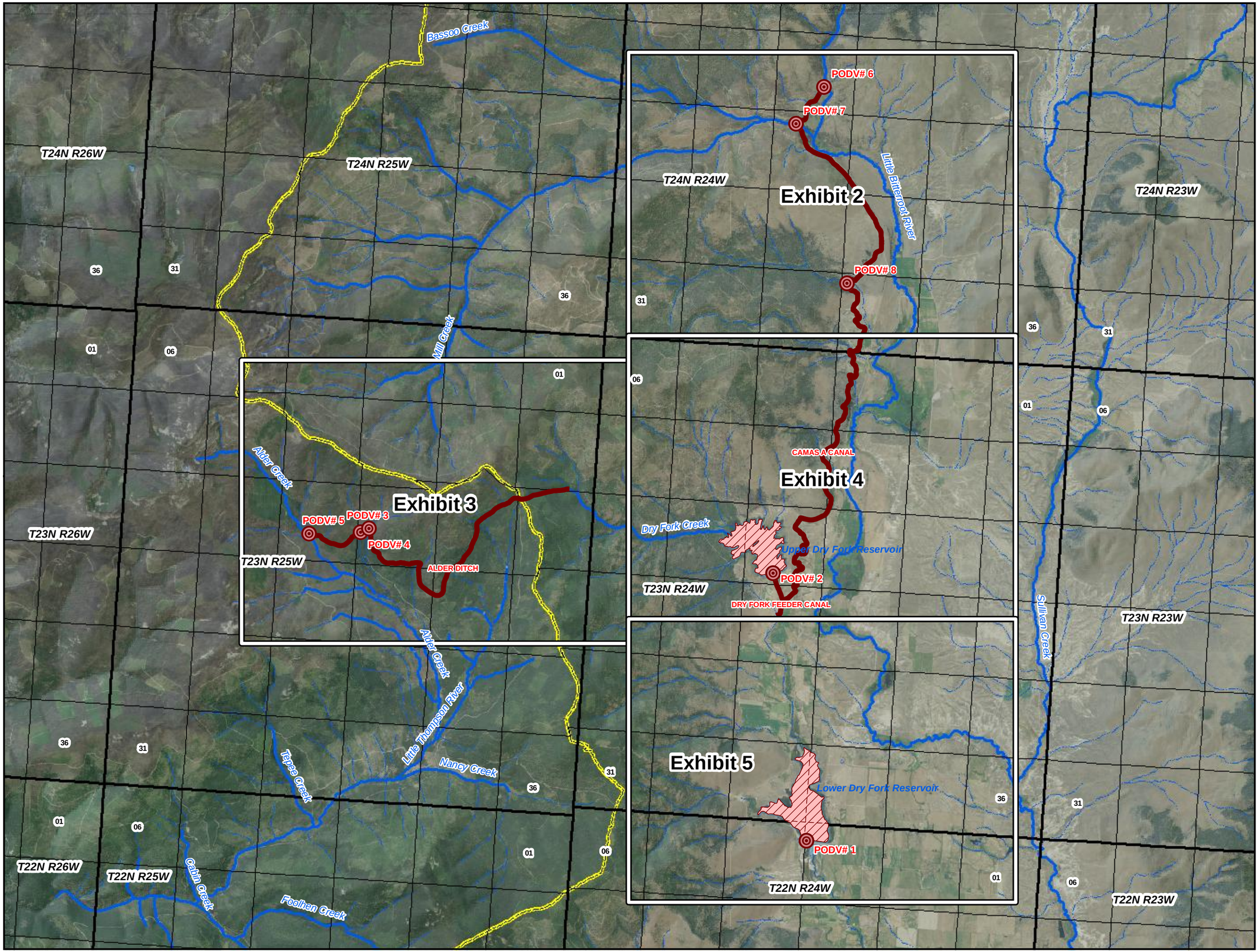
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052927

Exhibit 1



Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.75 1.5 Miles

POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052927

Exhibit 2

Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

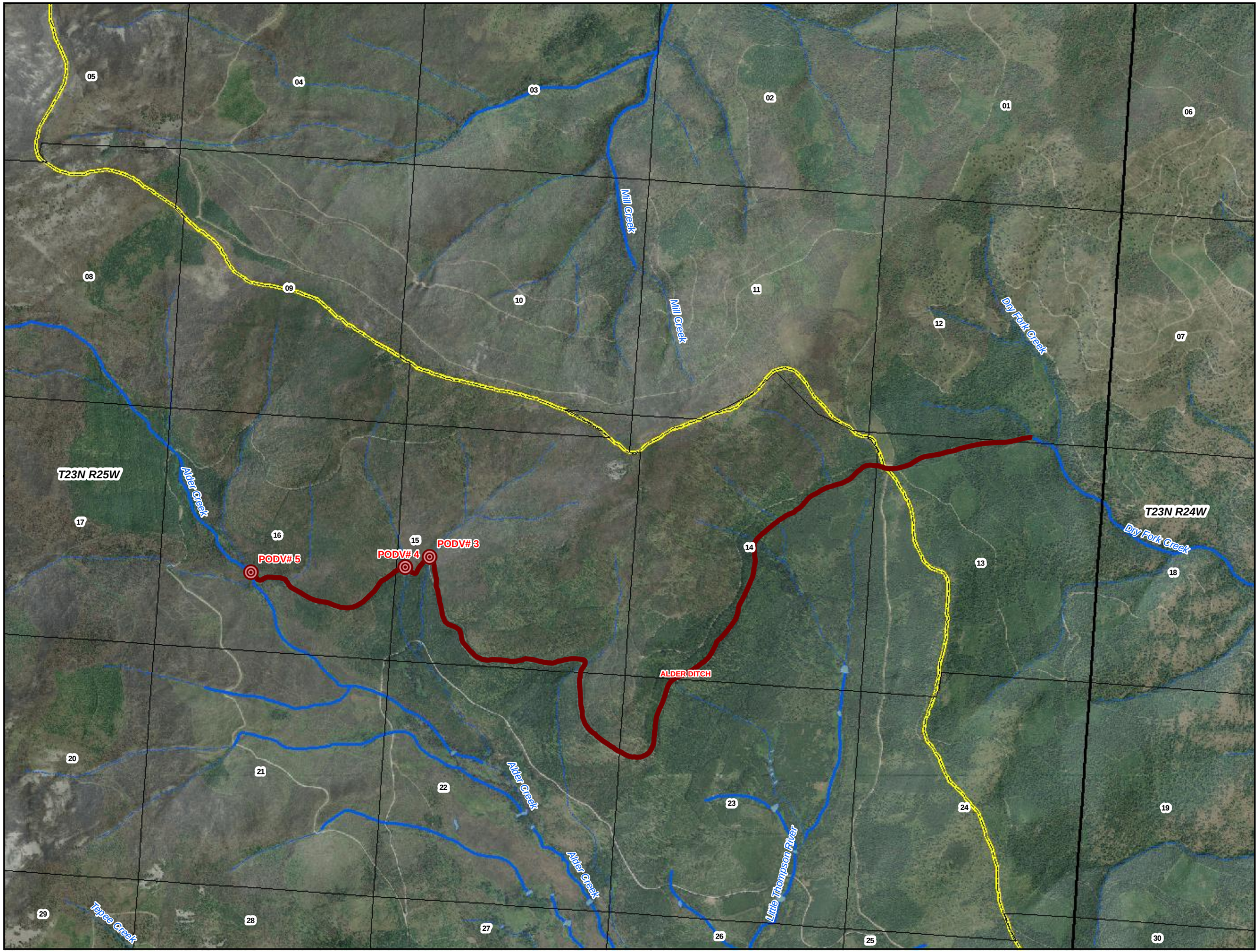
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052927

Exhibit 3



Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
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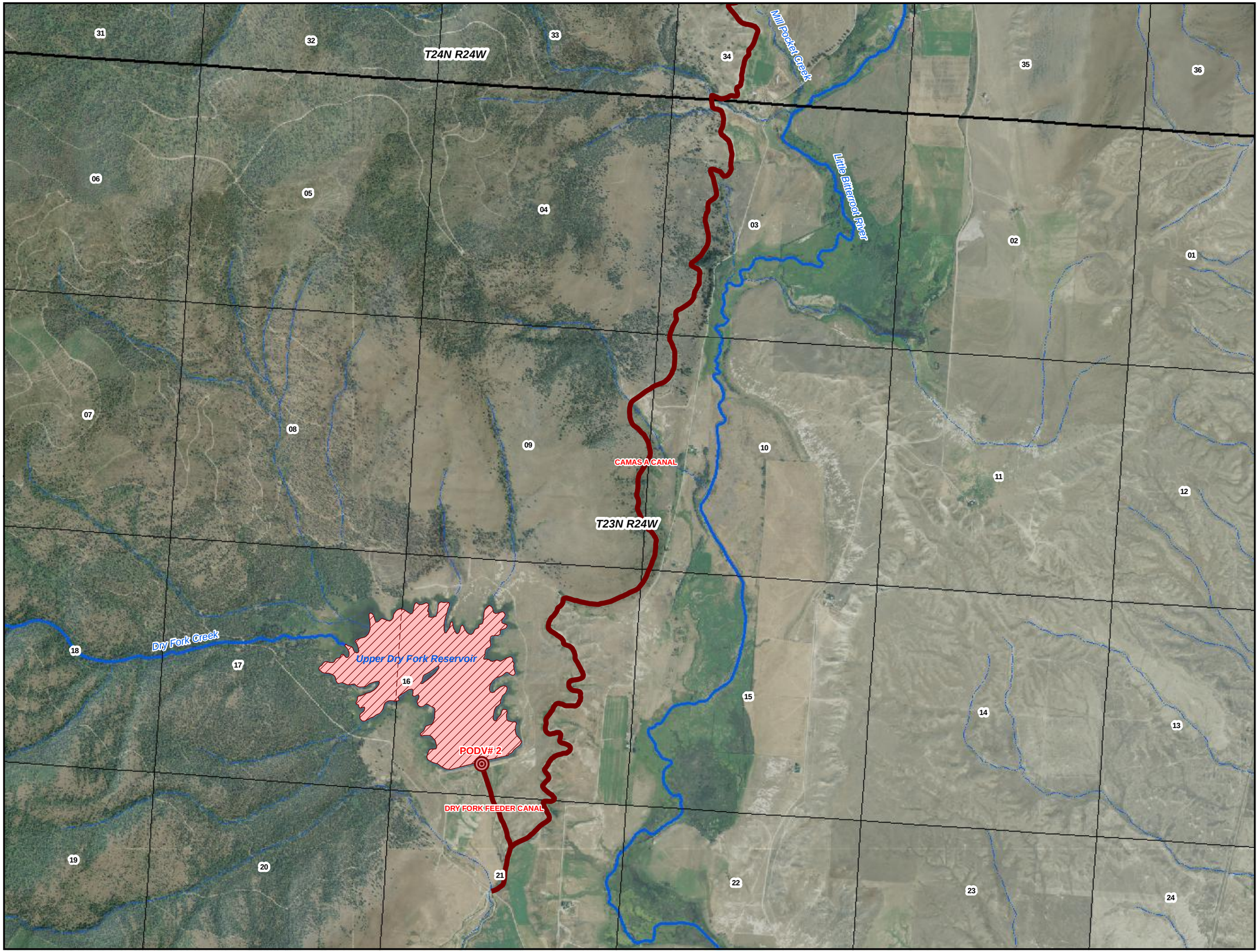
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052927

Exhibit 4



Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
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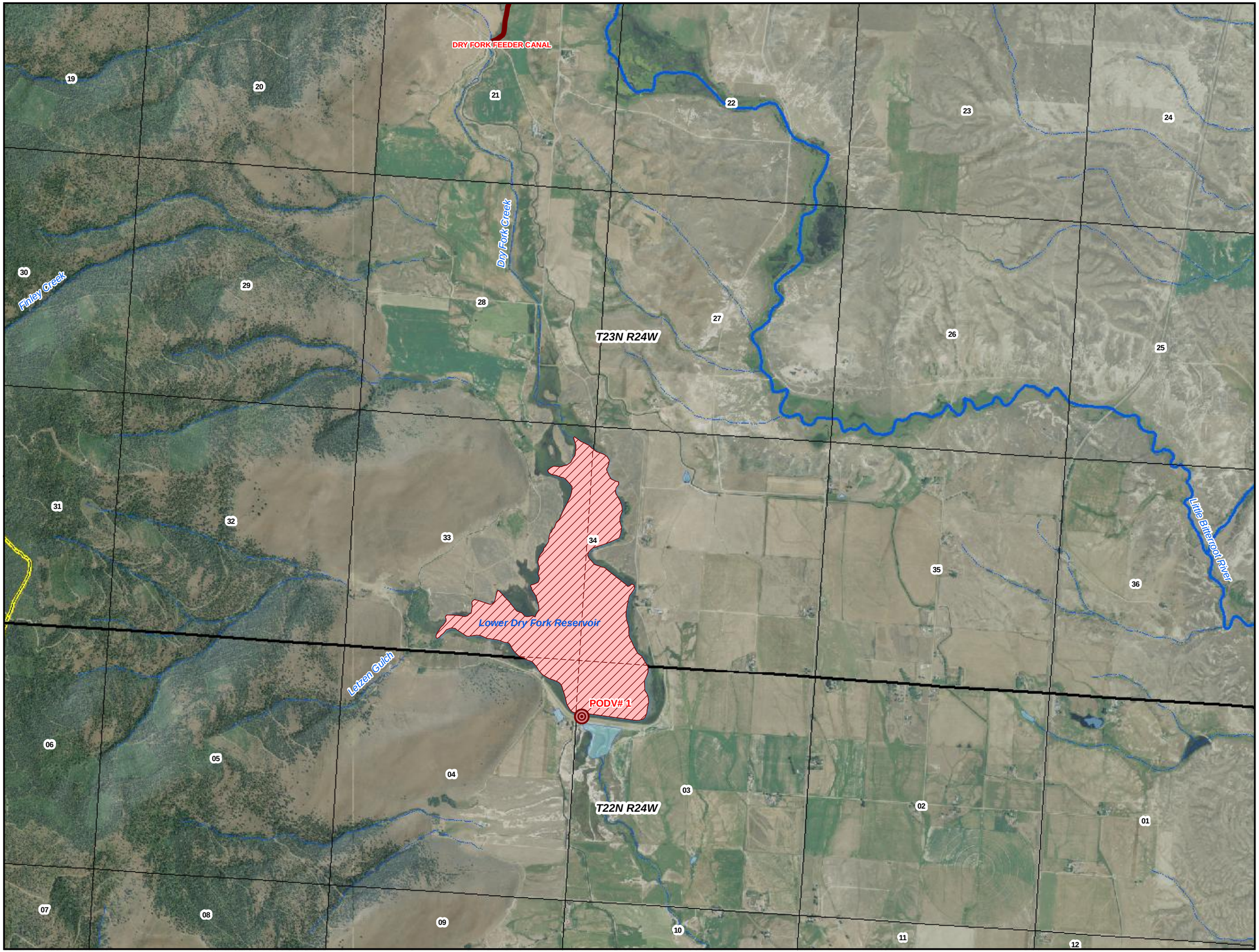
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052927

Exhibit 5



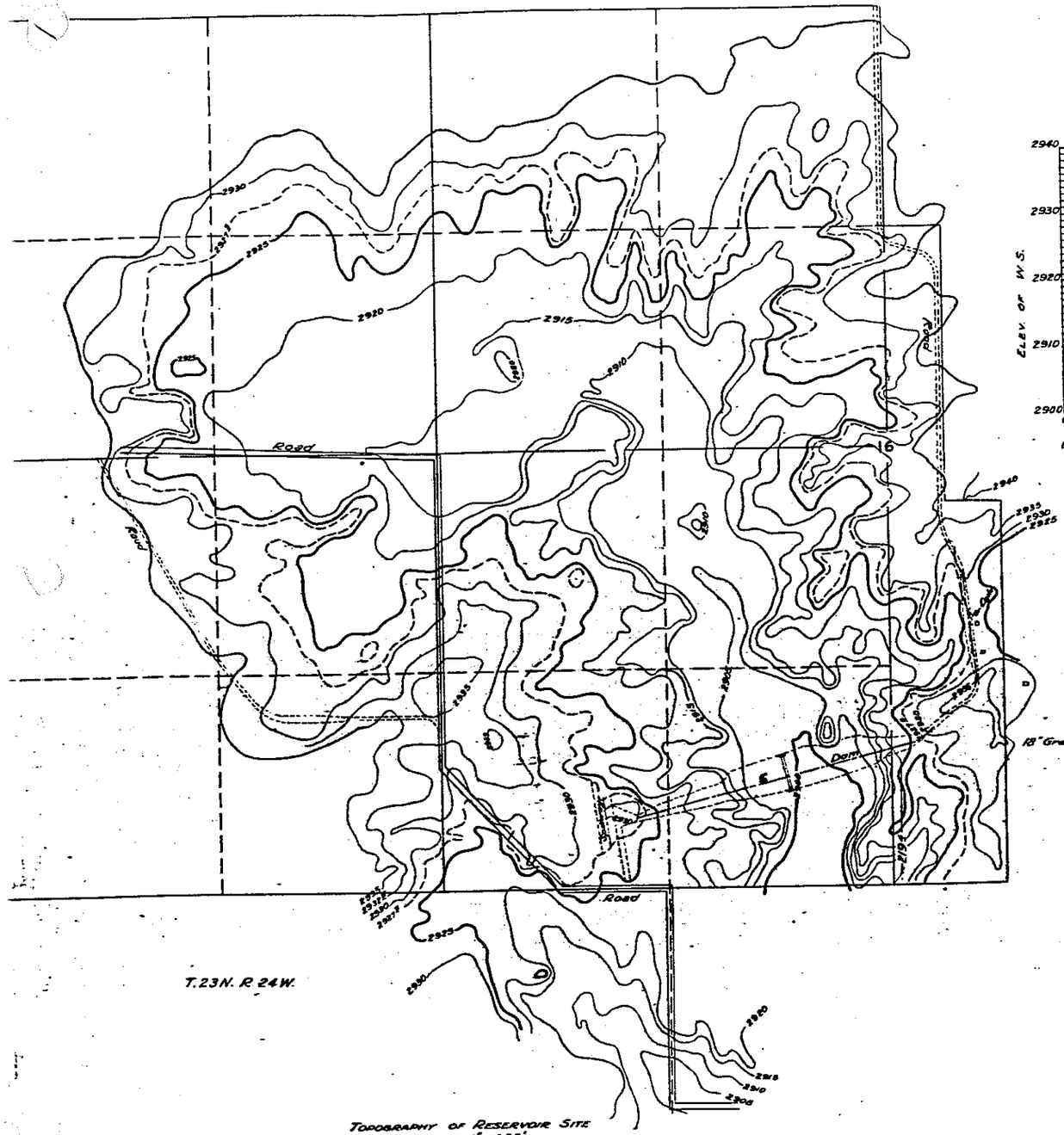
Flathead Indian Reservation

Legend

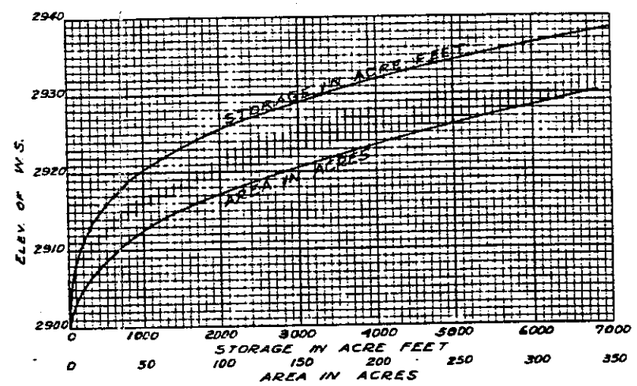
- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

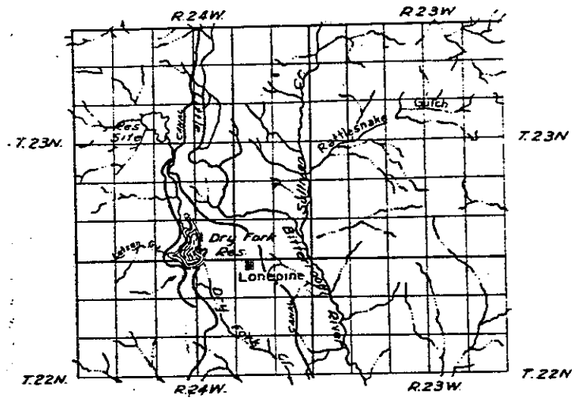
0 0.25 0.5 Miles

POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

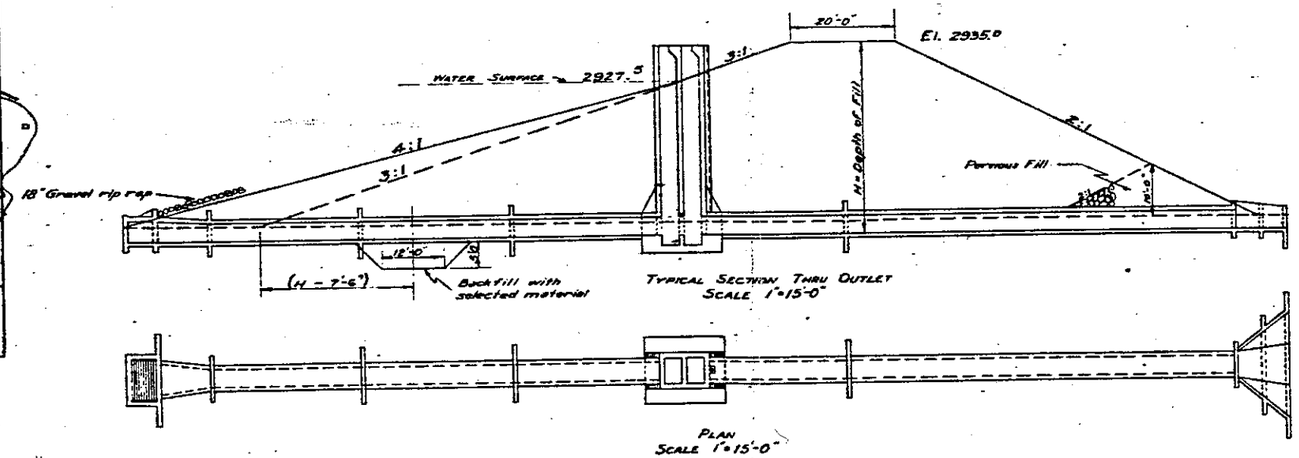


Topography of Reservoir Site
Scale 1"=400'





INDEX MAP



Typical Section Thru Outlet
Scale 1"=15'-0"

Plan
Scale 1"=15'-0"

For Details of Outlet
See F-5221

DEPARTMENT OF THE INTERIOR
U.S. INDIAN IRRIGATION SERVICE
A.L.WATHEN – DIRECTOR OF IRRIGATION
H.V.CLOTTS – ASST DIRECTOR – W.S.NAHUA – SUPERVISING
G.L.SPERRY – PROJECT ENGR.

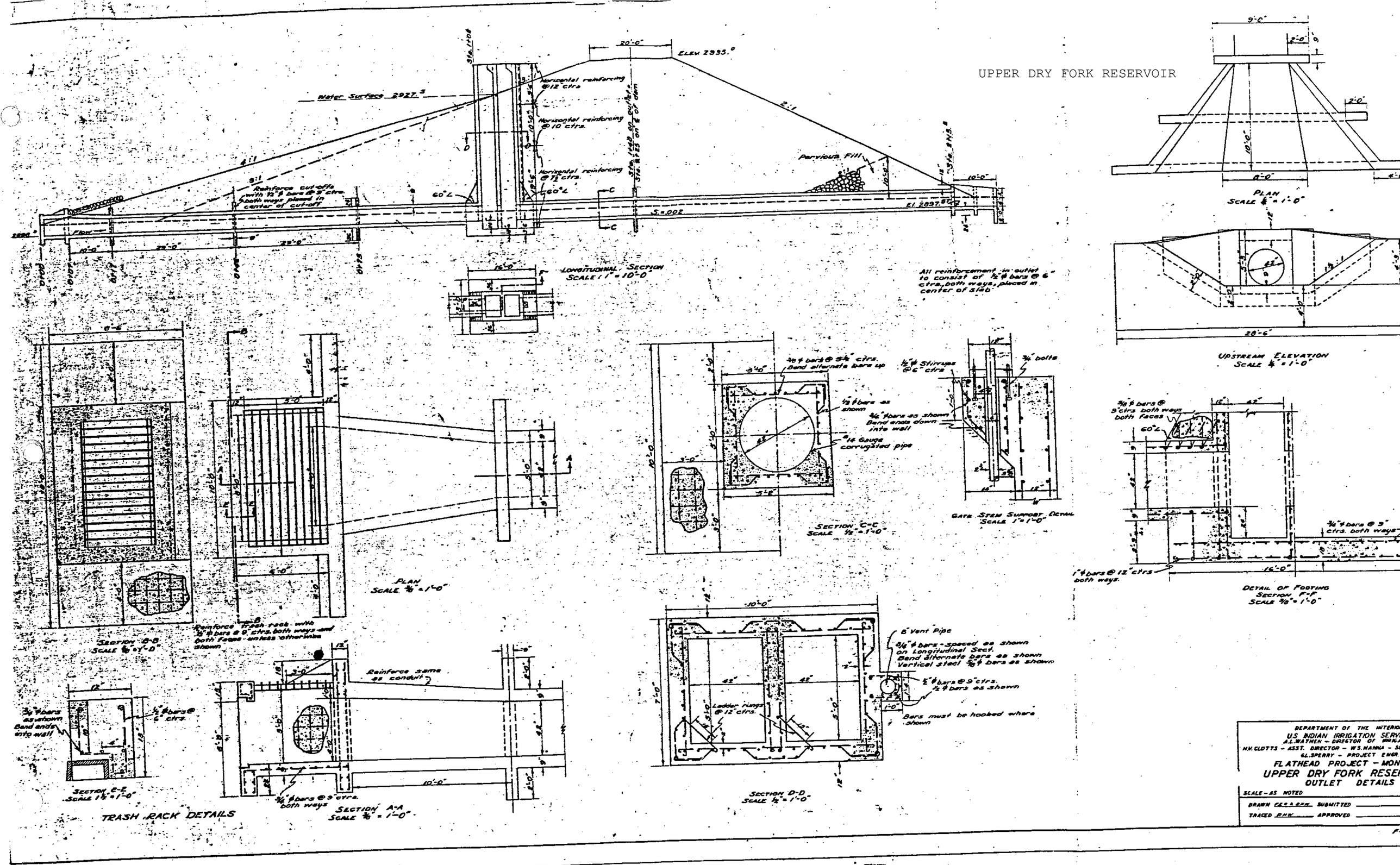
FLATHEAD PROJECT – MONTANA
UPPER DRY FORK RESERVOIR
GENERAL PLAN & SECTIONS

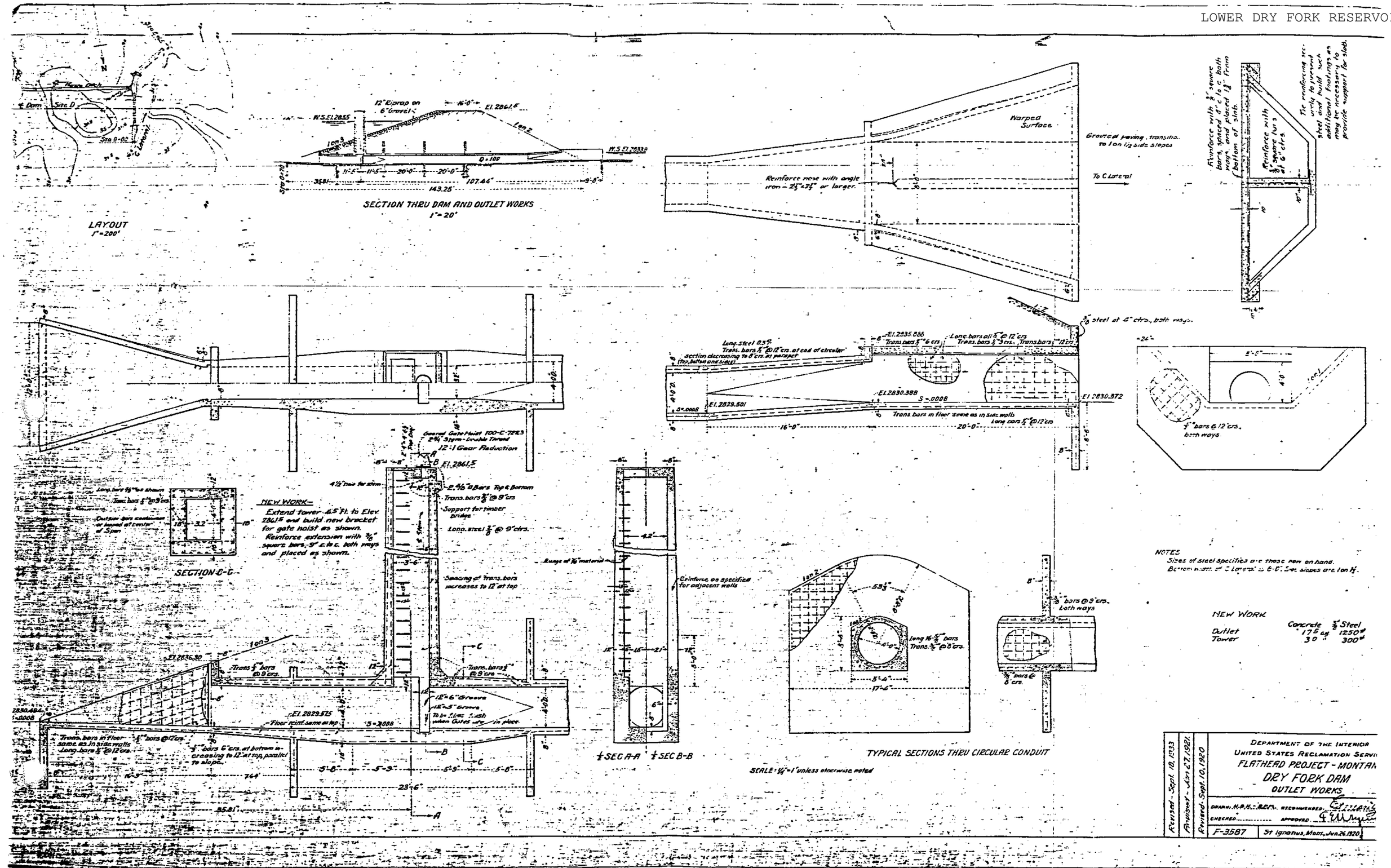
SCALE – AS NOTED AUG.

