444F54	------
06-15-93	M	SHORTY'S ISLAND	1050	24.5 KG	169 CM	31 FEET	7F7F3D5124	------
06-15-93	M	SHORTY'S ISLAND	1100	33.5 KG	182 CM	31 FEET	7F7F441E5E	------
06-15-93	M	SHORTY'S ISLAND	1215	27.0 KG	169 CM	31 FEET	7F7F12170E	------
06-15-93	M	SHORTY'S ISLAND	1220	-----	216 CM	31 FEET	7F7F43786F	------
06-15-93	M	SHORTY'S ISLAND	1310	12.0 KG	140 CM	31 FEET	7F7F443E1A	------
06-15-93	M	SHORTY'S ISLAND	1505	30.0 KG	166 CM	31 FEET	7F7F435103	------
06-15-93	M	SHORTY'S ISLAND	1510	32.0 KG	181 CM	31 FEET	7F7E12052A	------
06-15-93	M	SHORTY'S ISLAND	1605	-----	-----	31 FEET	7F7F435631	------

JUN 14 1995

DATE	SEX	LOCATION	TIME	WEIGHT	LENGTH	DEPTH	PIT TAG #	FLOY TAG #
05-13-93	M	SHORTY'S ISLAND	1004	45.0 KG	191 CM	-----	7F7E365326	------
05-13-93	M	SHORTY'S ISLAND	1740	33.5 KG	172 MC	-----	7F7F441E79	------
05-13-93	M	SHORTY'S ISLAND	1140	19.0 KG	155 CM	-----	----------	00737
06-11-93	M	SHORTY'S ISLAND	1206	22.0 KG	160 CM	31 FEET	7F7F440863	01063
06-11-93	M	SHORTY'S ISLAND	1206	-----	159 CM	31 FEET	7F7F436A54	------

Table 3a. Embryonic development of white sturgeon eggs hatched on heated city water at the Kootenai Experimental Facility, 12-120 hours post-fertilization.

WHITE STURGEON EMBRYONIC STAGES (heated city water)

HOURS	JAR #	# EGGS	EARLY CLEAVAGE	ADVANCED CLEAVAGE	LATE CLEAVAGE	EARLY GASTRULATION	GASTRULATION	YOLK PLUG	EARLY NEURALATION	NEURAL TUBE	LATE NEURALATION	# DEAD
12	13	33	3	1	16							13
25	14	37				21	15					1
50	13	68						4	54			10
74	14	41									28	13
98	13	73									50	23
120	NO COUNT: STARTED HATCHING BETWEEN 1700 HOURS AND 2000 HOURS											

JUN 14 1995

Table 3b. Embryonic development of white sturgeon eggs hatched on city water at the Kootenai Experimental Facility, 12-120 hours post-fertilization.

WHITE STURGEON EMBRYONIC STAGES (City water)

HOURS	JAR #	# EGGS	EARLY CLEAVAGE	ADVANCED CLEAVAGE	LATE CLEAVAGE	EARLY GASTRULATION	GASTRULATION	YOLK PLUG	EARLY NEURALATION	NEURAL TUBE	LATE NEURALATION	# DEAD
12	1	41	17	18								6
12	7	31	29	1								1
25	18	42			25	17						0
25	21	33			18	15						
50	2	47						early 25				22
50	6	49						early 2				47
74	19	34							28			6
74	22	52							5			47
74	3	30							13			17
74	9	105							7			98
98	4	33									17	16
98	10	66									6	60
98	17	42									18	24
98	20	34									5	29
120	5	71									45	26
120	11	31									1	30
120	18	50									25	25
120	21	43									3	40

JUN 14 1995

Table 3c. Embryonic development of white sturgeon eggs hatched on river and chilled river water at the Kootenai Experimental Facility, 12-120 hours post-fertilization.

WHITE STURGEON EMBRYONIC STAGES

HOURS	JAR #	# EGGS	EARLY CLEAVAGE	ADVANCED CLEAVAGE	LATE CLEAVAGE	EARLY GASTRULATION	GASTRULATION	YOLK PLUG	EARLY NEURALATION	NEURAL TUBE	LATE NEURALATION	# DEAD
						River water						
12	15	40	10	6	17							
25	16	31			25	6						7
50	15	52										0
74	16	33						6	25			21
98	15	44								23		10
122	16	62									20	24
											31	31
						Chilled river water						
12	23	35	15	15								
25	24	43			18	15						5
50	23	83										10
74	24	42					(early)33					50
98	23	76							11			31
122	44										36	40
											17	27

JUN 14 1995

Table 4. Hatching success of hand stripped and surgically removed white sturgeon eggs at the Kootenai Hatchery, 1993.

Tank No.	No. of eggs before hatch	Number hatched	Percent hatched
		Hand stripped eggs	
1	5,730	2,154	38.6
2	5,730	1,778	31.0
3	5,730	2,166	37.8
7	5,730	1,264	22.1
8	5,730	527	9.2
9	5,730	2,336	40.8
10	5,730	2,224	38.8
11	5,730	2,339	40.8
15	5,850	937	16.0
Total	51,690	15,725	30.4%
		Surgically removed eggs	
4	5,730	214	7.5
5	5,730	326	11.4
6	5,730	219	7.7
12	5,730	179	6.3
13	5,850	167	5.7
14	5,850	115	3.9
Total	34,620	1,220	7.1*

* See text for explanation of low percent hatch

JUN 14 1995

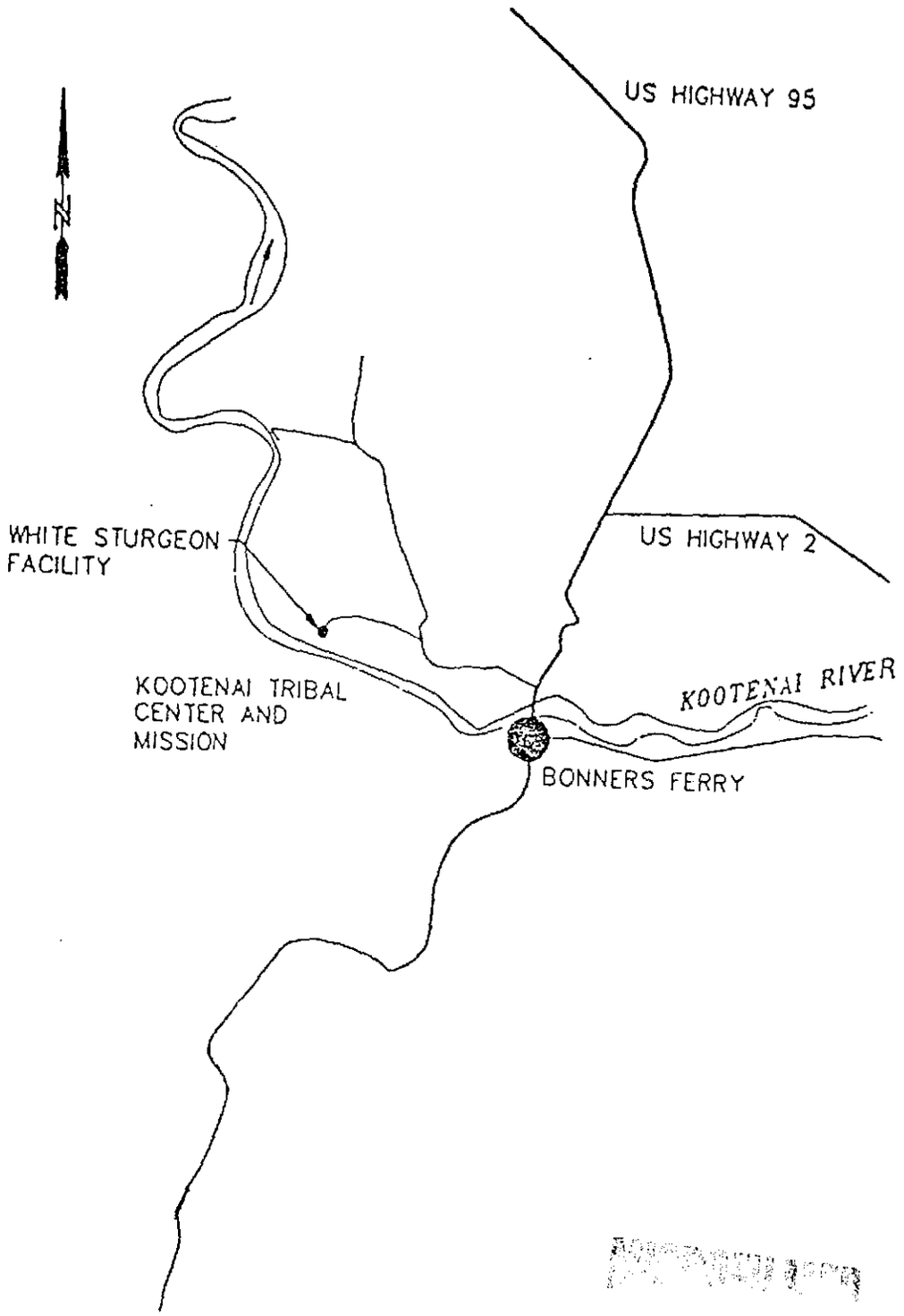
Table 5. Hatch and survival data for 1993 broodyear in the Kootenai Experimental Facility. Tank numbers 15-18 did not receive fish until August or September.

	Water source	Tank number	Number hatched	Number of fish surviving* July	Aug	Sept	Oct	Nov	Dec
1	city	1 H	2,154	1,635	136	43	38	200	187
2	"	2 H	1,778	1,267	283	85	80	59	56
3	"	3 H	2,166	1,697	821	713	708	693	688
4	"	4 C	214	120	75	24	23	441	419
5	"	5 C	326	127	88	21	14	418	415
6	"	6 C	219	189	111	83	78	59	42
7	"	9 H	2,336	1,886	1,072	941	207	37	36
	"	10 H	2,224	1,916	1,186	1,072	475	22	20
8	"	11 H	2,339	1,928	1,219	1,145	436	13	4
9	"	12 C	179	146	100	93	90	87	82
10	"	13 C	167	151	78	42	37	31	27
11	"	14 C	115	108	59	41	37	32	27
12	chilled river	15 H	937	767	665	301	266	211	198
13	heated city	8 H	527	502	431	177	30	17	8
14	river	7 H	1,264	487	230	78	38	36	35
15	"	16 H				301	293	245	230
16	"	17 H			1,061	923	917	907	905
17	"	18 H			97	75	68	67	66
18	"	19 H				375	374	372	372

*=increases and large decreases in # of fish surviving in a given tank is due to fish transfers among tanks to maintain optimum rearing densities
H=eggs collected by hand stripping
C=eggs collected by cesarian surgery

JUN 14 1995

Figure 1. Location of the Kootenai Experimental White Sturgeon Facility.



JUN 14 1995

Figure 2. Top view of newly installed river water intake system for the Kootenai Experimental Facility.

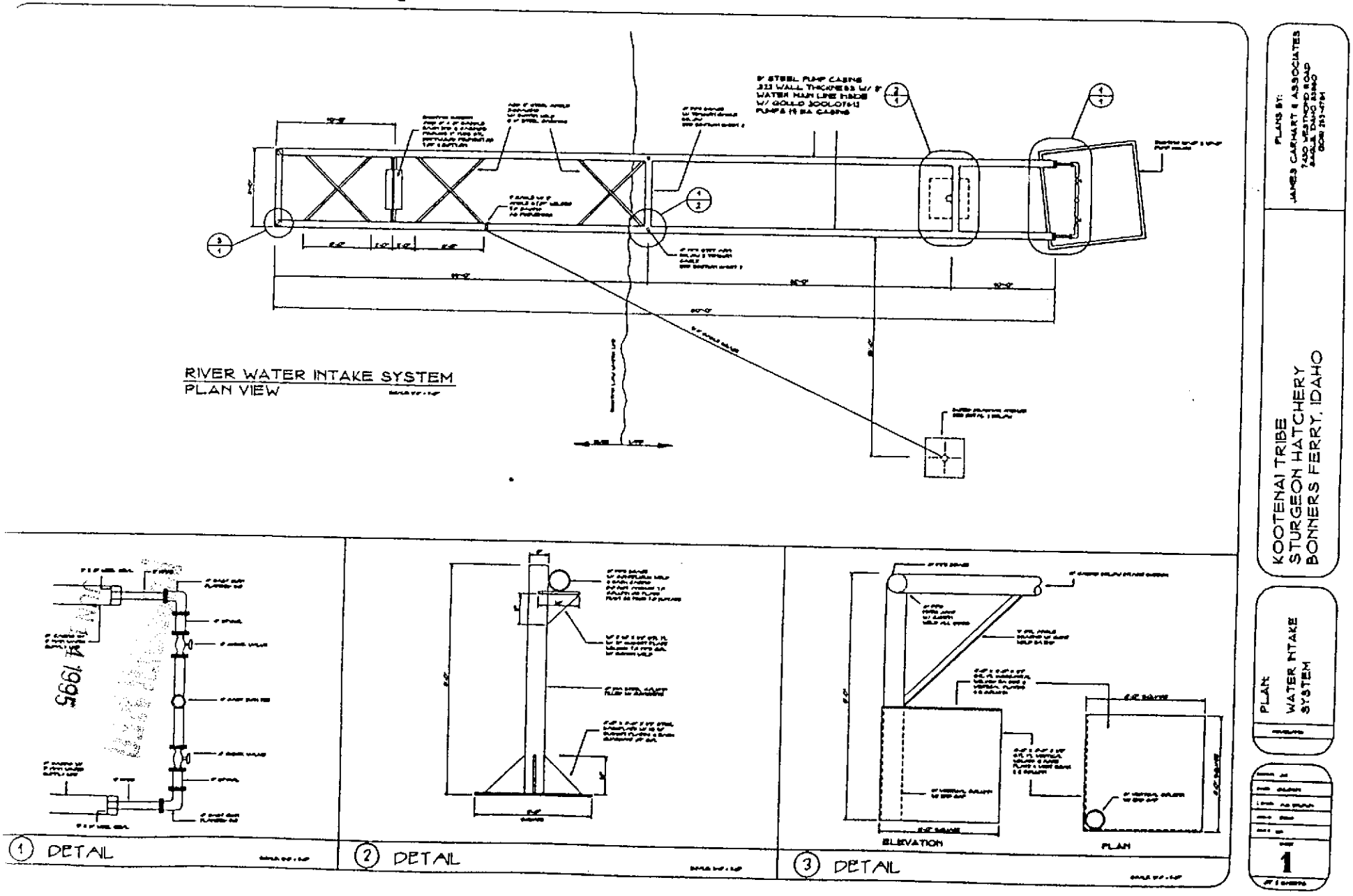
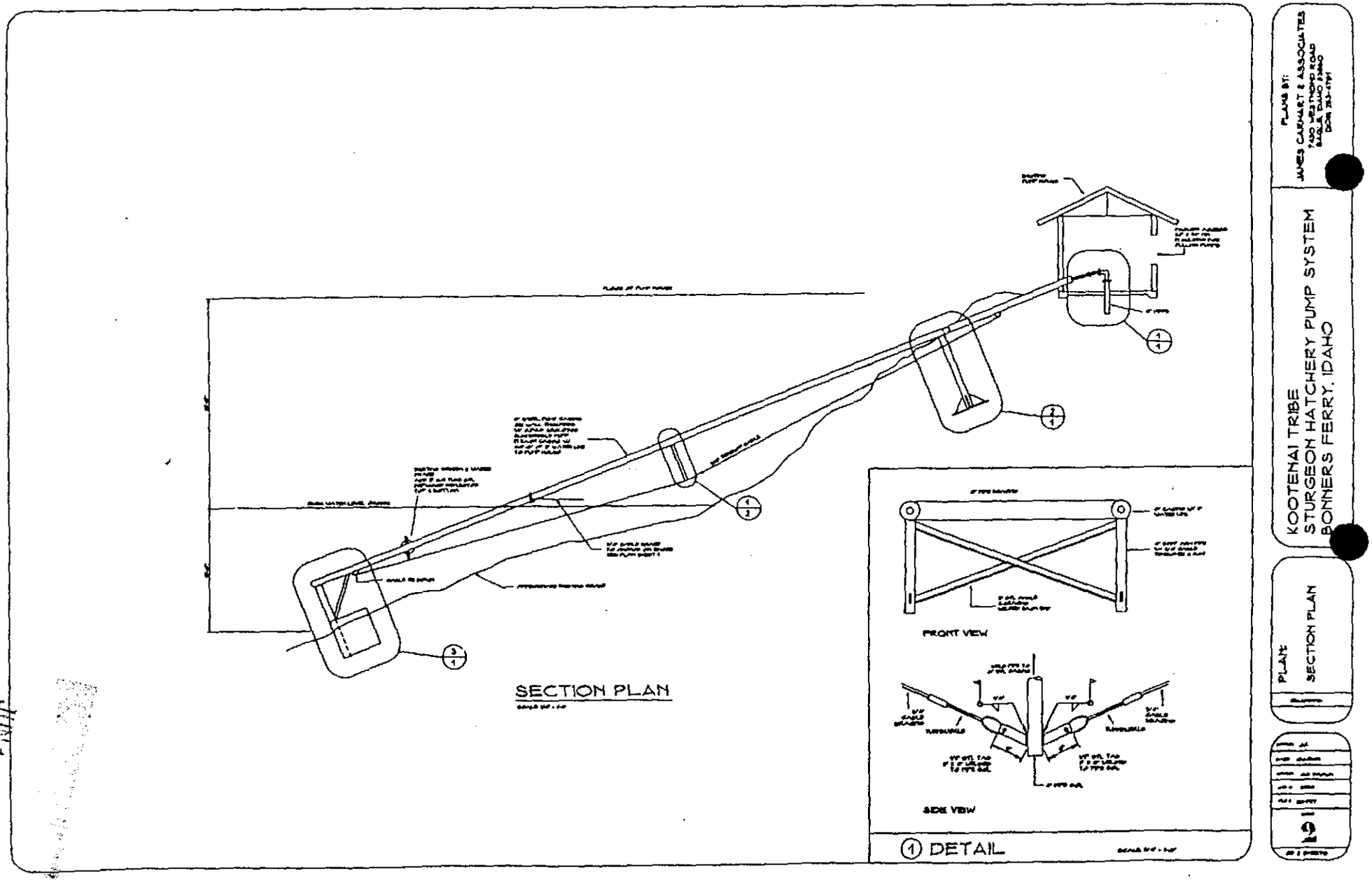


Figure 3. Side view of newly installed river water intake system at the Kootenai Experimental Facility.