DRAWN _____ SUBMITTED _____
TRACED R.H.W. APPROVED _____

F-522

UPPER DRY FORK RESERVOIR



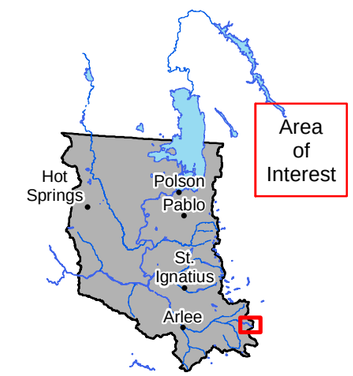

LAYOUT
1"=200'
Dam
Site D
Site D-D2
C Lateral
SECTION THRU DAM AND OUTLET WORKS
1"=20'
12" Riprap on 6" Gravel
W.S. El. 2855
El. 2861.5
W.S. El. 2833.9
143.25'
107.44'
Warped Surface
Grouted paving, transition to 1 on 1/2 side slopes
Reinforce nose with angle iron - 2 1/2"x2 1/2" or larger.
To C Lateral
Reinforce with 3/8" square bars, spaced 4" c to c both ways, and placed 1 1/2" from bottom of slab.
Reinforce with 3/8" square bars at 6" ctrs.
Tie reinforcing securely to prevent steel and build such additional footings as may be necessary to provide support for slab.
3/8" steel at 4" ctrs., both ways.
Long. steel 0.3%
Trans. bars 1/2" @ 12" crs. at end of circular section decreasing to 8" crs. at parapet (top, bottom and sides)
El. 2835.886
Trans. bars 1/2" @ 6" crs.
Long. bars all 1/2" @ 12" crs.
Trans. bars 1/2" @ 9" crs.
Trans. bars 1/2" @ 12" crs.
El. 2830.388
S = .0008
El. 2830.372
El. 2829.501
Trans. bars in floor same as in side walls
Long. bars 1/2" @ 12" crs.
16'-0"
20'-0"
1/2" bars @ 12" crs. both ways
Geared Gate Hoist 100-C-7783
2 3/4" Stem - Double Thread
12:1 Gear Reduction
El. 2861.5
4 1/2" base for stem
2 5/16" ø Bars Top & Bottom
Trans. bars 3/8" @ 9" crs.
Support for timber bridge
Long. steel 3/8" @ 9" crs.
NEW WORK—
Extend tower 6.5 ft. to Elev. 2861.5 and build new bracket for gate hoist as shown. Reinforce extension with 3/8" square bars, 9" c to c. both ways and placed as shown.
SECTION C-C
Outside bars continuous or lapped at center of Span
Rungs of 7/8" material
Spacing of trans. bars increases to 12" at top
Reinforce as specified for adjacent walls
1/2 SEC A-A
1/2 SEC B-B
Trans. 1/2" bars @ 9" crs.
El. 2836.90
El. 2829.575
Floor joint same as top
S = .0008
12" x 6" Groove
12" x 5" Groove
To be filled with lash when Gates are in place.
Trans. bars in floor same as in side walls
Long. bars 1/2" @ 12" crs.
1/2" bars @ 12" crs.
1/2" bars 6" crs. at bottom increasing to 12" at top, parallel to slope.
74.4'
23'-6"
35.81'
long 16-5/8" bars
Trans. 3/8" @ 8" crs.
17'-6"
3/8" bars @ 9" crs. both ways
3/8" bars @ 8" crs.
TYPICAL SECTIONS THRU CIRCULAR CONDUIT
SCALE: 1/4" = 1' unless otherwise noted
NOTES
Sizes of steel specified are those now on hand.
Bottom width of C Lateral is 8'-0". Side slopes are 1 on 1/2.
NEW WORK
Concrete 3/8" Steel
Outlet 175 cy 1250#
Tower 30 " 300#
DEPARTMENT OF THE INTERIOR
UNITED STATES RECLAMATION SERVICE
FLATHEAD PROJECT - MONTANA
DRY FORK DAM
OUTLET WORKS
Revised - Sept. 18, 1933
Revised - Jan 27, 1921
Revised - Sept. 10, 1920
F-3587
St Ignatius, Mont., Jan. 26, 1920

Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052928

Exhibit 1



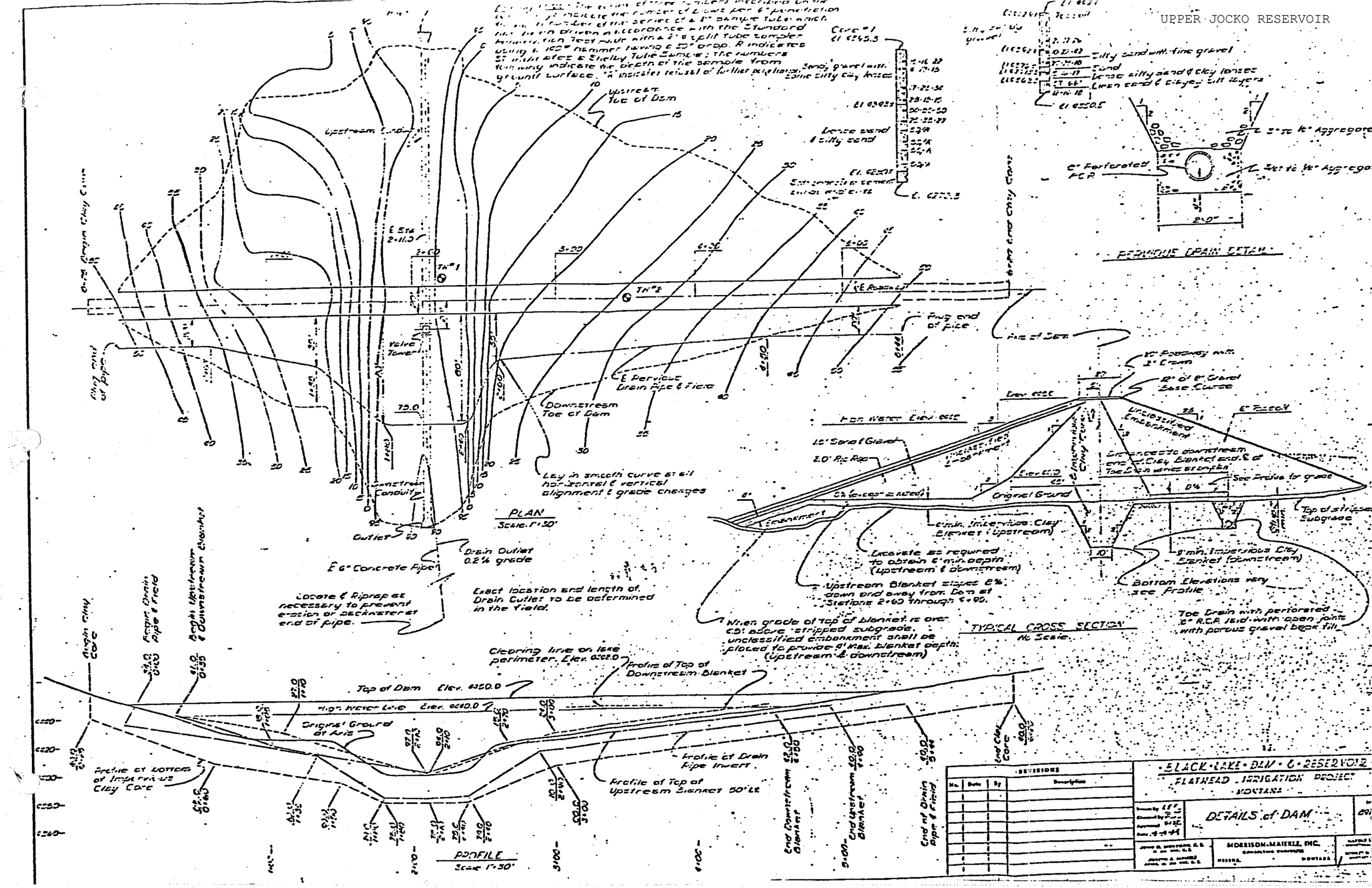
Flathead Indian Reservation

Legend

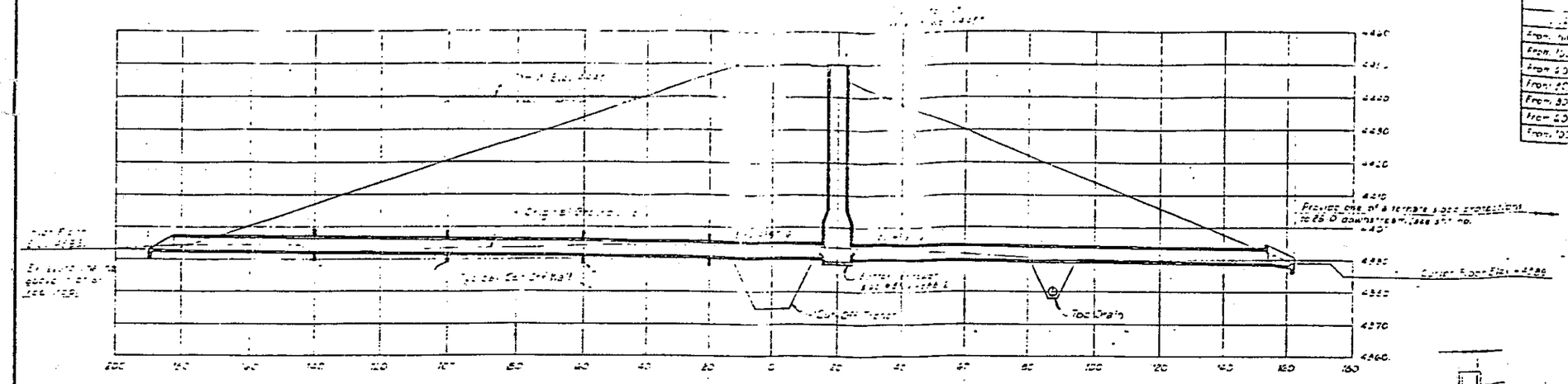
- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

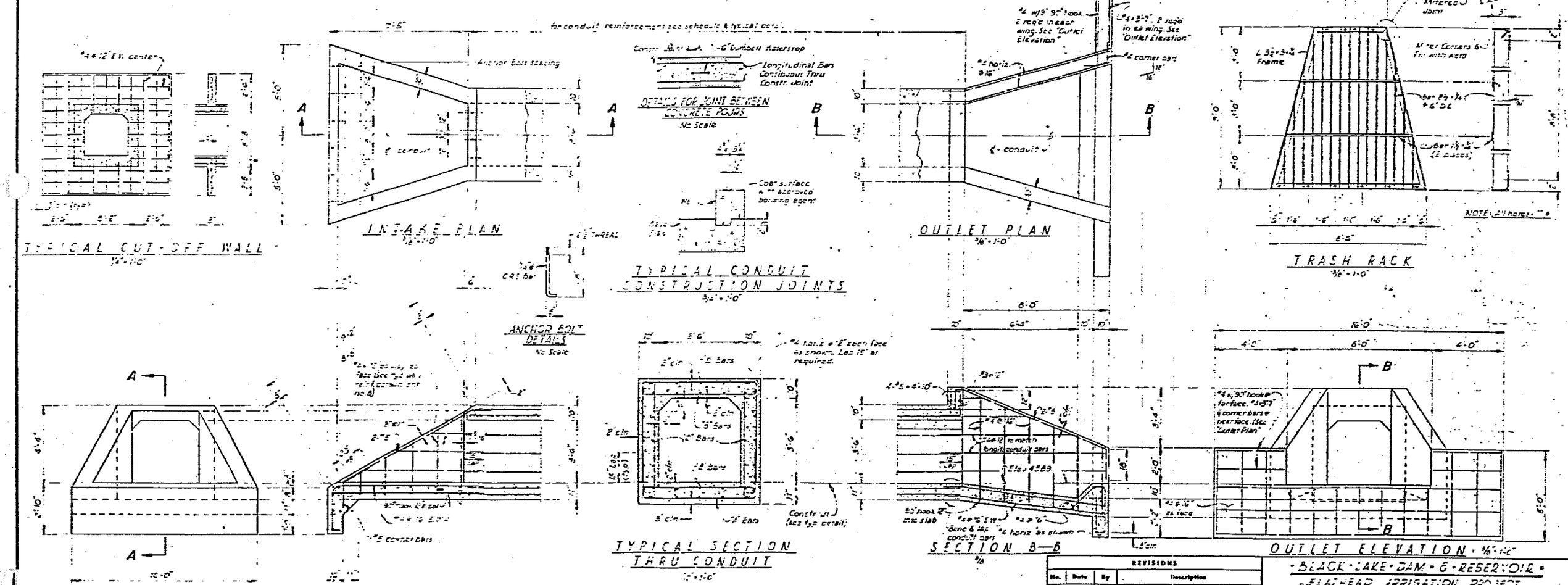
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)


PLAN
Scale 1"=30'
Upstream Toe of Dam
Downstream Toe of Dam
Valve Tower
Upstream Conduit
Outlet
Drain Outlet 0.2% grade
Lay in smooth curve at all horizontal & vertical alignment & grade changes
Core #1
Dense sand & silty sand
Silty sand with fine gravel
Sand
Dense silty sand & clay lenses
Open sand & clayey silt layers
Perforated PCP
Aggregate
Fine end of pipe
Fine of Dam
Top of Dam Elev. 4350.0
High Water Line Elev. 4340.0
Original Ground at Axis
Profile of Top of Downstream Blanket
Profile of Drain Pipe Invert
Profile of Top of Upstream Blanket 50' Lt
Profile of bottom of Impervious Clay Core
PROFILE
Scale 1"=30'
Original Ground
Excavate as required to obtain 6' min. depth (upstream & downstream)
Upstream Blanket slopes 8% down and away from Dam at Stations 2+60 through 4+95.
When grade of top of blanket is over 6' above stripped subgrade, unclassified embankment shall be placed to provide 6' min. blanket depth (upstream & downstream)
6' min. Impervious Clay Blanket (upstream)
6' min. Impervious Clay Blanket (downstream)
Bottom Elevations vary see Profile
Toe Drain with perforated 6" R.C.P. laid with open joints with porous gravel back fill
TYPICAL CROSS SECTION
No Scale
Unclassified Embankment
Top of stripped Subgrade
See Profile for grade
Clearing line on lake perimeter Elev. 4342.0
Drain Outlet 0.2% grade
Exact location and length of Drain Outlet to be determined in the field.
Locate & Riprap as necessary to prevent erosion at downstream end of pipe.
Drain Pipe & Field
Drain Pipe & Downstream Manhole
Drain Clay Core
End of Drain Pipe & Field
End Downstream Blanket
End Upstream Blanket
End Clay Core
REVISIONS
No. Date By Description
BLACK LAKE DAM & RESERVOIR
FLATHEAD IRRIGATION PROJECT
MONTANA
DETAILS of DAM
MORRISON-MAIERLE, INC.
KALISPELL MONTANA

UPPER JOCKO RESERVOIR



CONDUIT REINFORCEMENT SCHEDULE			
[illegible]	"A" & "C" Bars	"B" Bars	"C" Bars
From inlet to 20.0' upstream	#4@6"	#4@6"	#4@6"
From 20.0' upstream to 40.0' upstream	#5@6"	#4@6"	#4@5"
From 40.0' upstream to 60.0' upstream	#5@6"	#4@6"	#4@8"
From 60.0' upstream to 80.0' downstream	#5@7"	#4@5"	#4@8"
From 80.0' downstream to 60.0' downstream	#5@6"	#5@5"	#4@8"
From 60.0' downstream to 100.0' downstream	#5@8"	#4@6"	#4@8"
From 100.0' downstream to outlet	#4@6"	#4@6"	#4@8"



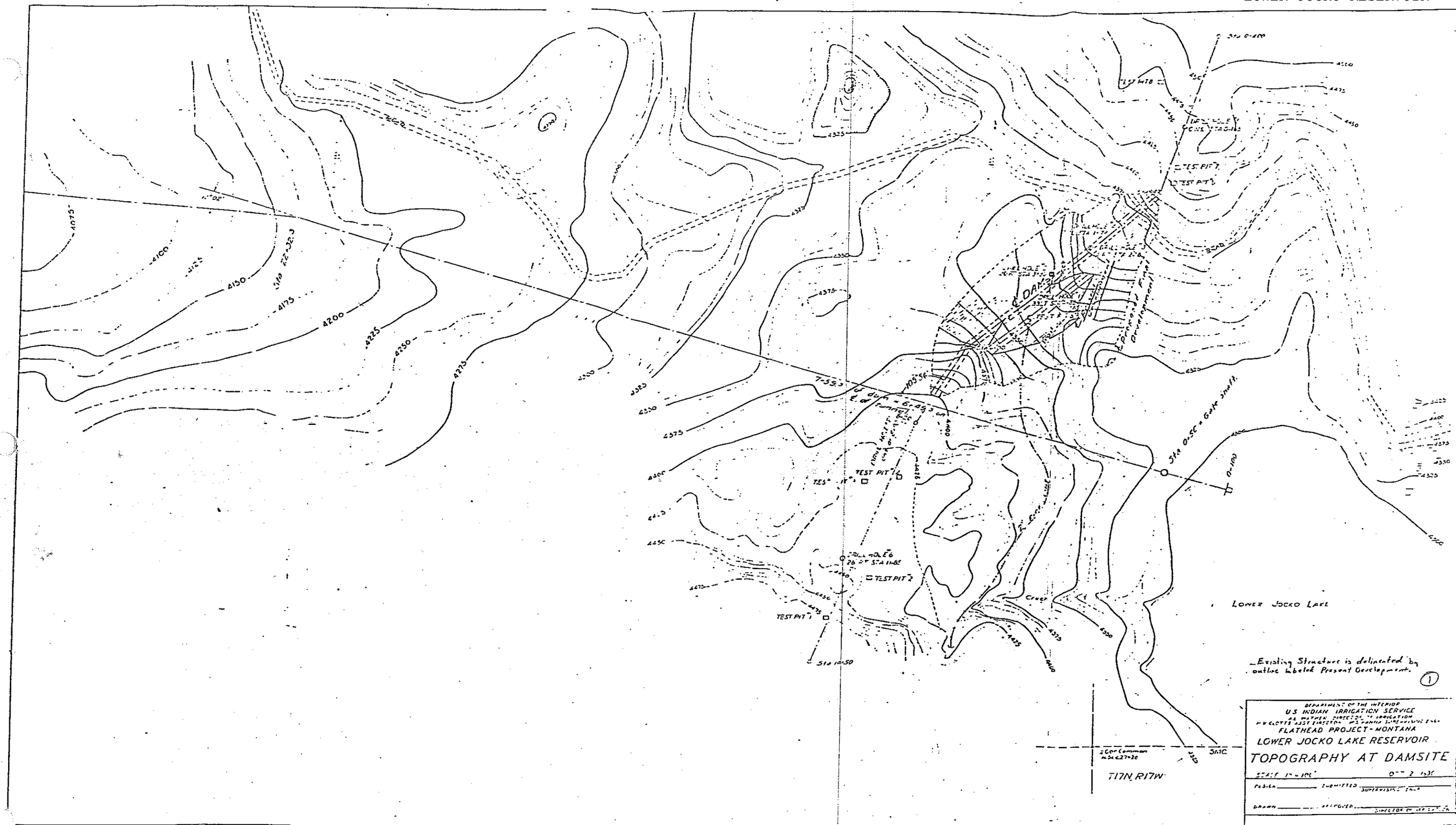
REVISIONS			
No.	Date	By	Description

BLACK LAKE DAM & RESERVOIR
FLATHEAD IRRIGATION PROJECT
MONTANA

OUTLET CONDUIT

SHEET NO. 097-01-01 4

JOHN H. MORRISON, C.E.
JOSEPH A. MAJERLE, C.E.
MORRISON-MAJERLE, INC. CONSULTING ENGINEERS HELENA, MONTANA
HAROLD L. ZABLE STRUCTURAL ENGINEER
ROBERT H. PRESTON SANITARY ENGINEER


TEST PIT 1
TEST PIT 2
TEST PIT 3
TEST PIT 4
TEST PIT 5
TEST PIT 6
DRILL HOLE 6
26' Sta 11+85
Sta 10+50
Sta 0+00
Sta 0+50 = Base Shaft
Sta 0+100
Sta 1+00
Sta 1+50
Sta 2+00
Sta 2+50
Sta 3+00
Sta 3+50
Sta 4+00
Sta 4+50
Sta 5+00
Sta 5+50
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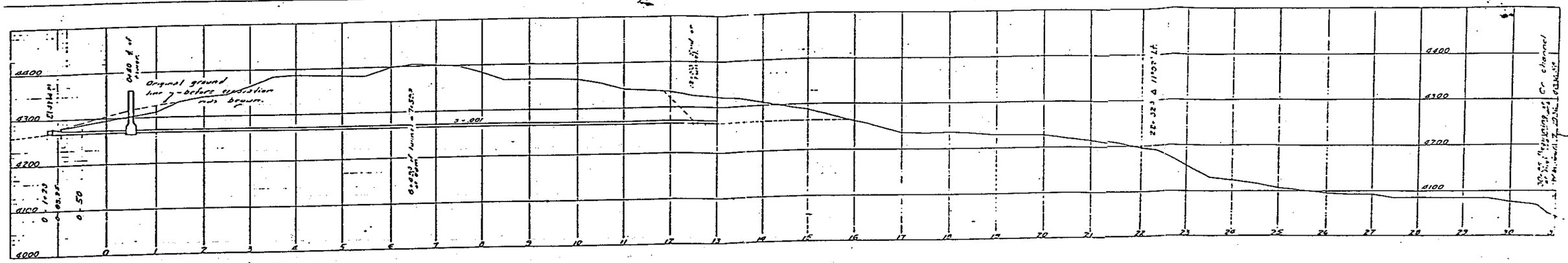
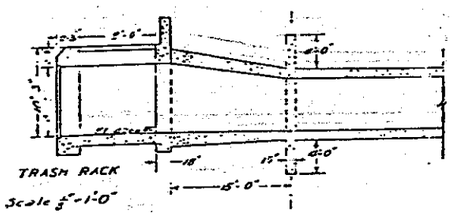
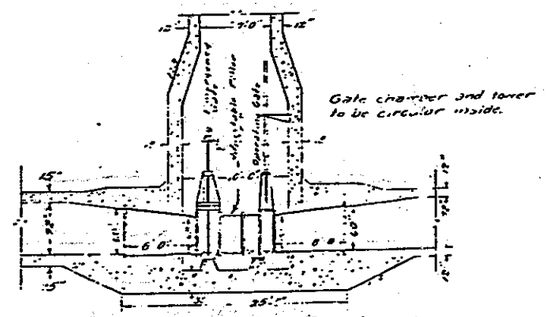
Sta 9+50
Sta 10+00
Sta 10+50
Sta



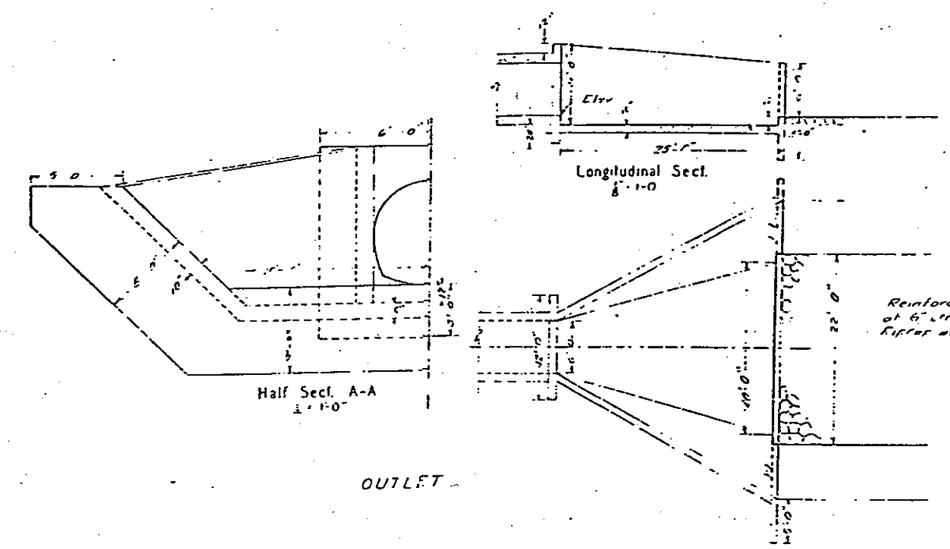
PROFILE ON CENTER LINE OF TUNNEL
Scale 1"=100'



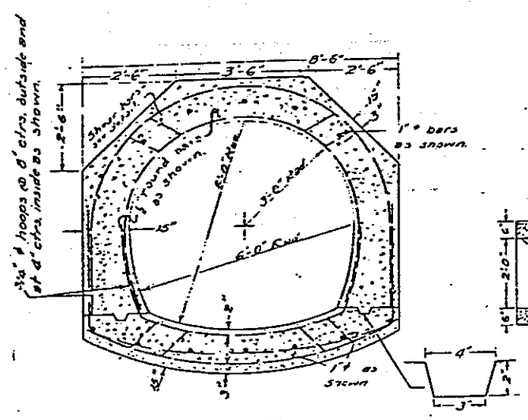
TRASH RACK
Scale ⅛"=1'-0"
For details see F-4993



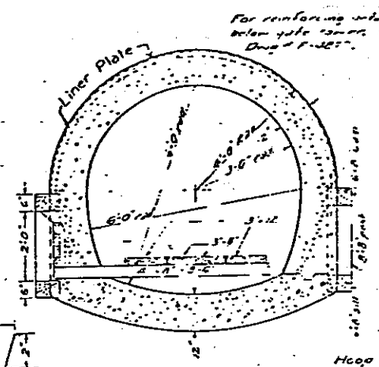
SECTION THRU GATE CHAMBER
Not to scale.
For details see F-4857



OUTLET

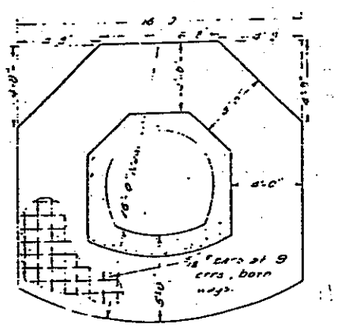


ABOVE GATE TOWER
Scale ⅛"=1'-0"
For details see F-5128



BELOW GATE TOWER
Scale ⅛"=1'-0"

Hoop reinforcing below gate tower to be ¾" bars, placed as shown on Dwg. # F-4880.



6 cut-offs required as shown on profile.

AT CUT-OFF
Scale ⅛"=1'-0"

TYPICAL TUNNEL SECTIONS

(3)

DEPARTMENT OF THE INTERIOR
U.S. INDIAN IRRIGATION SERVICE
A.S. WATKINS DIRECTOR OF IRRIGATION
W.W. CLOTT - 1937 DIRECTOR - W.S. HAMMA SUPERVISING ENGR.
FLATHEAD PROJECT - MONTANA
LOWER JOCKO LAKE RESERVOIR
CONTROLLING WORKS

Revised - May 1937

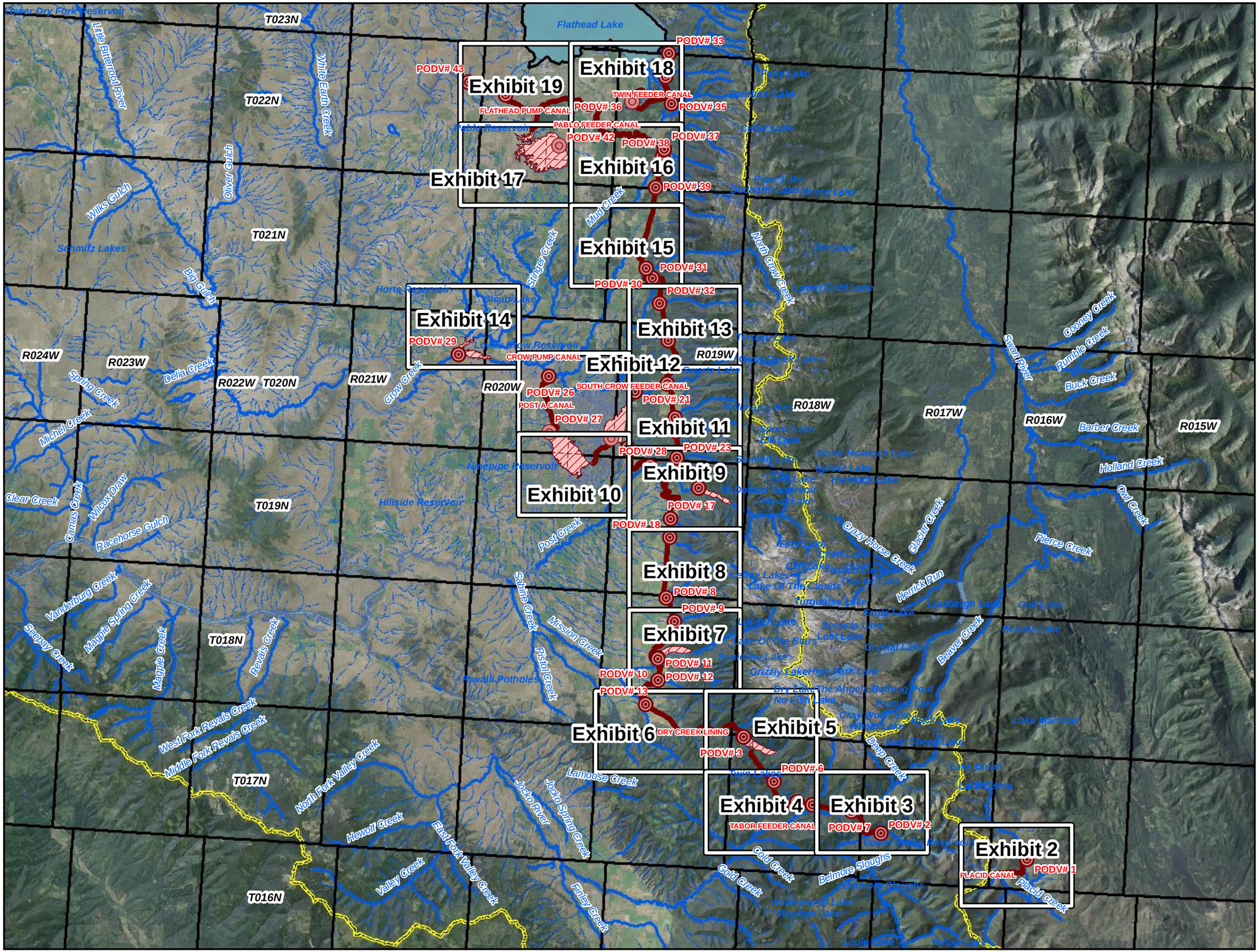
F-4836

Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 1



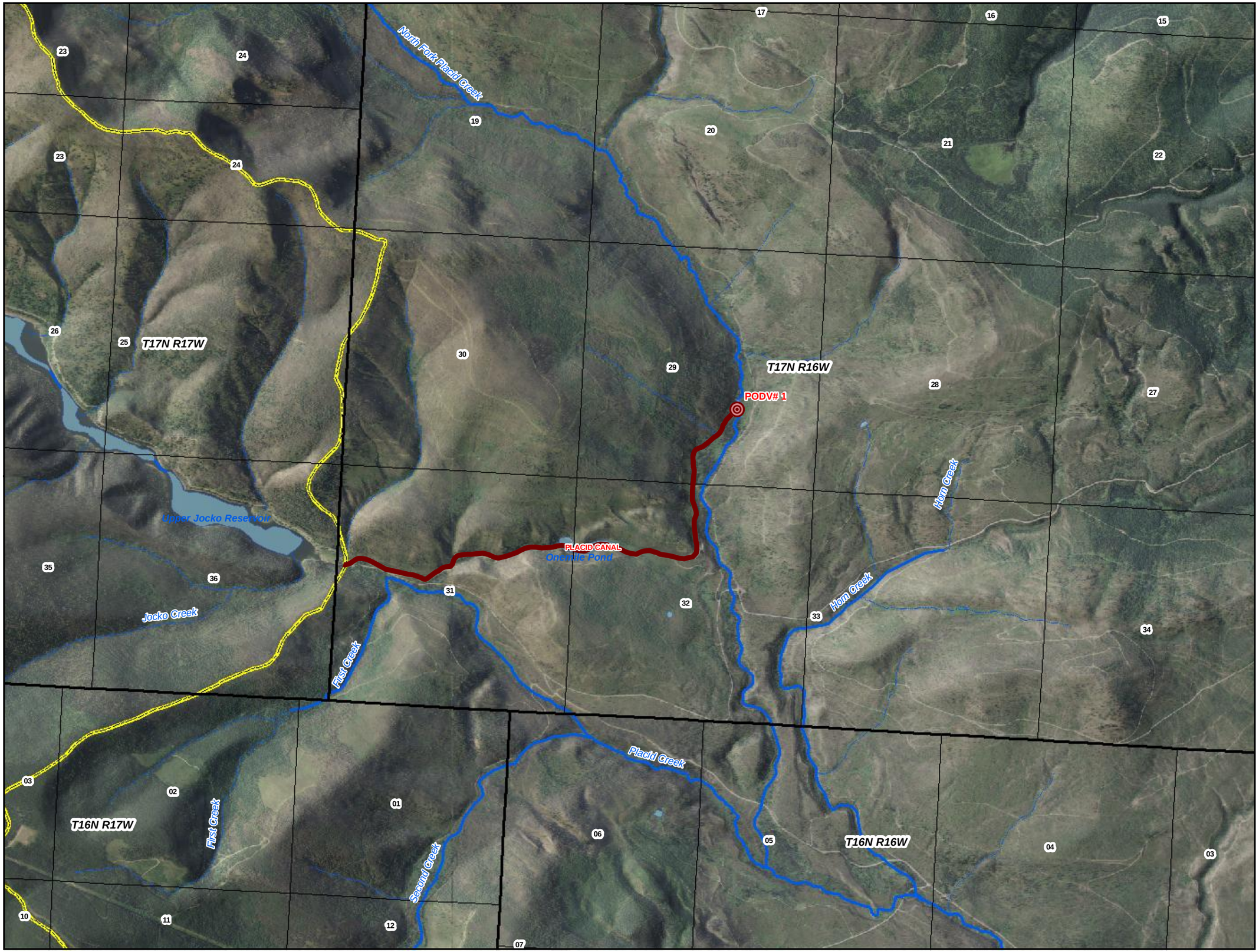
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

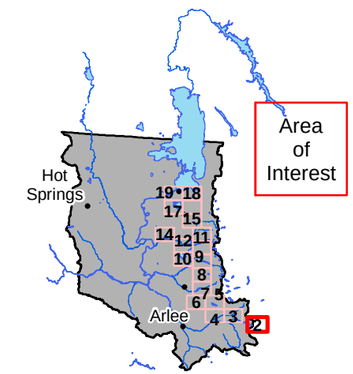
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 2





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

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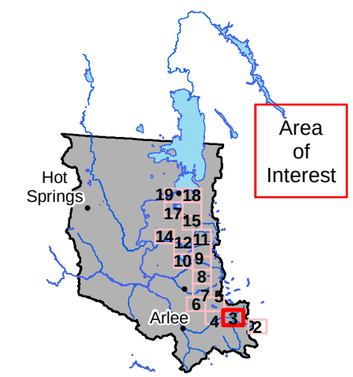
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 3



Flathead Indian Reservation

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0 0.25 0.5 Miles

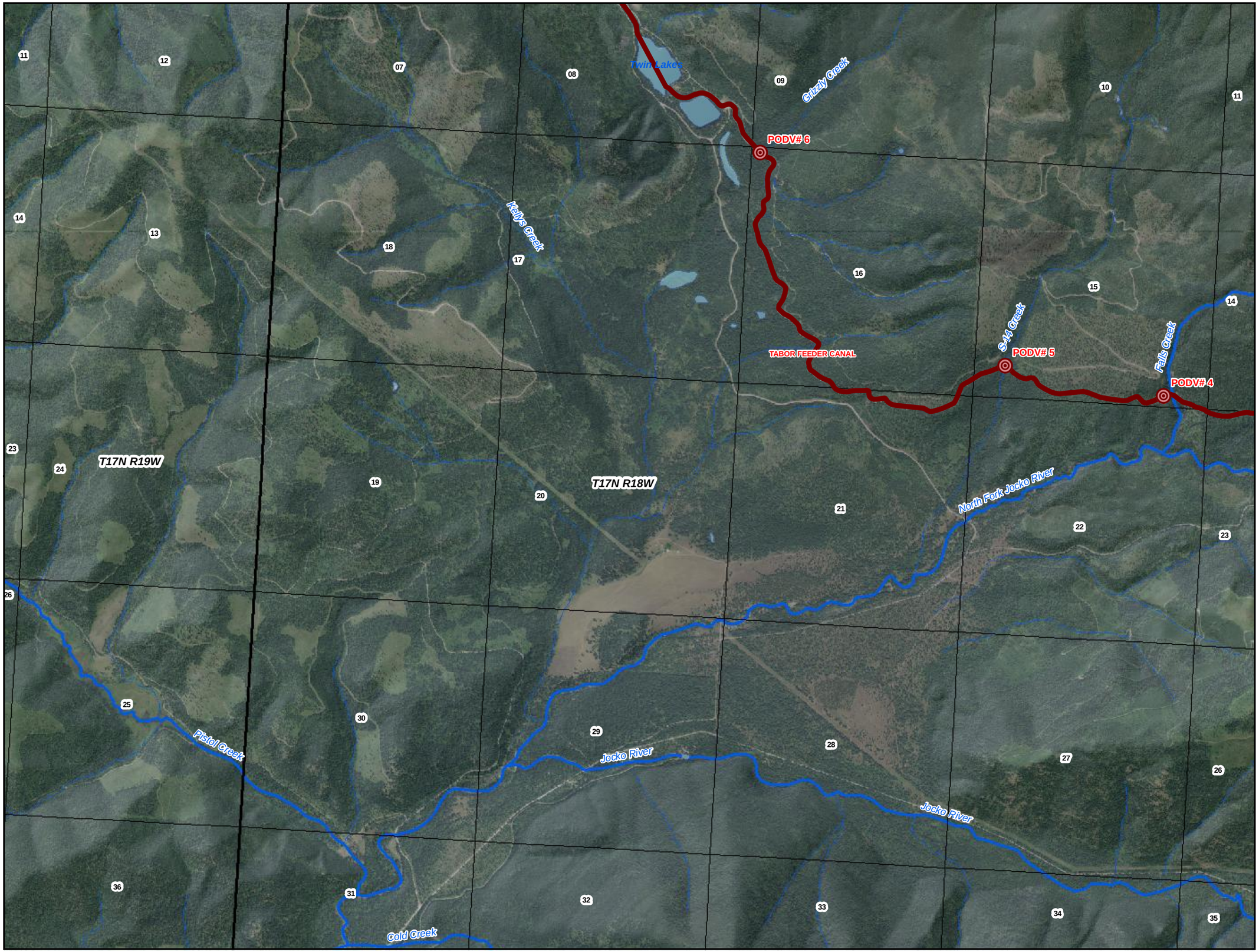
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

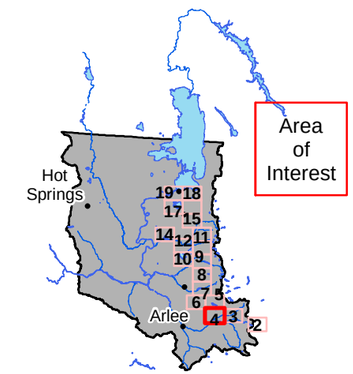
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 4





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

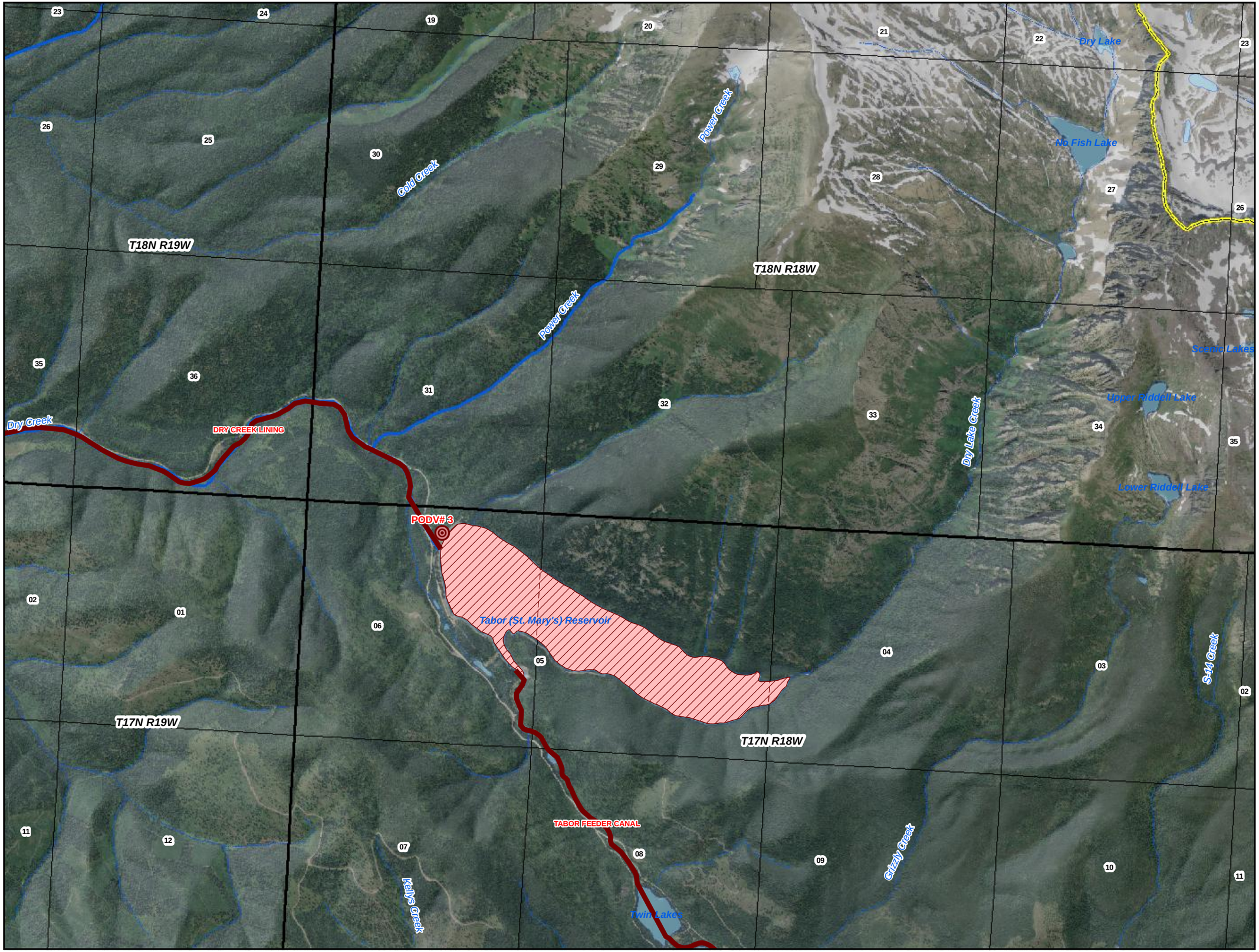
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

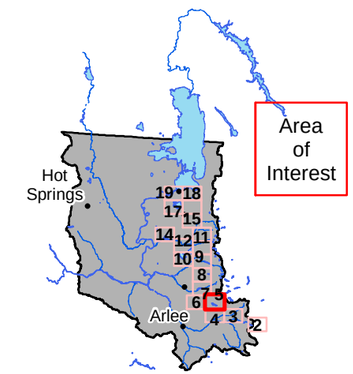
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 5





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

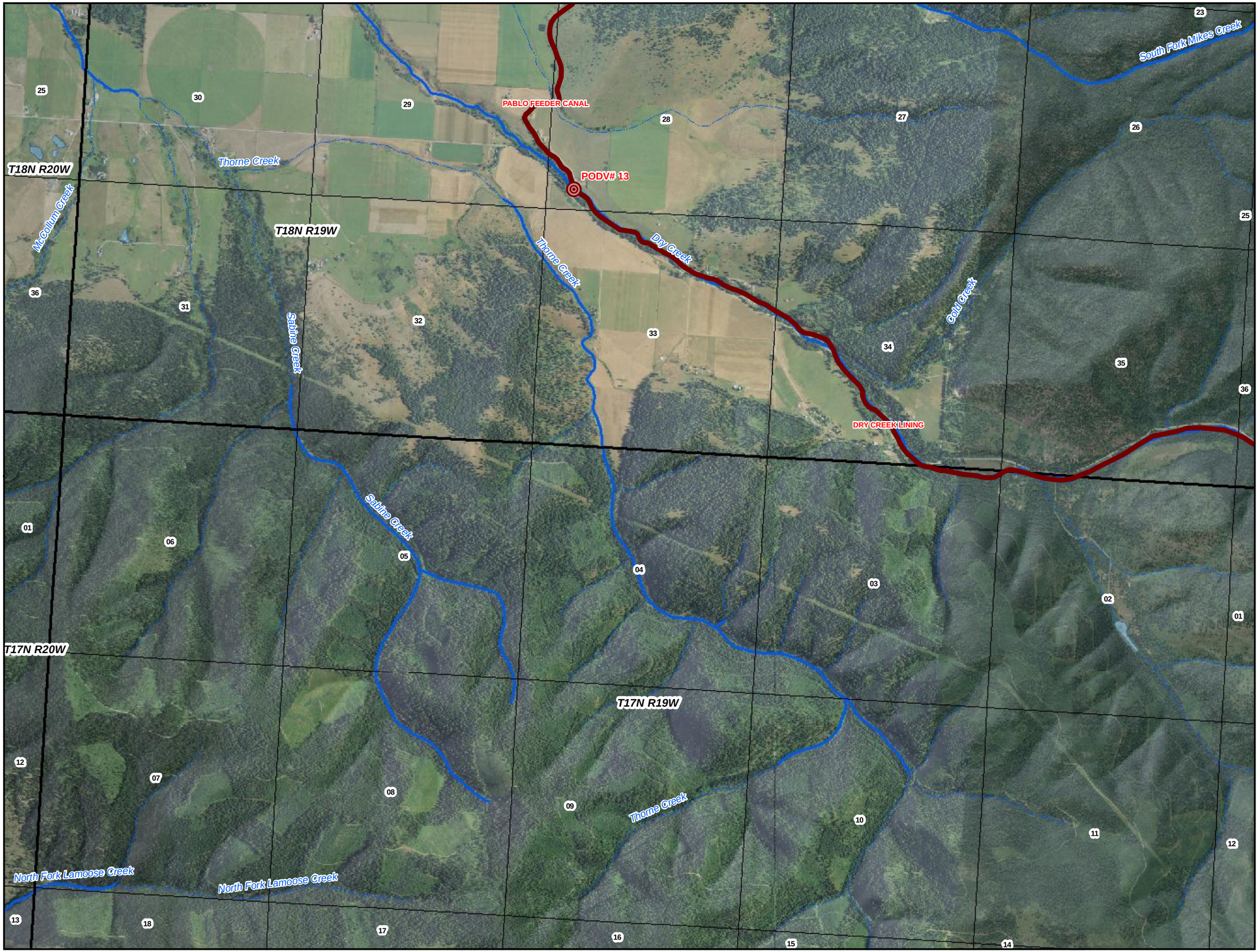
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

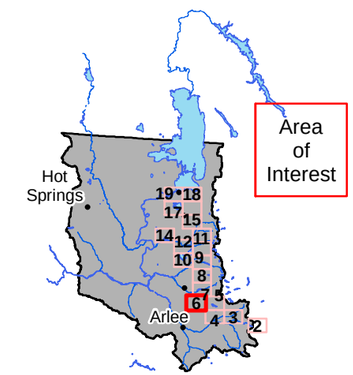
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 6





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

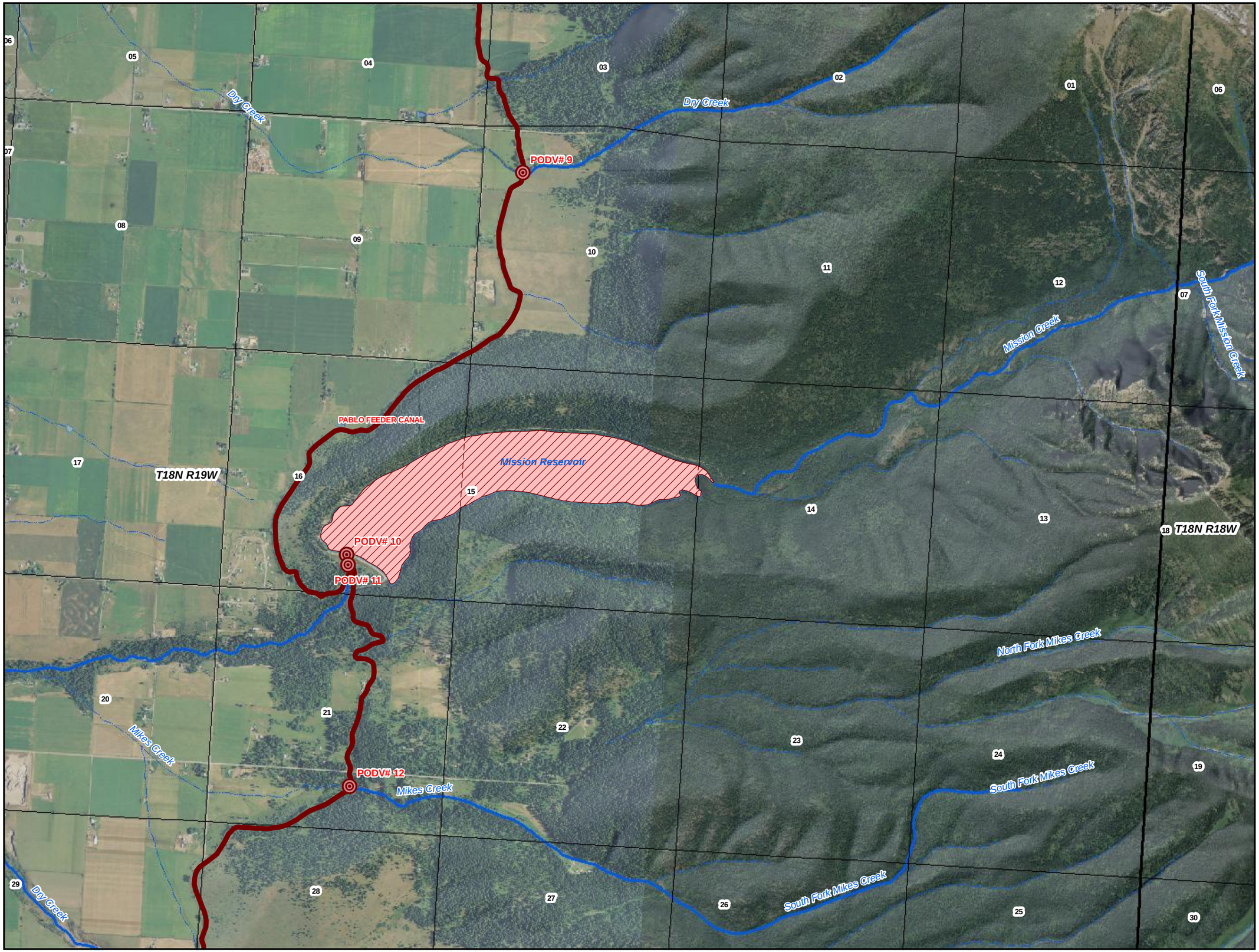
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

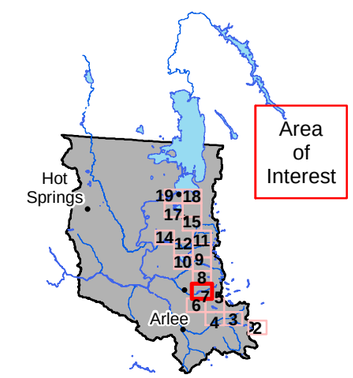
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 7





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

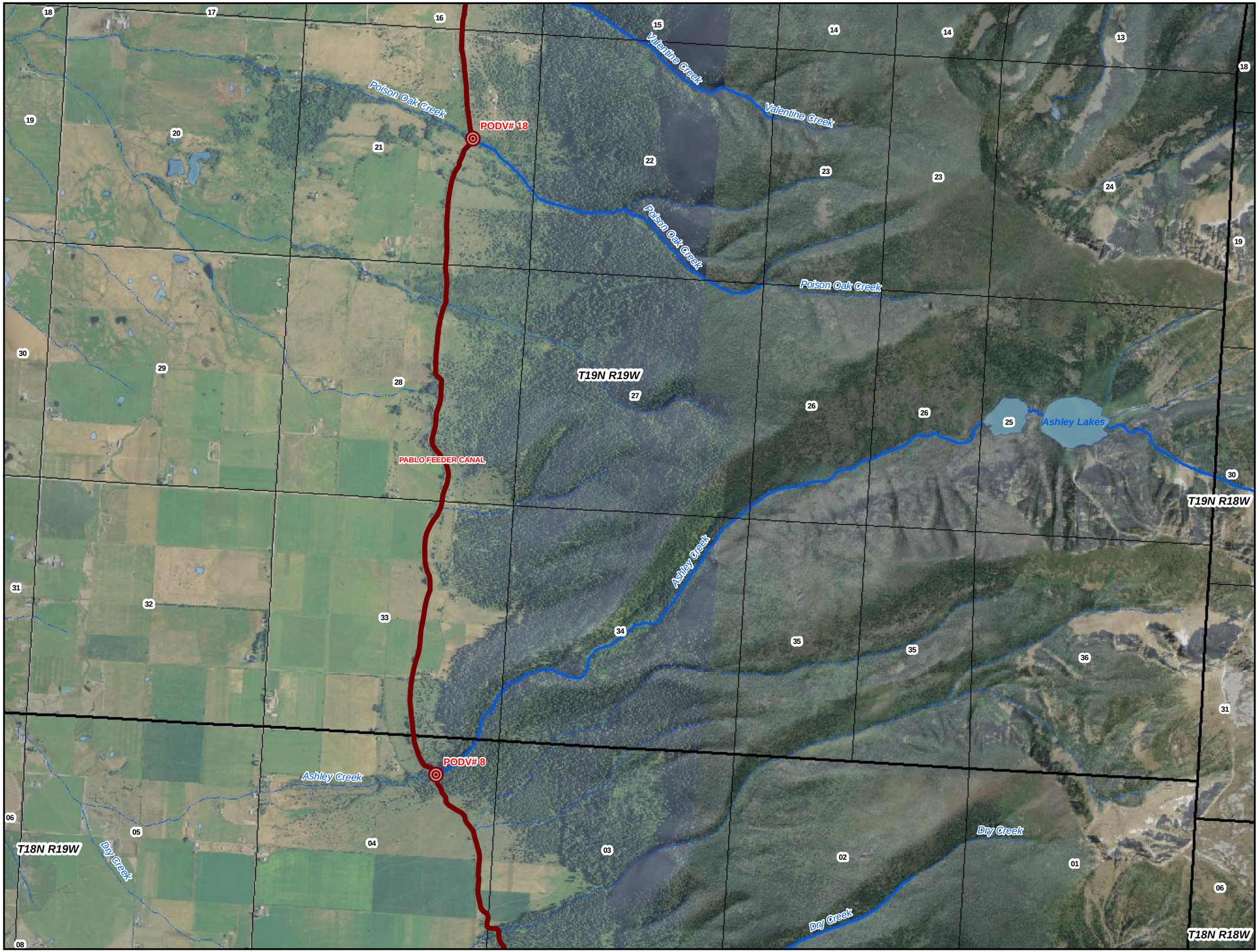
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

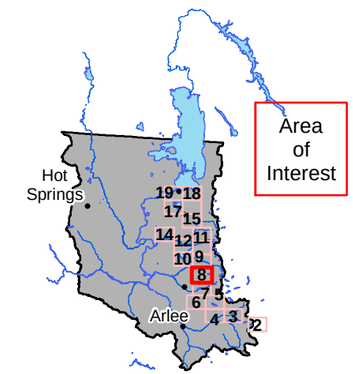
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 8





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

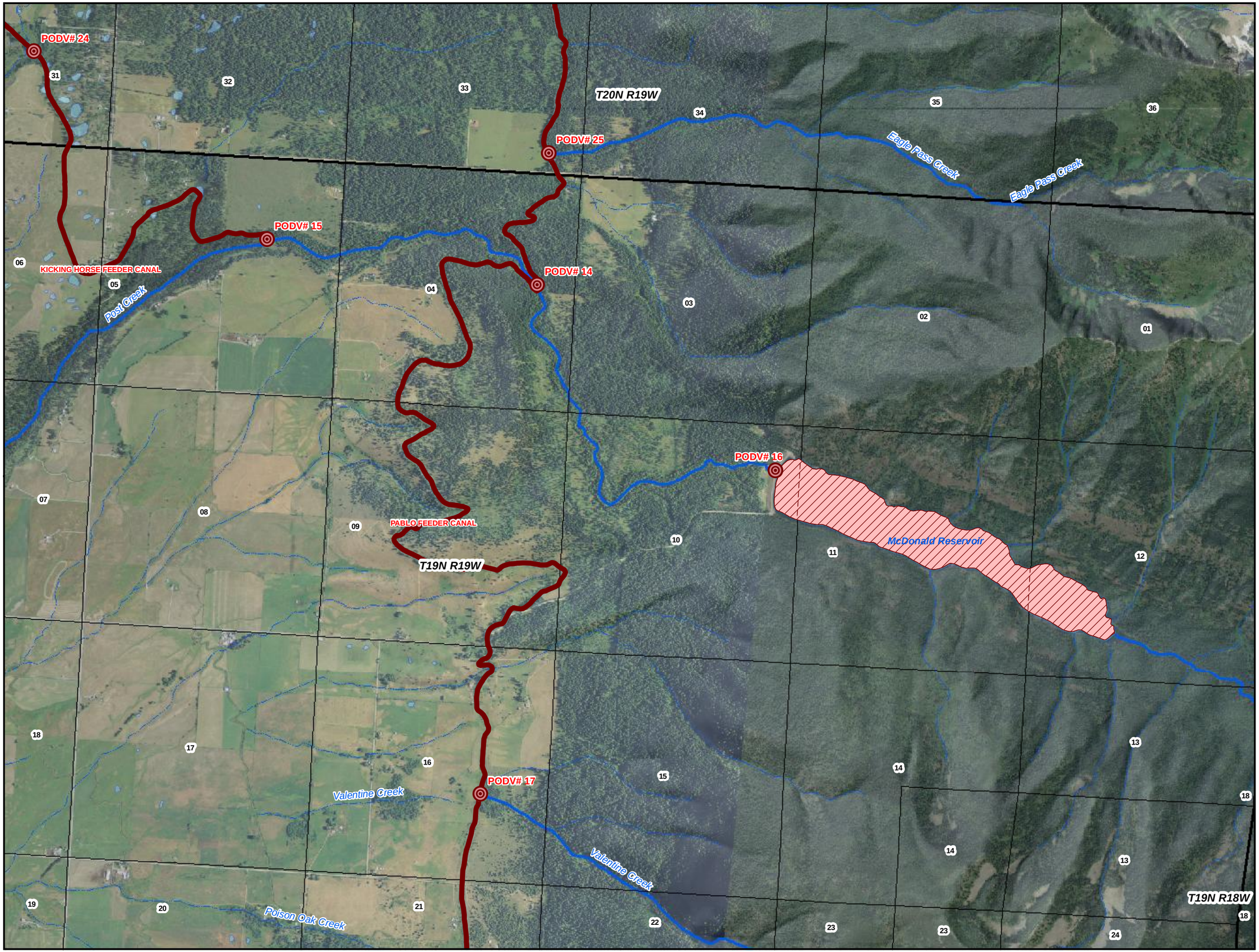
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

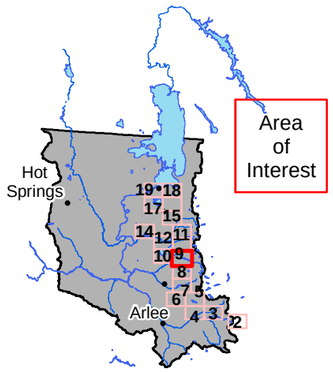
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 9





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

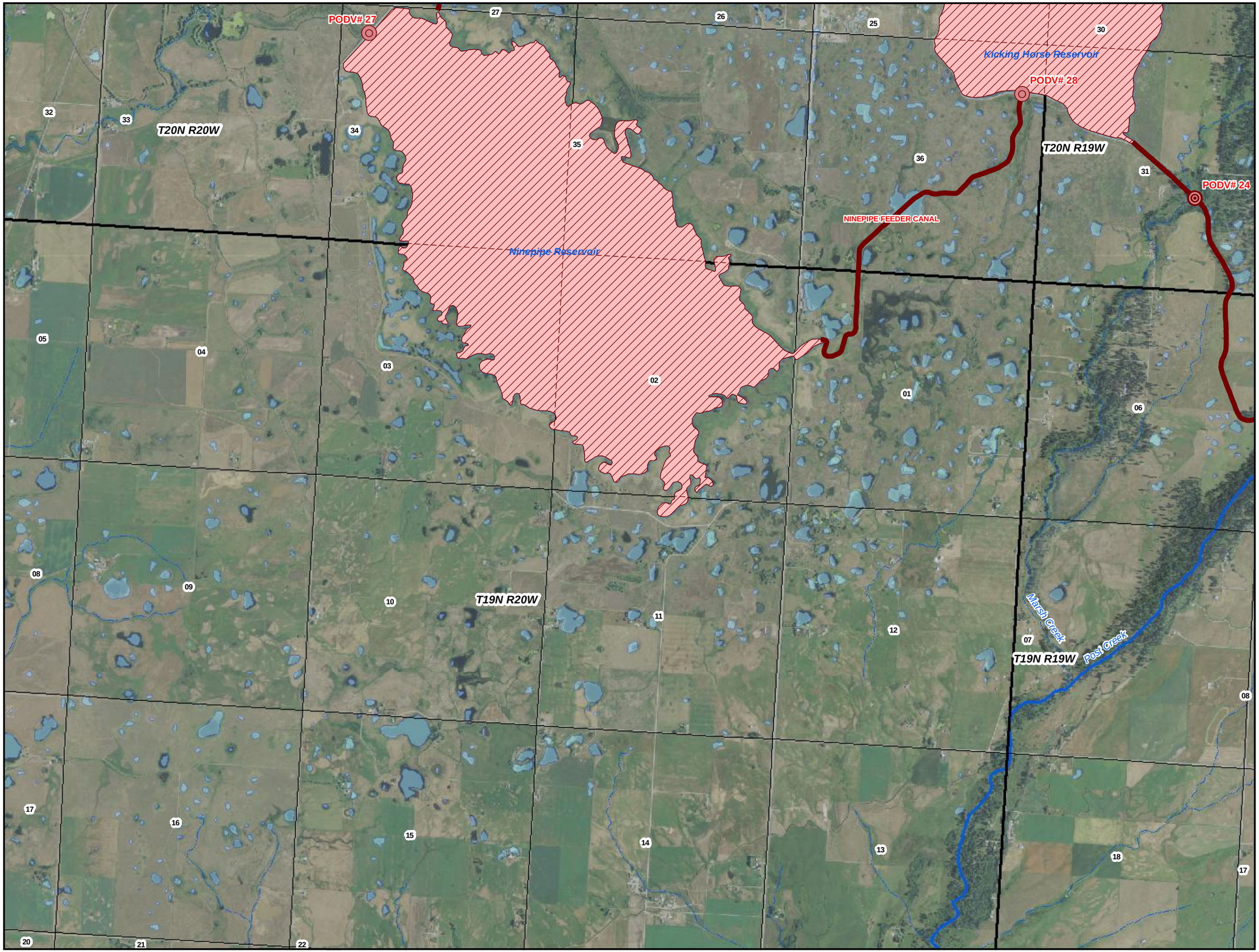
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

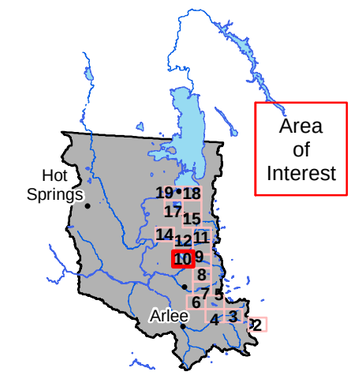
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 10