JUN 14 1995

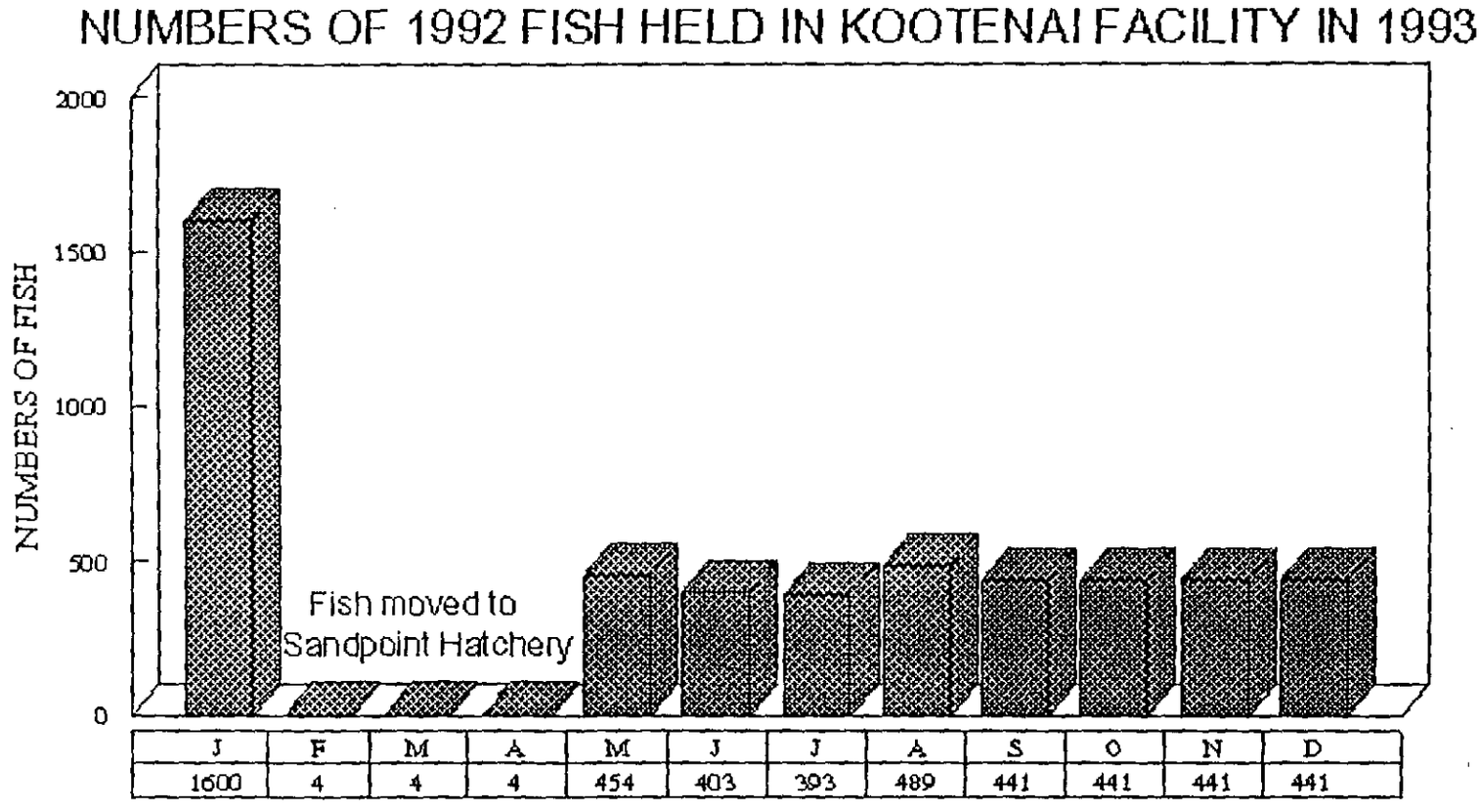


Figure 4. White sturgeon from the 1992 broodyear held in the facility during 1993.

1992 Annual- Kootenai Hatchery

INTRODUCTION

The Kootenai Tribal Experimental White Sturgeon *(Acipenser transmontanus)* Facility is located in Boundary County, Idaho approximately three miles west of the small community of Bonners Ferry (Figure 1 appendix). The facility was constructed in the spring of 1991, as a resident fish mitigation measure under the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program [Section 900 (g) (1) 1987 (H) ; Action Plan, section 1403 (7.5)]. Funding for this facility was provided by Bonneville Power Administration (BPA) under auspices of the Northwest Power Planning and Conservation Act (P.L. 96-501, 1980). It will produce one and two year old sturgeon for introduction into the Kootenai River. This research facility was established for experimental rearing of Kootenai River White Sturgeon as part of a BPA project evaluating White Sturgeon for the Kootenai River. The facility will release one and two year old sturgeon in the spring to fall period as directed to meet research objectives. A representative number of fish > 70 cm will be fitted with sonic transmitters so they may be located and tracked after release into the river.

Staffing at the facility includes three permanent Kootenai tribal personnel. There is no housing at the site, but there is a trailer pad ready for hook up.

JUN 1 4 1995

FACILITY CONSTRUCTION

The facility consists of a metal pole building, 17.8 m long and 12.5 m wide, housing rearing ponds, an office, laboratory space, and a backup generator. Rearing ponds consist of : two rectangular tanks 3.66 m in length by 0.36 m wide by 0.45 m high; one rectangular tank 3.66 m in length by 0.56 m wide by 0.30 m high; one rectangular tank 3.09 m in length by 0.37 m wide by 0.47 m high; ten rectangular tanks 1.20 m in length by 0.60 m wide by 0.40 m high; three rectangular tanks 1.20 m in length by 0.45 m wide by 0.57 m high; three circular tanks 3.06 m in diameter by 1.53 m high and three 1.53 m diameter circular tanks and 1.22 m high.

WATER SUPPLY

The facility has two water supply systems, Kootenai River water and Bonners Ferry city water. The Kootenai River water system is pumped into a head-box at about 947 l/min. and is distributed for adult holding, incubation, and rearing. The gravity fed city water is first dechlorinated through two activated charcoal canisters. Then the water goes through a column packed with aeration media [shot shell wads] and then into a head-box for distribution. This flow of 94.7 l/min. is used for incubation, rearing, and recovery of female spawners. The Kootenai River water

JUN 14 1995

temperature varies by season from a low of 1° C in the winter and as warm as 17° -18° C in the summer. The city water temperature also varies by the season as low as 4° C in the winter, and as warm as 17° C in the summer. An electric water heater is used on the city water in the winter, increasing the water temperature to 17° C in three rearing tanks.

BROODSTOCK COLLECTION

From April through June of 1992 white sturgeon broodstock were collected from the Kootenai River between Fleming Creek and Massacre Rock. Fish were captured only by angling this year (Table 1). Captured fish were placed upside down in a stretcher suspended across the boat gunwales, with river water added as needed. Fish were then sexed in the field either by making a 1 cm abdominal incision and viewing gonadal tissue with a veterinarian otoscope or by inserting a flexible plastic tube and extracting developing oocytes (eggs) by suction. Once the sex was determined and stage of sexual maturation determined it was decided whether to bring the fish to the facility by boat, or by truck, or release it. A total of thirteen mature fish, 3 females and 10 males, were collected and transported to the facility. All fish captured were tagged with a 30 cm spaghetti type floy tag attached through the base of the interior portion of the dorsal fin, PIT tagged, and weight and

JUN 14 1995

total length recorded.

STAGING BROODSTOCK

Adult female sturgeon brought to the facility were held in the large 3 meter circular tanks and examined about every 3 weeks, for egg development and level of maturation. The fish to be examined were guided into a stretcher so the head of the fish was enclosed in the stretcher hood. Once the fish was secured in the stretcher it was rolled ventral side up and inclined slightly towards the head, keeping the gills in water and the ventral surface dry. In preparation for examination the abdominal area anterior to the vent was treated with 4% nitrofurazone antibacterial solution. Using a scalpel with a size ten blade a 1 cm incision was made along the ventral midline approximately three to four ventral scutes anterior to the vent. Care was taken to cut just through the interior cavity lining. An egg sample was removed by aspiration using 4 mm internal diameter tygon tubing. A sample of about one hundred eggs was drawn into the tubing and placed into a 150 ml beaker containing 50 ml of chilled Leibovitz (L-15) solution medium. After the sample was collected the incision was closed and sutured using a cruciate suture. Suture material used was Ethicon's cutting C.P.-2(888) reverse cutting edge swedged to a 70 cm sterile, chromic gut suture. Care was taken to leave some slack in

JUN 14 1995

the suture to allow for swelling of the tissue during healing. The incision area was then washed with a 4% solution of nitrofurazone. After the examination the fish was released back into the 3 meter circular holding tank.

The four criteria we used to determine probability and time of optimal egg maturity of a potential spawner were; 1. appearance, shape, color and atresia of eggs; 2. egg diameter through long axis; 3. position of the germinal vesicle (GV); 4. Progesterone maturation assay producing GV breakdown (GVBD). As eggs develop they generally change from light grey to dark grey or black and from round to oval or irregular shaped. The amount of atretic eggs in a sample indicates a female is reabsorbing eggs and may not continue to develop in a positive direction.

Egg diameter varies with individual fish but it is helpful in determining positive development. This measurement can suggest that from examination to examination of an individual female, if egg diameter is increasing, maturation is continuing to progress. Egg diameter through the long axis was measured by lining up ten eggs along a millimeter ruler.

A portion of the egg sample was placed in a 150 ml beaker with 50 ml L-15 medium, placed on a hot plate and boiled for five to eight minutes. This solidified the yolk and fixed the position of the GV. The sample was then cooled and the GV position was determined by bisecting the eggs under a dissecting microscope. Each egg is held with a pair of Adson-Brown tissue forceps and cut along the animal-vegetal axis with a single-edged razor blade. The

JUN 14 1995

GV position and the yolk polarization could then be evaluated. Eggs were categorized from stage 1 through 5. In stage 1 the GV is located centrally and stage 5 is when the GV lies in the cortical ooplasm of the animal pole. Stage 2, 3, and 4 are a progression of the GV from central to the outer cortex of the animal pole. Eggs with a GV position of stage 4 and 5 represent females with a good chance of being induced to spawn.

The most important criteria used in staging potential female broodstock was progesterone maturation assay of eggs. Eggs were removed from the chilled L-15 medium and placed into a four well tissue culture plate containing 20 ml of incubation medium each. Then 0.1 ml of progesterone maturation stock solution was added to two culture wells leaving two wells as a control. The tissue culture plate containing 25 eggs in each well was incubated for 24 hours at 15° C. The absence of a GV after exposure to progesterone maturation steroid for 24 hours is termed germinal vesicle breakdown (GVBD). After incubation the sample was placed in separate 150 ml beakers boiled for 5 to 8 min. and then cooled. A portion of each sample was fixed in 10% buffered formalin for future maturation criteria. The eggs were then bisected along the animal-vegetal axis and examined for GVBD. Normally, a female that will successfully spawn will exhibit GVBD in 80% or more of the eggs assayed.

JUN 14 1995

Female tag #1697 that was captured on May 19 and transported to the facility where she was staged with an egg diameter of 3.2 mm and a GV position of stage 4. A progesterone assay was performed on the eggs on May 28 with only 60% exhibiting GVBD, although the texture and color were both positive.

On June 8, she was staged again with more favorable results. The eggs had a diameter of 3.4 mm and the GV position was stage 4-5 with > 90% of the eggs exhibiting GVBD, it appeared she could be induced to spawn.

Hormone injections to induce spawning began on June 10. She was injected with a primary injection of 10% of a 0.1 mg/kg body weight dose of luteinizing hormone releasing hormone analogue (LHRHa) at 2135 hours. Twelve hours later, she was given a resolving dose of 90% of the 0.1 mg/kg body weight LHRHa. Prior to the induction injections she was placed by stretcher into a 1.0 X .67 X 3.0 meter covered fiberglass holding tank. The holding tank allowed the fish to be injected under water reducing stress and handling. This also makes for easier observation while waiting for ovulation.

Three males (#'s 1240, 1696, 1687) had milt when checked at 1500 hours on June 9. A total of 30 ml of milt was collected from each. A sample of milt from each male was checked by microscope for motility and time of death. The remaining milt was placed in ziplock plastic bags with pure oxygen and stored in a refrigerator. Care was taken to keep the tubing, syringe and surface area of the

JUN 14 1995

fish dry when collecting sperm.

Ovulation was expected between 24 to 48 hours post resolving injection on June 12. Approximately 500 dark eggs were observed about 47 hours post resolving injection, floating near the bottom of the holding tank. This was not a good sign as viable eggs stick to the bottom of the tank. We continued to observe her until 0130 hours on June 13th when she was checked and found to be overripe. Why or how this happened, when the eggs looked so good, is still undetermined. It may have been stress related response or reaction to the hormone. She was again examined by the hatchery staff and released at 1000 hours.

SECOND SPAWN 1992

On June 15th the two remaining females were staged. Female #1683 was overripe, the eggs were ringed with white and the texture was uneven. Female #1699 had progressed to stage 5 and egg diameter had increased to 3.0-3.1 mm from 2.8-2.9 mm, the color and texture were both positive.

Hormone injections for female #1699 to induce spawning began on June 16th. She was injected with a primary injection of 10% of a 0.1 mg/kg body weight dose of LHRHa at 1800 hours. Eighteen hours later, she was given a resolving dose of 90% of the 0.1 mg/kg body weight LHRHa, this was recommended by [illegible] University of

JUN 14 1995

California at Davis (U.C. Davis) to reduce stress on the female and bring an early ovulation of approximately 24 hours.

Three males (#'s 1240, 1691, 1541) had milt when checked on June 16th. A total of 40 ml of milt was collected from each. A sample of milt from each male was checked by microscope for motility and time to death. The counts were good except #1240 which was lower, but motility was two minutes plus for all. Sperm collection techniques remained the same.

Ovulation began 18 hours post resolving injection on June 18th. Approximately 200 dark eggs were observed stuck to the bottom of the holding tank at 0545 hours. Fresh milt was collected from the males at 0600 hours on June 18th. At approximately 0845 egg removal procedure was started, the female was placed in the stretcher and supported over the holding tank. A length of tygon tube connected to the hatchery water supply was placed into her mouth for aeration. The ventral side was disinfected with 4% nitrofurazone. A 10 cm incision was made along the midline to expose the egg mass, then the eggs were gently removed with a plastic spoon from the body cavity. A sample for contaminate analysis of at least 70 g of eggs were removed and frozen. The eggs were placed into nine stainless steel bowls to await fertilization. This process took approximately 60 minutes. Three, 10 g egg samples were collected and counted later to facilitate determining fecundity. She was thoroughly disinfected with 4% nitrofurazone and the incision was closed with Ethicon's PDSII violet monofilament (polydioxanone) suture swedged to a reverse

JUN 14 1995

cutting CP-1 curved, surgical needle. A continuous suture of both the inside and outside body cavity wall was used. She was placed back into the holding tank at 1000 hours. After three hours she was checked and then transferred to the recovery tank.

Egg fertilization and processing began at 0940 hours. The coelomic fluid was removed from the eggs. A 10 ml sperm sample was poured into a bowl of 2,000 ml of water. This mixture was then stirred and added to the eggs and gently stirred with feathers until the eggs began to stick to the feathers, approximately 2 minutes later. This process was performed with sperm from each male and for each of the three water experiments, for a total of nine samples which were kept separate (Table 2). The bowls were drained off and the de-adhesive solution of Fullers Earth (diatomaceous earth) mixed with water, which was set in flowing water for tempering, was then added to the eggs and again gently stirred until the eggs were no longer sticky. Constant monitoring of the egg temperature was done so when the egg mixture increased more than 5° C it was poured off and new tempered mix was added. This process lasted 75 minutes. The eggs were thoroughly rinsed to remove excess material and placed into 11 MacDonald jars, four on regular city water, four on heated city water, and three on Kootenai River water. Approximately 13,000 eggs per jar. The flow was set at 3.79 l/min/jar. This flow rate kept the eggs suspended but not rolling. A total of 4,640 ml of eggs at 30.6 eggs/ml were removed from the fish for a total of 141,984 eggs.

JUN 14 1995

INCUBATION AND EARLY FRY REARING

At 2300 hours, twelve hours post fertilization, random egg samples were taken from the bottom, middle and top of the incubators, from each male and water source. We then recorded number of eggs and their stage of development under the dissecting microscope (Table 2). The water flow was increased 48 hours post fertilization, to roll the eggs and reduce fungus clumping. With water temperatures of 18° C to 20° C for both heated city and Kootenai River water, fungus clumping had already occurred, most egg mortality (99.99% of those groups) occurred at this time. Regular city water temperature was approximately 15° C, with much better survival to hatch (Table 3). Hatching began 4.5-5 days post fertilization on Kootenai River water and heated city water. On regular city water hatching began 7 days post fertilization. Hatching lasted for 3 days. The late hatching larvae, from the three water sources, showed a high incidence of deformity. Total hatching produced 22,027 larvae on regular city water, heated city water produced 487 larvae and 379 were produced on Kootenai River water (Figure 2).

Larvae were allowed to swim out of the MacDonald jars directly into emergence tanks.

JUN 1 4 1995

The three different lots of larvae on regular city water were split up, weighed and sampled into lots according to their male #'s 1240, 1691, and 1541. They were kept separated by screens in two

rectangular tanks 3.66 meters in length by 0.36 meters wide by 0.45 meters high. The remaining larvae from heated city water males #1240 and #1541 were transferred into the Kootenai River lots from males #1240 and #1541. The male #1691's larvae from the Kootenai River lots and heated city water lots were placed with the male #1691 on regular city water.

Feed initiation began 10 days post hatch. The larvae were not actively feeding at first, but the exposure to feed seemed to help stimulate feeding in the larvae in time.

FEED EXPERIMENT

This experiment was to test the growth and survival of the larvae on two different diets. This year we tested Bio-Kyowa larvae feed 250, 400, and 700 on 9,087 larvae. This was the diet used in 1991 at the Kootenai facility. We also tested Rangen Soft Moist diet on total of 9,905 larvae. During the day the larvae were fed on the sides of the tanks by hand and with double AA-100 brand fish sitters. At night they were fed only with automatic feeders (AA-100). The larvae started on Rangen Soft Moist, were growing approximately the same, but the mortality was less (Figure 3). With the cost of Bio-Kyowa at $74.00/kg, and the additional mortality when diets are changed. The larvae were changed from Bio-Kyowa to Rangen Soft Moist diet which cost .44/lb

JUN 14 1995

approximately, after 30 days.

FISH TRANSFERS

On June 18th, approximately 10,000 green eggs were transferred from the Kootenai Tribal Experimental White Sturgeon Facility to Sandpoint State Hatchery for hatching. On June 30th, approximately 3,700 additional larvae were transferred to Sandpoint Hatchery to increase their dwindling sturgeon population. Also on November 3rd, 728 fingerling sturgeon were transferred to Sandpoint Hatchery to reduce overcrowding at the Kootenai facility.

MORTALITY AND SURVIVAL

The majority of the mortality occurred with the fungus clumping of the eggs in the incubators, and in the first 20-45 day period while feed training. To improve survival this year, no handling was attempted until the larvae becomes at least 76 mm in length. Last years survival was approximately 1%, this years survival was approximately 10% from commencement of feeding to December 31st.

Mortality and growth between fish reared on city water, and

JAN 4 1995

Kootenai River water were not separated this year. This experiment was done in 1991 and proved that sturgeon could be reared from egg to release of Kootenai River water. For Sandpoint State Hatcheries mortality and growth see (Patterson 1992). Mortality and growth for the Kootenai facility is in (Table 4).

FISH HEALTH

The losses due to egg fungus was the majority of mortality at the facility this year. The larvae through fingerling continued to have generally good health until overcrowding began putting stress on the population, and mortality began to increase on November 27th. Previously, when mortality would rise a 1% salt bath was utilized with success. The salt baths did little or nothing to reduce this mortality. Samples were sent to the Idaho Fish and Games Fish Health Lab in Eagle, Idaho, and to U. C. Davis for analysis. The majority of the mortality, 80 broodyear 91 and 2,596 broodyear 92, perished by December 15th. This outbreak left approximately 1,785 broodyear 92 fingerlings at the facility by the end of December. Mortality was at normal by December 15th with only a few fish showing symptoms of any problems. The presumptive diagnosis from U. C. Davis was a White Sturgeon Virus, specific determination as to the particular strain was pending culture protocol at this writing.

JUN 14 1995

BROODYEARS 1990, 1991 TO RELEASE

All broodyear 91 sturgeon large enough to PIT tag were tagged at both the Sandpoint State Hatchery and Kootenai facility. Sandpoint's fish were transported to the Kootenai facility to acclimate to the Kootenai River water. The smaller sturgeon from the Sandpoint Hatchery along with fish reared at the Cabinet Gorge Hatchery were transported and placed in tanks with city water, to continue to grow for holdover and future release.

The fish that were to be released into the Kootenai River, approximately mid-August, were being held in large circular tanks on Kootenai River water. On the night of August 2nd or early morning of August 3rd, a blown fuse between the back-up generator and the pump relay, stopped the pump and caused an oxygen deficiency to the sturgeon held for release. A total of 742 broodyear 91, and 43 broodyear 90 perished. As a result of this loss only 200 broodyear 91 sturgeon, mean length 25.5 cm and mean weight 65.4 g were released in two sites on the Kootenai River on August 26th. Massacre Rock and Smith Island were selected as release sites. Along with the broodyear 91 fish, seven per site of the broodyear 90 fish were also released. The mean length was 45.5 cm and the mean weight was 321 g. Six sturgeon of the broodyear 90 were fitted with 40 day mini-transmitters for habitat preference of juveniles.

JUN 14 1995

NEW CONSTRUCTION

A settling tank was installed and put into operation for rearing water. This will help with the silt problems in the Kootenai River water system during the spring run off.

The installation of two alarm systems, a new breaker box and rewiring of the river pump system was completed.

All of the semi-square or rectangular tanks used for fish rearing were installed this year.

Construction has begun on a backup river pump, pump house and water line for the Kootenai River water system.

PUBLIC RELATIONS

Approximately 150 people attended the June 1st open house at the facility. Most were local residents.

Nearly 500 people toured the facility during 1992. Also, we have given tours to students from schools in nearby communities.

JUN 14 1995

RECOMMENDATIONS

Broodstock:

1. Broodstock collected should be transported as soon as possible following hooking to the facility to reduce stress.

2. Fish should be checked regularly to determine degree of maturation.

3. At least three females should be at the facility one month prior to spawning.

4. One of these females should have spawned at least once before.

Spawning:

1. Have a male to female ratio of 3:1.

2. Use three separate bowls to fertilize the eggs.

3. Keep them sorted by the male's number from incubation through stocking or until overcrowding becomes a problem.

4. Transfer a portion of the eggs to Sandpoint State Hatchery to hatch and rear on heated spring water not to exceed 10° C.

JUN 14 1995

Rearing: Same as last year.

Incubation:

1. Do not use water warmer than 15° C for incubation if survival is desired.

2. Continue to incubate on Kootenai River water what ever the water temperature happens to be to provide a replicate of the natural environment.

Feed: Continue to do feed experiments on the larvae to increase survival and growth.

TIME ALLOCATION

The time the hatchery staff allocated to the different phases of hatchery management is represented in (Figure 4).

JUN 14 1995

JUN 1 4 1995

Figure 2. Kootenai River White Sturgeon egg survival to hatch in three water supplies at the Kootenai Hatchery in 1992.

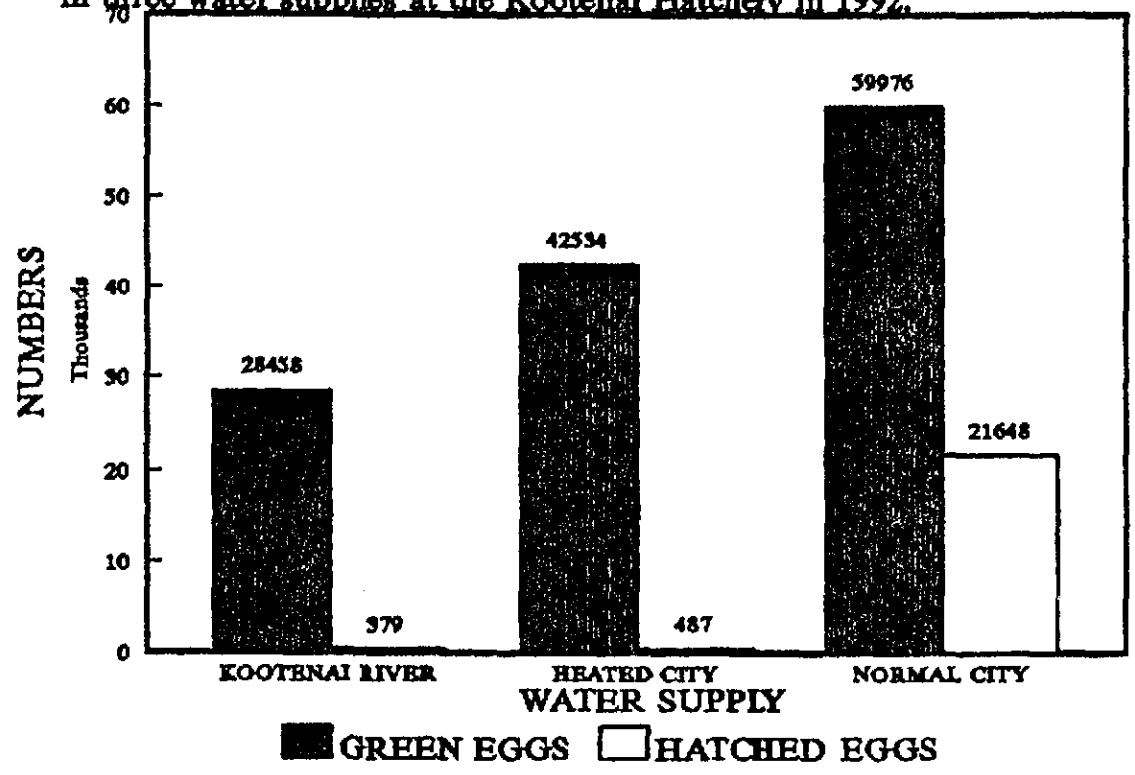
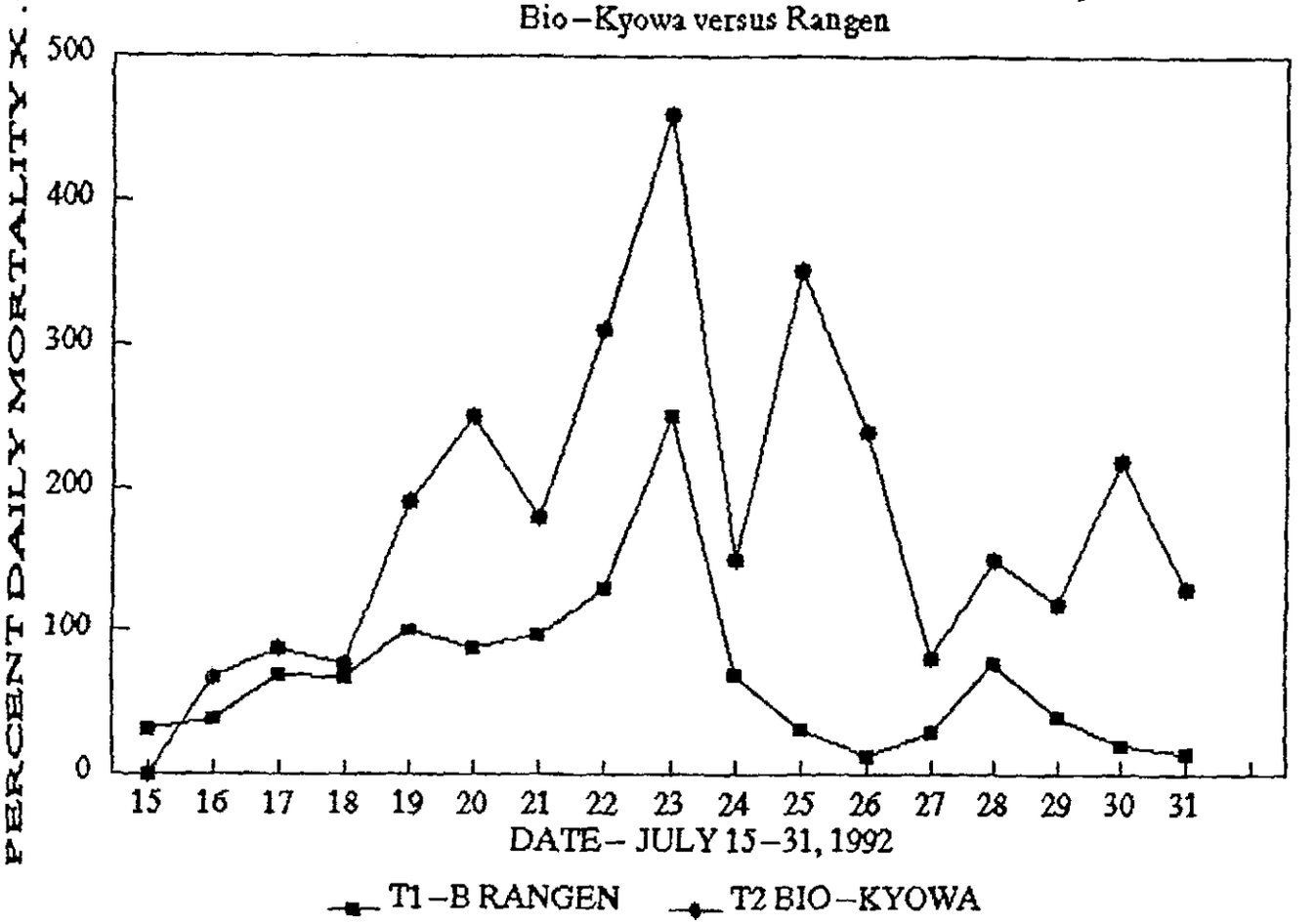


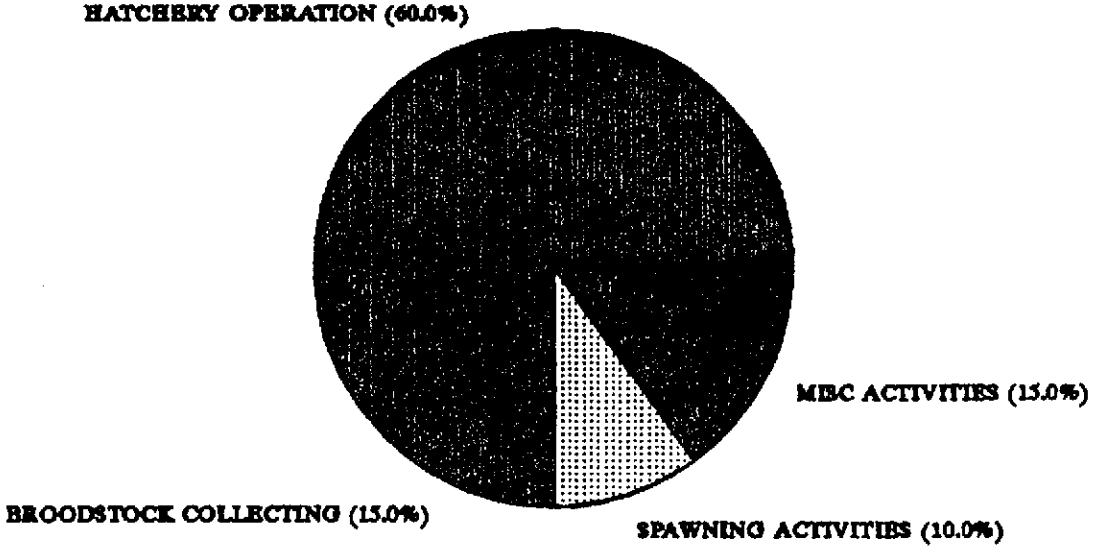
Figure 3. Kootenai Hatchery feed experiment



JUN 1 4 1995

JUN 1 4 1995

Figure 4. Time allocation for Kootenai Hatchery Personnel 1992.



JUN 14 1995

Table 1. Kootenai River broodstock collection data for 1992.

FLOY TAG NUMBER	PIT TAG NUMBER	CM FORK LENGTH	WEIGHT IN KG	DATE CAUGHT	DATE RELEASED	USED IN SPAWN	SEX	RIVER KM CAUGHT
1691	7F7F3B6160	190		05/13/92	06/29/92	YES 2ND	M	231.1
1697	7F7F442851	180	57.0	05/19/92	06/13/92	YES 1ST	F	230.9
1683	7F7F425063	160	28.0	05/19/92	06/21/92	NO	F	230.9
1679	7E7E426F66	238		05/19/92	05/21/92	NO	F	230.9
1699	7F7F427055	162	40.0	05/20/92	10/11/92	YES 2ND	F	230.9
1696	7F7F441C65	147	24.5	05/21/92	06/29/92	NO	M	230.1
1687	7F7F42776E	171	37.0	05/21/92	06/29/92	NO	M	230.1
1686	7F7F442946	133		05/21/92	06/09/92	NO	M	231.1
1240	7F7F137816	205	62.0	05/21/92	06/29/92	YES 2ND	M	231.1
1682	7F7F426374	138		06/11/92	06/29/92	NO	M	244.5
1680	7F7F423420	151		06/11/92	06/09/92	NO	M	230.9
1541	7F7F403768	142		06/11/92	06/29/92	YES 2ND	M	244.5

NOTE: MISSING WEIGHTS WERE NOT RECORDED BECAUSE SCALES WERE BROKEN OR LEFT BEHIND

Table 2.0 1992 Egg development separated by male floy tag number and water supply.

TIME LAPSE	TAG NO	EGGS VIEWED	EAR CLVG	ADV CLVG	LATE CLVG	EAR GSTR	% FERT
12 HRS	1240	95	2	71			77
	1541	99	3	89			89
	1691	100	5	90			90
			GSTR	YOLK PLUG	EAR NEUR	NEUR TUB	
24 HRS	1240	74	70				95
	1541	69	66				97
	1691	89	84				94
			EAR YOLK	YOLK PLUG	EAR NEUR	NEUR TUB	
48 HRS	1240	78		17	53		90
	1541	55		8	46		98
	1691	103		15	86		98
			EAR NEUR	NEUR TUB	LATE NEUR		
72 HRS	1240						
	1541						
	1691	101			86		85
			EAR NEUR	NEUR TUB	LATE NEUR		
96 HRS	1240						
	1541						
	1691	29			25		86
120 HRS	1240	HATCHED					
	1541	HATCHED					
	1691	HATCHED					

KOOTENAI RIVER WATER

JUN 1 4 1995

Table 2.1 1992 Egg development separated by male floy tag number and water supply.