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

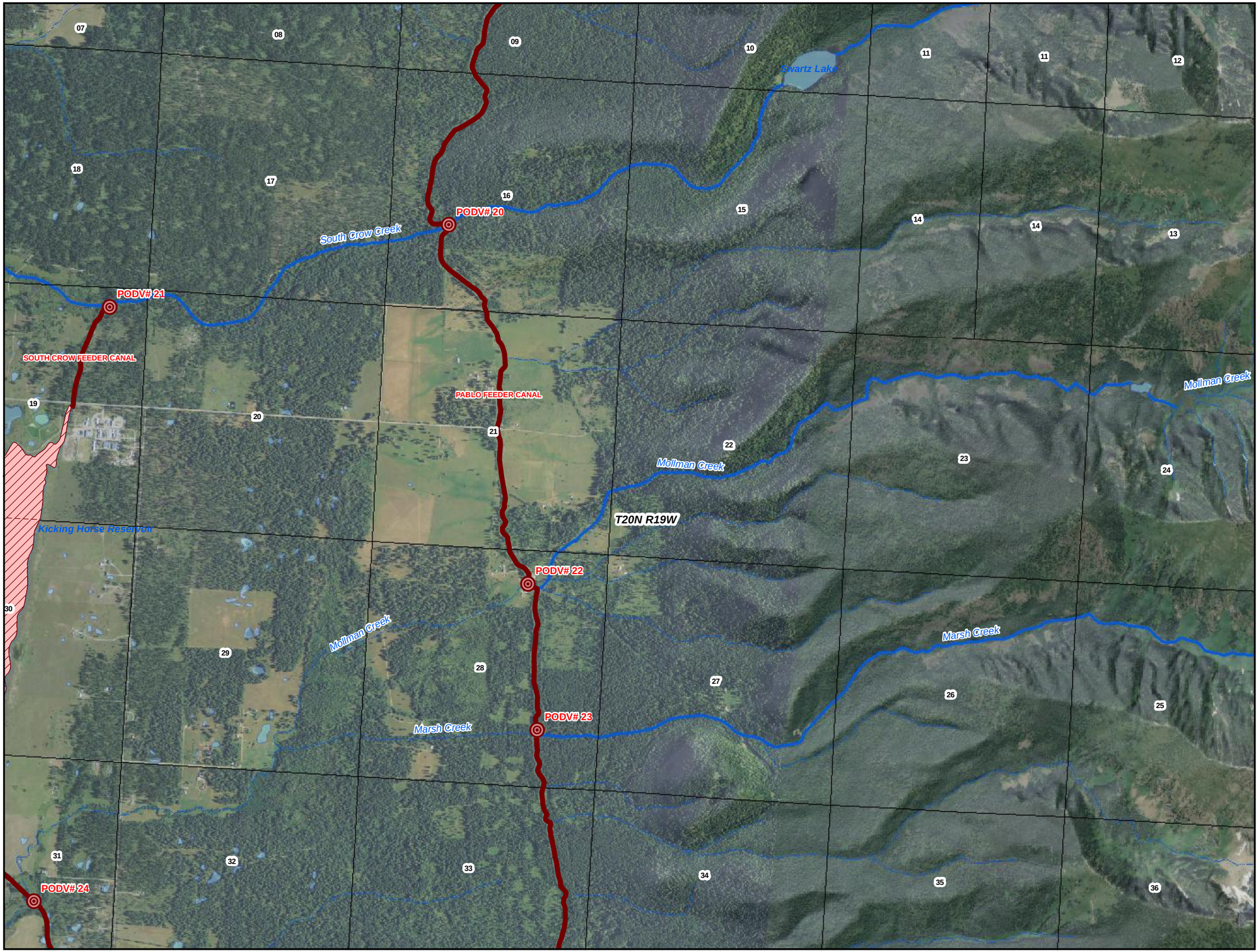
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

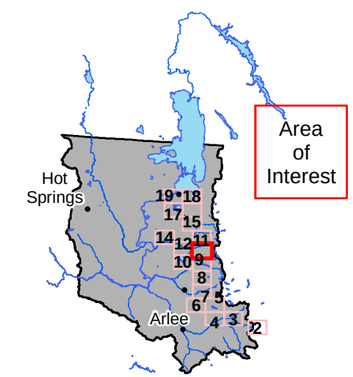
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 11





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

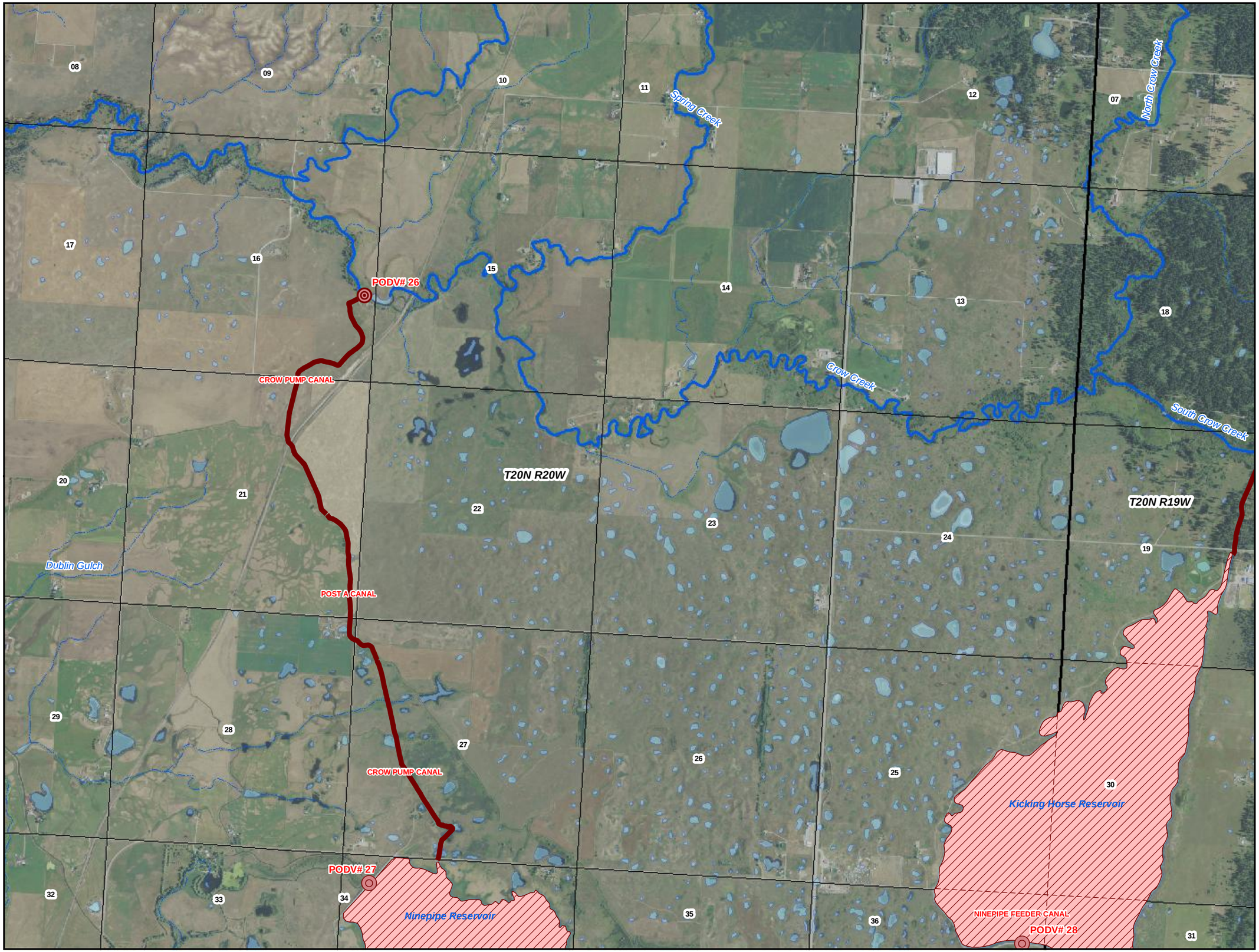
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

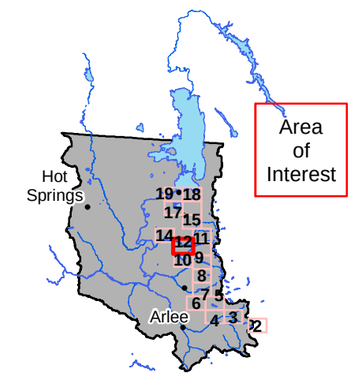
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 12





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

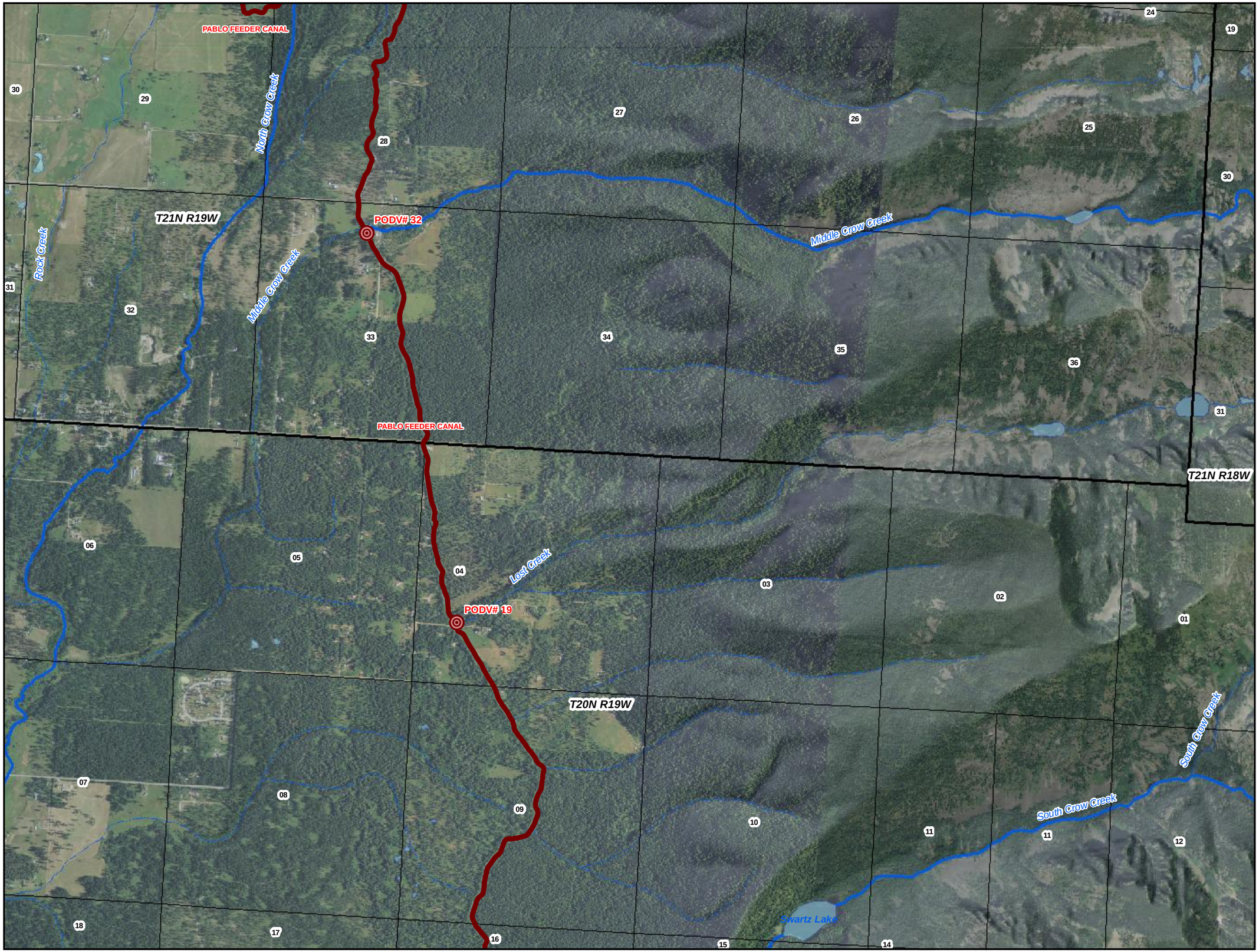
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

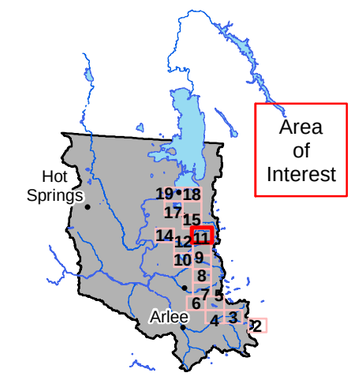
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 13





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
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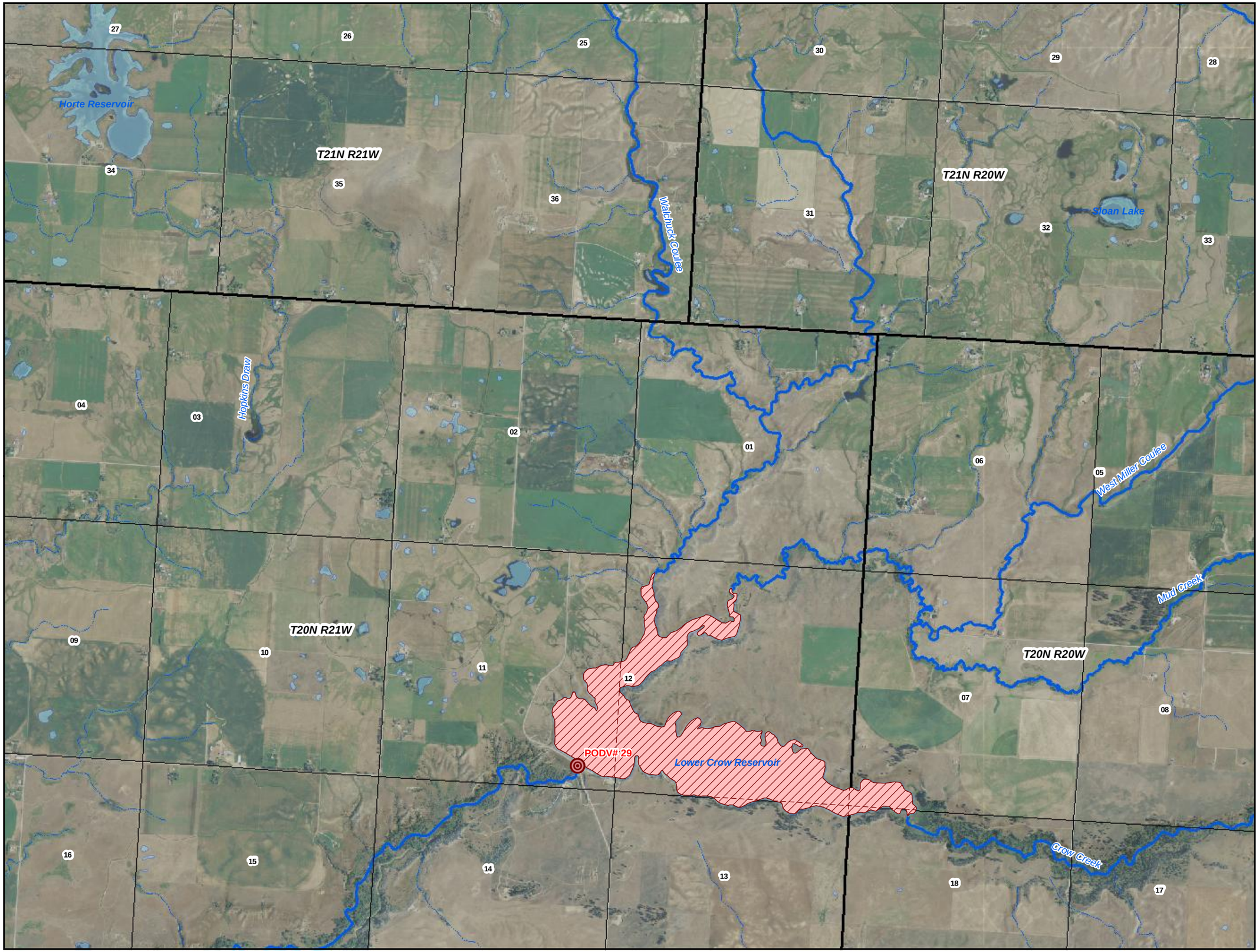
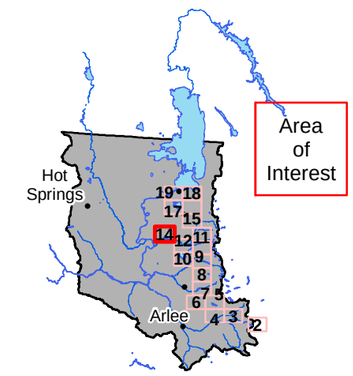
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 14





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

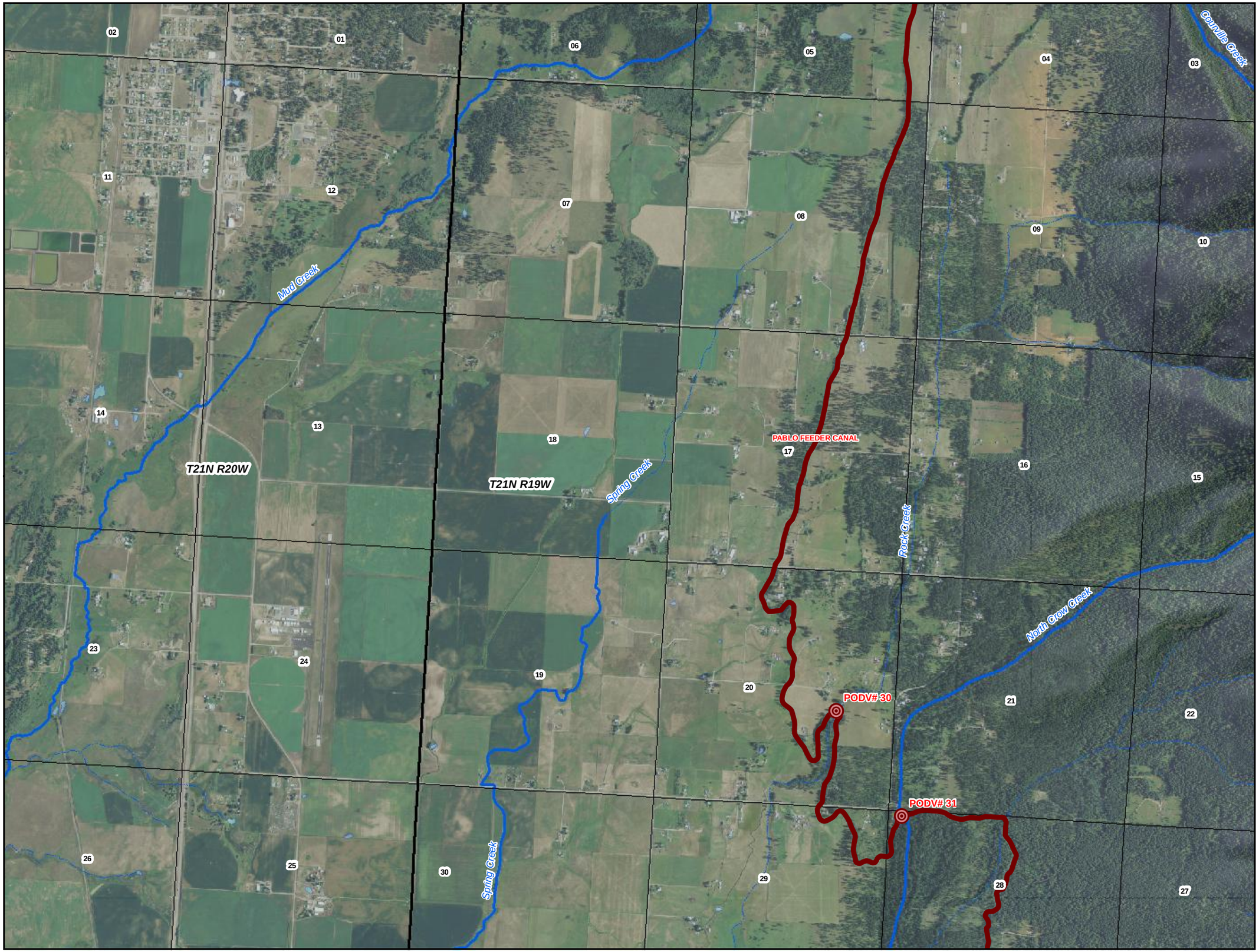
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

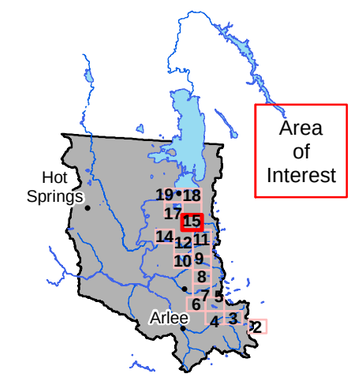
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 15





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

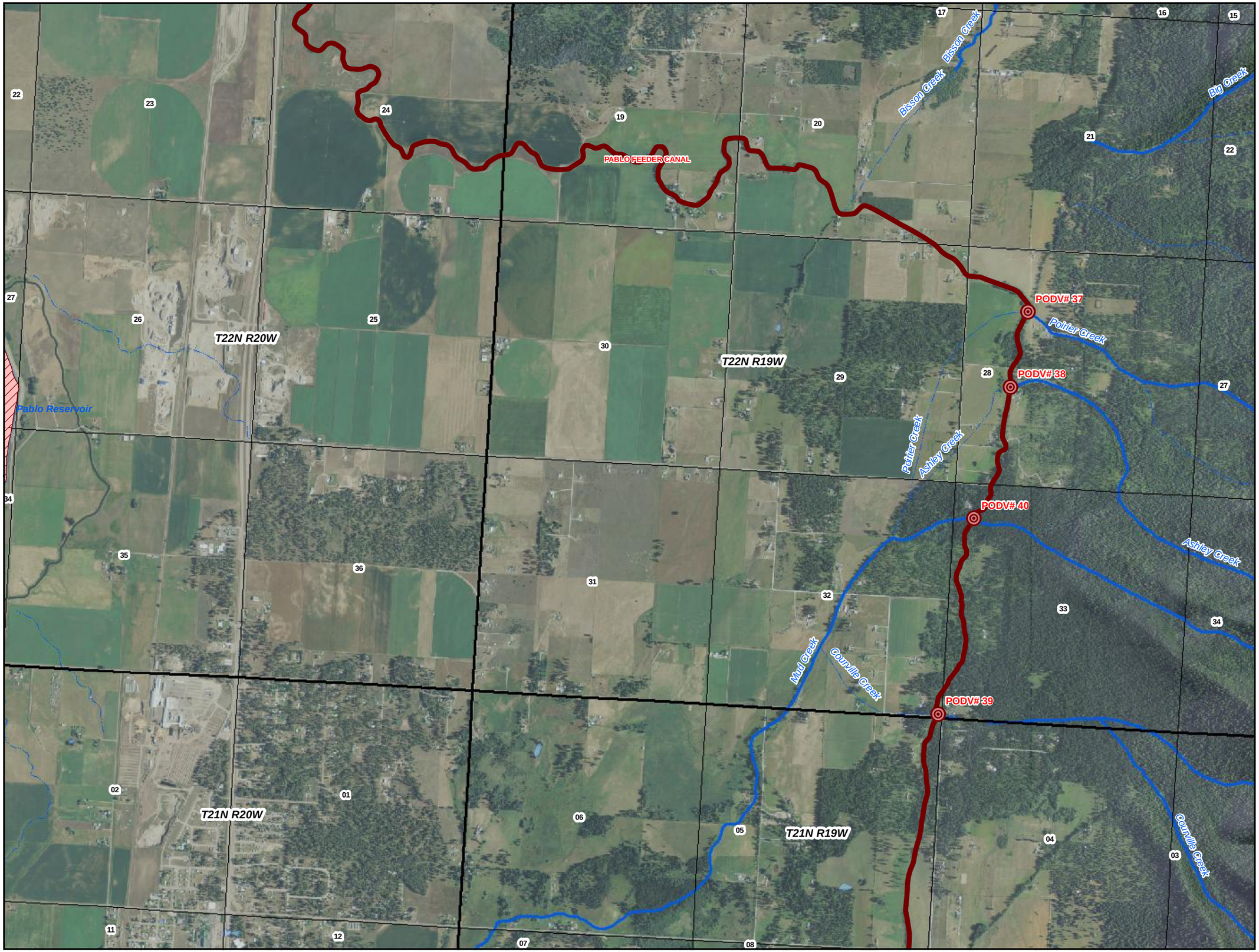
POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

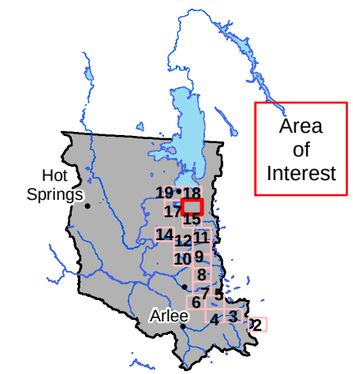
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 16





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
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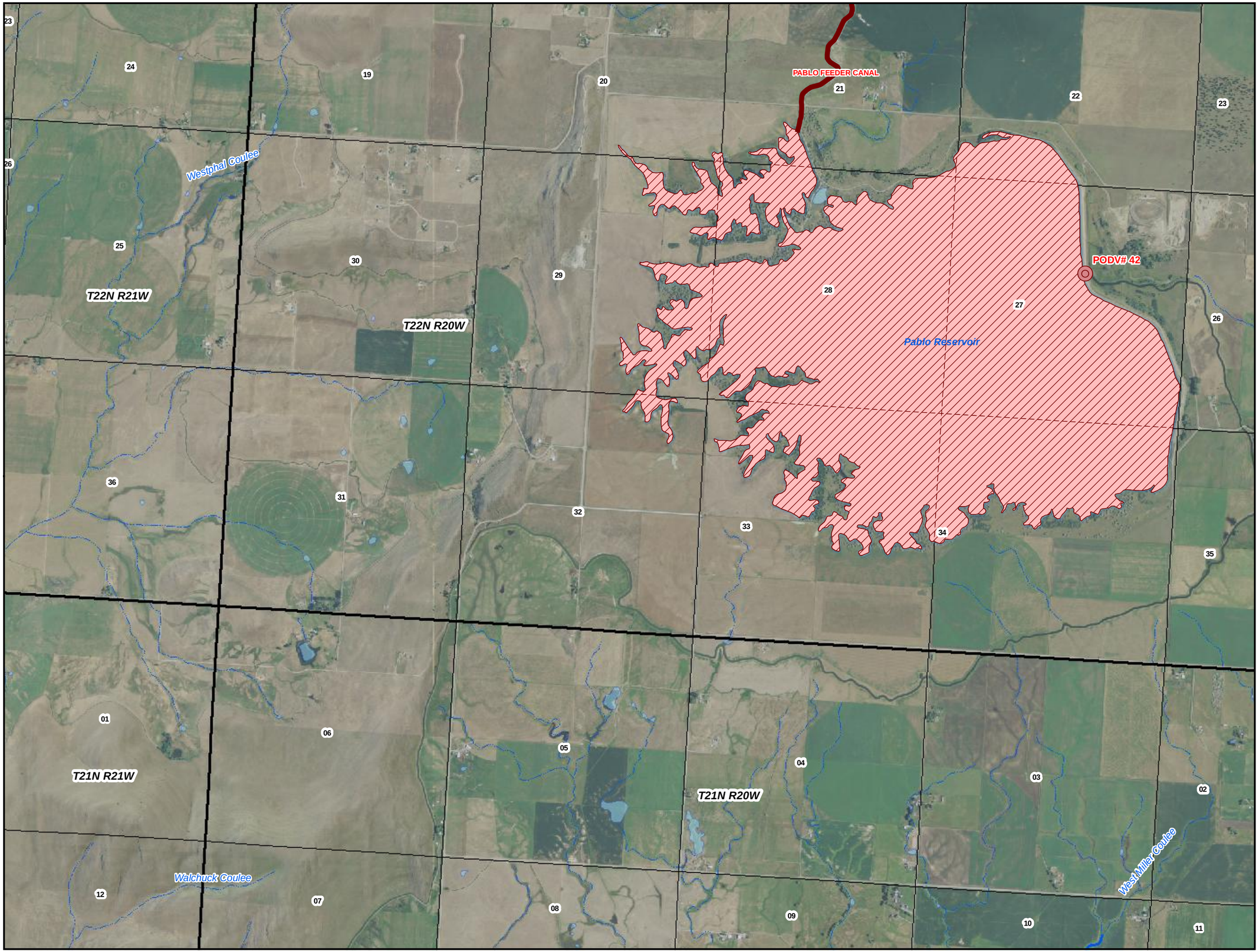
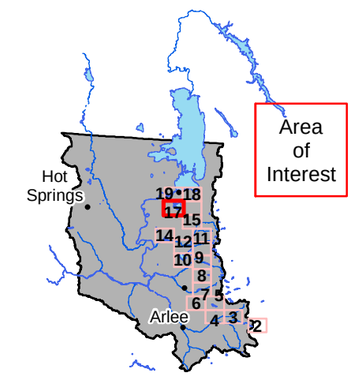
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 17





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
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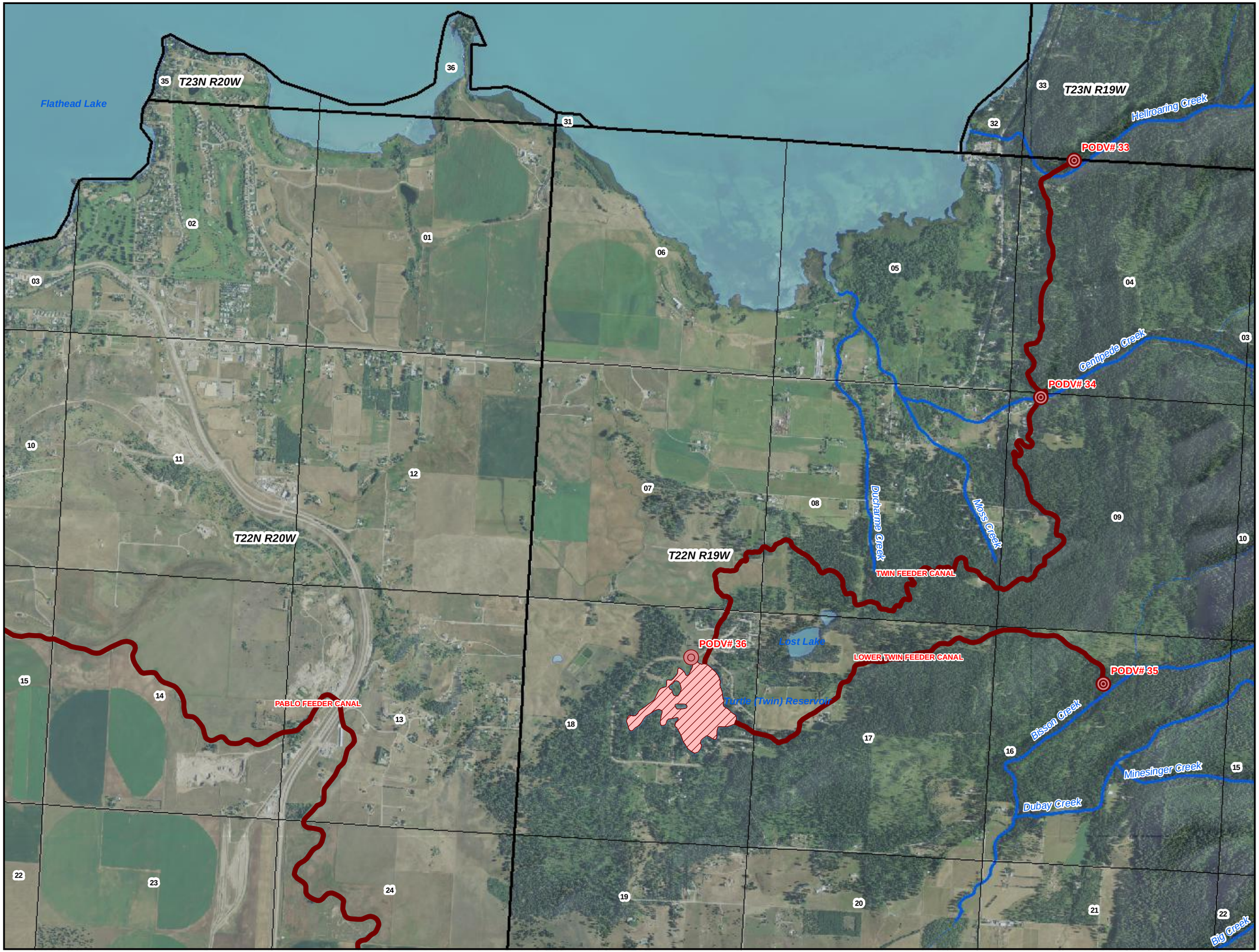
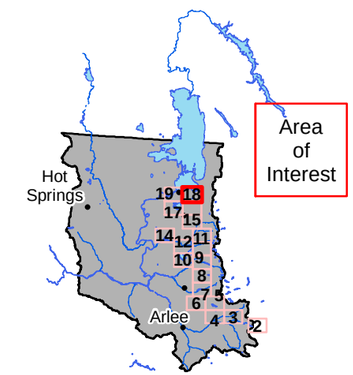
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 18





Flathead Indian Reservation

Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
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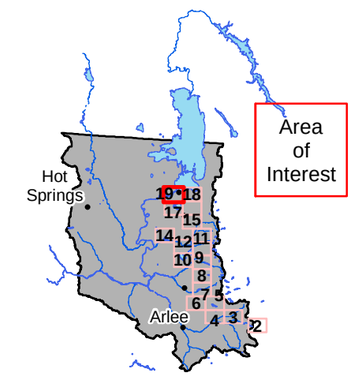
Place of Use and Point of Diversion

FIIP Reservoir Minimum Pool

76L 30052929

Exhibit 19



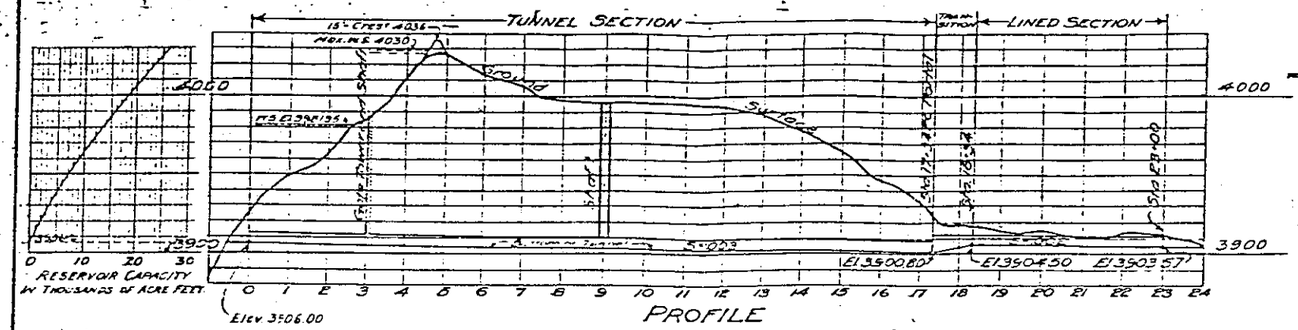
Flathead Indian Reservation

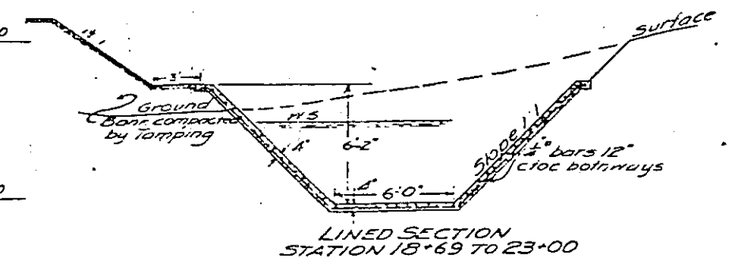
Legend

- Place of Use
- Primary Point(s) of Diversion
- Secondary Point(s) of Diversion
- Ditch or Pipeline
- Reservoir
- Reservation Boundary

0 0.25 0.5 Miles

POU/POD Data Source: CSKT-MT Compact FIIP Reservoir Minimum Pool (available at nris.mt.gov)
Imagery Source: "Montana 2009 Color NAIP Orthophotos, 12-Kilometer Tiles" courtesy of USDA-Farm Services Agency Aerial Photography Field Office and the Montana State Library.
Hillshade created from: "National Elevation Dataset" courtesy of U.S. Geological Survey (USGS), EROS Data Center (1-arc second)

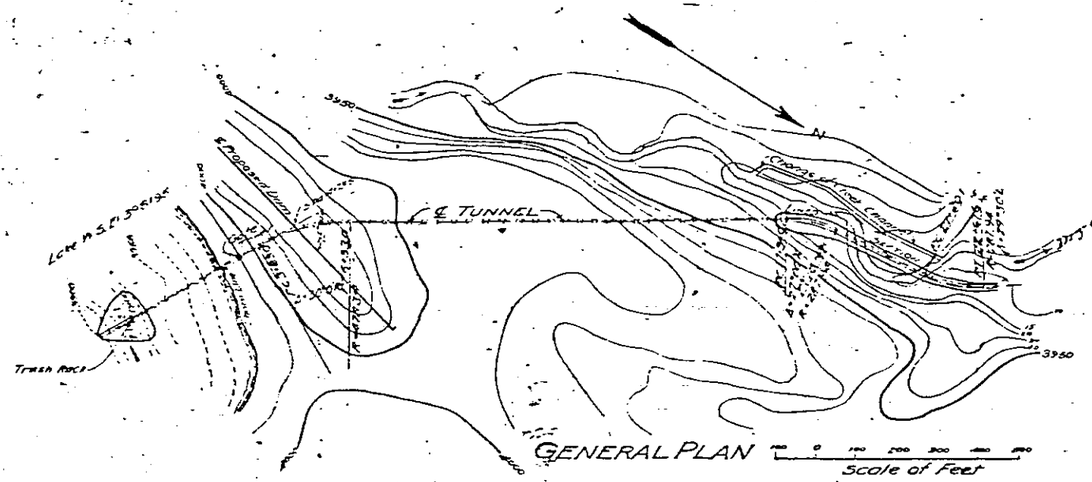




LINED SECTION
STATION 18+69 TO 23+00

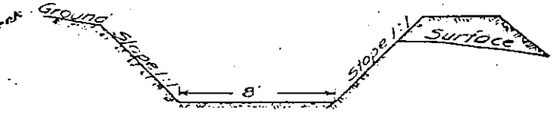
HYDRAULIC PROPERTIES

n=.013	r=2.40
S=.002	V=9.29
A=42.84	Q=398.0
d=4.2'	

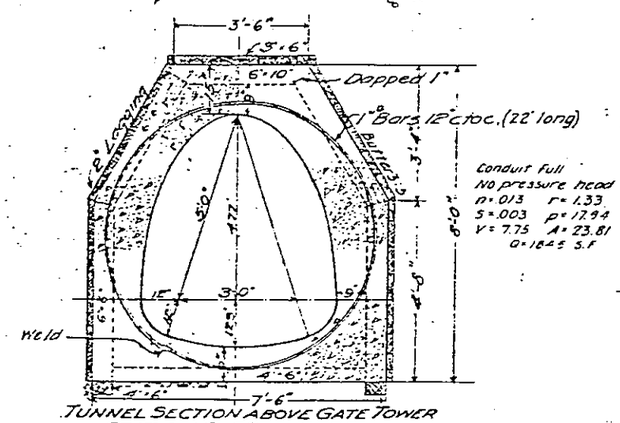


GENERAL PLAN

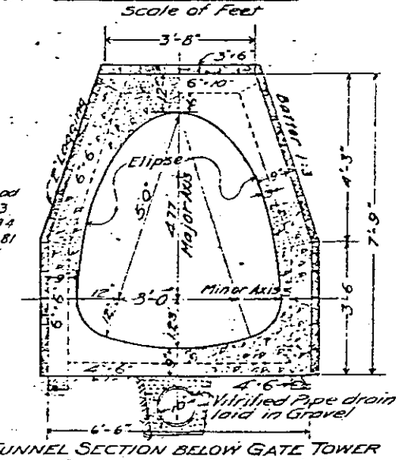
Scale of Feet



SECTION OF CREEK CHANNEL CHANGE

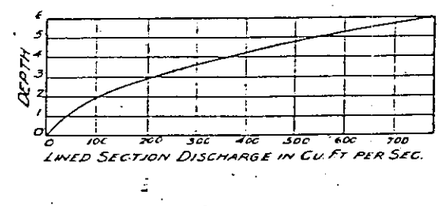


TUNNEL SECTION ABOVE GATE TOWER
STATION 0+00 TO 3+00

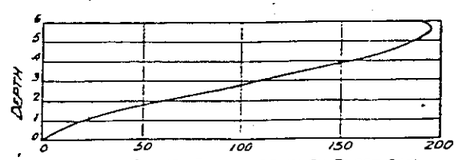


TUNNEL SECTION BELOW GATE TOWER
STATION 3+00 TO 17+34

Scale of Feet

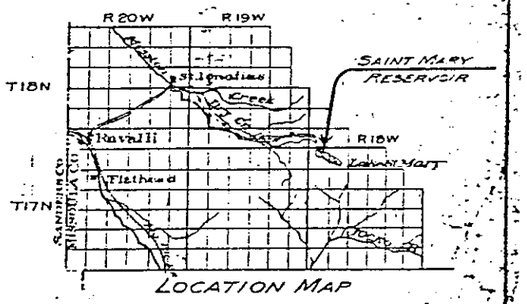


LINED SECTION DISCHARGE IN CU FT PER SEC.



TUNNEL DISCHARGE IN CU FT PER SEC.

(No pressure head)



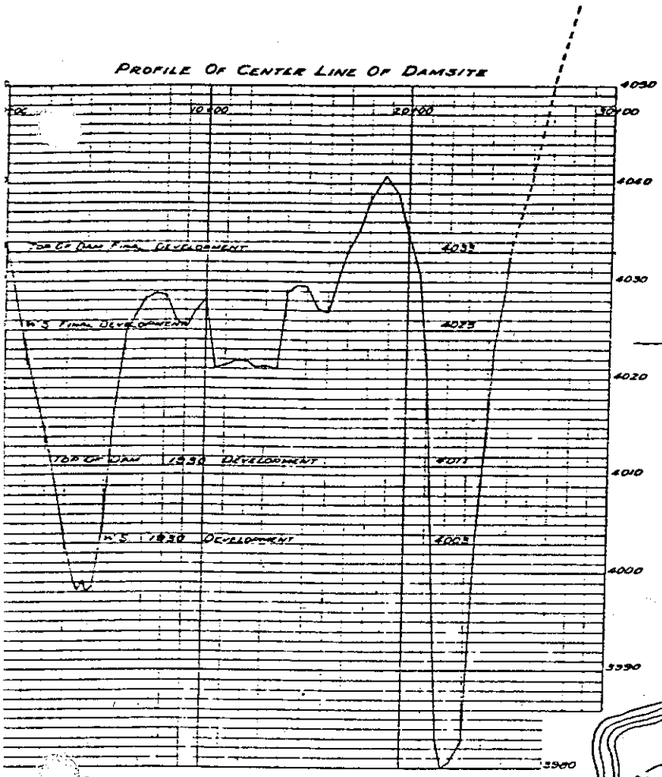
LOCATION MAP

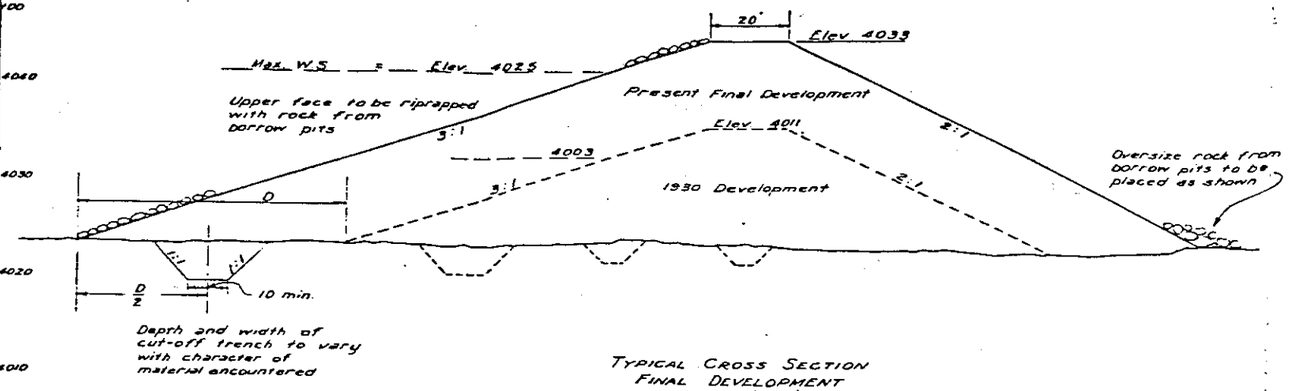
Reviewed: [illegible]

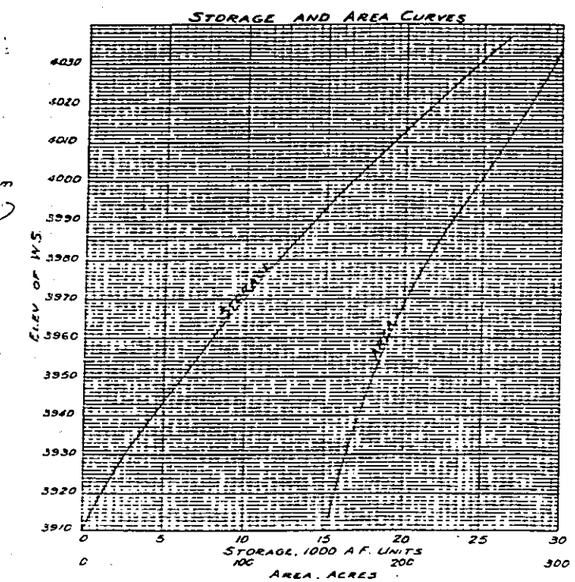
DEPARTMENT OF THE INTERIOR
UNITED STATES RECLAMATION SERVICE
FLATHEAD PROJECT-MONTANA
SAINT MARY RESERVOIR
OUTLET
PROFILE, PLAN AND SECTIONS

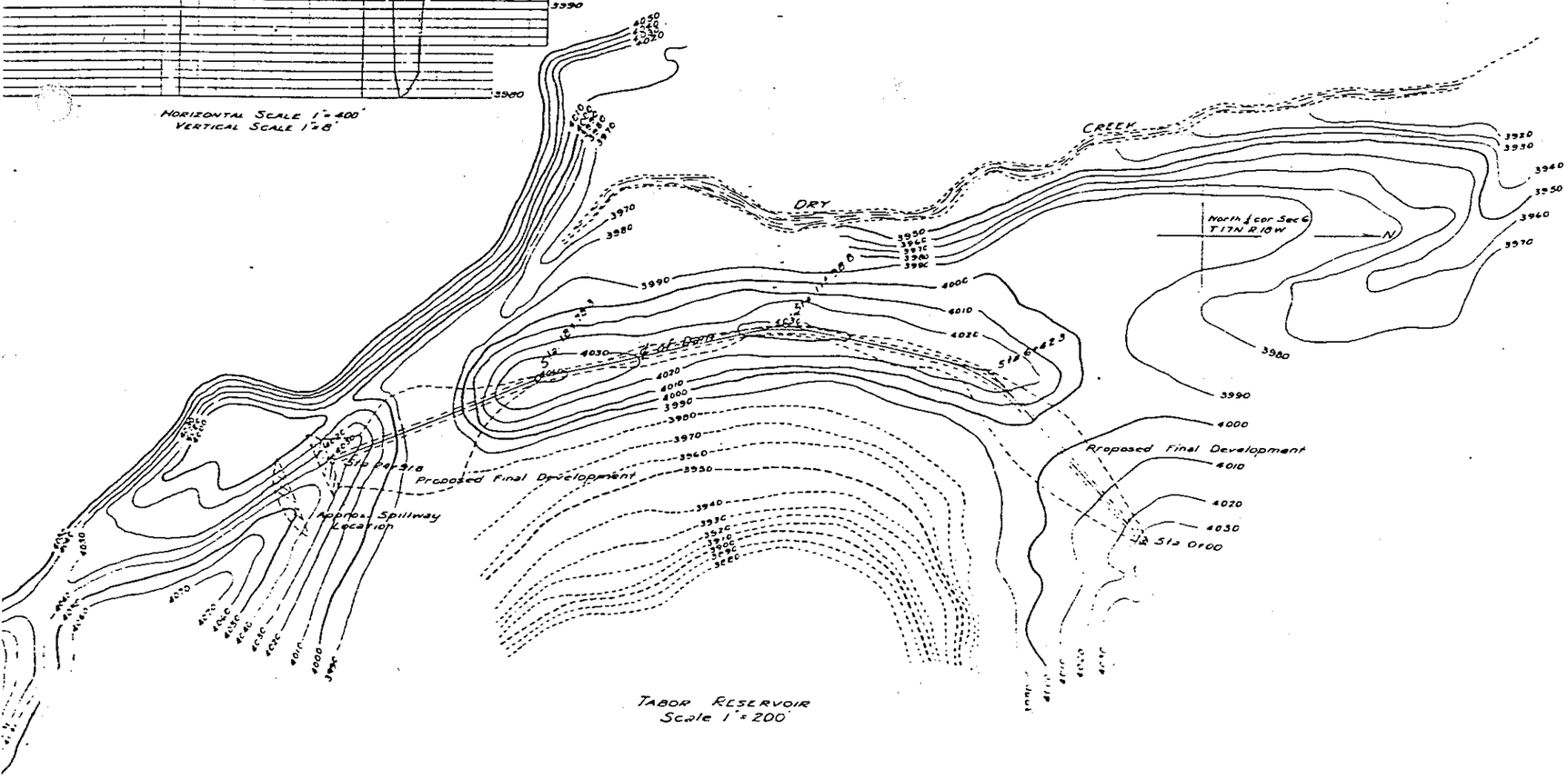
Drawn: [illegible] Recommended: [illegible]
Checked: [illegible] Approved: [illegible]

F-2355 ST IGNATIUS, MONT. 9-5-16







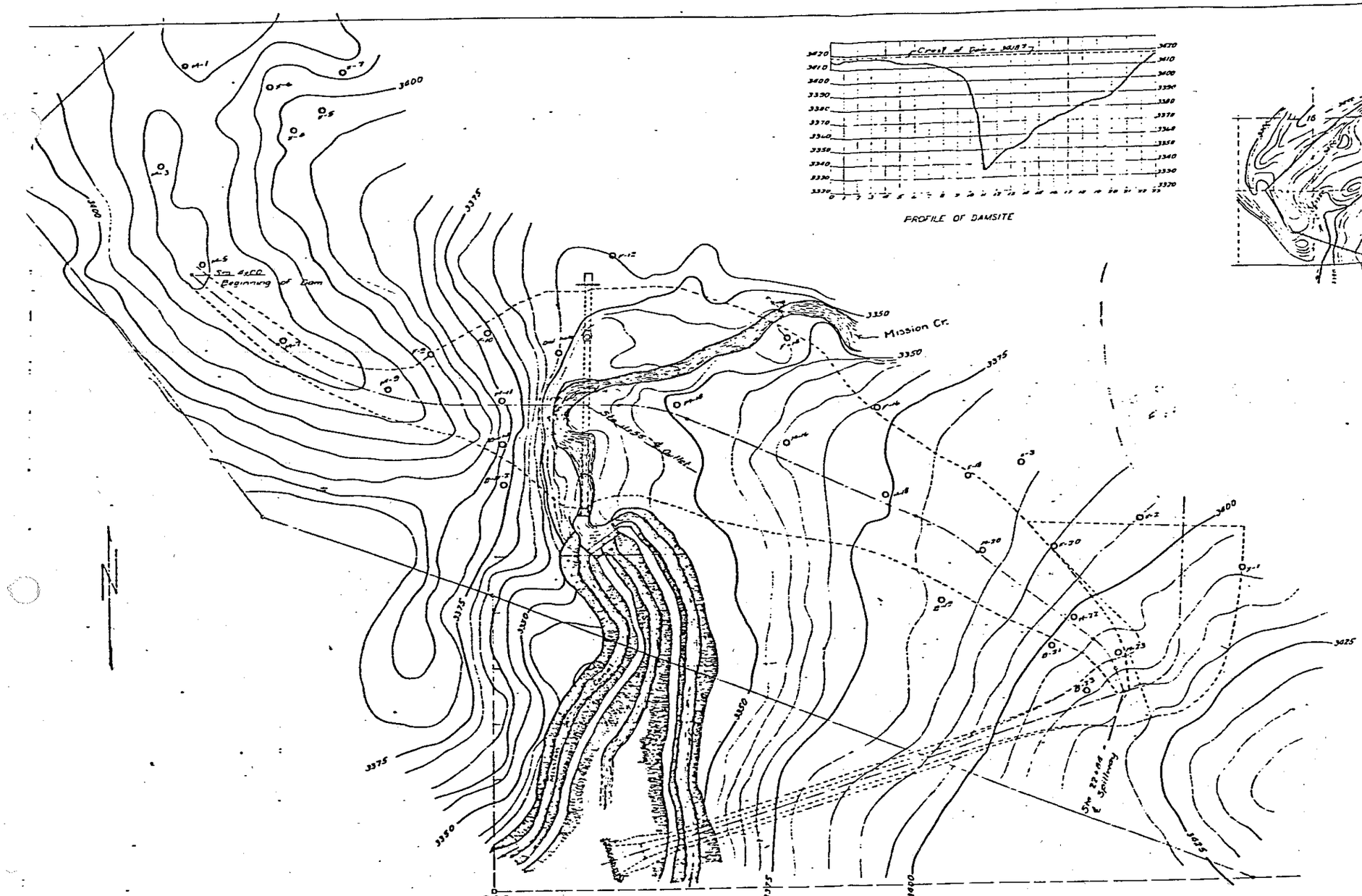


DEPARTMENT OF THE INTERIOR
U.S. INDIAN IRRIGATION SERVICE
A.L. WATHEN - DIRECTOR OF IRRIGATION
H.V. CLOTTS - ASST. DIRECTOR - W.S. MANNA - SUPER. STRU. ENG.
G.L. SPEDDY - PROJECT ENGR.

FLATHEAD PROJECT - MONTANA
TABOR RESERVOIR
PROPOSED FINAL DEVELOPMENT

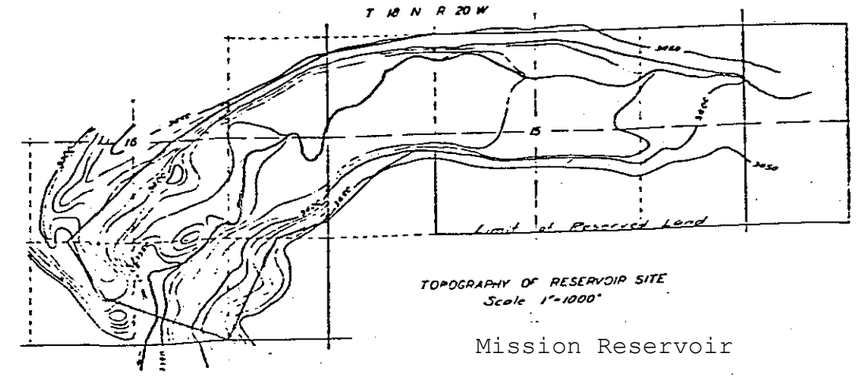
SCALE - AS NOTED — SEPT. 19

DESIGNED ____ SUBMITTED ____
DRAWN ____ RECOMMENDED ____
TRACED R.M.W. APPROVED ____



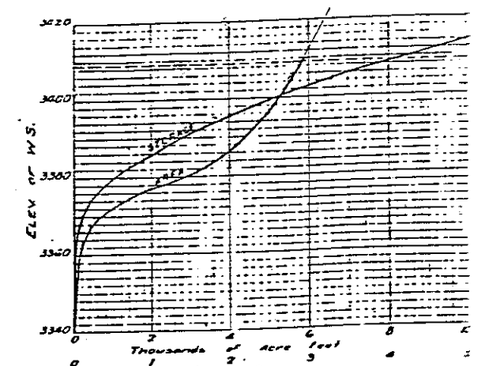
TOPOGRAPHY OF DAMSITE
Scale 1"=100'

PROFILE OF DAMSITE

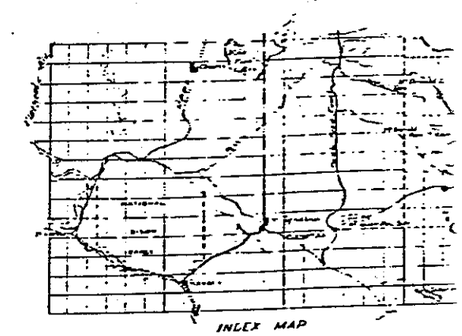


TOPOGRAPHY OF RESERVOIR SITE
Scale 1"=1000'

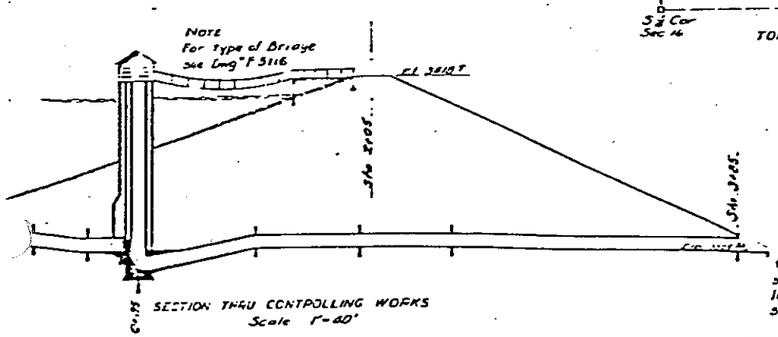
Mission Reservoir



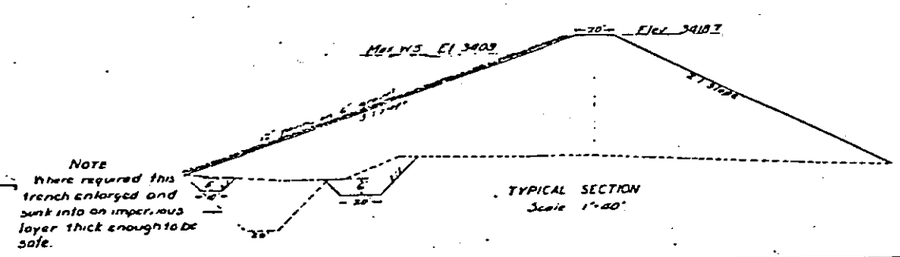
STORAGE AND AREA CURVES



INDEX MAP



SECTION THRU CONTROLLING WORKS
Scale 1"=40'



TYPICAL SECTION
Scale 1"=40'

DEPARTMENT OF THE INTERIOR
U.S. INDIAN IRRIGATION SERVICE
A.L. WATHEN — DIRECTOR OF IRRIGATION
H.V. CLOTTS ASST DIRECTOR — W.S. HARDING SUPT.

FLATHEAD PROJECT-MONT.
MISSION RESERVOIR
PLAN AND SECTIONS OF DAM

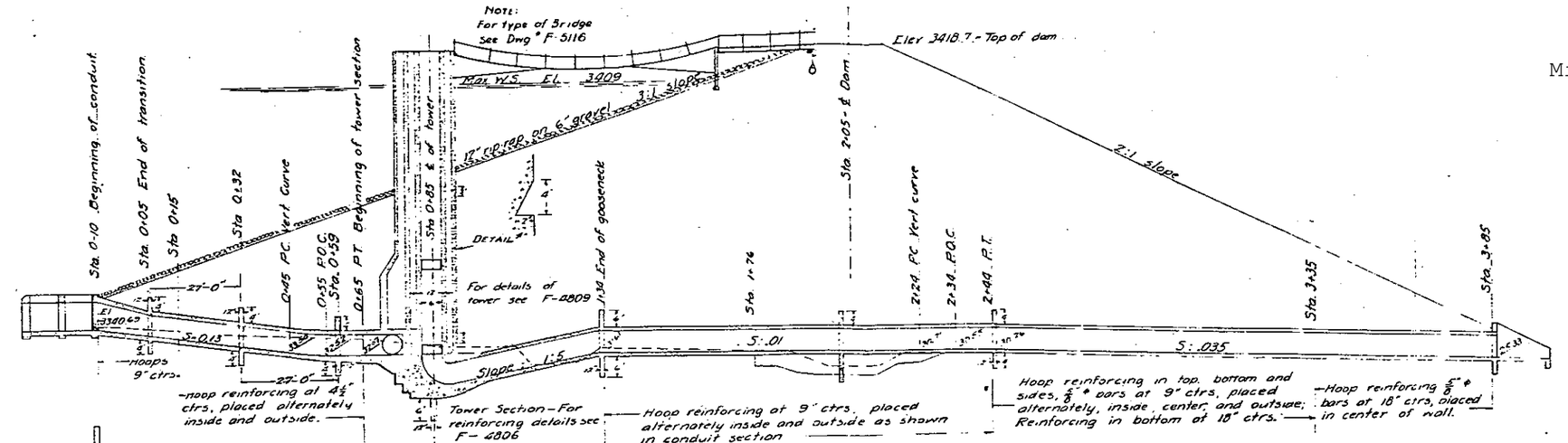
Scale: As Noted

DESIGN ____ SUBMITTED ____ SUPERVISOR
DRAWN ____ APPROVED ____ DIRECTOR

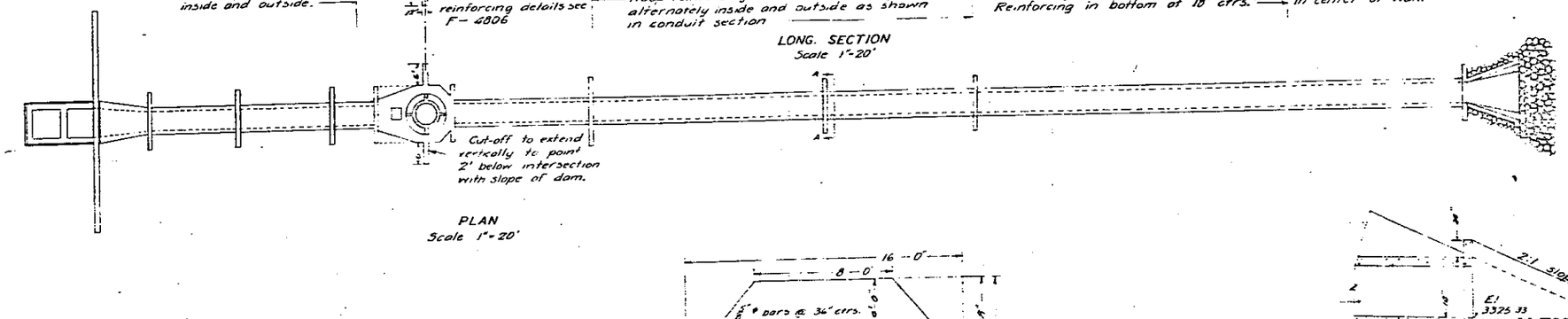
REVISED FEB. 1936 F.E.R.