TIME LAPSE	TAG NO	EGGS VIEWED	EAR CLVG	ADV CLVG	LATE CLVG	EAR GSTR	% FERT
12 HRS	1240	65	41				63
	1541	123	108	3			90
	1691	153	144				94
			GSTR	YOLK PLUG	EAR NEUR	NEUR TUB	
24 HRS	1240	73	35				48
	1541	88	86				98
	1691	98	98				100
			EAR YOLK	YOLK PLUG	EAR NEUR	NEUR TUB	
48 HRS	1240	70		37	24		87
	1541	53		18	33		96
	1691	98		45	51		98
			EAR NEUR	NEUR TUB	LATE NEUR		
72 HRS	1240	50			30		60
	1541						
	1691						
			EAR NEUR	NEUR TUB	LATE NEUR		
96 HRS	1240						
	1541						
	1691	79			5		6
120 HRS	1240	HATCHED					
	1541	HATCHED					
	1691	HATCHED					

HEATED CITY WATER

JUN 14 1995

Table 2.2 1992 Egg development separated by male floy tag number and water supply.

TIME LAPSE	TAG NO	EGGS VIEWED	EAR CLVG	ADV CLVG	LATE CLVG	EAR GSTR	% FERT
12 HRS	1240	39	8				20.5
	1541	100	80				80
	1691	107	76				71
			ADV CLVG	LATE CLVG	EAR NEUR	NEUR TUB	
24 HRS	1240	73	47	1			66
	1541	63		60			95
	1691	130		129			99
			EAR YOLK	YOLK PLUG	EAR NEUR	NEUR TUB	
48 HRS	1240	70	19	19			54
	1541	81	7	67			91
	1691	126	14	54			86
			EAR NEUR	NEUR TUB	LATE NEUR		
72 HRS	1240						
	1541						
	1691	103			92		89
			EAR NEUR	NEUR TUB	LATE NEUR		
96 HRS	1240						
	1541						
	1691	105			88		84
			EAR NEUR	NEUR TUB	LATE NEUR		
120 HRS	1240						
	1541						
	1691	115			88		77
211 HRS	1240	HATCHED					
	1541	HATCHED					
	1691	HATCHED					

REGULAR CITY WATER

JUN 14 1995

Table 3. Egg survival through hatching separated by male and incubation water used for female #1699.

Tag No.	Egg Size #/ml	Number of ml	Number of eggs	Eggs hatched	Percent hatched
Normal City Water					
1240	30.6	230	7038	635	9.02
1691	30.6	1230	37638	17618	46.81
1541	30.6	500	15300	3774	24.67
Heated City Water					
1240	30.6	250	7650	6	0.08
1691	30.6	870	26622	455	1.71
1541	30.6	270	8262	26	0.31
Kootenai River Water					
1240	30.6	310	9486	174	1.83
1691	30.6	410	12546	101	0.81
1541	30.6	210	6426	104	1.62
TOTALS		4640	130968	22893	17.48

JUN 1 4 1995

Table 4. Kootenai White Sturgeon facility mortality and growth for 1992.

DATE	NUMBERS	MORTS	PERCENT SURVIVAL	WEIGHT IN KG	GRAMS/ FISH	FISH/ POUND	LENGTH IN CM	AVERAGE TEMP C
07/01/92	22893	0	100.00	0.92307	0.041	11073	1.34	15.98
08/01/92	8911	9902	46.43	7.93078	0.89	510	5.47	17.40
09/01/92	6611	2001	34.44	59.76344	9.04	50	11.79	14.90
10/01/92	5448	1171	28.40	45.00048	8.26	55	11.39	12.30
11/01/92	4817	631	25.10	57.51498	11.94	38	12.90	9.65
12/01/92	3129	1252	16.95	34.88835	11.15	41	12.60	5.39
12/31/92	1785	1344	9.70	22.77660	12.76	36	14.38	5.39

NOTE: WE MOVED 3700 LARVAE (3 JULY) AND 728 FISH (3 NOV.) TO SANDPOINT HATCHERY.

February 28, 1995

KOOTENAI TRIBE OF IDAHO
P.O. BOX 1269
BONNERS FERRY ID 83805

PROOF DUE NOTICE

RE: PERMIT NO. 98-07684

Dear Permit Holder:

One of the conditions of approval of the above referenced water permit was that proof of the extent of your beneficial use must be submitted to this office on or before May 1, 1995. (See last page of your approved permit or your last approved extension request.) Enclosed is a form which when accompanied by the license examination fee or a complete field examination report prepared by a certified water right examiner may be used to submit the required proof.

If you have not fully completed your project, and you or a previous owner of this permit have not received a prior extension of time, you may request an extension of time if the delay is for reasonable cause as provided in Section 42-204, Idaho Code. If you have been prevented from proceeding by a governmental agency or by litigation which might bring title to the water in question, more than one extension of time can be granted. An extension of time request form is enclosed for your convenience.

Either an acceptable proof of beneficial use submittal or an acceptable request for an extension of time must be received by this department on or before the above described proof due date. If neither is received, the department will send you a lapse notice. Within sixty (60) days of the mailing of the lapse notice, the permit will no longer be of any force nor effect.

SINCERELY,

JUN 14 1995

JULIE L. YARBROUGH
Senior Secretary

Enclosures

CERTIFIED MAIL
NO. 141958

RECEIVED

MAY 1 0 1993

Department of Water Resources

JOINT APPLICATION FOR PERMIT
U.S. ARMY CORPS OF ENGINEERS
AND
STATE OF IDAHO, DEPARTMENT OF WATER RESOURCES
STATE OF IDAHO, DEPARTMENT OF LANDS

SEPARATE PERMIT DECISIONS MUST BE RECEIVED FROM BOTH THE STATE OF IDAHO AND THE CORPS OF ENGINEERS PRIOR TO START OF WORK

The Department of the Army permit program is authorized by Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. These laws require permits authorizing structures and work in or affecting navigable waters of the United States and the discharge of dredged or fill material into waters of the United States, including their adjacent wetlands. State permits are required under the State of Idaho, Stream Channel Protection Act (Title 42, Chapter 38, Idaho Code) and the Idaho Lake Protection Act, Section 58-142 et. seq. Idaho Code. This application will meet the requirements of the above agencies.

1. Corps of Engineers # 930101050	2. State of Idaho #
Date Received 4/14/93	Date Received

PLEASE TYPE OR PRINT

3. Applicant: Kootanai Tribe of Idaho
Mailing Address: P.O. Box 1269
Bonners Ferry, ID 83805
Work Phone: Area 208 267-7082 Area ( )
Fax Number: 208-267-2960

4. Authorized Agent: Paul Spruce
Mailing Address: P.O. Box 1269
Bonners Ferry, ID 8380
Work Phone: Area (208 267-7088 Area ( )
Date of Application: April 12, 1993

5. Location where proposed activity exists or will occur.
Waterway: Kootanai River
In or near city or town: Bonners Ferry
County: Boundary State: Idaho Zip Code: 83805
Tributary of: Columbia River
Assessor's Desc. (Tax No. or Subdivision, Lot & Block No.)* (See Instructions)
NE ¼ of SW ¼ of SW¼
1/4 1/4 Section: 20 Township: 62N Range: 1E B.M.
A portion of Tribal Allotment 11
UTM coordinate grid

6. Describe the proposed activity, including description of the type of structures, if any, to be erected on fills, or pile or float-supported platforms. If additional space is needed, use a separate sheet or Section 16 (Remarks).
No structures will be built on fills, and no pilings will be constructed for this project

Describe construction methods and equipment: A preassembled structure (see enclosed drawings) will be lowered into the river from the bank and will rest on the substrate and the shore, bolted and cabled to concrete footings

List all soil series located at project site, and indicate if any are on the county's hydric soils list:
Farnhampton silt loam only ; this soil type is NOT on list

Length of project along the stream or extension into lake or reservoir: Less than 50 feet, 35' out on river bottom

Will material be placed waterward of ordinary high water mark? No If yes, volume: (cubic yards) (both temporary and permanent)

Will material be placed in wetlands? No If yes, area: (acres)

Type and composition of fill material: -- (i.e. sand, etc.) Material Source: --

Will excavation be required? No If yes, volume: (cubic yards) Composition --

Disposal site for excavated material: --- Method of dredging: --

Stream gradient: 1%

Method of controlling turbidity: No increased turbidity caused by operation

7. Size and flow capacity of proposed bridge or culvert and area of drainage served (sq. miles): N/A
(Idaho Department of Water Resources requirement.)

APR 14 1995

8. Preparation of drawings. One set of original or good quality reproducible drawings must be attached to this application. NOTE: DRAWINGS NO LARGER THAN 8-1/2 X 11 INCHES IN SIZE. See the instruction pamphlet for instructions and a checklist for completing the drawings. Include photographs of the project site mounted on 8-1/2 x 11 sheets.

9. Purpose and intended use: Commercial _____ Public _____ Private X Other _____

Describe Experimental white sturgeon culture facility

Necessity and justification for project Bonneville Power Administration funded fisheries program soon to be endangered species

10. Proposed Starting Date ASAP!! April 1993 Estimated Duration 4 years

11. If any portion of the activity is complete, indicate month and year of completion entire hatchery completed 199(Indicate the existing work on the drawings.

12. Names, addresses, and telephone numbers of adjoining property owners, lessees, etc., whose property also adjoins the waterway.

Kootenai Tribe also owns all adjoining property (208) 267-3519

☐ Check here if the alteration is located on endowment lands administered by the Idaho Department of Lands

13. LEGAL OWNER IF OTHER THAN APPLICANT _____

MAILING ADDRESS _____ CITY, STATE, ZIP CODE _____

PHONE AREA WORK( ) _____ AREA HOME( ) _____

14. List other applications, approvals, or certifications from other Federal, interstate, state, or local agencies for any structures, constructions, discharges, deposits, or other activities described in the application.

Issuing Agency	Type of Approval	Identification No.	Date of Application	Date of Approval
None				

15. Has any agency denied approval for the activity described herein or for any activity directly related to the activity described herein? Yes _____ No X (If "Yes" explain)

16. Remarks or additional information: We are simply replacing a submersible pump system (with addition of a back-up pump) to keep a hatchery running.

17. Application is hereby made for a permit or permits to authorize the activities described herein. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief, such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities. I hereby grant to the agencies to which this application is made, the right to come upon the above-described location to inspect the proposed or completed work.

4/15/93 Paul Anders Kootenai Tribe of Idaho
Date Signature of Applicant (REQUIRED)

The application must be signed by the applicant. If an authorized agent is to be designated, Item 4 and the following information should be completed.

I hereby designate _____ to act as my agent in matters related to this permit application. I understand that if a Federal permit is issued, I must sign the permit.

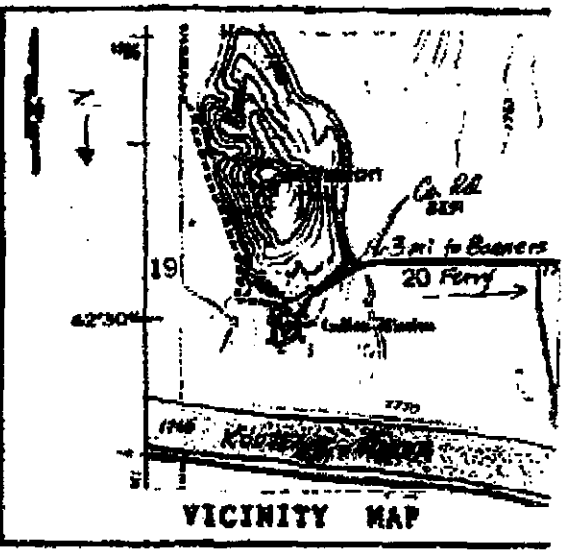
_____ _____ _____
Date Signature of Authorized Agent (if applicable) Signature of Applicant (if applicable)

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years or both. Do not send a Federal permit processing fee with this application. The appropriate fee will be assessed when a permit is issued.

1995

DO NOT SEND FEDERAL PROCESSING FEE WITH APPLICATION

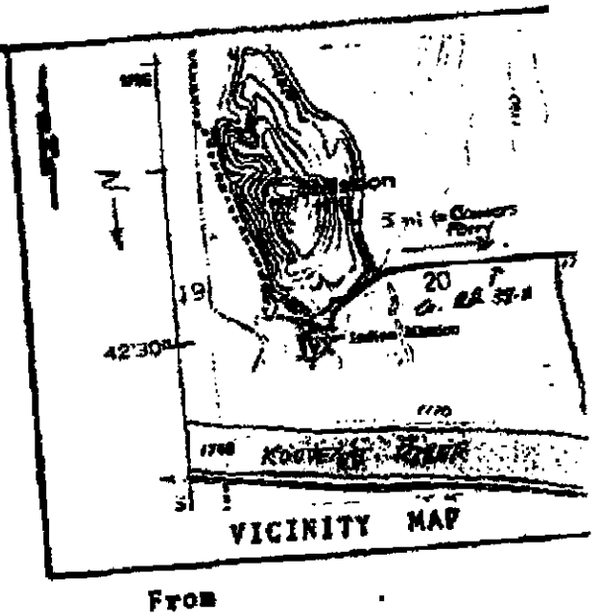
IDWR Form 3804-B
Feb 92 (REV)



From

IN
IN/NEAR Bonners Ferry, Idaho
Boundary COUNTY,
DATE: 4/15/93 SHEET 1 OF 3
APPLICATION BY: Paul Anderson
Kootenai Tribe of Idaho

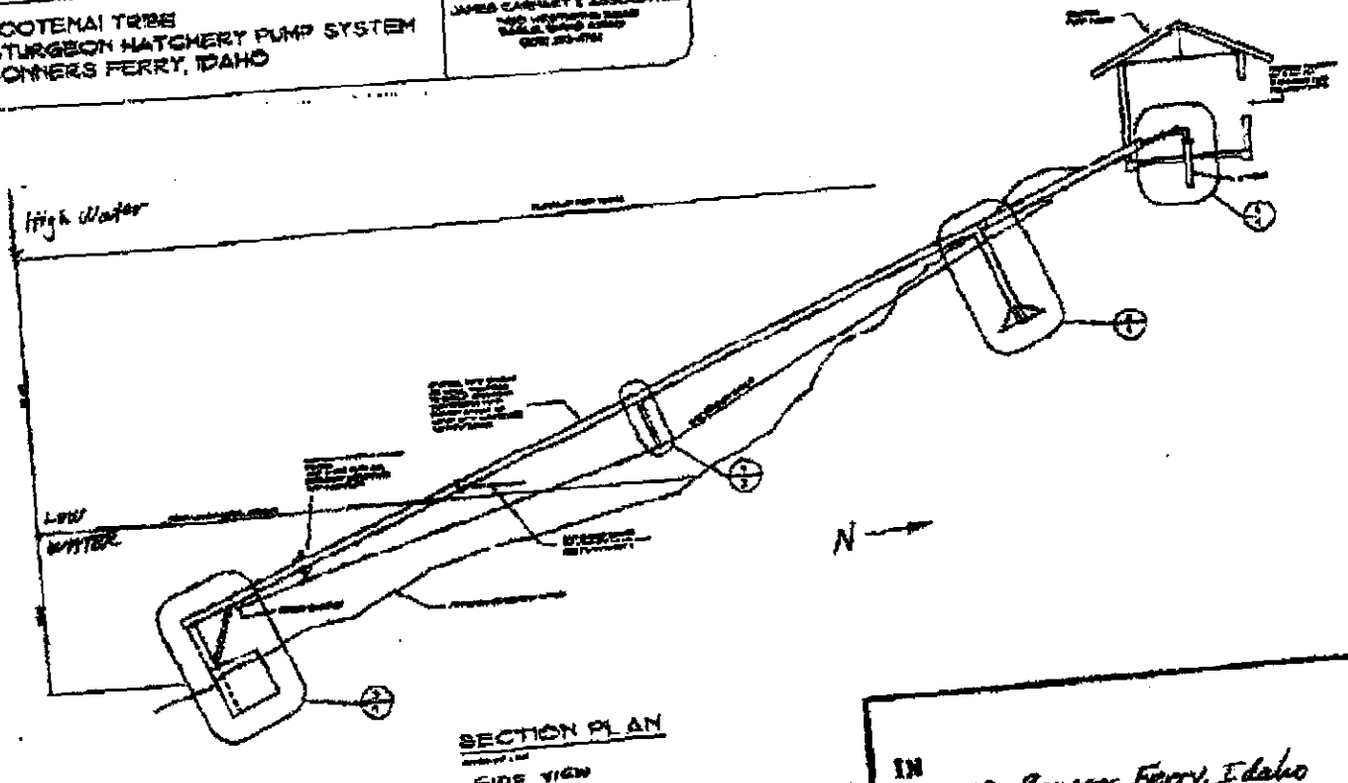
JUN 14 1995



From

KOOTENAI TRIBE
STURGEON HATCHERY PUMP SYSTEM
BONNERS FERRY, IDAHO

PLANS BY:
JAMES CARNEY & ASSOCIATES

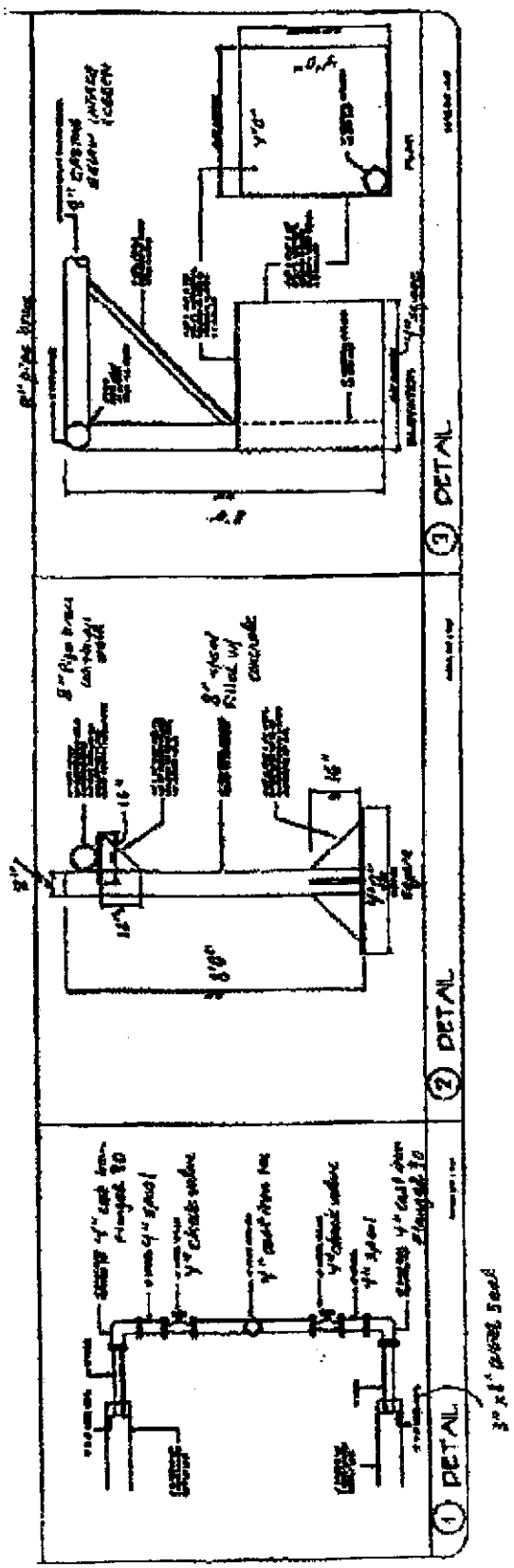


SECTION PLAN
SIDE VIEW

IN
IN/NEAR Bonners Ferry, Idaho
Boundary COUNTY.
DATE: 4/15/93 SHEET 2 OF 3
APPLICATION BY: Paul Andrea
Kootenai Tribe of Idaho