F-

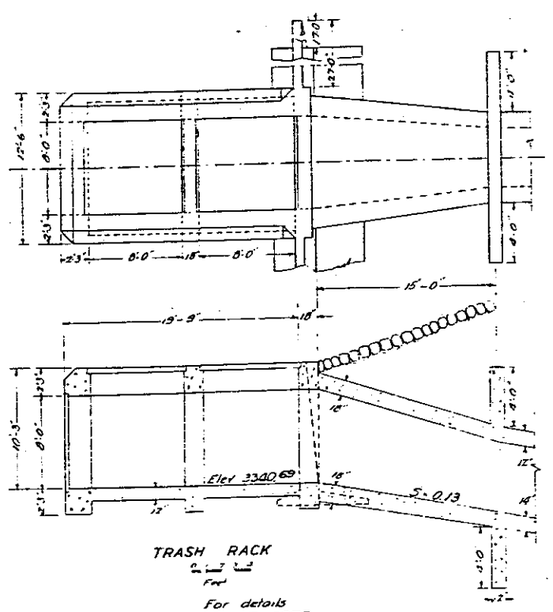
Mission Reservoir



LONG. SECTION
Scale 1"=20'

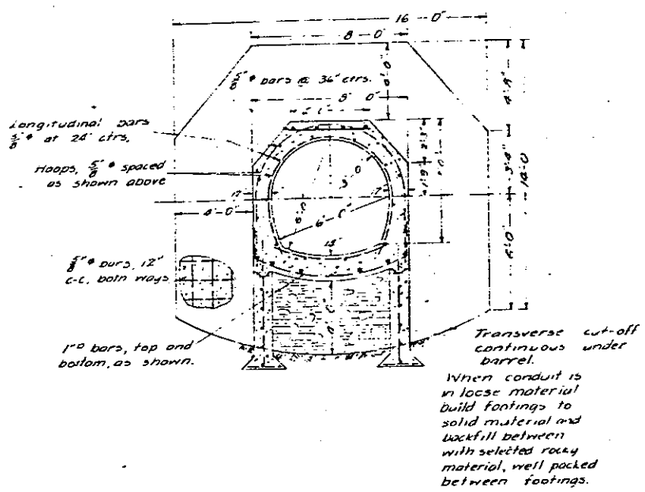


PLAN
Scale 1"=20'



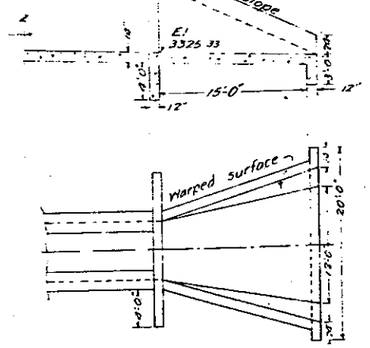
TRASH RACK
Scale ⅛"=1'

For details see F-4972



CONDUIT SECTION
Scale ⅛"=1'

Typical section as at "AA" (Sta 2+05)



OUTLET
Scale ⅛"=1'

For general plan and section of dam see F-4787

MATERIAL LIST

SECTION	CONC C.Y.	STEEL — POUNDS ½" ϕ	⅝" ϕ	¾" ϕ	⅞" ϕ	1" ϕ
Tower Sect	486	600	21,820.	3150		36,200.
Trash Rack	55	1000	2,000.		600	5,000.
Conduit	342		28,200.			9,250.
Cut-offs	56		3,865.			
Outlet	25		1,500.			
Totals	958	1,600	57,985	3150	600	50,450

DEPARTMENT OF THE INTERIOR
U.S. INDIAN IRRIGATION SERVICE
A.L. WATHEN — DIRECTOR OF IRRIGATION
H.V. CLOTTS - ASST. DIRECTOR — W.S. HANNA - SUPERVISING ENGR.

FLATHEAD PROJECT - MONTANA

MISSION RESERVOIR

CONTROLLING WORKS

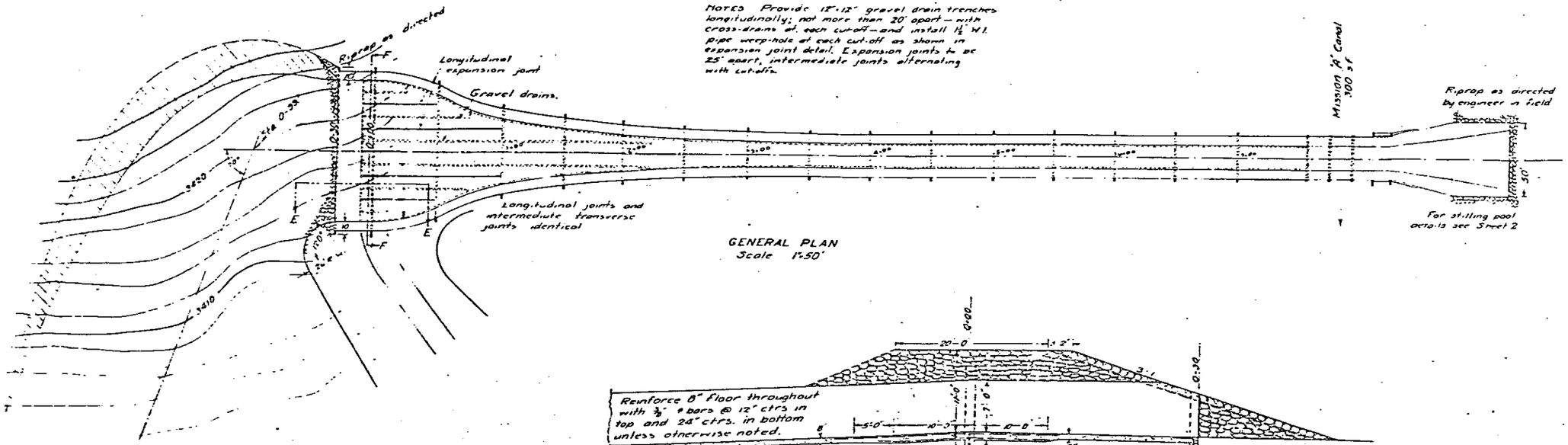
Scales: As noted — Jan 1934

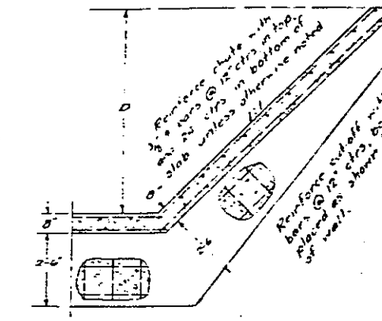
DESIGN — SUBMITTED W.S. Hanna 1/10/34 SUPERVISING ENGR.

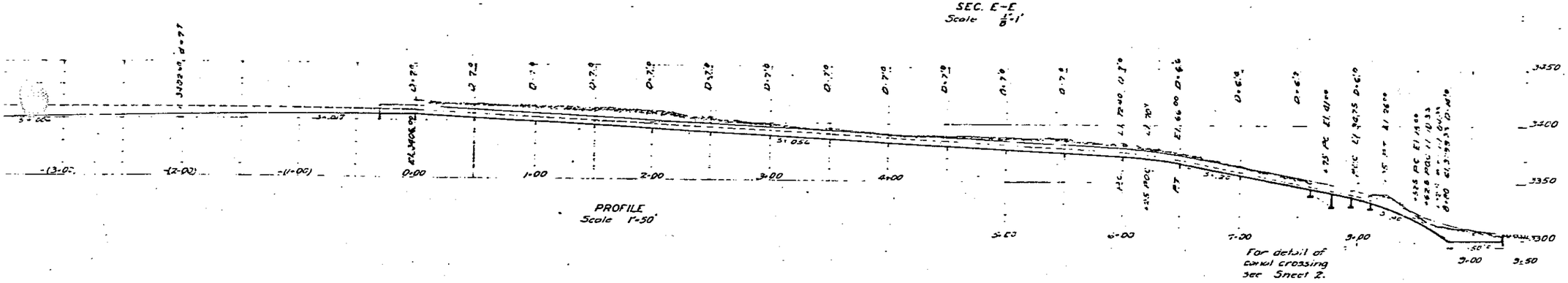
DRAWN — APPROVED Herbert L. Grote DIRECTOR OF IRRIGATION

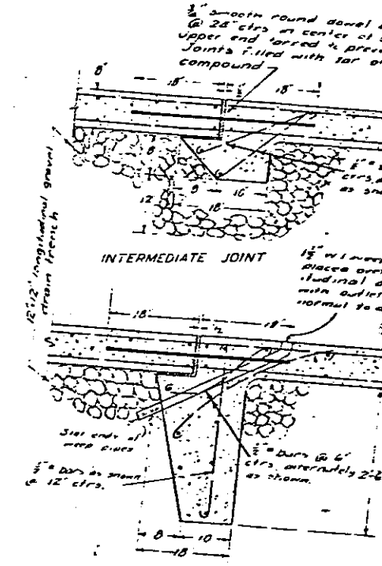
F-4795

Mission Reservoir



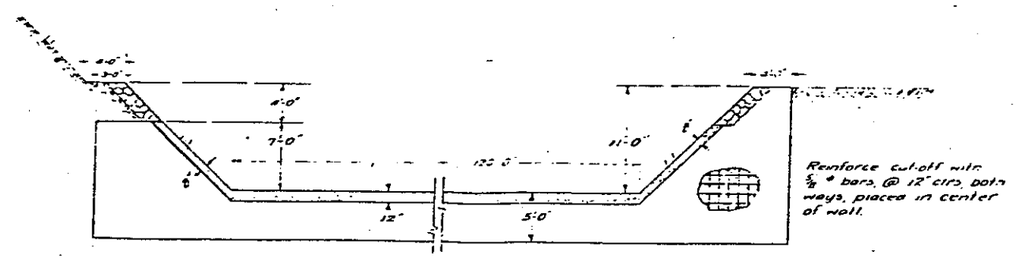






YDRAULIC PROPERTIES Q = 3000 S.F.

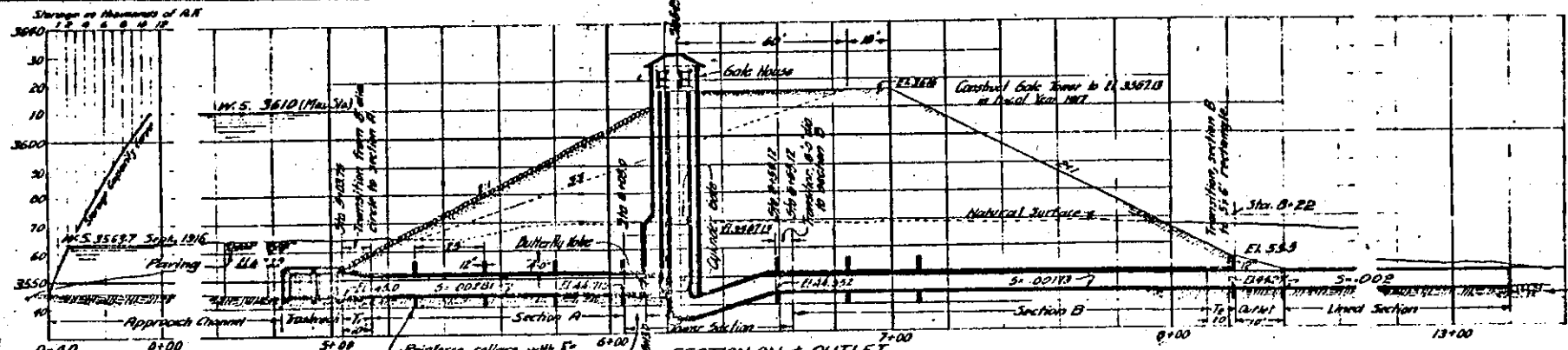
Bottom Elev.	r	s				F	Bottom Elev.	S	d	Vel.
3306.00	1.5	2.8	9.2		2+50		3332.00			2.73
5					+60		91.00			
2					+70		90.88			
0					+80		90.77			
3370					+90		90.66			
3371		2.5	10.21		3+00		90.28		3.8	24.4
268					+10		89.80			
258					+20		89.34			
1.54					+30		88.92			
3420.04					+40		88.58			
3420.40		2.8	26.1		+50		87.26			
3399.95					+60		86.96			
95.75					+70		86.68			
94.77					+80		86.42			
9816					+90		86.16			
9760		3.1	22.5		4+00		86.00	.056		
9705					6+00 PC		3372.40			
9648					+25 PDC		70.10			
9593					+50 PT		3366.00			
9540					7+00		56.00	.20		
9480		3.4	25.0		+75 PC		3351.00			
9378					+8+00 PDC		34.33			
9365					+25 PT		3326.00			
9317					+42.5 PC		3315.00	.30		
9260	.056				+67.5 PDC		10.33			
					+75 PT		3308.33			
					+80		3299.33			
								0.00		
					9+37 Cut 50		3299.33			

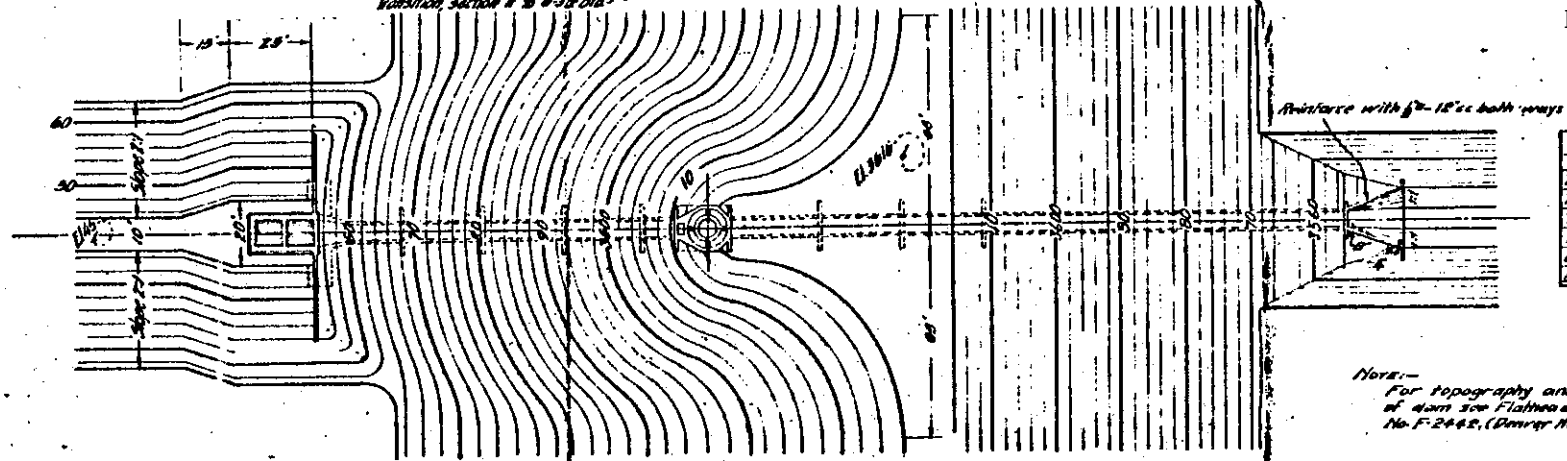


DEPARTMENT OF THE INTERIOR
U.S. INDIAN IRIGATION SERVICE
A.L. WATHEN — DIRECTOR OF IRRIGATION
H.V. CLOTTS ASST DIRECTOR W.S. HANNA SUPERVI
FLATHEAD PROJECT-MONTA
MISSION RESERVOI
SPILLWAY PLAN AND DETA
SHEET 1 OF 2 SHEETS
Scales: As shown Mar
DESIGN G.L.C. SUBMITTED SUPERVISING
DRAWN F.E.R. APPROVED DIRECTOR OF IR
Revised - Jan 1935

F-

McDonald Reservoir

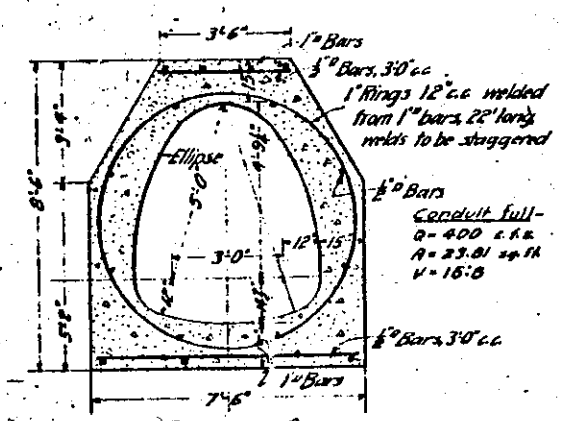


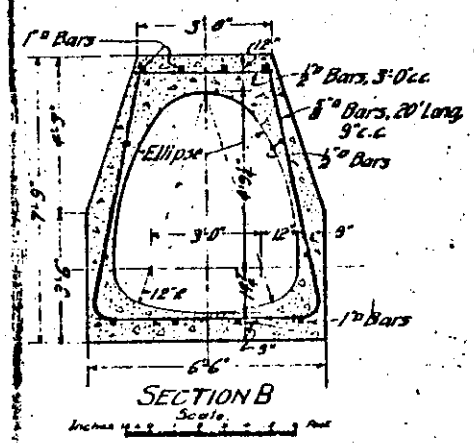


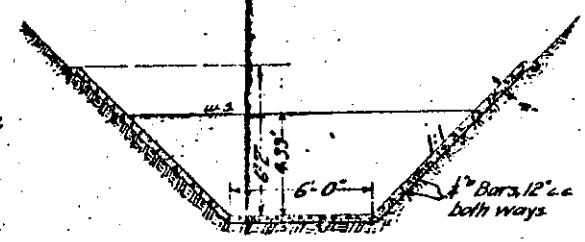
Note:—
For topography and plan of dam see Flathead drwg. No. F-2462, (Drawing No. 66 D).

BILL OF MATERIAL

Section	Concrete Cu. Yds.	Steel - Pounds ⅝"	½"	⅜"	1"
Trash Rack	See drawing 6-C-40				
T1 & A	165		11.00	2500	10500
Tower	See drawing 6-C-74				
B & T2	140			300	7500	5100
Outlet	13			3.0		
Lined Sect'n	144	5100				







LINED SECTION

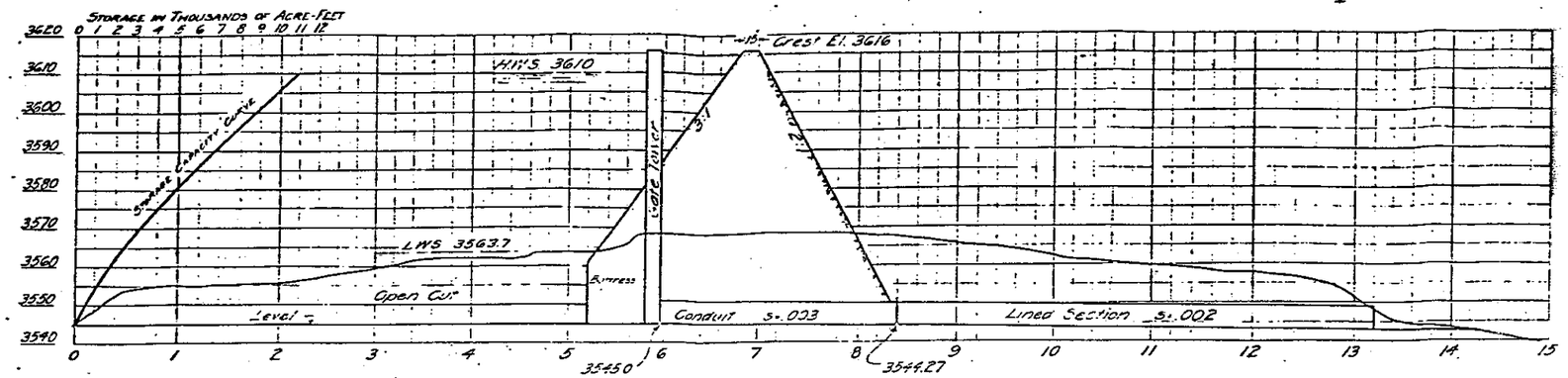
Hydraulic Properties
n = .014 S = .002
d = 4.39 V = 8.78
Q = 400

DEPARTMENT OF THE INTERIOR
U.S. RECLAMATION SERVICE
FLATHEAD PROJECT MONTANA
McDONALD LAKE RESERVOIR
SECTIONS & GENERAL PLAN

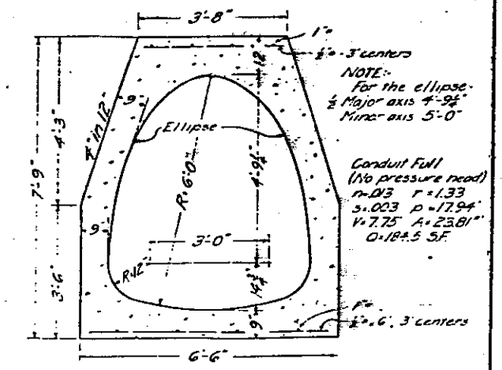
Drawn J.H. Recommended
Checked L.S.Y. Approved

F-2495 | Denver, Colo. 1917-18 | 6-C-3

McDonald Reservoir



PROFILE

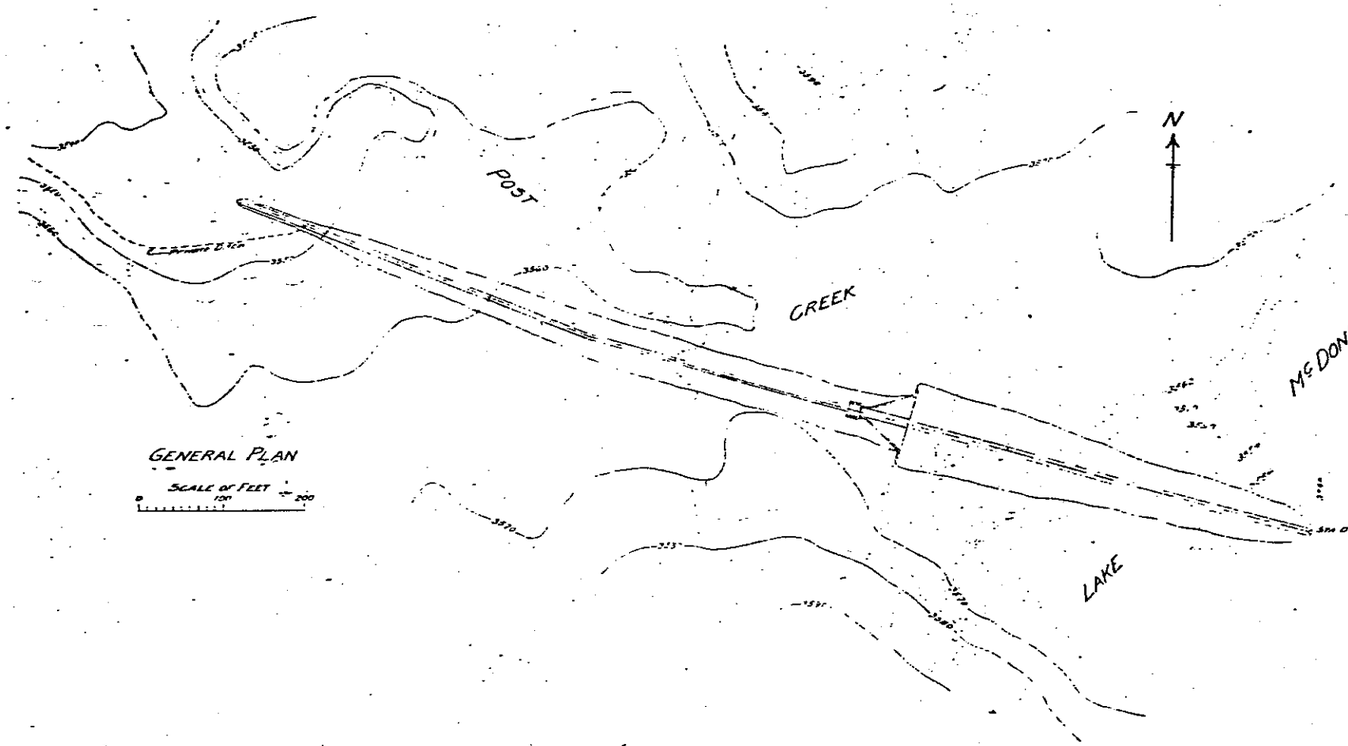


NOTE:- For the ellipse ½ Major axis 4'-9½" Minor axis 5'-0"

Conduit Full (No pressure head) n=.013 r=1.33 s=.003 p=17.94' V=7.75' A=23.81' Q=184.5 S.F.

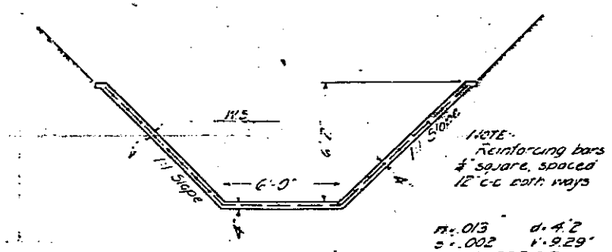
CONDUIT SECTION

SCALE OF FEET



GENERAL PLAN

SCALE OF FEET

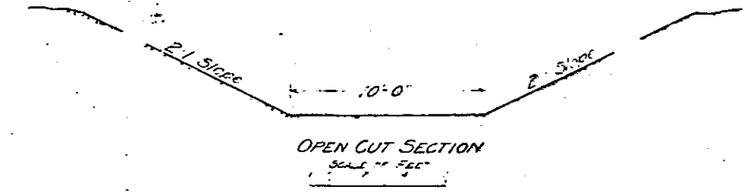


NOTE:- Reinforcing bars ½" square, spaced 12" c-c both ways

n=.013 d=4'2" s=.002 V=9.29' Q=39.5 S.F.

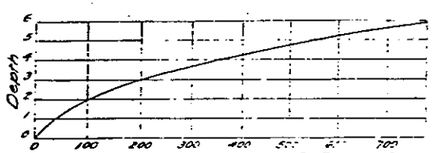
LINED SECTION

SCALE OF FEET

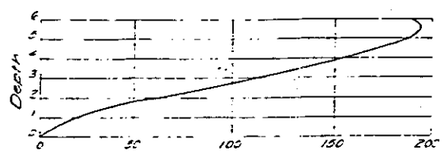


OPEN CUT SECTION

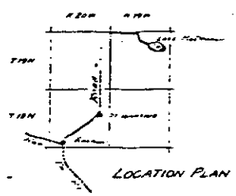
SCALE OF FEET



LINED SECTION DISCHARGE IN CU FT PER SEC.



CONDUIT DISCHARGE IN CU FT PER SEC.
(No pressure head)



LOCATION PLAN

Reviewed

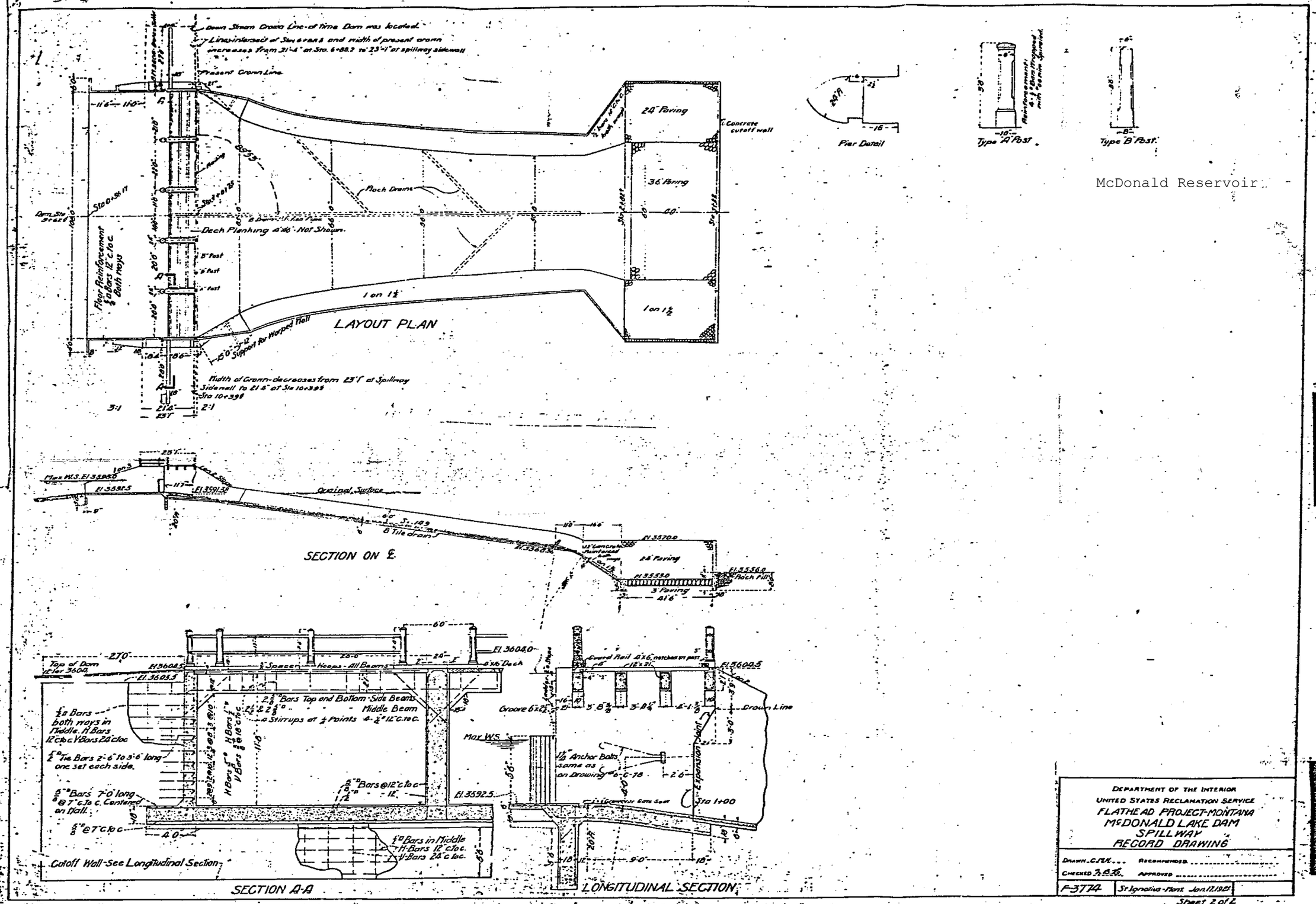
DEPARTMENT OF THE INTERIOR
UNITED STATES RECLAMATION SERVICE

FLATHEAD PROJECT - MONT.
McDONALD LAKE RESERVOIR
OUTLET
PROFILE, PLAN AND SECTIONS.

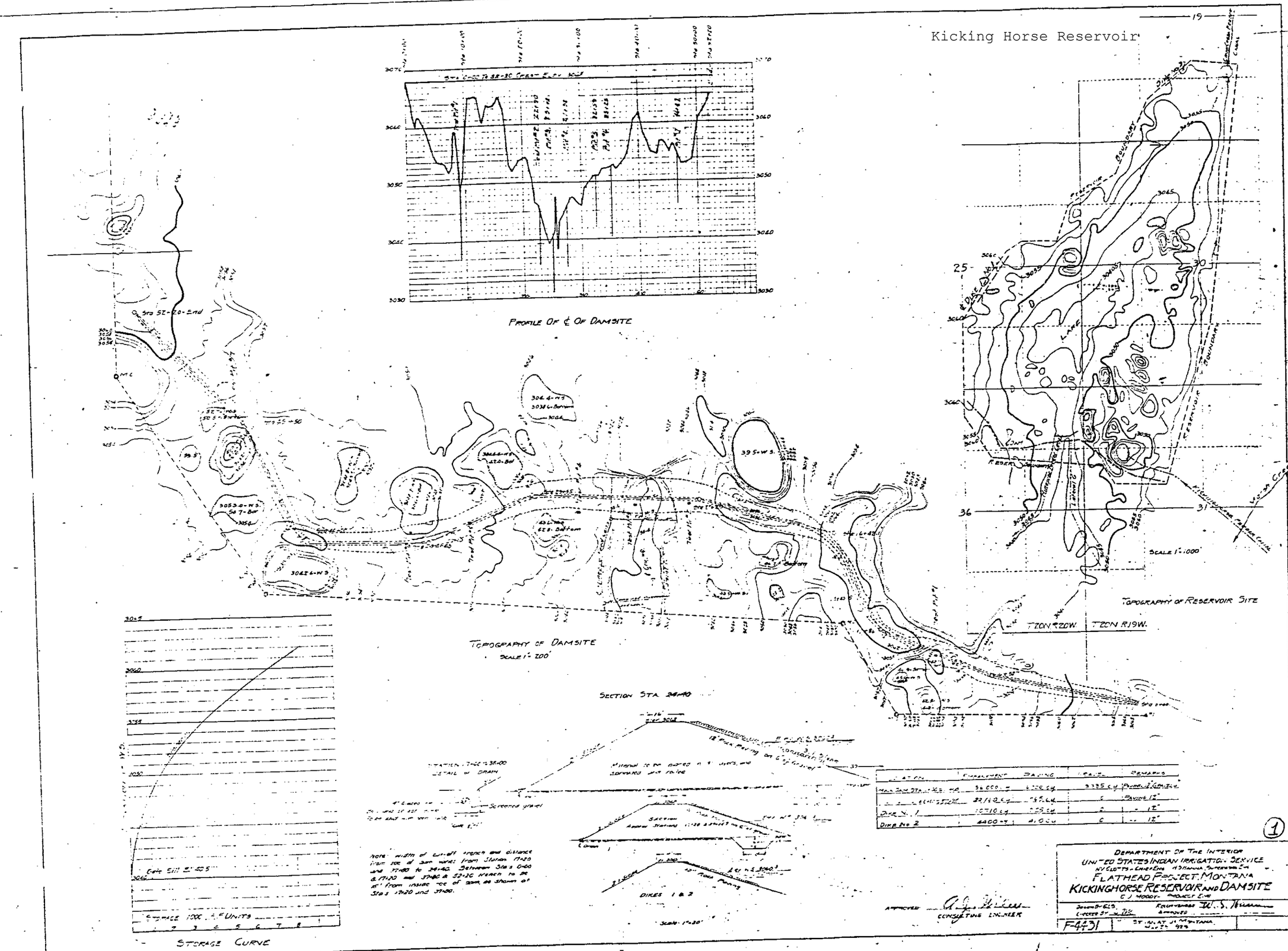
Drawn: W.C.C. Recommended
Checked Approved

F-2356 | ST IGNATIUS, MONT SEP 13-16

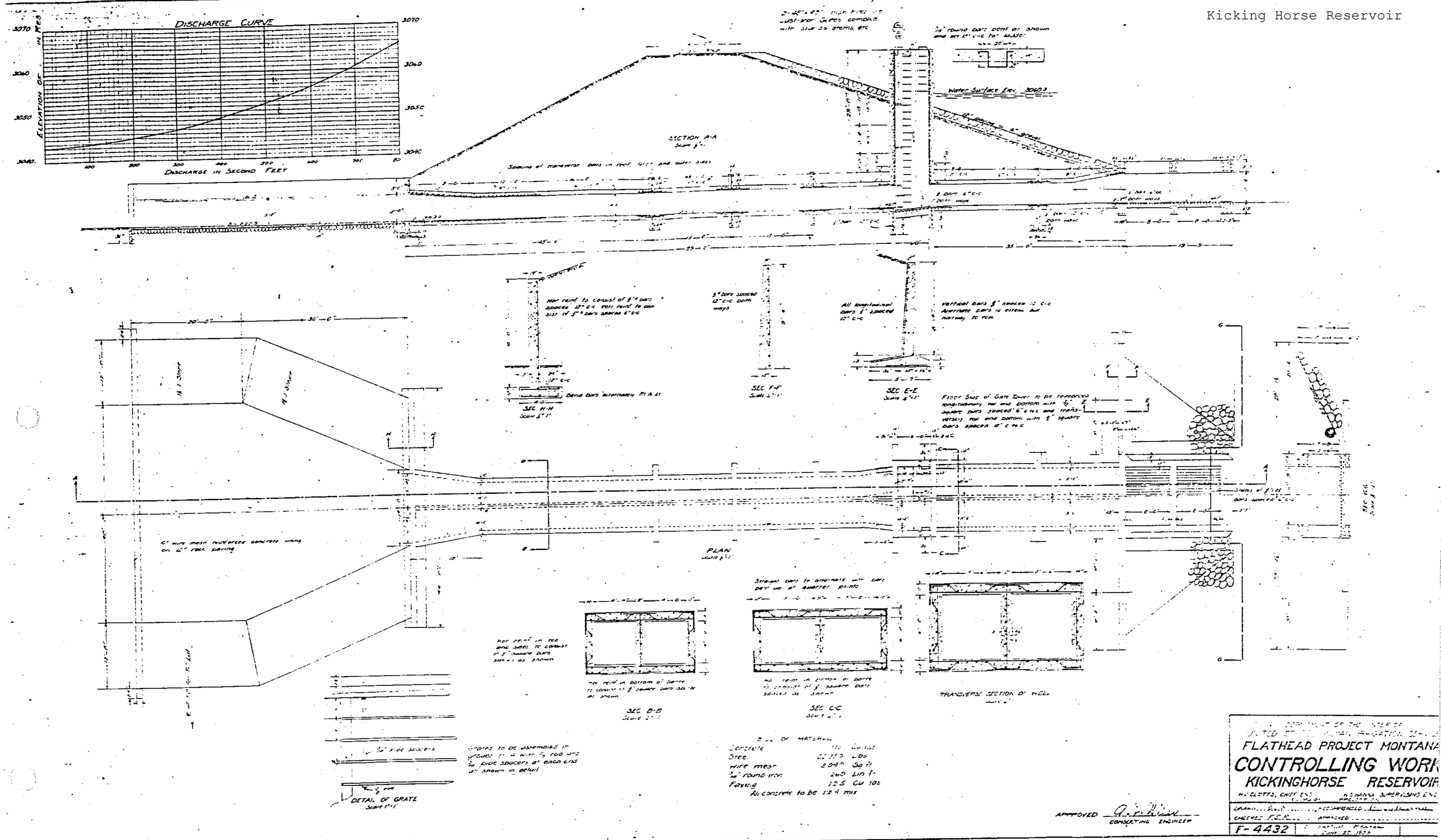
McDonald Reservoir



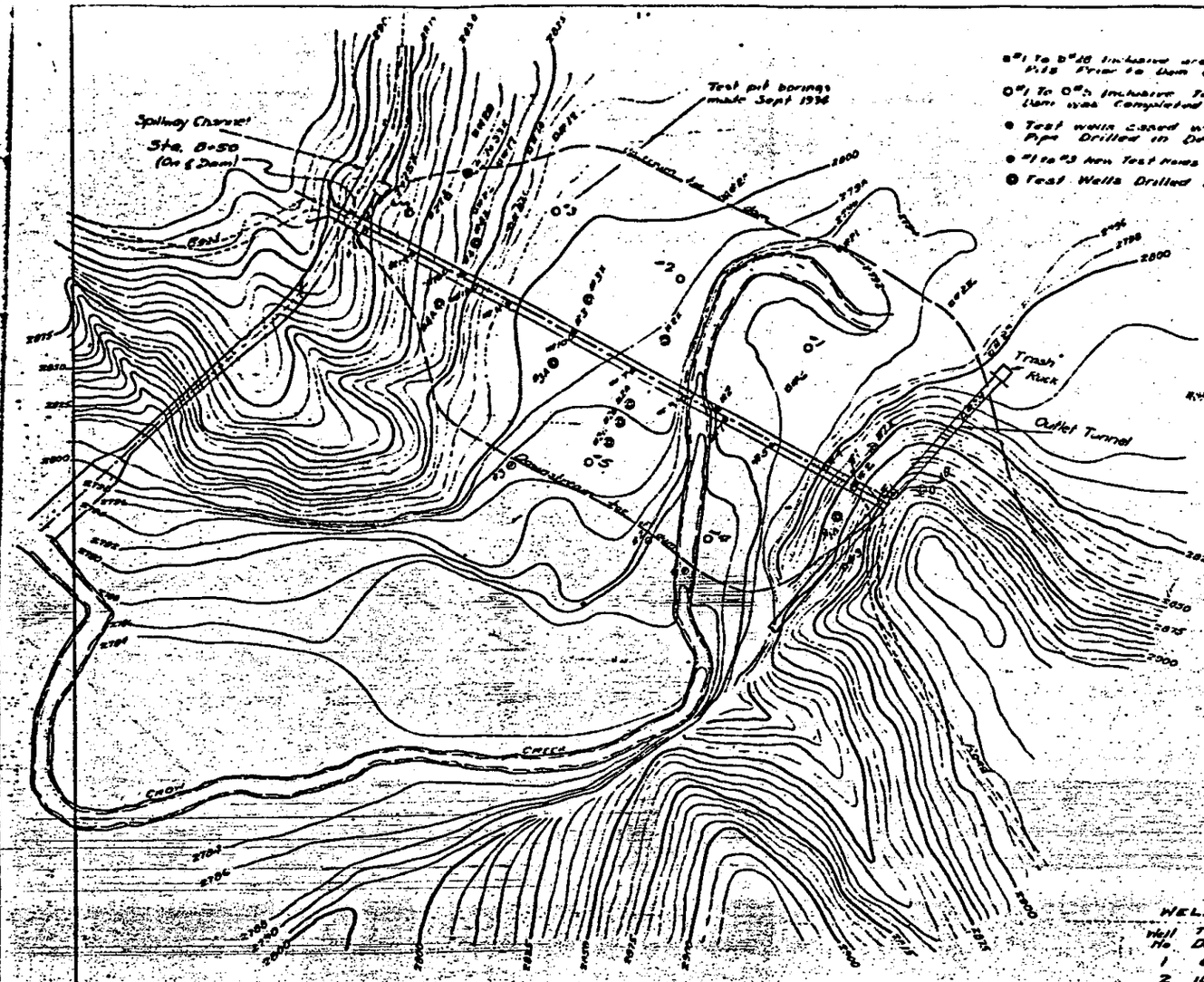
Kicking Horse Reservoir



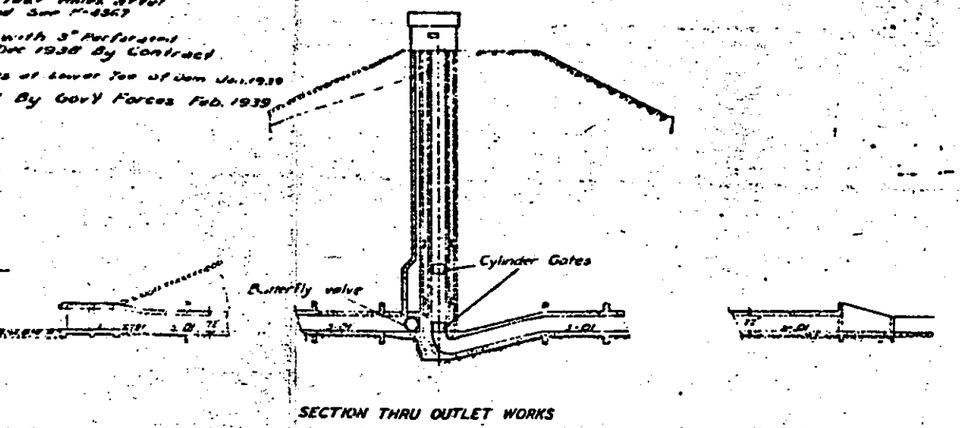
Kicking Horse Reservoir



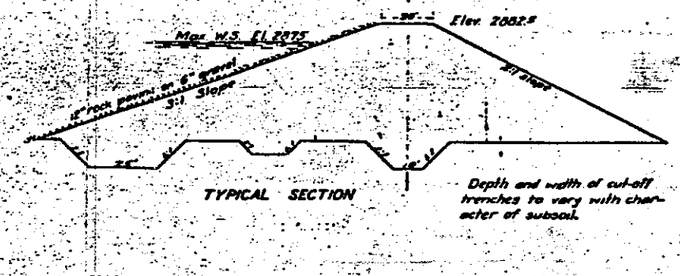
Lower Crow Reservoir



TOPOGRAPHY OF DAMSITE
Scale - 1" = 100'

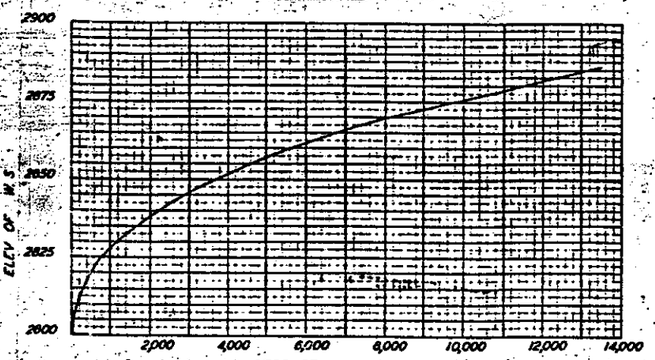


SECTION THRU OUTLET WORKS



TYPICAL SECTION

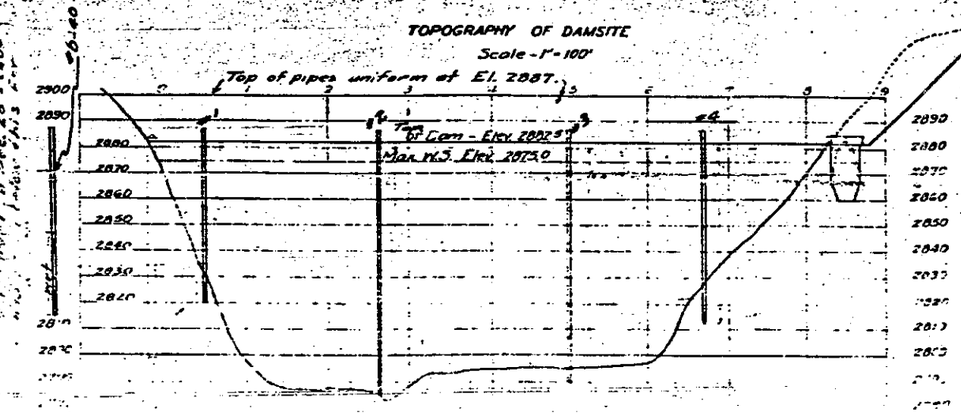
Depth and width of cut-off trenches to vary with character of subsoil.

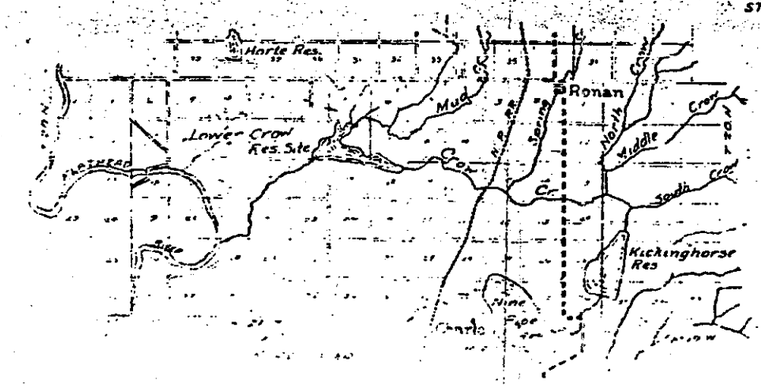


STORAGE CAPACITY CURVE

WELL DATA

Well No.	Total Depth	Drilling Time	Depth of Pipe Driven
1	67'-0"	12 hr.	6'-0"
2	102'-0"	14 "	7.5
3	96'-0"	13 "	3'-0"
4	74'-0"	7½ "	3'-0"





For topography of res. site, see F-4761.

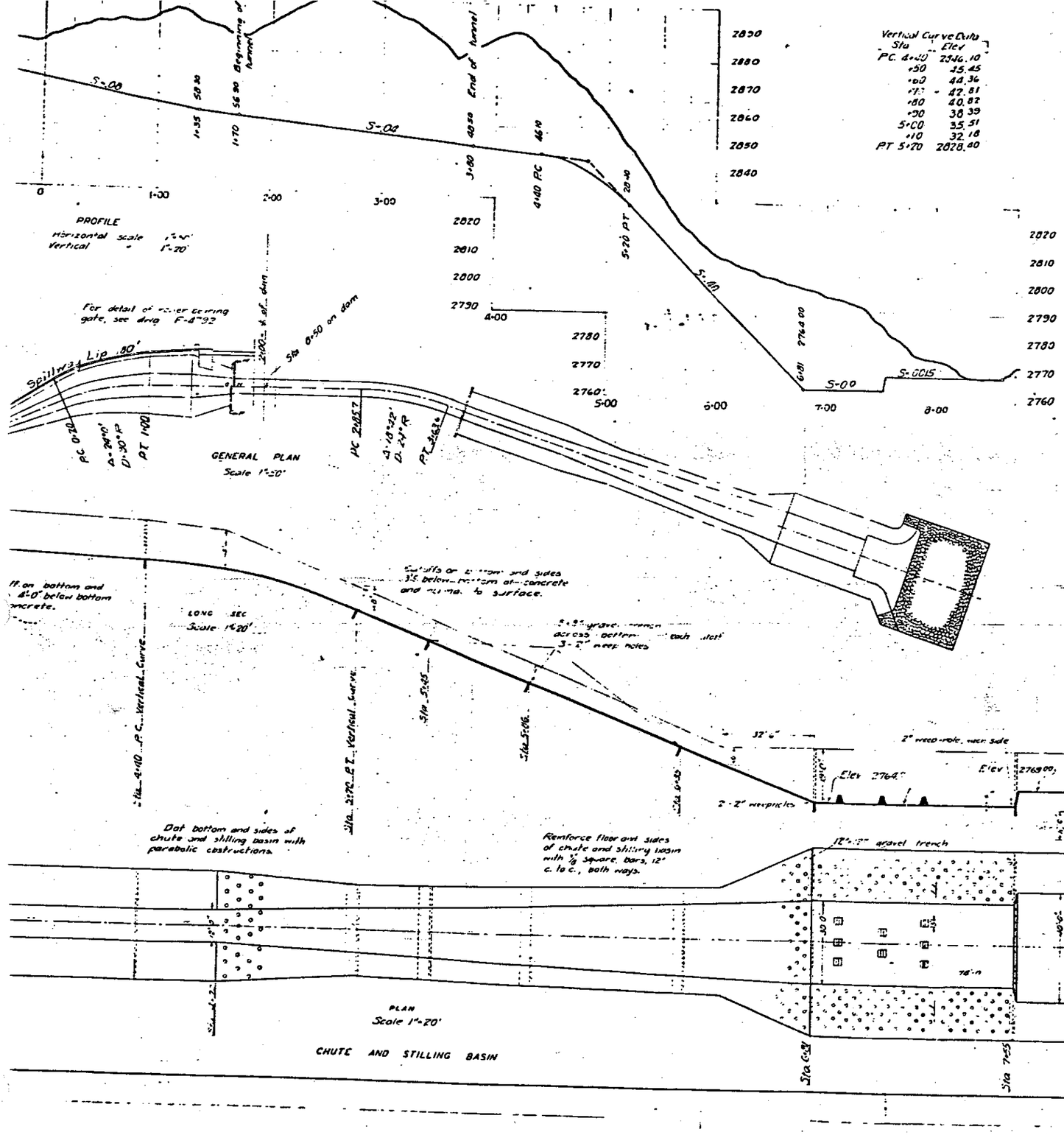
DEPARTMENT OF THE INTERIOR
U.S. INDIAN IRRIGATION SERVICE
WM. S. POST DIRECTOR OF IRRIGATION
H.V. CLOTTS ASST. DIRECTOR W. S. MANNA SUPERVISING ENG.

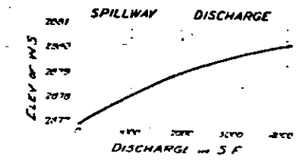
FLATHEAD PROJECT - MONTANA

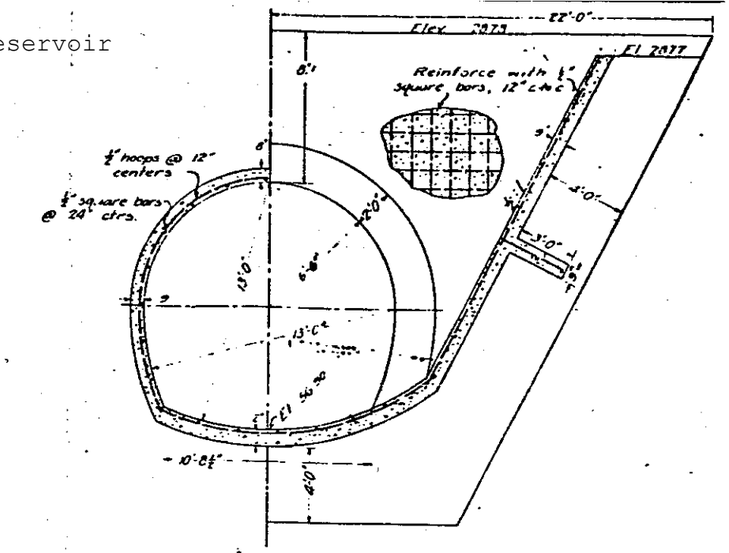
LOWER CROW RESERVOIR
PLAN & SECTION OF DAM

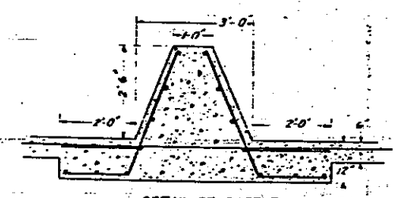
DRAWN BY ... RECOMMENDED: W. S. Manna

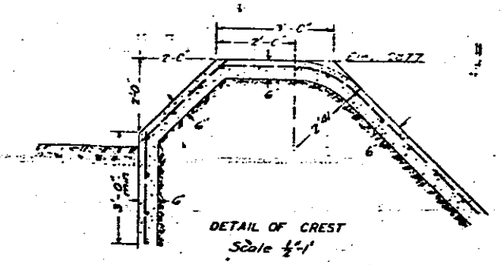
Lower Crow Reservoir

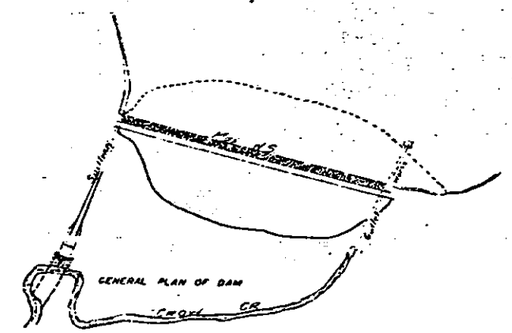












DEPARTMENT OF THE INTERIOR
U. S. INDIAN IRRIGATION SERVICE
WM. S. POST-DIRECTOR OF IRRIGATION
H. W. CLOTTS-ASST. DIRECTOR W. S. HAMMA SUPERVISING ENG.

FLATHEAD PROJECT - MONTANA

LOWER CROW RESERVOIR

SPILLWAY DETAILS

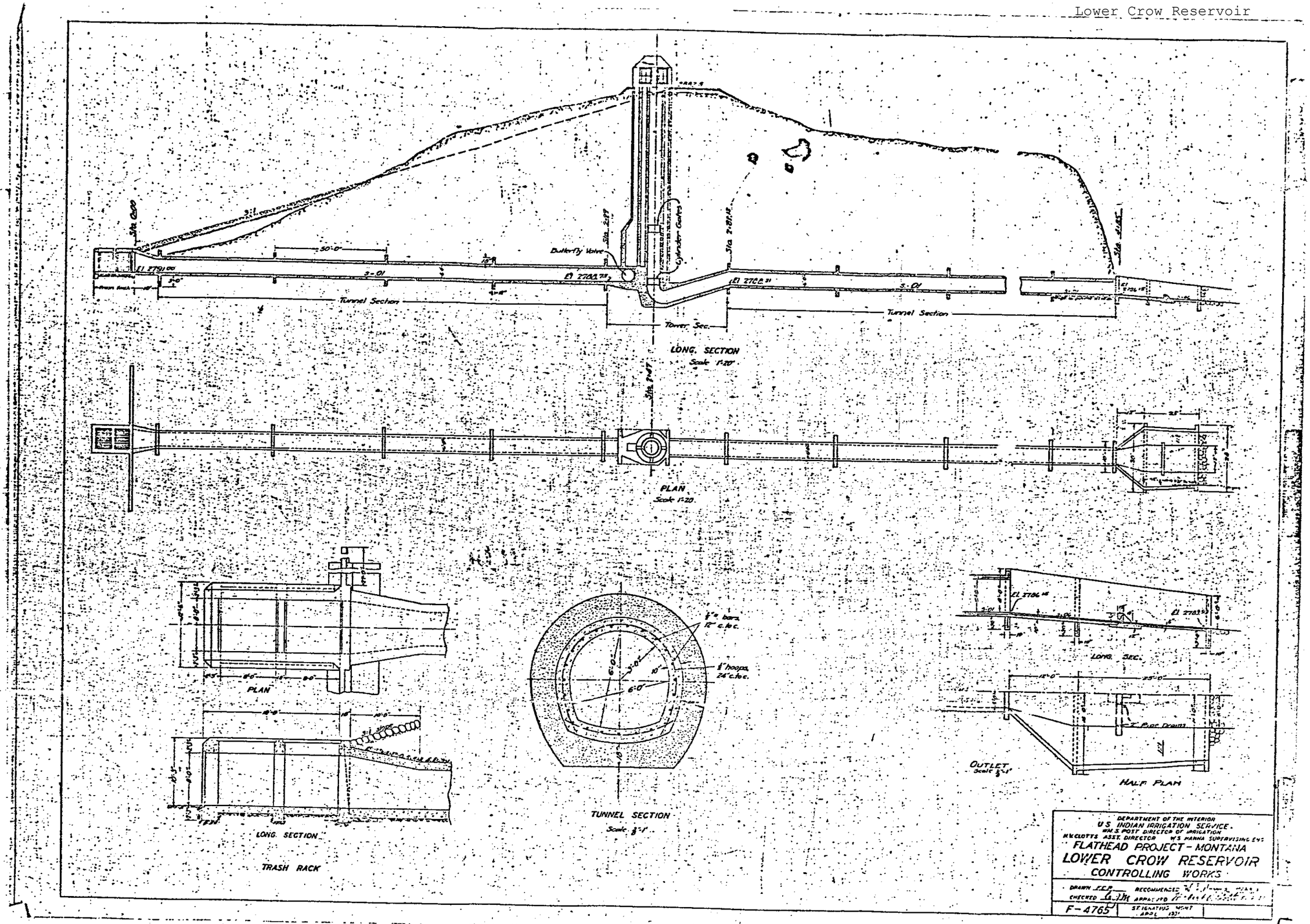
GENERAL PLAN AND SECTIONS

Scales As noted Nov. 1932

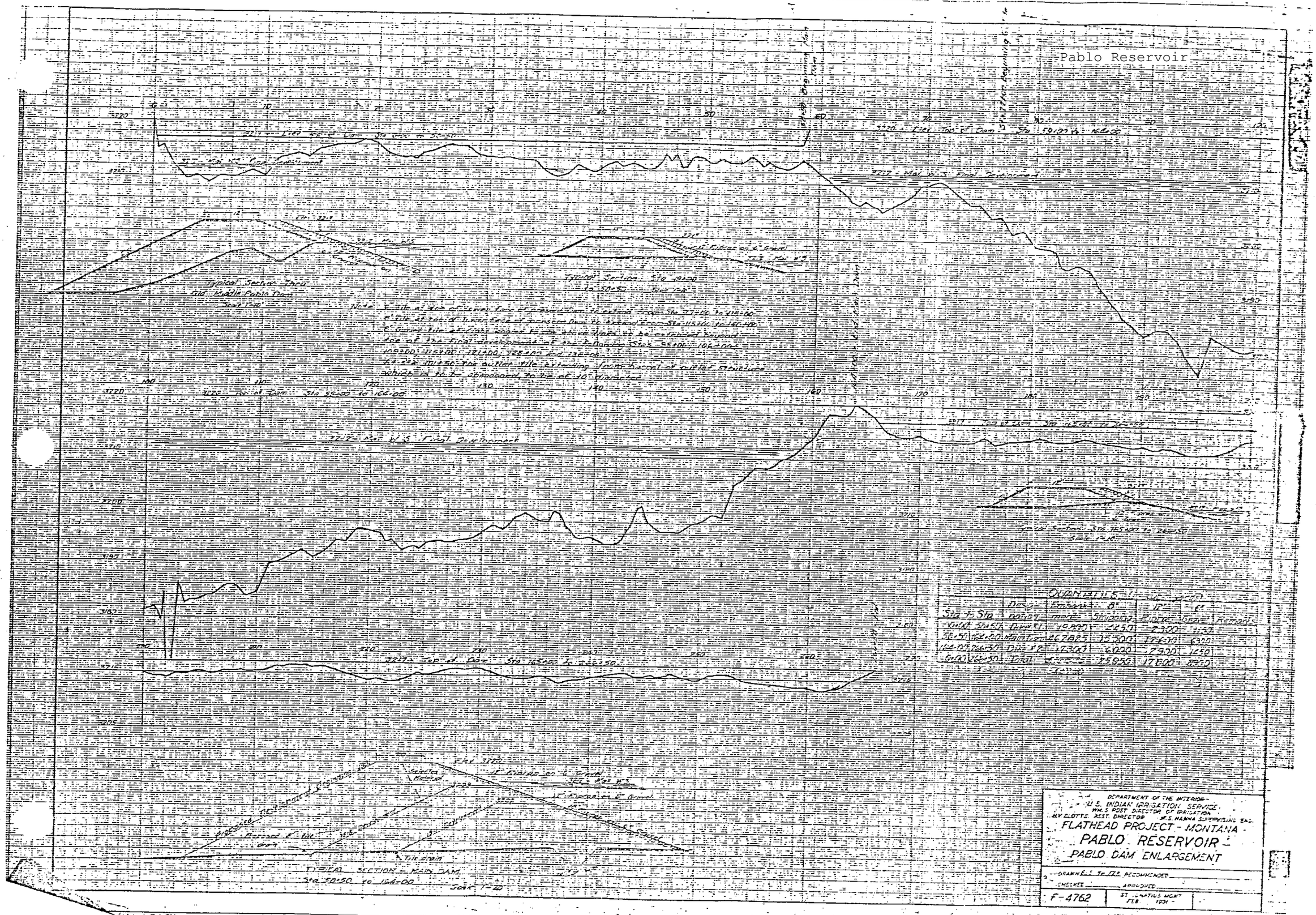
DESIGN CHF. ELEC. SUBMITTED W. S. Hamma SUPERVISING ENGR.