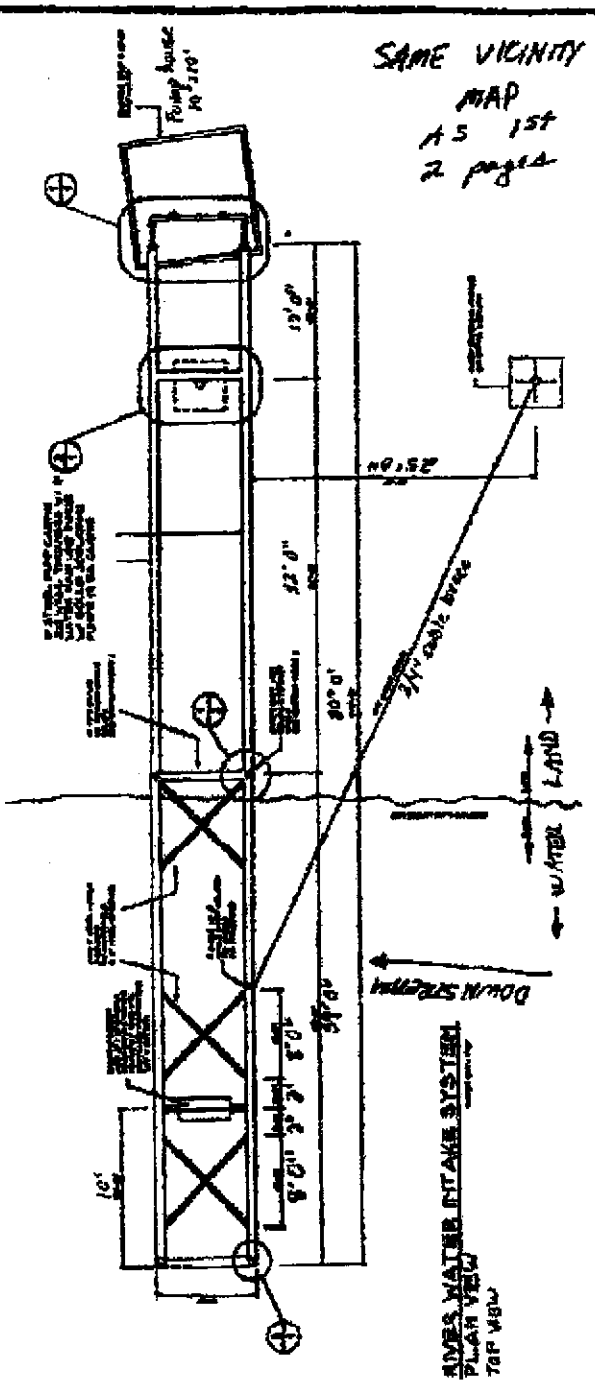
JUN 14 1995

SAME VICINITY MAP AS 1st 2 pages



KOOTENAI TRIBE
STURGEON HATCHERY
BONNERS FERRY, IDAHO

PLAN
WATER INTAKE SYSTEM



IN:
IN/NEAR Bonners Ferry/Naples
Boundary COUNTY.
DATE: 4/15/93 SHEET 3 OF 3
APPLICATION BY: Paul Arellano
Kootenai Tribe of Idaho

State of Idaho
DEPARTMENT OF WATER RESOURCES
1301 North Orchard Street, Statehouse Mail, Boise, Idaho 83720-9000
Phone: (208) 327-7900 FAX: (208) 327-7866

CECIL D. ANDRUS
GOVERNOR

R. KEITH HIGGINSON
DIRECTOR

April 25, 1991

KOOTENAI TRIBE OF IDAHO
P.O. BOX 1269
BONNERS FERRY, ID 83805

PERMIT APPROVAL NOTICE

RE: PERMIT NO. 98-07684

Dear Permit Holder:

Enclosed is a copy of your approved application for permit. We direct your attention to the conditions of approval on the final page.

As a permit owner you must commence the excavation or construction of the diverting works within one year of the date the permit was issued, and you must proceed diligently until the project is completed. The date shown under condition no. 1 is the date when the project must be completed. You will receive a "Proof Due Notice" from this Department approximately 60 days prior to the completion date requiring you to file either a Proof of Beneficial Use form stating that the project has been completed or file a Request for an Extension of Time in which to file the proof statement.

Please be advised that water quality is subject to regulations of the Idaho Department of Health and Welfare. We suggest that you check with them before starting construction.

Sincerely,

JIM JOHNSON
Water Rights Supervisor

JJ:blm

Enclosures

AUG 0 9 1991

APPLICATION FOR PERMIT REVIEW

Application #: 98-7684 Reviewer: Pam Skaggs PS
Date: 4-16-91

✓Existing:
✓No - 26A-P17
Complete in 1 year - P16
Yes
Proof not submitted - P16
Proof submitted - N/A
Groundwater:
GT. 0.7 cfs - 01G-P03, 01C-P03(existing well)
LT. 0.7 cfs - N/A
Drilling Permit:
Approved w/permit - P99
Not included - 046-P23(All GW, even existing wells)
✓Location:
✓Water Districts - WD No. ——
Surface water - 005, 005-01H-P01(LT.7 w/pump)
005-01J-P08(GT.7)
Groundwater - P05
Irrigation Districts - 023
Canal Co. Areas - 023
Drainage Districts - 024
Boise Front (63) - 058 (Groundwater)
✓Swan Falls Flag - ——(1, Blank or Other)
Trust - 051-052-053-P74(Cons.), 041(DCMI, w/Irr
Non Trust - 048-049 or Irr & Dom)
River Basins:
(Surface Water) Water District Control Condition &....
Boise (63) - 05A & 11E
Payette (65) - 047-P04, 059-P71
Snake (01, 02 & 03) - 11A-P04(01), 061-P07(02/03 No W.D.Cond.)
✓Use:
✓ Fish Propagation - 06A (settling ponds), 09E-P10 (Water Quality) & 010 (WQ/Choose One), 042(req.), 002-P06(MD), 07A(Spec.), 044(Policy 5G)
Power - ——Use Power Review
Mining - 06A or 010, 09E-P10 & 054(req.)
Storage - 18A-for multiple measuring devices(In WD), 18B-P09(Size)
Rec. & Aesthetic - 027(Non-Consumptive)
Domestic - 021(restricted areas)
✓ Ownership:
✓Non land owner - 004
Protested:
Agreement - 020
Minimum Stream Flow:
Overlapping uses - 029-P20

✓Beneficial Use Due Date: - 05-01-1995
Other Conditions Recommended ——

✓ 4-17-91

AUG 09 1991

Form No. 202a.
4/87-8/89N

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
APPROPRIATION APPLICATION ANALYSIS SHEET

INITIAL REVIEW BY: TDK DATE: 2/25/91 APPLICATION NUMBER: 98-7684

APPLICANT: KOOTENAI

REQUIRED INFORMATION

(1). (✓) Name & Address: (If applicant is a corporation or partnership, names must be provided for the director,officers, and other partners.)
(2). (✓) Source: (See USGS Quad for names of water sources)
(3). (✓) Point of Diversion including county: (10 acre tract, Subd. lot & block)
(4). (✓) Quantity: (flow and/or volume)
(✓) Nature of proposed use: (Include description of use)
(✓) Period of use:
(5). (✓) Total Quantity: (flow and/or volume)
(6). (✓) Description of diverting works:
(7). (✓) Time required for beneficial use of water:
(8). (✓) Proposed uses:
(9). (✓) Place of use or acres irrigated:
(10). (✓) Other Water Rights:
(11). (✓) Ownership:
(13). (✓) Map:
(✓) Signature: (signator title required for corp., partnership, etc
(✓) Fee: (Amount, receipt number and date recorded on application)
(✓) Acknowledgement Letter:
(✓) Overlap Review: Attachment? (Y)___ (N)✓ Remarks? (Y)___(N)✓

ADDITIONAL INFORMATION

YES	NO	
___	✓	Field check required: Field check by: _____
___	✓	Field report attached:
___	✓	Critical groundwater area:
___	✓	Groundwater management area:
___	✓	Send dam safety information:
✓	___	Send letter for additional fish information:
___	✓	Send letter for additional power information:
___	✓	Within trust water boundary: (Attach Trust Water Supp. Analysis Sheet):
___	✓	Diversion greater than 5 cfs or 500 af, supp. analysis sheet attached:
___	✓	Well drilling permit required:

PROCESSING

YES	NO	
✓	___	In form for advertising:
___	✓	Statewide advertising: (10.00 cfs or more, 1,000 AFA or more).

Send Copies To

YES	NO		YES	NO		YES	NO	
✓	___	I.D. H & W	___	✓	U.S. BLM	___	___	Other _____
✓	___	I.D. F & G	___	✓	U.S.F.S.			
___	✓	I.D. Lands	___	✓	W District #___			
___	✓	Adj. Bur.	___	✓	G.W. Prot. Div.			

RECEIVED
APR 9 1991
Department of Water Resources

Application Number 98-7684

FINAL REGIONAL PROCESSING REVIEW

YES NO

___ ___ Additional information received:
___ ___ Notice of pending void order issued: Final date of order response. _____
___ ___ Comments added
___ ___ Maps Copied

___ ___ Affidavit of publication received:

___ ___ Application published correctly: If not, record action taken.

_____

_____

_____

___ ___ Publication dates and paper recorded on application:

___ ___ Protests received, Final date for protest _____

___ ___ Recommendations attached:

___ ___ Measuring device required:

___ ___ Measuring port required:

___ ___ Water delivered by water master? District #_____

___ ___ Special conditions of approval or cover letter: (see additional info. below)

Recomended Date of Priority 2-22-91

Recomended by: _____ Date _____

STATE OFFICE REVIEW _____

_____

_____

___See remarks for additional information. By _____ Date _____

REMARKS

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

98-07684

KOOTENAI TRIBE OF IDAHO
P.O. BOX 1269
BONNERS FERRY, ID 83805

Source: KOOTENAI RIVER Tributary: COLUMBIA RIVER

Diversion Pt: NESWSW Sec 20 T 62N R 01E

Use: FISH PROPAGATION (.560 CFS)
Total Diversion: (.560 CFS)

Date Filed: 2/22/ 1991

In: T62N R01E S20 SWSW

AUG 09 1991

KOOTENAI TRIBE OF IDAHO
P.O. BOX 1269
BONNERS FERRY, IDAHO
83805
208/267-3519 or
208/267-5223

March 28, 1991

RECEIVED
MAR 29 1991
NORTHERN REGION
IDWR

Mr. Bob Haynes
State of Idaho
Department of Water Resources
Northern Region
1910 Northwest Blvd. Suite 210
Coeur d'Alene, Idaho 83814

Re: Water Appropriation Application No. 98-7684

Dear Mr. Haynes:

The Kootenai Tribe of Idaho has made an Application for Permit to Appropriate the Public Waters of the State of Idaho. In the letter dated February 28, 1991 from Tom D. King regarding the Tribe's application it was stated that due to the nature of the application additional information is required to be made a part of the application file.

Enclosed with this correspondence are the following documents as was requested by the Department of Water Resources:

1) A permit from the Bureau of Indian Affairs to the Tribe granting permission to operate and construct an Experimental Sturgeon Hatchery on Kootenai Tribal Allotment 11; 2) A letter of support from the Boundary County Commissioners; 3) A letter of support from the Idaho Department of Fish and Game; 4) Two letters of approval from the Idaho Department of Health and Welfare - Division of Environmental Quality; 5) A letter of permission from the Water District 11 Commission.

Also for your records is a copy of the Affidavit of Publication from the Bonners Ferry Herald to document the required legal notice publication and notification of the protest period.

The Tribe sincerely appreciates the special service and attention you have given to expedite the processing of this important Water Appropriation Permit. If you require any further information, please do not hesitate to contact either Shannon Work, Tribal Attorney at (208) 667-1184 or David ThunderEagle, Executive Director at (208) 267-3519.

Sincerely,

KOOTENAI TRIBE OF IDAHO

David ThunderEagle

David ThunderEagle
Executive Director

c: Shannon Work, Tribal Attorney
Raymond Abraham, Economic Development Director
Gary Aitken, Tribal Fisheries Manager

AUG 09 1991

United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Northern Idaho Agency
P.O. DRAWER 277
LAPWAI, ID 83540

TAKE PRIDE IN AMERICA

RECEIVED
MAR 2 9 1991
NORTHERN REGION
I D W R

REVOCABLE PERMIT

Permission is hereby granted to permittee and co-owner, the Kootenai Tribe of Idaho, P.O. Box 1269, Bonners Ferry, ID 83805 to enter upon, operate and construct a Experimental Sturgeon Hatchery facility on Kootenai Allotment 11 described as follows:

> Lot 7, Tract D, and the portion of Tract E lying within Sec. 19; Lot 3, and the portion of Tract E lying within Sec. 20, T. 62 N., R. 1 E., B.M., Boundary County, excepting 2.50 and 10.00 acres, containing 82.51 acres, more or less, after the above exceptions.

This permit becomes effective on the date of approval by the Superintendent under 25 CFR 1.2, 25 CFR 162, and Kootenai Tribal Resolution 91-17.

1. Permittee agrees that the entire project will be at no expense to the landowners.

2. Permittee will be required to stay within the designated area as shown on the attached plat (being a portion lying within Sec. 20).

3. The property shall be properly maintained in that the permittee shall promptly repair any and all damage caused by their use of the property. The permittee shall commit no waste on the premises and shall not permit any violation of law thereon.

4. Permittee takes full responsibility for any and all violations of NEPA laws. This permit is issued based on pending environmental and Archaeological Clearances.

It is further understood and agreed that this instrument is not a perpetual easement and it is not to be taken or construed as granting an easement interest or leasehold right in or to the land described herein but is a mere temporary permit, terminable and revocable in the discretion of the Superintendent or other Officer in Charge upon approval of a Bureau lease.

AUG 0 9 1991

ACTING Superintendent Sharon F. Gipp

Date Approved: FEB 7 1991

KOOTENAI TRIBE OF IDAHO

P.O. BOX 1269
BONNERS FERRY, IDAHO
83805
208/267-3519 or
208/267-3223

KOOTENAI TRIBE OF IDAHO

TRIBAL RESOLUTION

NUMBER 91-17

WHEREAS, The Kootenai Tribal Council has been empowered to act for and on behalf of the Kootenai Tribe of Idaho pursuant to the Constitution and the By-laws ratified by the adult members of the Kootenai Tribe of Idaho on April 10, 1947 and approved/signed by the Acting Commissioner of Indian Affairs on June 16, 1947; and

WHEREAS, The Tribal Council is responsible for maintaining, promoting and protecting the general welfare of its members, and for protecting the treaty and aboriginal rights of the people of the Kootenai Tribe of Idaho;and

WHEREAS, The continued existence of numerous fish species in the Kootenai River is protected by the Tribe's rights as reserved in the Treaty of Hell Gate, and is also in the interest of the general welfare of tribal members; and

WHEREAS, The Tribe has entered into a contract with the U. S. Department of Energy - Bonneville Power Administration (BPA) to conduct Project 88-64, Kootenai River White Sturgeon Studies; and

WHEREAS, The Tribal Council in its pervious Resolution #91-16 approved the entire Experimental Sturgeon Hatchery Project.