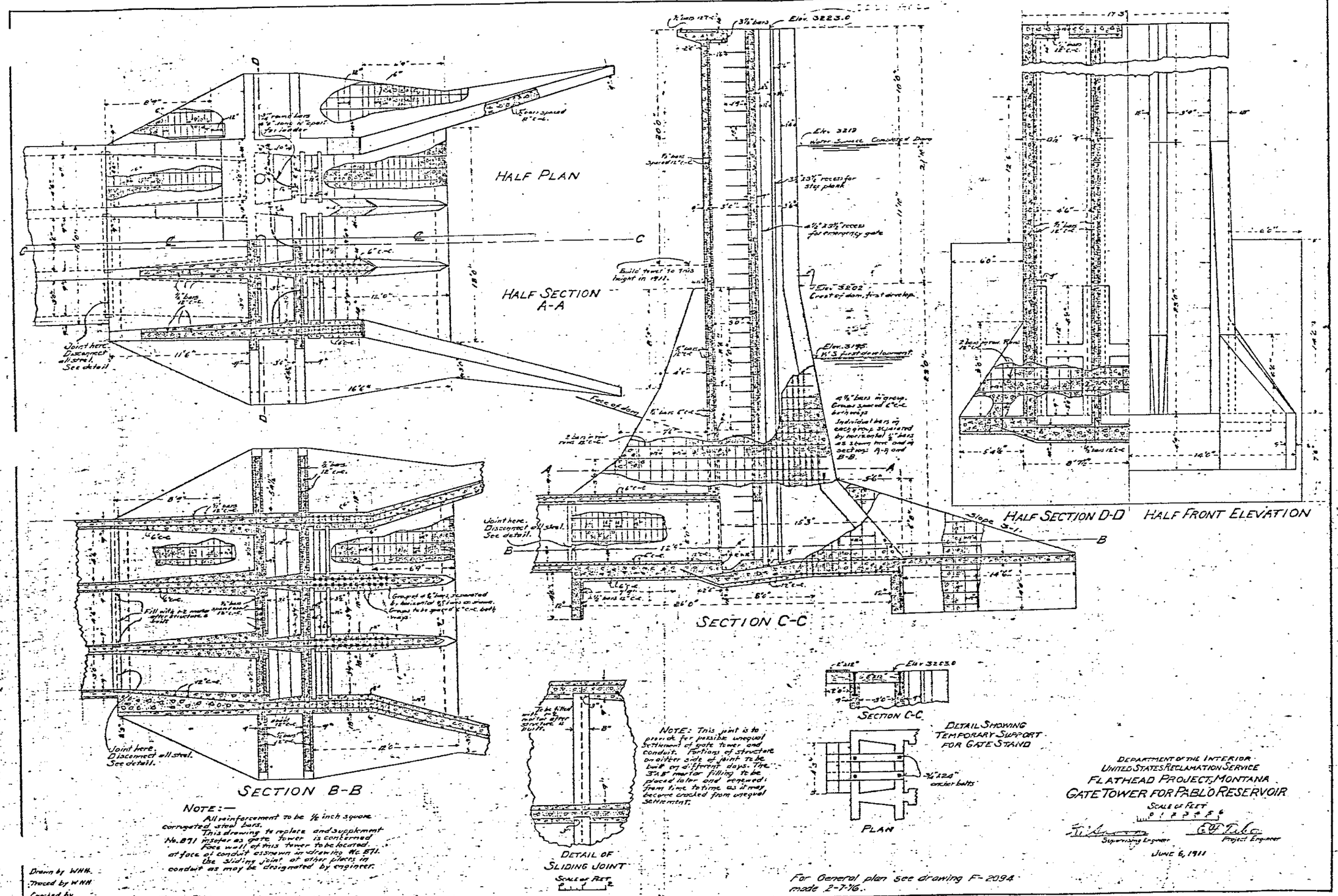
DRAWN JCR APPROVED Herbert W. Clotts ASST. DIRECTOR OF IRRIGATION

F-478


Sta 0+00
El 2791.00
50'-0"
18"
S-01
Butterfly Valve
Sta 2+27
El 2788.78
Cylinder Gates
Sta 2+81.48
El 2786.31
S-01
Tunnel Section
Tower Sec.
Tunnel Section
LONG. SECTION
Scale 1"=20'
Sta 7+47
PLAN
Scale 1"=20'
PLAN
LONG. SECTION
TRASH RACK
TUNNEL SECTION
Scale 3/8"=1'
3/4" bars 12" c. to c.
3/8" hoops 24" c. to c.
6'-0"
3'-0"
10"
El 2786.48
El 2783.50
LONG. SEC.
12'-0"
25'-0"
T. Pipe Drains
OUTLET
Scale 3/8"=1'
HALF PLAN
DEPARTMENT OF THE INTERIOR
U.S. INDIAN IRRIGATION SERVICE
WM. S. POST DIRECTOR OF IRRIGATION
H.W. CLOTTS ASST. DIRECTOR W.S. HANNA SUPERVISING ENG.
FLATHEAD PROJECT - MONTANA
LOWER CROW RESERVOIR
CONTROLLING WORKS
DRAWN
CHECKED
RECOMMENDED
APPROVED
F-4765
ST. IGNATIUS MONT.
APRIL 1931

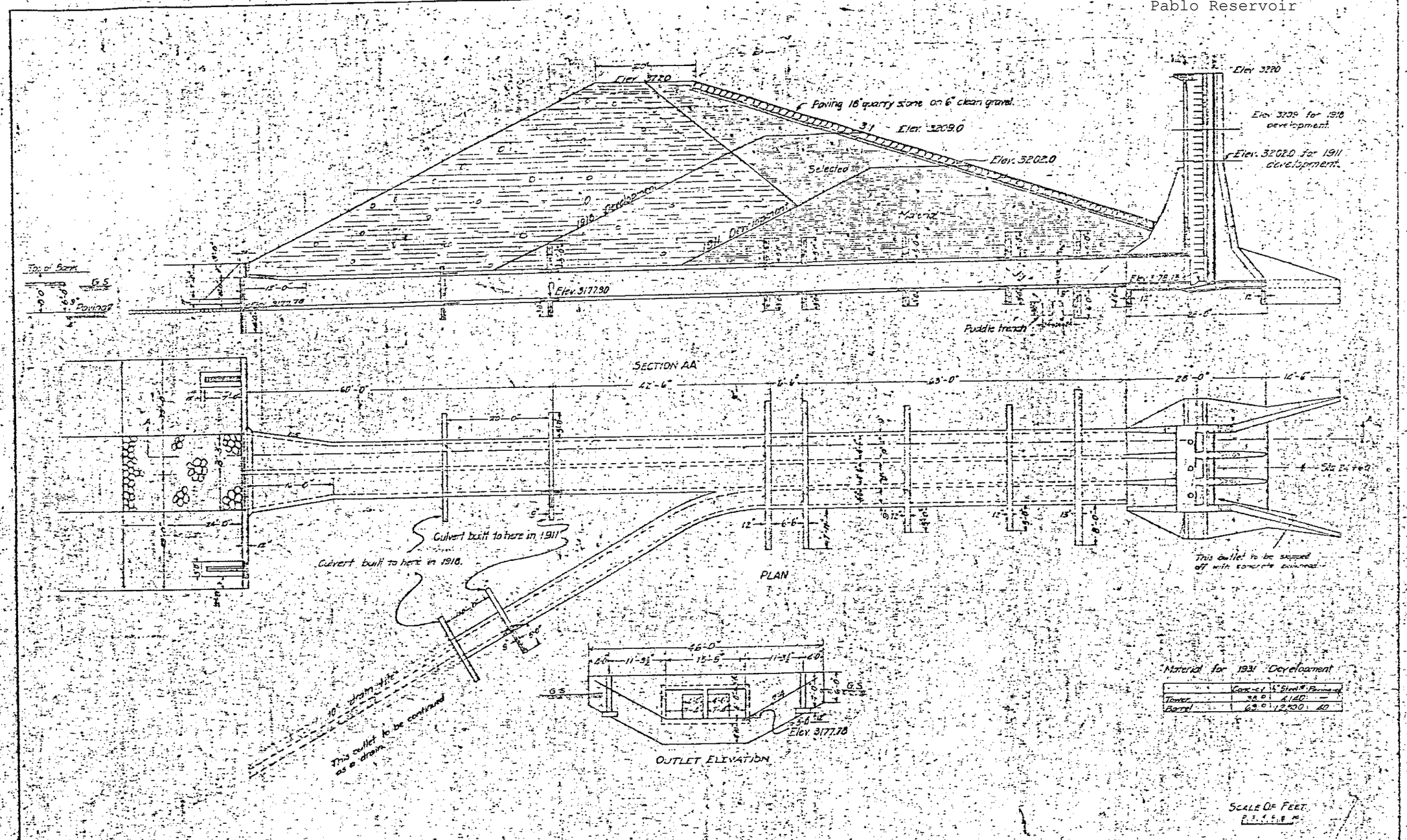
Pablo Reservoir



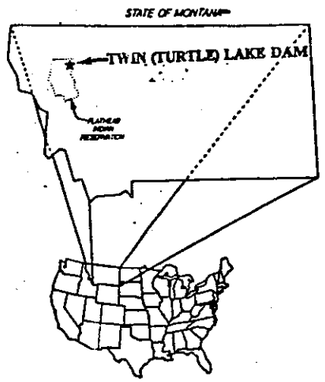

HALF PLAN
HALF SECTION A-A
SECTION C-C
SECTION B-B
HALF SECTION D-D
HALF FRONT ELEVATION
Joint here. Disconnect all steel. See detail.
Elev. 3223.0
Elev. 3212 Water Surface Concrete Dam
Elev. 3202 Crest of dam, first develop.
Elev. 3175. W.S. first development
Build tower to this height in 1911.
Face of dam
Slope 3-1
Fill with 1:2 mortar after structure is built.
Grouted of ½" bars, connected by horizontal ½" bars as shown. Groups to be spaced 6" c-c. bolt ways.
Tube filled with 1:2 mortar after structure is built.
DETAIL OF SLIDING JOINT
Scale of Feet
NOTE: This joint is to provide for possible unequal settlement of gate tower and conduit. Portions of structure on either side of joint to be built on different days. The 3'x3' mortar filling to be placed later and renewed from time to time as it may become cracked from unequal settlement.
SECTION C-C
DETAIL SHOWING TEMPORARY SUPPORT FOR GATE STAND
PLAN
anchor bolts
NOTE:—
All reinforcement to be ½ inch square corrugated steel bars.
This drawing to replace and supplement No. 871 insofar as gate tower is concerned.
Face wall of this tower to be located at face of conduit as shown on drawing No. 871.
Use sliding joint at other points in conduit as may be designated by engineer.
Drawn by WHH.
Traced by WHH
Checked by
For General plan see drawing F-2094 made 2-7-16.
DEPARTMENT OF THE INTERIOR
UNITED STATES RECLAMATION SERVICE
FLATHEAD PROJECT, MONTANA
GATE TOWER FOR PABLO RESERVOIR
Scale of Feet
Superintendent Engineer
Project Engineer
JUNE 6, 1911

S-3260
F-925

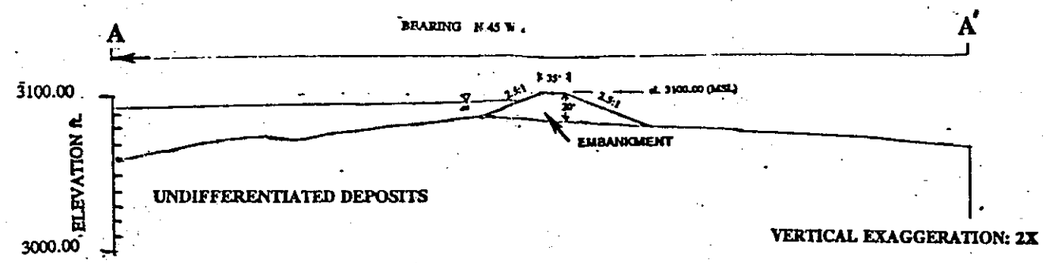
Pablo Reservoir



Turtle (Twin) Reservoir



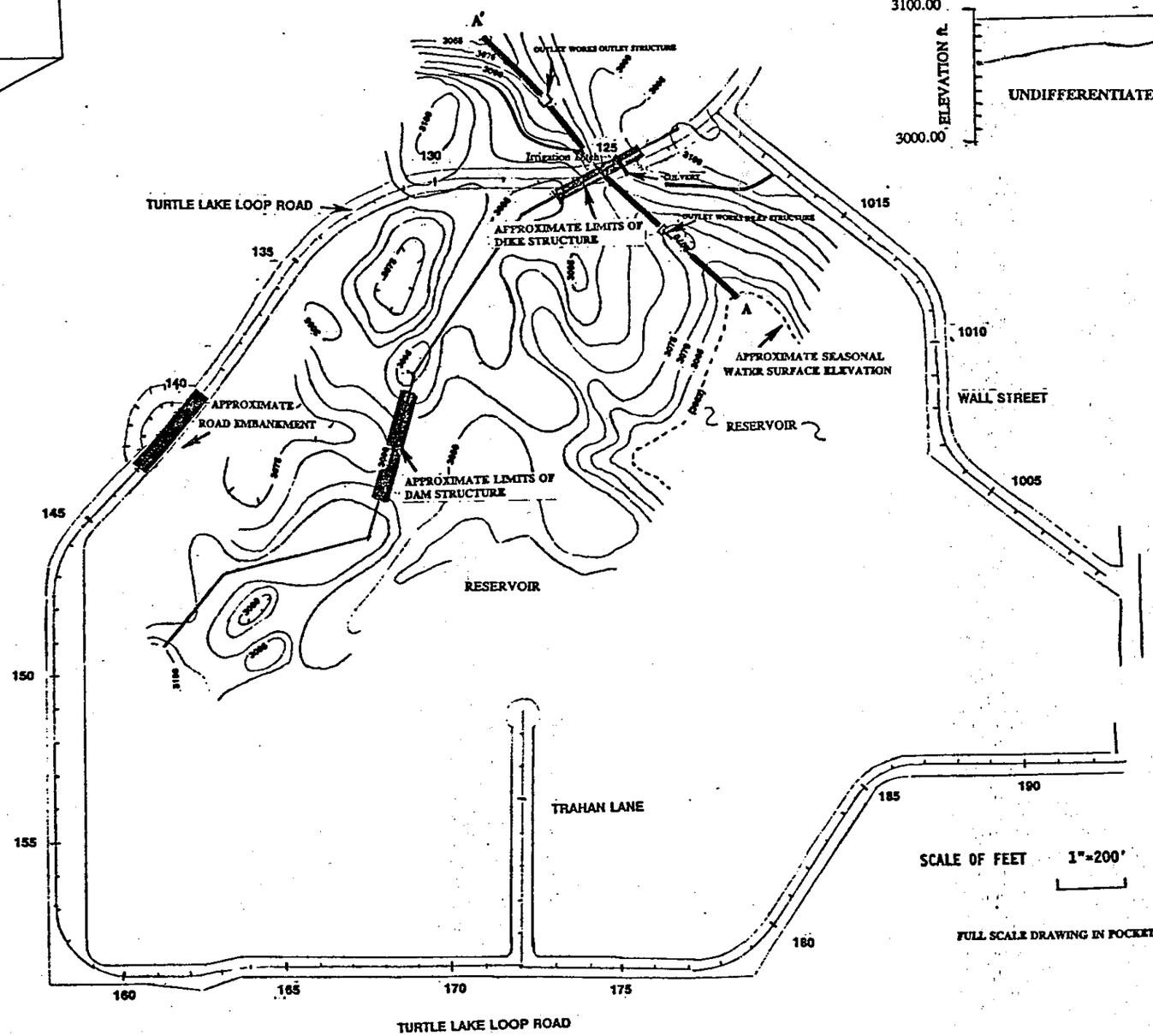
LOCATION MAP



SECTION A-A'

SCALE OF FEET

100'

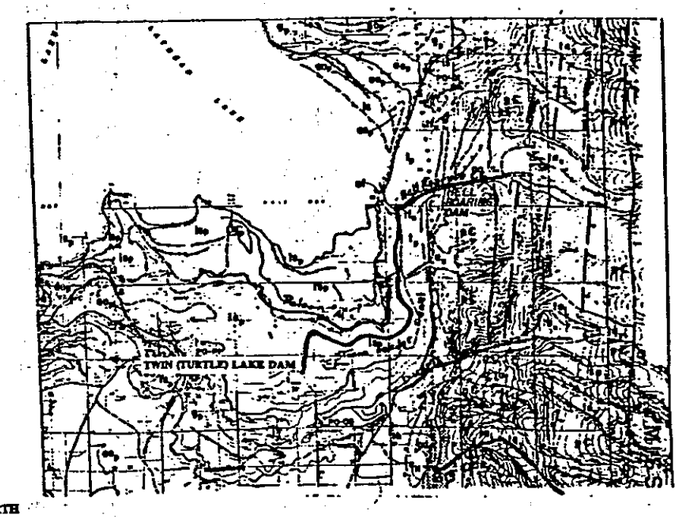


GENERAL PLAN AND TOPOGRAPHY

SCALE OF FEET 1"=200'

FULL SCALE DRAWING IN POCKET

NORTH



SURFICIAL GEOLOGY

1 MILE

NOTE: 1. TOPOGRAPHIC CONTOURS FROM F-4751 SEPT.,1930

2. ROAD ALIGNMENT AND STATIONING FROM BIA ROADS DRAWINGS

3. STRUCTURE LOCATIONS ARE FROM F-4751 AND SHOULD BE CONSIDERED APPROXIMATE.

4. DWG F-4751 REFERENCED IS TITLED "TWIN RESERVOIR AND DAMSITE" AND IS LOCATED IN THE ST. IGNATIUS PROJECT OFFICE.

ALWAYS THINK SAFETY

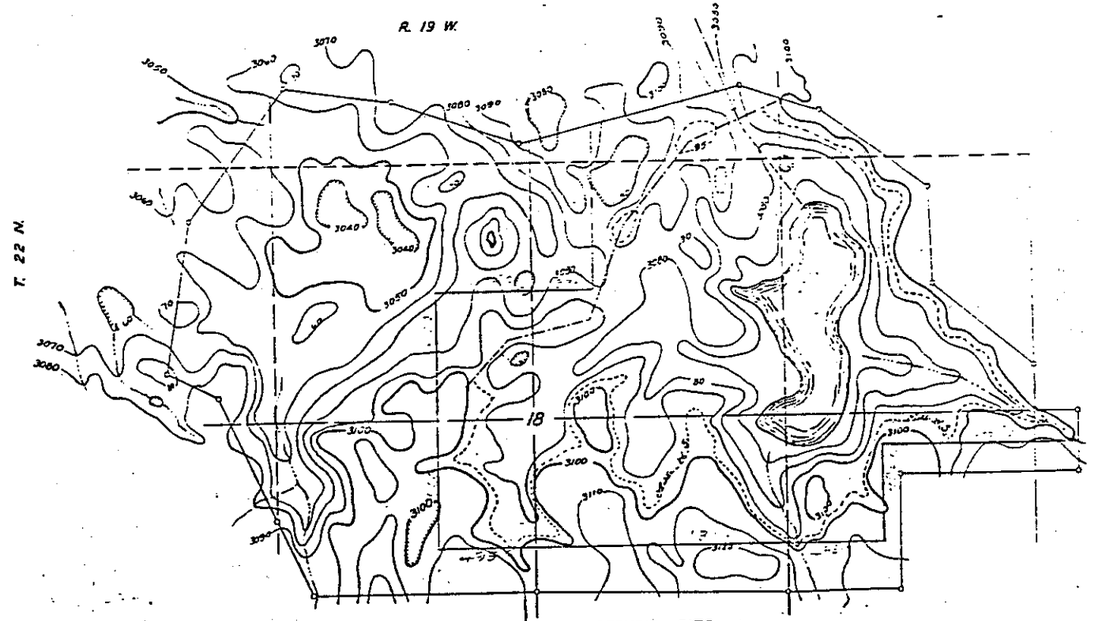
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

TWIN (TURTLE)-FAID-BIA-SOD

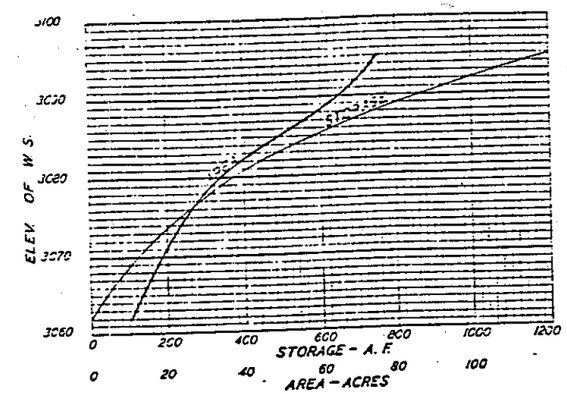
GENERAL PLAN, LOCATION, AND GEOLOGY MAP

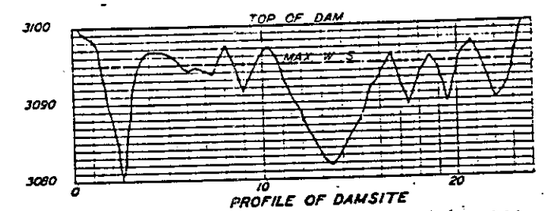
DESIGNED _____ TECHNICAL APPROVAL _____
DRAWN M.FAHY SUBMITTED _____
CHECKED M.FAHY APPROVED _____
DENVER, COLORADO NOVEMBER 30, 1991 981-D-50

Turtle (Twin) Reservoir

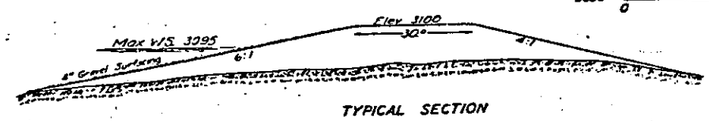


TOPOGRAPHY OF RESERVOIR SITE
SCALE – 1" = 400'

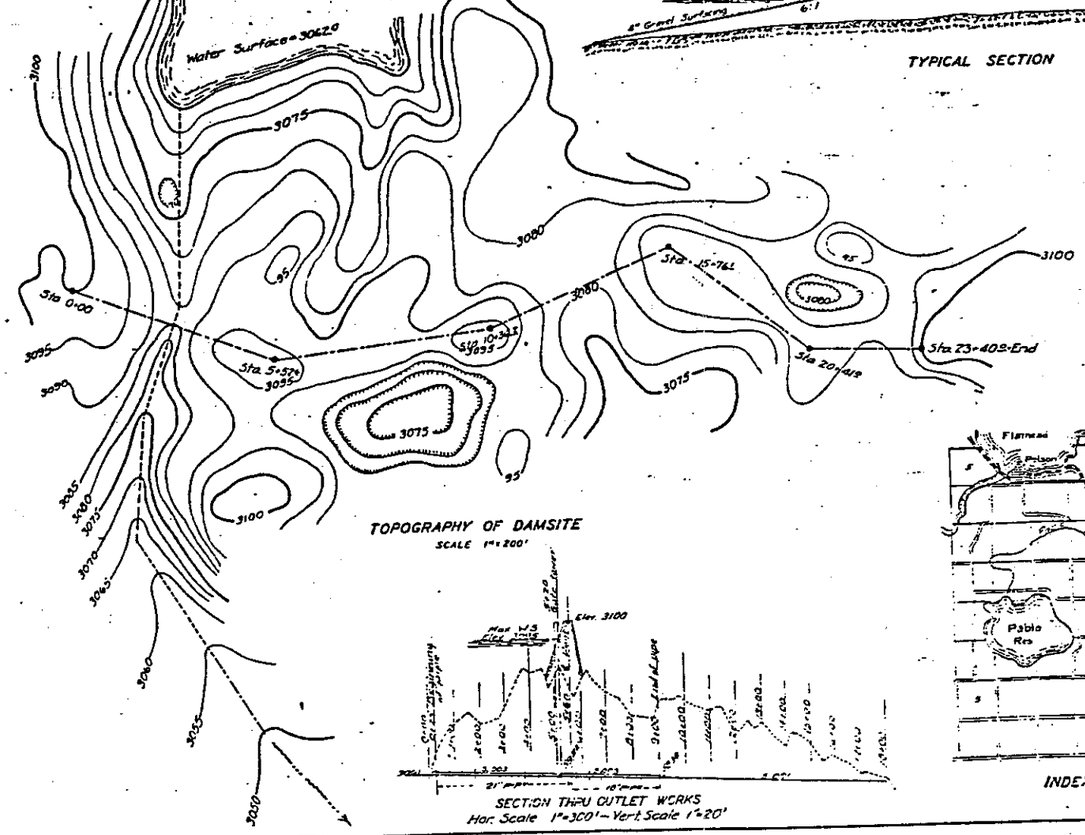




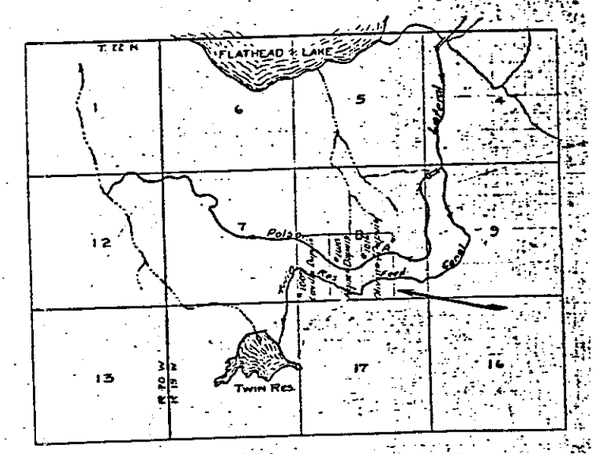
PROFILE OF DAMSITE



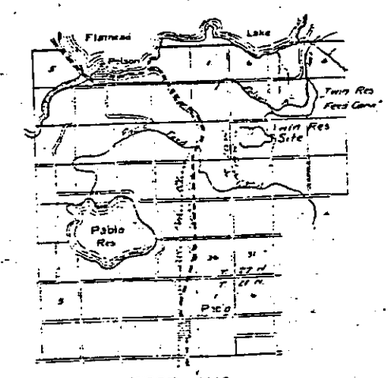
TYPICAL SECTION



TOPOGRAPHY OF DAMSITE
SCALE 1" = 200'



SECTION THRU OUTLET WORKS
Hor. Scale 1" = 300' – Vert. Scale 1" = 20'



INDEX MAP

DEPARTMENT OF THE INTERIOR
U. S. INDIAN IRRIGATION SERVICE
H.V. CLOTTS CHIEF ENG. – W.S. HANNA SUPERVISING ENG.
C.J. MOSBY – PROJECT ENG.

FLATHEAD PROJECT – MONTANA

PABLO SUBDIVISION

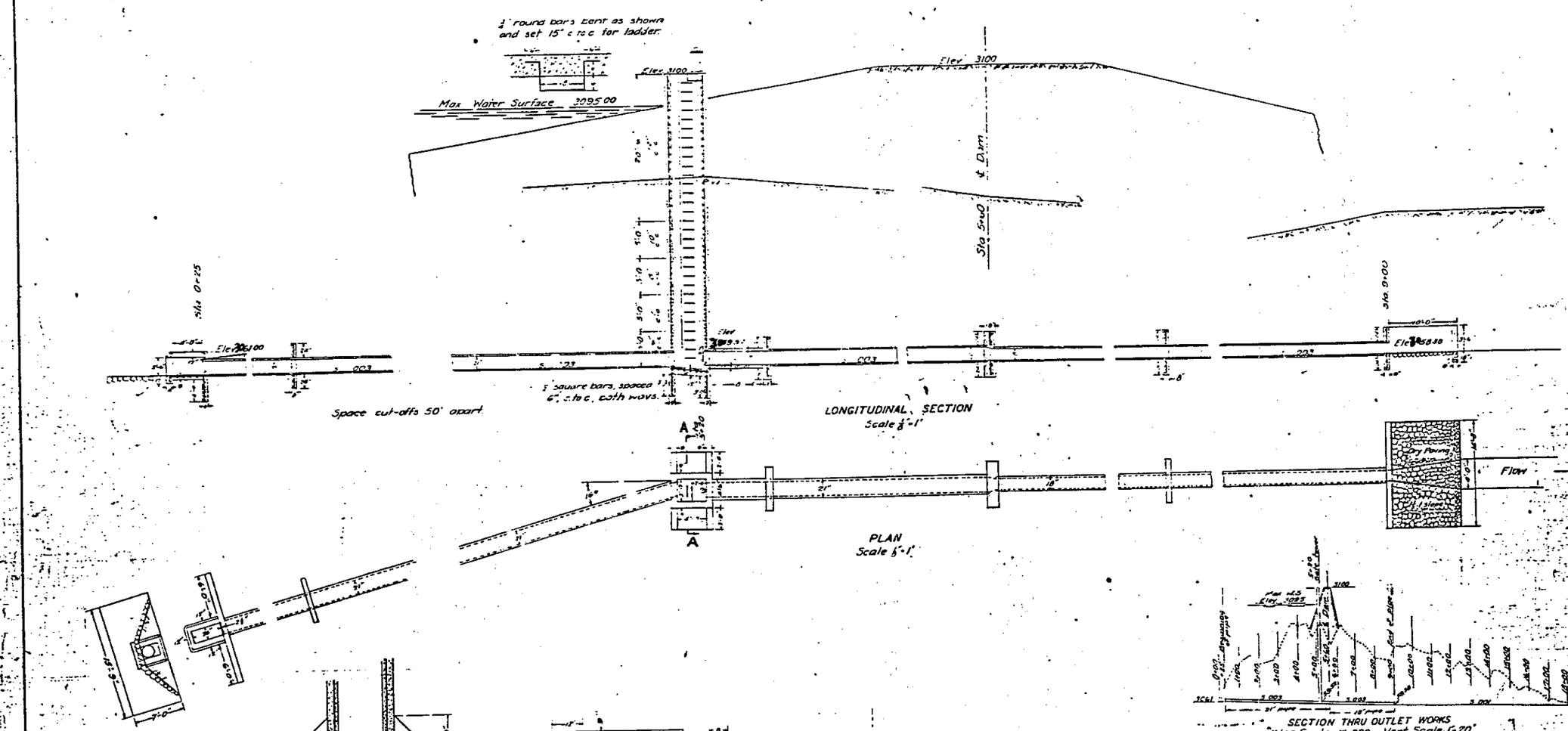
TWIN RESERVOIR AND DAMSITE

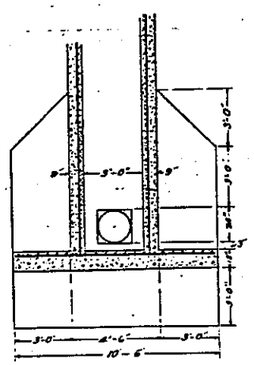
DRAWN ____ RECOMMENDED ____
CHECKED ____ APPROVED ____

F-4751	ST. IGNATIUS MONT. SEPT. 1930	

"A" DRAWER

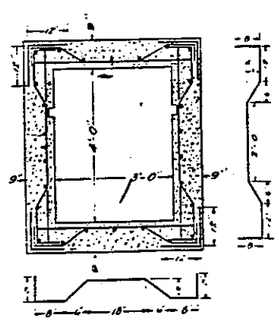
Turtle (Twin) Reservoir





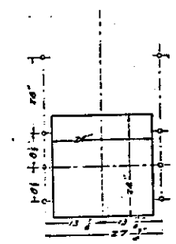
SEC. A-A
Scale 1/4"=1'

Reinforcement in footings and cutoffs to consist of 1/2" square bars, spaced 12" c to c, both ways.

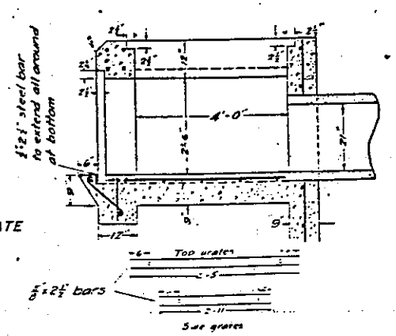


TRANSVERSE SECTION OF WELL
Scale 1/8"=1'

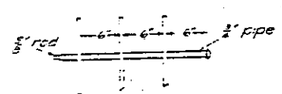
Vertical reinforcement in well to consist of 1/2" square bars, placed as shown. Transverse reinforcement to consist of 1/2" square bars, placed as shown and spaced as shown in longitudinal section. Straight bars to alternate with vert bars.



BOLT SPACING FOR GATE
Scale 3/4"=1'



DETAIL OF TRASH RACK
Scale 1/2"=1'



GRATE ASSEMBLY
Scale 1"=1'

MATERIAL

Concrete	500 c.y.
Dry Paving	15.0 "
1/2" reinf. steel	4475 #
One 24"x24" High Pressure Gate	
1/2" round steel	140 lin ft.
21" concrete pipe	465 " "
18" " "	400 " "

Required Minimum Capacity: 10 s.f.

DEPARTMENT OF THE INTERIOR
U. S. INDIAN IRRIGATION SERVICE
H. V. CLOTTS CHIEF ENG. H. S. HANNA SUPERVISING ENG.
C. J. MOODY - PROJECT ENG.

FLATHEAD PROJECT - MONTANA
PABLO SUBDIVISION

TWIN RESERVOIR OUTLET WORKS

DRAWN F.E.M. RECOMMENDED W. L. Adams 12-21-1930
CHECKED C.J.M. APPROVED Herbert Clotts 1/4/31

F-4759 | ST. IGNATIUS MONT. DEC 1930