NOW, THEREFORE LET IT BE RESOLVED, That the Kootenai Tribal Council authorizes the Tribe to obtain any documents necessary to enable the operation of the Hatchery at the planned location, including a short-term permit for the Hatchery Visit and a Lease as soon as possible for the Hatchery site for the entire duration of the project.

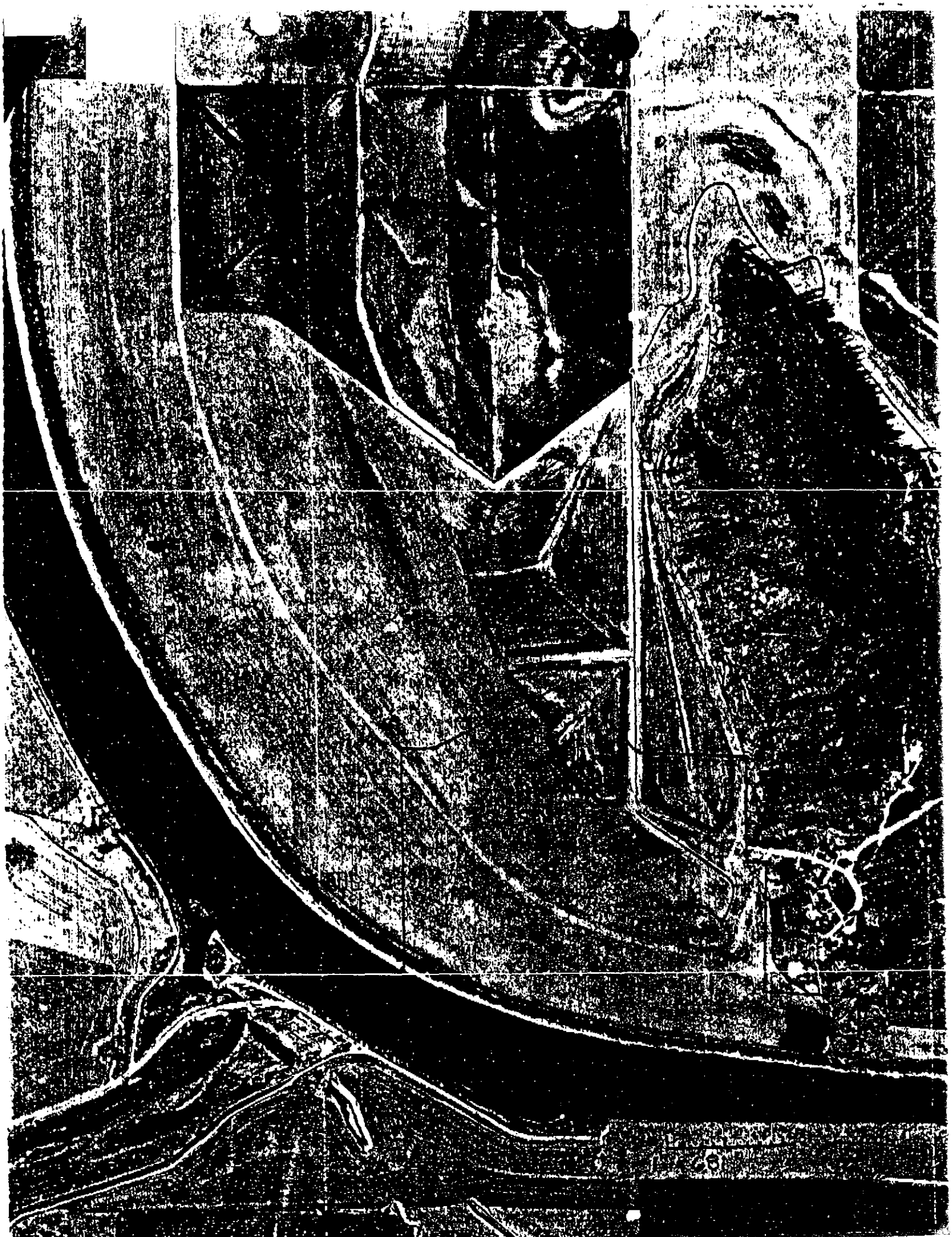
C E R T I F I C A T I O N

The foregoing RESOLUTION was duly adopted at a Kootenai Tribal Council meeting held at the Kootenai Tribal Complex, near Bonners Ferry, Idaho on this 28th day of January 1991.

ATTEST:

Dianne David
Dianne David, Secretary
Kootenai Tribal Council

Velma Bahe
Velma Bahe, Chair
Kootenai Tribal Council



County of Boundary
P.O. Box 419
Bonners Ferry, Idaho--83805

March 22, 1991

Velma Bahe, Chairperson
Kootenai Tribe of Idaho
P.O. Box 1269
Bonners Ferry, Idaho 83805

Dear Velma:

The Boundary County Commissioners were pleased to have a presentation of the Experimental Sturgeon Hatchery Facility by Chief Raymond Abraham, David Thunder Eagle and Gary Aitken. The Commissioners do agree that the enhancement of the sturgeon population of the Kootenai River system will bring long-lasting benefits to the citizens of Boundary County.

The Commission, by unanimous vote, voted to support your efforts in this project. We also would hope that in the future the facility could be expanded to a full-scale hatchery.

Sincerely,

Ronald Smith Jr

Ronald Smith, Chairman
Boundary County Commissioners

RS/th

AUG 0 9 1991

March 20, 1991

Mr. Raymond Abraham
Kootenai Tribe of Idaho
Kootenai Mission Road 38-A
P.O. Box 1269
Bonners Ferry, Idaho 83805

Dear Mr. Abraham:

The Fisheries Bureau of the Idaho Department of Fish and Game does not foresee any water quality problems in the Kootenai River from construction or operation of the Kootenai Hatchery, assuming the following concerns are addressed:

(1) The water intake and hatchery discharge are constructed in a manner to minimize soil loss to the river and adequately protected to prevent future erosion.

(2) That fish feeding levels remain below a maximum of 30 pounds of fish food per day.

Health and Welfare's Division of Environmental Quality is the approving agency for water quality concerns in the Kootenai River. It is important that you contact them for approval.

We appreciate the concern and dedication you have shown towards rebuilding the Kootenai River sturgeon population.

Sincerely,

COPY ORIGINAL SIGNED BY STEVEN M. HUFFAKER

Steven M. Huffaker, Chief
Bureau of Fisheries

SMH:MRL:cc

cc: Al Murray

AUG 09 1991

Post-it™ brand fax transmittal memo 7671 | # of pages ▸ 1

To Gary Aitken	From Fish & Game
Co.	Co.
Dept.	Phone #
Fax #	Fax # 1-367-2960

State of Idaho
DEPARTMENT OF HEALTH AND WELFARE
Division of Environmental Quality

2110 Ironwood Parkway
Coeur d'Alene, ID 83814
(208) 667-3524

CECIL D. ANDRUS
Governor
RICHARD P. DONOVAN
Director

February 27, 1991

recd 3/1/91

Jay Kidder, P.E.
Chinook Engineering
Box 1244
Mukilteo, WA 98275

RE: Kootenai Tribe's Experimental White Sturgeon Facility

Dear Mr. Kidder:

Plans and specifications for construction of the fish wastewater system associated with the above-referenced facility in Boundary County were submitted for our review on December 7, 1990 by you. As the result of your January 24, 1991 reply to our January 9, 1991 review comments, the submitted plans and specifications were found to be in accordance with Idaho Department of Health and Welfare regulations and are approved for construction purposes.

Since this is an experimental facility to pilot a white sturgeon hatchery, we anticipate either closing down of the facility or expansion to a full-scale hatchery in the future.

Section 39-118 of Idaho Code requires that the project engineer must submit as-built plans or certification within 30 days of project completion for review and approval by this department. An engineer must be retained for inspection activities during construction.

If construction is not started within one year of the date of this letter, this approval expires.

Sincerely,

Gary J. Gaffney, P.E.
Water Quality Engineer

GJG:mb

c: Raymond Abraham, Kootenai Tribe of Idaho, Bonners Ferry

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YC. Gary Haylik

State of Idaho
DEPARTMENT OF HEALTH AND WELFARE
Division of Environmental Quality

2110 Ironwood Parkway
Coeur d'Alene, ID 83814
(208) 667-3524

CECIL D. ANDRUS
Governor
RICHARD P. DONOVAN
Director

RECEIVED JAN 2 8 1991

January 25, 1991

Jay Kidder, P.E.
Chinook Engineering
Box 1244
Mukilteo, Washington 98275

RE: Kootenai Tribe - Experimental White Sturgeon Facility

Dear Mr. Kidder:

National Pollutant Discharge Elimination System (NPDES) permits are required for fish production facilities exceeding 20,000 pounds of annual production and 5,000 pounds of feed fed per calendar month. Since the Experimental White Sturgeon Facility does not exceed these limits, a permit is not required. Additionally, the state does not require a permit. However, we would like to encourage voluntary compliance with the following design recommendations and monitoring plan.

We are aware that the proposed facility is indeed an experimental facility with the possibility of increased production in the future. If an NPDES permit is required at a later date, the following designs would be required. Fortunately, I believe these designs have already been included in the proposed facility.

1) A sedimentation pond must be incorporated with a minimum retention time of 30 minutes.

2) The ability to divert flow around the sedimentation pond to allow for cleaning of the pond.

Kootenai River is designated as a Special Resource Water under IDAPA Section 16.01.2110,01.d of Idaho's Water Quality Standards and Wastewater Treatment Requirements. According to IDAPA 16.01.2300,01, no new point source can discharge to any water designated as special resource water if pollutants significant to the designated uses contained in that discharge can or will result in a reduction of the ambient water quality of the receiving special resource water as measured immediately below the applicable mixing zone. We recommend that a monitoring plan be adopted to determine if water quality standards are being met. This monitoring plan is designed to sample quarterly the facility effluent and the Kootenai River both upstream and downstream of the hatchery discharge. A list of the constituents to be monitored include:

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Constituent
Total Suspended Solids
Total Ammonia as N
Total NO_2 + NO_3 as N
Total Kjeldahl Nitrogen as N
Total Phosphorus as P
Ortho Phosphate as P

Nutrients should be analyzed from an 8 hour composite sample. Hourly collections should be placed in a churn splitter then samples drawn from this reservoir. A single grab sample can be taken to analyze for total suspended solids.

If you have any questions concerning the monitoring plan, please give me a call.

Sincerely,

Division of Environmental Quality

Brian Hoelscher

Brian Hoelscher
Water Quality Compliance Officer

c: Kootenai Tribe of Idaho, Bonners Ferry
John Siple, IDFG, Bonners Ferry
Ed Tulloch, IDHW-DEQ, CDA
Gary Gaffney, IDHW-DEQ, CDA

1991

March 11, 1991

Chief Raymond Abraham
Kootenai Tribe of Idaho
P.O Box 1269
Bonners Ferry, Idaho 83805

Dear Chief Abraham:

During a recent meeting between the District and representatives of the Kootenai Tribe of Idaho, we were provided relevant information pertaining to the Tribe's Experimental Kootenai River White Sturgeon Hatchery Facility. We were asked by the Kootenai Tribe to approve the following:

1) To allow the Tribe to install a pipeline through the dike in order to pump water from the River into the Experimental Hatchery Facility and also to discharge water back through the dike into the River.

2) To allow the Tribe to utilize the drainage ditch as a secondary water discharge site.

Pursuant to that request, the District approves the above items, and we have no additional concerns or objections to the project as proposed.

Sincerely,

District 11 Commission

Verle Hubbard
Commissioner

AUG 09 1991

AFFIDAVIT OF PUBLICATION

State of Idaho

ss.

County of Boundary,

Carol Arthur being first duly sworn on oath deposes and says that he/she is Manager of the Bonners Ferry Herald, a newspaper printed and published at Bonners Ferry, Boundary County, Idaho; that the said newspaper has been continuously and uninterruptedly published in said Boundary County during a period of 12 months prior to the first publication of the hereto attached notice of publication in the case of:

#1826 98-07684
Kootenai Tribe

as it was published in the regular and entire issue of the said paper for a period of 2 consecutive weeks, commencing on 6 day of March, 1991 and ending on the 13 day of March, 1991 and that said notice was published in said newspaper.

Dated: March 22, 1990
Carol A. Arthur

Subscribed and sworn to before me this 22 day of March, 1991.

Anna Thomas
Notary Public for Idaho

Residing at Bonners Ferry

My Commission expires: 12-1-1994

AUG 09 1991

NOTICE OF APPLICATION FOR WATER RIGHT

The Following applica[illegible]) have been filed to appropriate[illegible] public waters of the State of Idaho:

98-07684
KOOTENAI TRIBE OF IDAHO
P.O. BOX 1269
BONNERS FERRY, ID 83805
Source: KOOTENAI RIVER
Tributary: COLUMBIA RIVER
Diversion Pt: NESWSW Sec 20 T 62N R 01E
Use: FISH PROPAGATION (.560 CFS)
TOTAL DIVERSION: (.560 CFS)
Date Filed: 2/22/1991
In: T62N R01E S20 SWSW

For additional information concerning the property location, call the Northern Regional Office at 765-4639.

The permit(s) will be subject to all prior water rights. Protests must be filed with the Director, Dept. of Water Resources, Northern Region, 1910 Northwest Blvd., Suite 210, Coeur d'Alene, Idaho 83814 on or before MARCH 25, 1991.

R. KEITH HIGGINSON,
Director

BFH #1826 March 6, 13, 1991

State of Idaho
DEPARTMENT OF WATER RESOURCES
NORTHERN REGION, Suite 210 • 1910 Northwest Blvd. • Coeur d'Alene, Idaho 83814 • (208) 765-4639

CECIL D. ANDRUS
Governor

R. KEITH HIGGINSON
Director

February 28, 1991

Ms. Debra M. Van Dyk, P.E.
Clearwater Engineering
P.O. Box 251
Sandpoint, Id. 83864

Mr. Jay S. Kidder, P.E.
Chinook Engineering
Box 1244
Mukilteo, Wa. 98275

Re: Water Appropriation Application No. 98-7684

Dear Ms. Van Dyk and Mr. Kidder:

The Idaho Department of Water Resources acknowledges receipt of the Kootenai Tribe of Idaho's Application for Permit to Appropriate the Public Waters of the State of Idaho, and we have assigned it the above-referenced number. To assist us in providing you with prompt, accurate service, please refer to this number in all future matters concerning this water right application. We have also received the Tribe's filing fee in the amount of $45.00 for which Receipt No. N004349 is enclosed.

The Tribe's appropriation application is currently being processed for advertisement in the county newspaper. The Advertisement will be published for two consecutive weeks followed by a waiting period of ten days to allow for the submittal of protests.

If the application is protested, you and the Kootenai Tribe of Idaho will be sent a copy of the protest and instructions to aid you in resolving the protest without a hearing. However, all protests must be resolved before the application can be approved or denied, so if the protestant does not voluntarily withdraw the protest, this Department will conduct a conference and/or hearing on the matter.

Due to the nature of your application, additional information is required to be made part of the application file pursuant to Idaho Code Section 42-203A and the Rules and Regulations for Water Appropriation:

1) Copies of deeds, leases, easements, or other information documenting that you have a possessory interest in the place of use. (Rule 4,5,3,3,1.)

2) You must seek comment on the effects of the construction and operation of the proposed project from the city and/or county within which the project is to be located, the Idaho Department of Fish and Game, the Idaho Department of Health and Welfare (Divn. of Environment), and any irrigation district or canal company within which the project is to be located. (Rule 4,5,3,5,1.) A copy of your application is enclosed for your use in seeking comments.

MAR 0 8 1991

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This information must be submitted to this office with any other information your deem appropriate within 30 days of the above date. Failure to communicate with this office within that time may result in the voiding of your application. The time limit may be extended upon request and showing of good cause that additional time is required for submittal of the information.

If you have any questions or if I can be of any assistance, please feel free to contact me at this office.

Sincerely,

TOM D. KING
Senior Water Resource Agent

TDK/pms

Enc. - Receipt
Application
c Mr. Raymond Abraham, Chief, Kootenai Tribe of Idaho

February 28, 1991

Idaho Divn. of Environment
2110 Ironwood Parkway, #101
Coeur d'Alene, Id. 83814

Re: 98-7684

Gentlemen:

Enclosed is a recent filing with this Department that may be of interest to your Agency.

Sincerely,

ROBERT G. HAYNES, P.E.
Regional Manager

RGH/pms

Enclosure

RECEIVED
AUG 09 1991

February 28, 1991

Idaho Dept. of Fish & Game
2320 Government Way
Coeur d'Alene, Id. 83814

Re: 98-7684

Gentlemen:

Enclosed is a recent filing with this Department that may be of interest to your Agency.

Sincerely,

ROBERT G. HAYNES, P.E.
Regional Manager

RGH/pms

Enclosure

AUG 08 1991

CLEARWATER ENGINEERING
P.O.Box 251
Sandpoint, ID 83864-0251
(206) 263-9398

RECEIVED
FEB 22 1991
NORTHERN REGION
IDWR

February 20, 1991

Tom King
Senior Water Resource Agent
Idaho Department of Water Resources
Northern Region
1910 Northwest Blvd., Suite 210
Coeur d'Alene, ID 83814

Subject: Kootenai Tribe of Idaho
Experimental White Sturgeon Facility
Application For Permit

Dear Mr. King:

Attached, please find the completed subject permit and fee required by your office. Chinook Engineering is the Tribe's consultant on this project. However, if you have any questions regarding this permit, please contact me at (208) 263-9398 or Jay Kidder of Chinook Engineering at (206) 347-8873.

Sincerely,

Debra M. Van Dyk, P.E.
Principal

Jay S. Kidder, P.E.
CHINOOK ENGINEERING
P.O.Box 1244
Mukilteo, WA 98275

Encl.

CHINOOK ENGINEERING
P.O. Box 1244
Mukilteo, Washington 98275
(206) 347-8873

September 22, 1990

Mr. Roger Mochnick
U.S. Environmental Protection Agency
Mailstop WD 134
1200 6th Ave
Seattle, WA 98101

Dear Mr. Mochnick;

Subject; Kootenai Tribe of Idaho
Experimental White Sturgeon Facility
NPDES Wastewater Discharge Permit

I'm writing this letter on behalf of the Kootenai Tribe of Idaho. We would like to thank you for the information you conveyed to me by telephone on September 14, 1990.

The Kootenai Tribe of Idaho is planning to have a functioning Experimental White Sturgeon facility on line by spring of 1991 in Bonners Ferry, Idaho. The planned annual aquatic species production for cold water fish species(trout sp., sturgeon, kokanee, and burbot) will be below the EPA permitting criteria of 20,000 pounds. Likewise the monthly volume of fish food fed during this period will fall well below the EPA permitting criteria of 5000 pounds per calendar month. We also plan to temporarily hold approximately 40 pounds of salmonids at the subject project in the very near future for the purpose of testing the water quality at the site.

As you have informed me, a wastewater discharge permit is not required for the subject facility while operating at the proposed levels. We would like this letter filed with your regional US EPA office to notify all people concerned about the planned facility. We are also contacting the Idaho state Department of Environmental Quality regional environmental specialist about our project.

AUG 0 9 1991

If you foresee a need for any other contacts or required information from us concerning the planned facility and wastewater discharge from it, please contact myself or Raymond Abraham at the Kootenai Tribe of Idaho at (208) 267-3519.

Thank you very much and if you have any questions please call me at 206-347-8873.

Sincerely,

9/22/90

Jay S. Kidder, P.E.
Principal

, c:
Raymond Abraham, Chief, Kootenai Tribe of Idaho
Shannon Work, Tribal Legal Counsel

AUG 09 1991

CHINOOK ENGINEERING
P.O. Box 1244
Mukilteo, Washington 98275
(206) 347-8873

Gary Gaffney
State of Idaho
Department of Health and Welfare
Division of Environmental Quality
2110 Ironwood Parkway
Coeur d'Alene, ID 83814

December 4, 1990

Dear Gary;

Subject; Kootenai Tribe
Experimental White Sturgeon Facility
Final Design and Contract

Please find enclosed the Final Design drawings and Contract Documents for the Kootenai Mission Site of the experimental facility. These are for your use in reviewing our Idaho wastewater discharge permit.

The off-line sedimentation pond is designed to accept a strong fish waste cleaning effluent stream of 5 GPM for five hours a day. The capacity of the pond is 1500 ft^3 and has a detention time of 24 hours.

Thank you very much and if you have any questions please call me at (206) 347-8873.

Sincerely,

ENCL:

Jay S. Kidder, P.E.
Principal

RECEIVED
AUG 09 1991

CLEARWATER ENGINEERING
Planning, Design, Construction Management

DEBRA M. VAN DYK, P.E.
Principal

P.O. Box 251
Sandpoint, ID 83864

(208) 263-9398

AUG 0 5 1991

CHINOOK ENGINEERING
Consulting, Design, Construction Management

JAY S. KIDDER, P.E.
Civil Engineer
Fisheries Biologist

P.O. Box 1244
Mukilteo, WA 98275
(206) 347-8873

CHINOOK ENGINEERING
P.O. Box 1244
Mukilteo, Washington 98275
(206) 347-8873

RECEIVED
JAN 2 4 1991
NORTHERN REGION
IDWR

January 11, 1991

State of Idaho
Department of Water Resources
Northern Region
1910 Northwest Boulevard, Suite 210
Coeur d'Alene, ID 83814

Subject: Kootenai Tribe
Experimental White Sturgeon Facility
Joint Application for Permit

Attached please find the completed subject permit for joint application to the U.S. Army Corps of Engineers and the Idaho Department of Water Resources. This facility, a project of the Kootenai Tribe of Idaho, is funded by the Bonneville Power Administration. Chinook Engineering is the Tribe's consultant and should be contacted if questions arise concerning this permit.

Sincerely,

Jay S. Kidder, P.E.
Principal

Encl:

AUG 0 9 1991

RECEIVED
JAN 2 4 1991
NORTHERN REGION
IDWR

JOINT APPLICATION FOR PERMIT
U.S. ARMY CORPS OF ENGINEERS
AND
STATE OF IDAHO, DEPARTMENT OF WATER RESOURCES
STATE OF IDAHO, DEPARTMENT OF LANDS

SEPARATE PERMIT DECISIONS MUST BE RECEIVED FROM BOTH THE STATE OF IDAHO AND THE CORPS OF ENGINEERS PRIOR TO START OF WORK

The Department of the Army permit program is authorized by Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. These laws require permits authorizing structures and work in or affecting navigable waters of the United States and the discharge of dredged or fill material into waters of the United States, including their adjacent wetlands. State permits are required under the State of Idaho, Stream Channel Protection Act (Title 42, Chapter 38, Idaho Code) and the Idaho Lake Protection Act, Section 58-142 et. seq, Idaho Code. This application will meet the requirements of the above agencies.

AGENCY USE

PLEASE TYPE OR PRINT

1. Corps of Engineers #	2. State of Idaho #
Date Received	Date Received

AGENCY USE

The applicant has sent copies of this application to the agencies checked: ID Dept. Water Res. - Boise____, Coeur d'Alene X, Twin Falls____, Idaho Falls____; ID Dept. Lands - Boise____, Coeur d'Alene____; Corps of Engineers - Walla Walla x.

3. Applicant Kootenai Tribe of Idaho, Raymond Abraham
Mailing Address P.O.Box 1269
Bonners Ferry, ID 83805
Work Phone (Area 208) 267-3519 Home (Area 208) 267-3500
Date of Application January 11, 1991

4. Authorized Agent Chinook Engineering, Jay Kidder
Mailing Address P.O.Box 1244
Mukilteo, WA 98275
Work Phone (Area 206) 347-8873 Home (Area) ____

5. Location where proposed activity exists or will occur.
Waterway Kootenai River Tributary of: Columbia River
In or near city of town: Bonners Ferry
Assessor's Desc. (Tax No. or Subdivision, Lot & Block No.): Tribal Allotment 11 *(See pamphlet)
County: Boundary State: Idaho Zip Code: 83805
1/4 1/4: SW SW Section: 20 Township: 62N Range: 1E

6. Describe the proposed activity, including description of the type of structures, if any, to be erected on fills, or pile or float-supported platforms. If additional space is needed, use a separate sheet or Section 16 (Remarks).

Describe the proposed activity in detail: Construct an experimental white sturgeon facility landward of an existing dike. Facility will be connected to a river water supply pipeline and intake pump and a drain pipeline; both of which lie on the river bottom. The 8 in. diameter HDPE drain pipeline will be confined by 3 anchors. See drawing section (attached) for details of 6 in. HDPE supplyline and intake pump.

Describe construction methods and equipment: Both pipelines will be placed in the river during low water. Drain pipeline will be lowered from the river's edge. The supplyline and intake pump assembly will be placed from a temporary bench on the river bank using a boom truck or track excavator.

Length of project along the stream or extension into lake or reservoir: 80' of drainline extends 20' into river
40' of supplyline ext. 25' into river
Stream gradient: less than 1/2 %
Will material be placed waterward of ordinary high water mark? yes
Will material be placed in adjacent wetlands? no
Type of fill material: native mat.& crushed rock (i.e.sand, etc.) Material Source: rock - imported
Volume of material to be placed: 7.4 native, 4.4 rock (cubic yards)
Will excavation by required? yes Disposal Site Location: pipe backfill
Method of diverting flow, if needed:
Method of controlling turbidity: upland disposal, if needed

AUG 09 1991

7. Size and Capacity of proposed bridge or culvert and area of drainage served (sq. miles): ____
(Idaho Department of Water Resources requirement.)

8. Preparation of drawings. One set of original or good quality reproducible drawings must be attached to this application. NOTE: DRAWINGS NO LARGER THAN 8-1/2 X 11 INCHES IN SIZE. See the instruction pamphlet for instructions and a checklist for completing the drawings.

9. Purpose and intended use: Five year experimental facility to be used by Kootenai Tribe of Idaho in cooperation with Idaho State Dept. of Fish and Game

Commercial _____ Public _____ Private _____ Other X

10. Proposed Starting Date Jan. 1, 1991 Estimated Duration 3 months -- See Section 16

11. If any portion of the activity is complete, indicate month and year of completion _____ Indicate the existing work on the drawings.

12. Names, addresses, and telephone numbers of adjoining property owners, lessees, etc., whose property also adjoins the waterway.

Joint Ownership:
1.Abraham Abraham c/o Raymond Abraham
P.O.Box 726, Bonners Ferry,ID 83805
2.Diane Andrews, P.O.Box 3041
Bonners Ferry,ID 83805
3.Kootenai Tribe of Idaho
P.O.Box 1269, Bonners Ferry, ID 83805
Other adjoining owner:
Kootenai Tribe of Idaho

13. LEGAL OWNER IF OTHER THAN APPLICANT _____

MAILING ADDRESS _____ CITY, STATE, ZIPCODE _____

PHONE AREA WORK(___)_____ AREA HOME(___)_____

14. List other applications, approvals, or certifications from other Federal, interstate, state, or local agencies for any structures, constructions, discharges, deposits, or other activites described in the application.

Issuing Agency	Type of Approval	Identification No.	Date of Application	Date of Approval
U.S. E.P.A.				
Dept. Health & Welfare -- See attached letters.				

15. Has any agency denied approval for the activity described herein or for any activity directly related to the activity described herein? Yes _____ No X (If "Yes" explain)

16. Remarks or additional information: Nothing contained herein is intended in any manner to effect, diminish, or waive any aboriginal treaty or other rights existing in the Kootenai Tribe of Idaho.
Work below the high water elevation to commence upon issuance of permit.

17. Application is hereby made for a permit or permits to authorize the activities described herein. I certify that I am familiar with the information contained in this application, and that to the best of my knowledge and belief, such information is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities. I hereby grant to the agencies to which this application is made, the right to come upon the above-described location to inspect the proposed or completed work.

1/23/91
Date

x Raymond Abraham
Signature of Applicant (REQUIRED)

The application must be signed by the applicant. If an authorized agent is to be designated, Item 4 and the following information should be completed.

I hereby designate Chinook Engineering to act as my agent in matters related to this permit application. I understand that if a Federal permit is issued, I must sign the permit.

1/11/91
Date

Jay E. Kridler
Signature of Authorized Agent (if applicable)

x Raymond Abraham
Signature of Applicant (if applicable)

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly falsifies, conceals, or covers up by any trick, scheme, or device a material fact or makes any false, fictitious, or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious, or fraudulent statement or entry, shall be fined not more than $10,000 or imprisoned not more than 5 years or both. Do not sent a permit processing fee with this application. The appropriate fee will be assessed when a permit is issued.

DO NOT SEND PROCESSING FEE WITH APPLICATION

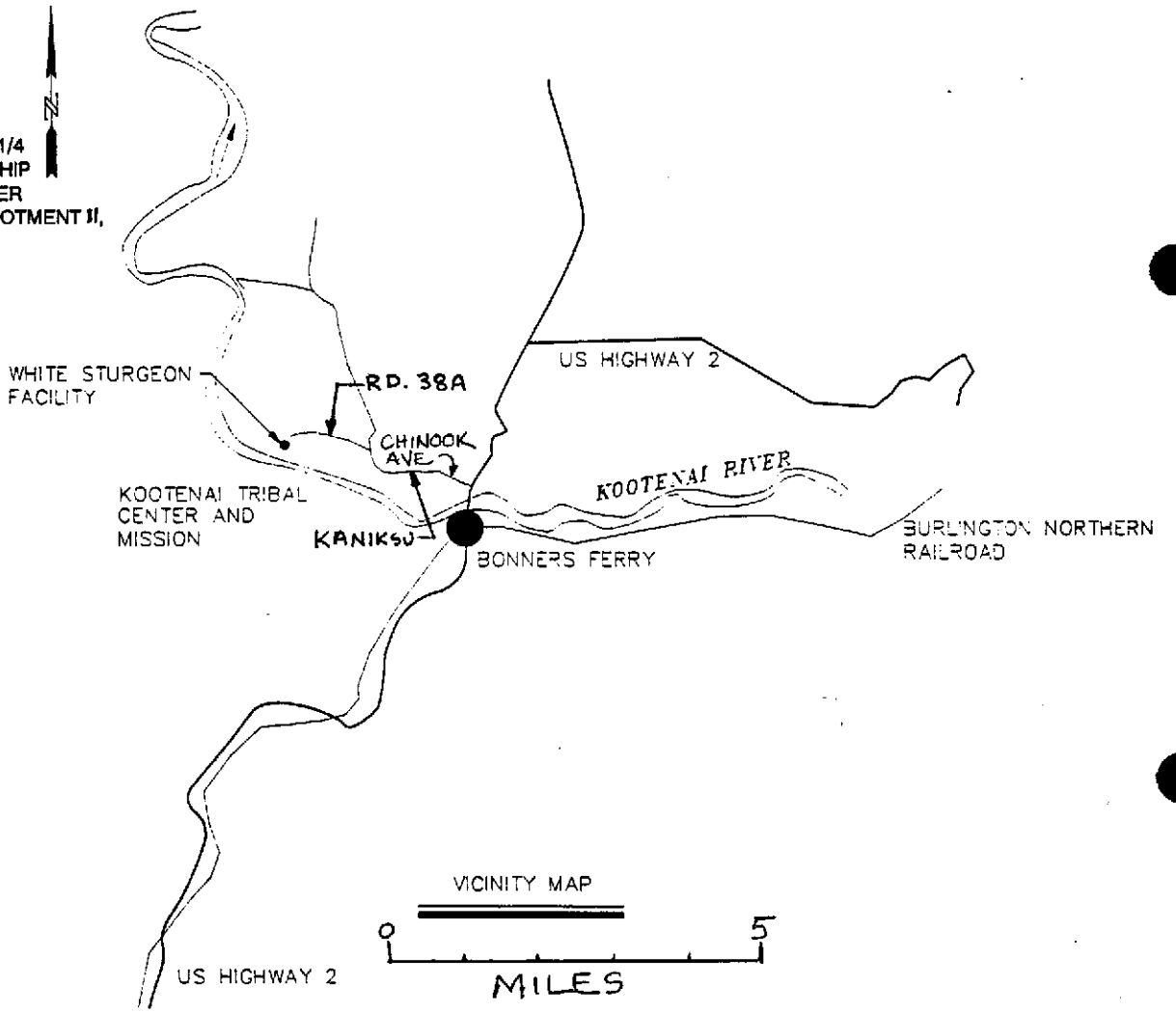
NPW Form 304
JUN 90 (Rev)

AUG 0 9 1991

IDWR Form 3804-B
Oct 89 (Rev)

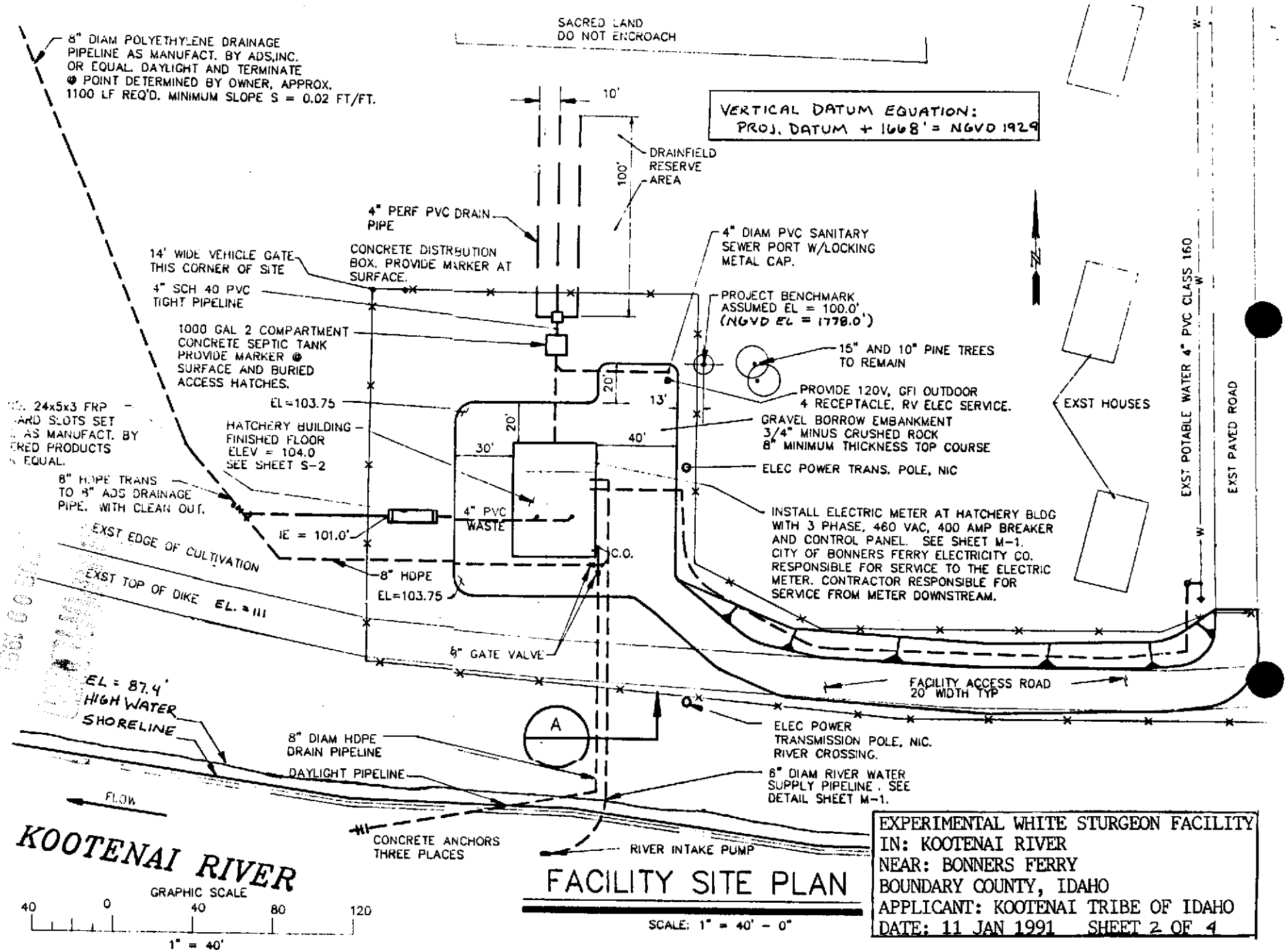
WHITE STURGEON
FACILITY
SITE LOCATED;

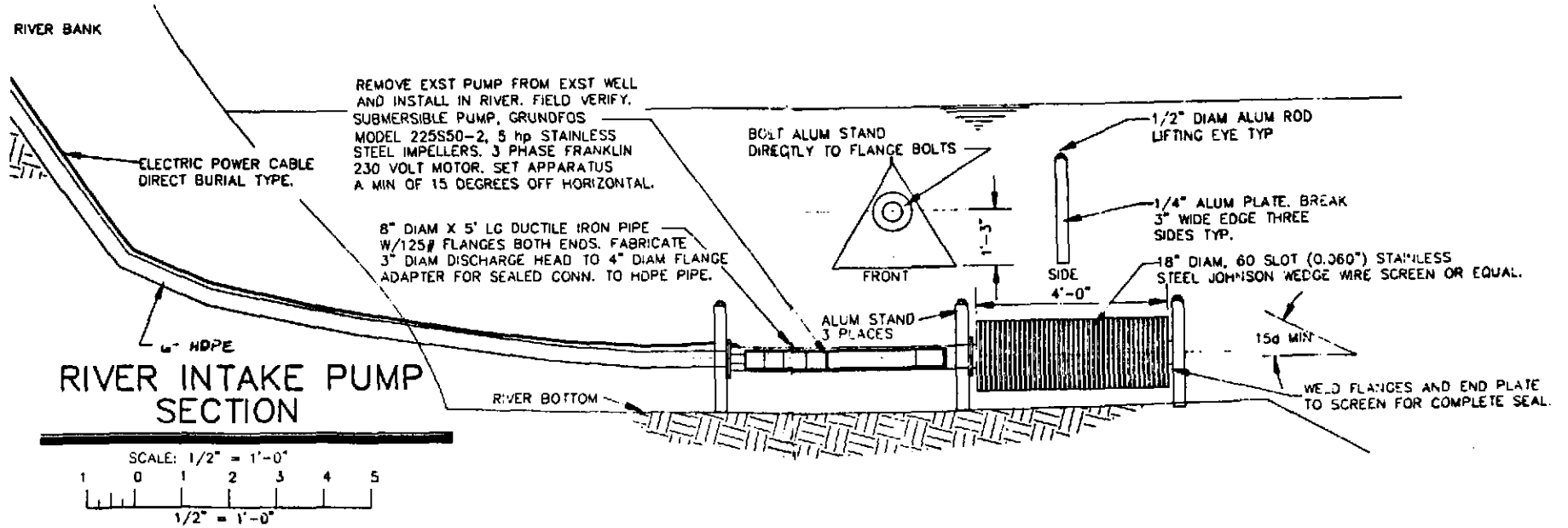
A PORTION OF THE SOUTHWEST 1/4 SECTION OF SECTION 20, TOWNSHIP 62 NORTH, RANGE 1 EAST, BONNER MERIDIAN, KNOWN AS TRIBAL ALLOTMENT #1, KOOTENAI TRIBE OF IDAHO.



AUG 0 9 1991

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 1 OF 4


8" DIAM POLYETHYLENE DRAINAGE PIPELINE AS MANUFACT. BY ADS,INC. OR EQUAL. DAYLIGHT AND TERMINATE @ POINT DETERMINED BY OWNER, APPROX. 1100 LF REQ'D. MINIMUM SLOPE S = 0.02 FT/FT.
SACRED LAND DO NOT ENCROACH
VERTICAL DATUM EQUATION: PROJ. DATUM + 1668' = NGVD 1929
10'
100'
DRAINFIELD RESERVE AREA
4" PERF PVC DRAIN PIPE
CONCRETE DISTRIBUTION BOX. PROVIDE MARKER AT SURFACE.
14' WIDE VEHICLE GATE THIS CORNER OF SITE
4" SCH 40 PVC TIGHT PIPELINE
1000 GAL 2 COMPARTMENT CONCRETE SEPTIC TANK PROVIDE MARKER @ SURFACE AND BURIED ACCESS HATCHES.
EL=103.75
HATCHERY BUILDING FINISHED FLOOR ELEV = 104.0 SEE SHEET S-2
30'
20'
13'
40'
4" PVC WASTE
C.O.
8" HDPE
EL=103.75
IE = 101.0'
8" HDPE TRANS TO 8" ADS DRAINAGE PIPE. WITH CLEAN OUT.
EXST EDGE OF CULTIVATION
EXST TOP OF DIKE EL. = 111
8" GATE VALVE
4" DIAM PVC SANITARY SEWER PORT W/LOCKING METAL CAP.
PROJECT BENCHMARK ASSUMED EL = 100.0' (NGVD EL = 1778.0')
15" AND 10" PINE TREES TO REMAIN
PROVIDE 120V, GFI OUTDOOR 4 RECEPTACLE. RV ELEC SERVICE.
GRAVEL BORROW EMBANKMENT 3/4" MINUS CRUSHED ROCK 8" MINIMUM THICKNESS TOP COURSE
ELEC POWER TRANS. POLE, NIC
INSTALL ELECTRIC METER AT HATCHERY BLDG WITH 3 PHASE, 460 VAC, 400 AMP BREAKER AND CONTROL PANEL. SEE SHEET M-1. CITY OF BONNERS FERRY ELECTRICITY CO. RESPONSIBLE FOR SERVICE TO THE ELECTRIC METER. CONTRACTOR RESPONSIBLE FOR SERVICE FROM METER DOWNSTREAM.
EXST HOUSES
EXST POTABLE WATER 4" PVC CLASS 160
EXST PAVED ROAD
FACILITY ACCESS ROAD 20' WIDTH TYP
ELEC POWER TRANSMISSION POLE, NIC. RIVER CROSSING.
6" DIAM RIVER WATER SUPPLY PIPELINE. SEE DETAIL SHEET M-1.
EL = 87.4' HIGH WATER SHORELINE
8" DIAM HDPE DRAIN PIPELINE
DAYLIGHT PIPELINE
FLOW
A
CONCRETE ANCHORS THREE PLACES
RIVER INTAKE PUMP
KOOTENAI RIVER
GRAPHIC SCALE
40 0 40 80 120
1" = 40'
FACILITY SITE PLAN
SCALE: 1" = 40' - 0"
EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 2 OF 4

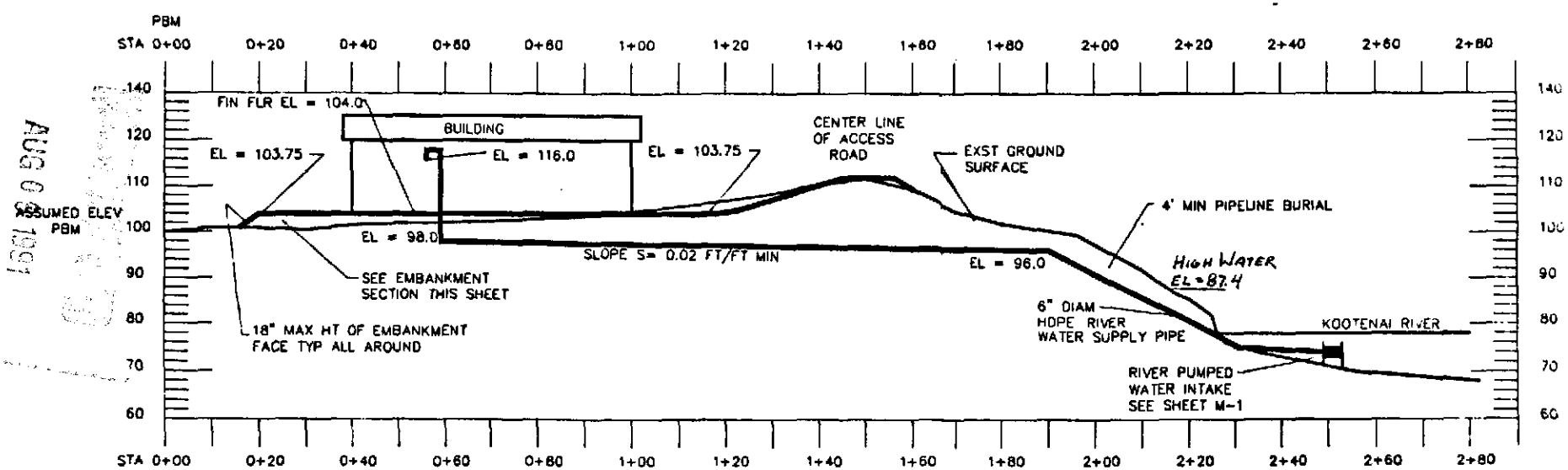


RIVER INTAKE PUMP SECTION

SCALE: 1/2" = 1'-0"

1 0 1 2 3 4 5

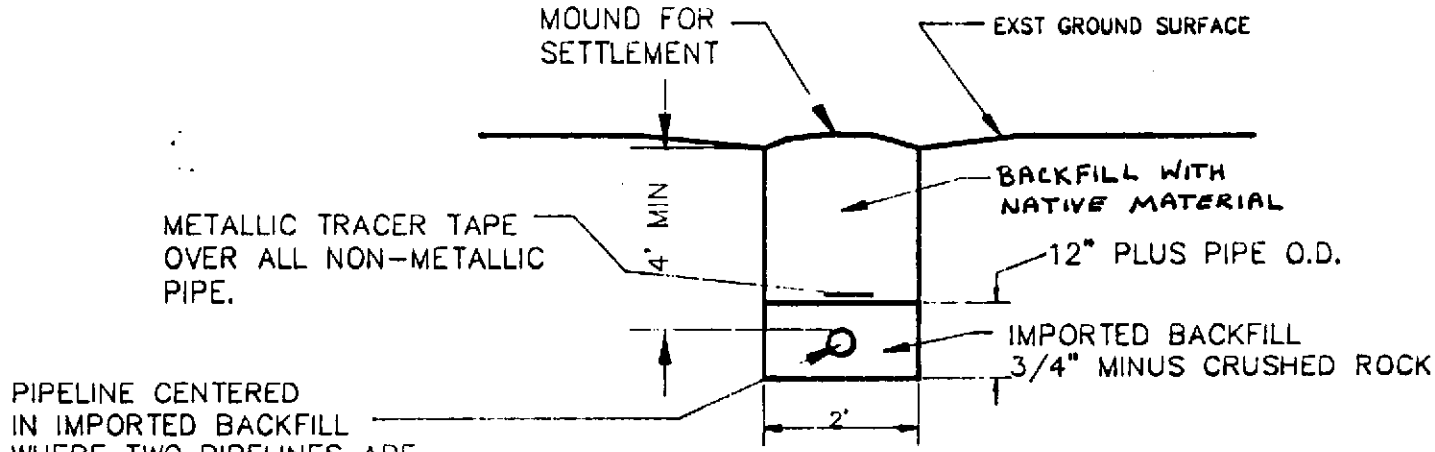
1/2" = 1'-0"



Note:
PROJECT DATUM + 166.8' = NGVD 1929

SITE PROFILE

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 3 OF 4



A

TYPICAL TRENCH SECTION

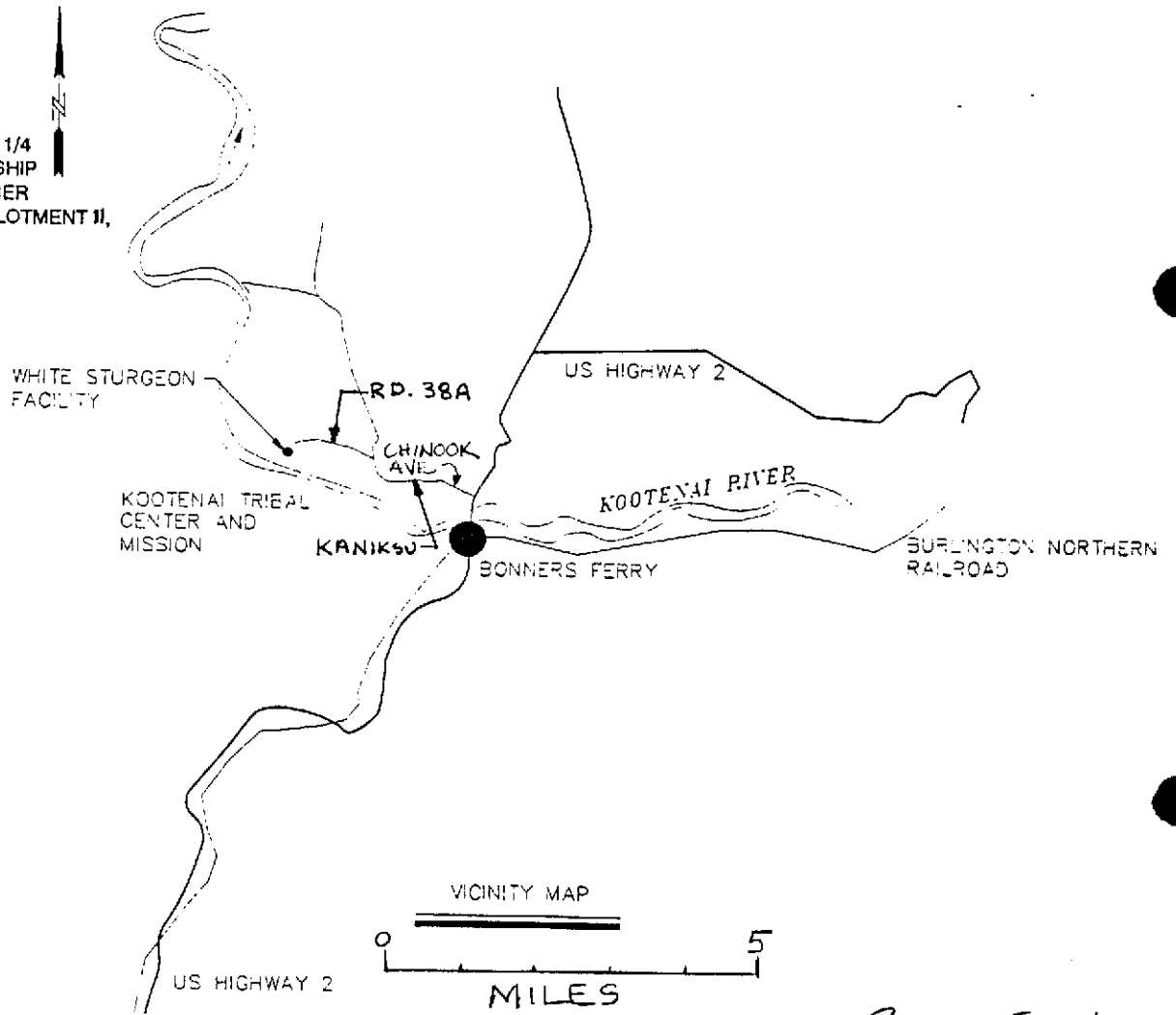
SCALE: NONE

AUG 0 6 1991

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 4 OF 4

WHITE STURGEON
FACILITY
SITE LOCATED;

A PORTION OF THE SOUTHWEST 1/4 SECTION OF SECTION 20, TOWNSHIP 62 NORTH, RANGE 1 EAST, BONNER MERIDIAN, KNOWN AS TRIBAL ALLOTMENT 11, KOOTENAI TRIBE OF IDAHO.



REVISED FEB 1 '91

EXPERIMENTAL WHITE STURGEON FACILITY
IN: KOOTENAI RIVER
NEAR: BONNERS FERRY
BOUNDARY COUNTY, IDAHO
APPLICANT: KOOTENAI TRIBE OF IDAHO
DATE: 11 JAN 1991 SHEET 1 OF 4 6

CLEARWATER ENGINEERING
P.O.Box 251
Sandpoint, ID 83864-0251
(208) 263-9398

RECEIVED
FEB 0 6 1991
NORTHERN REGION
I D W R

February 1,1991

Mr. Tim Erkel
Regulatory Branch
Department of the Army
Corps of Engineers
Walla Walla District
Walla Walla, WA 99362-9265

Subject: NPW No. 071-OYC-2-004309

Dear Mr. Erkel:

Please find the attached additional information requested by your office for the subject permit. This information will also be forwarded to your Coeur d'Alene field office and the Department of Water Resources.

If you have any further questions, please contact me at (208)-263-9398 or Jay Kidder at (206) 347-8873.

Sincerely,

Debra M Van Dyk

Debra M. Van Dyk, P.E.
Principal

Jay S. Kidder, P.E.
CHINOOK ENGINEERING
P.O.Box 1244
Mukilteo, WA 98275

Encl.