## 2b. Drops 14-15 Hydro Site Background Information

IRRICAN Power


January, 2011

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## 3.1. General Location and Site Plan

The site is located approximately 25 km east of the City of Lethbridge on the St. Mary Main canal as shown on Figure 3.1 of the following page. The main canal system is owned and operated by the St. Mary River Irrigation District (SMRID), in conjunction with the Taber and Raymond Irrigation Districts.

The main canal system is approximately 308 km in length and starts south of the town of Raymond. The canal continues north-east past the City of Lethbridge (at approximately kilometre 40) and terminates near Medicine Hat. The system operates during the irrigation season, generally from late-April to early-October. The proposed hydro site incorporates the head from two in-line drops on the main canal.

The flowrate at Drops 14-15 is dictated by irrigation demand and fluctuates accordingly. The main canal flow at this location (design flow = 36.9 m3/s) combined with an average gross head of 15.0 m, provides Irrican Power or other potential developers with an opportunity for hydro power generation.

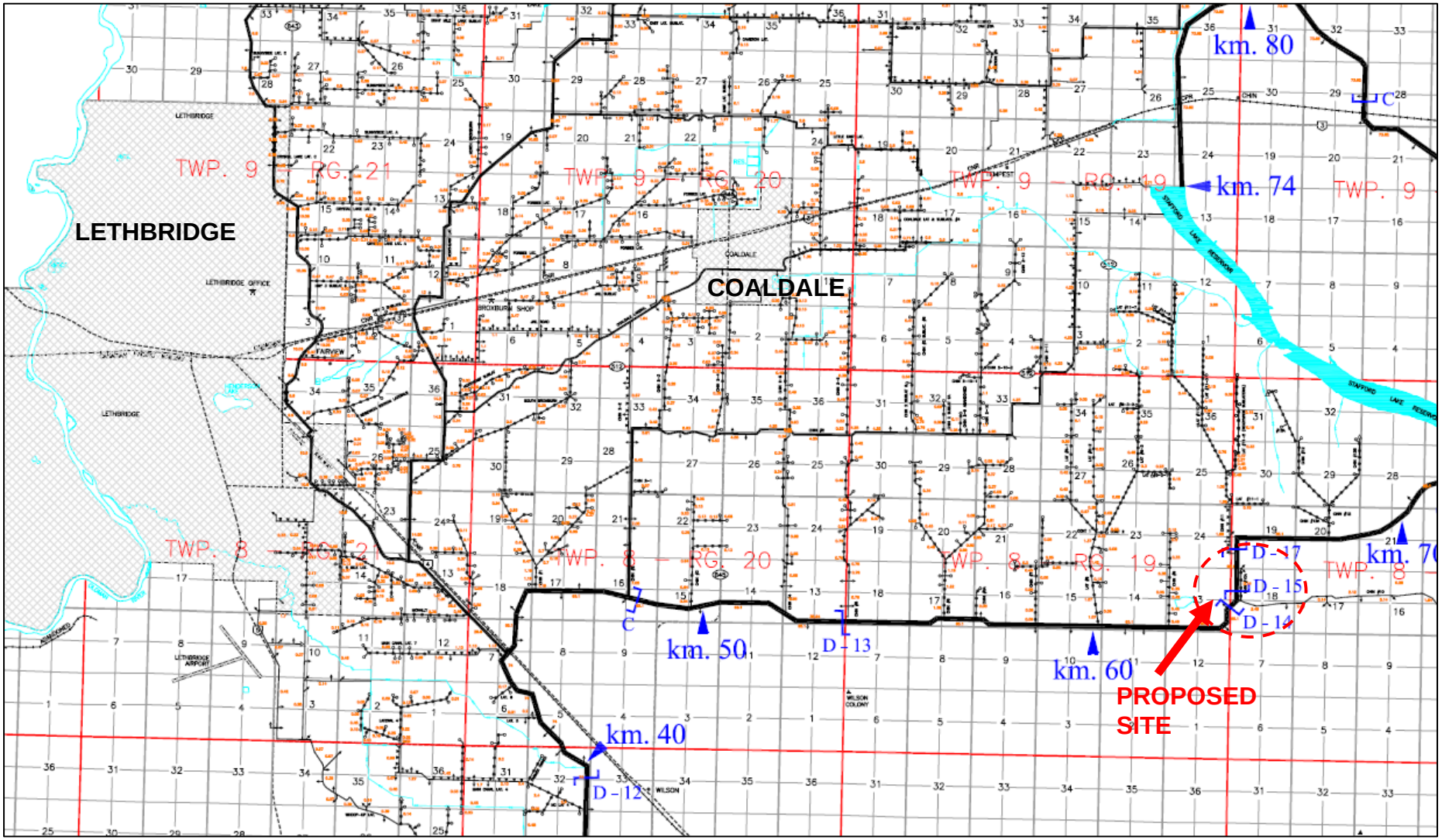



Figure 3.2 Site Location Plan, Drops 14-15 Hydro Site

## 3.2. General Site Parameters

a) UMA Design Flow = 36.9 $m^3/s$
b) UMA Design head = 14.95 m

Above from *Potential Hydroelectric Project Investigations within the St. Mary River Project (UMA, 2001)*

c) Maximum flowrate = 55 $m^3/s$.

Flowrates will vary according to irrigation demand; see table 3.1 below.

**Table 3.1. Chin-Stafford flow data, 2000-2010**

| Year | Start-up Date | End Date | Q average ($m^3/s$) |
|---|---|---|---|
| 2000 | 28-Apr-00 | 16-Oct-00 | 29 |
| 2001 | 03-May-01 | 10-Oct-01 | 21 |
| 2002 | 07-May-02 | 21-Oct-02 | 34 |
| 2003 | 30-Apr-03 | 17-Oct-03 | 23 |
| 2004 | 30-Apr-04 | 29-Oct-04 | 24 |
| 2005 | 02-May-05 | 20-Oct-05 | 22 |
| 2006 | 30-Apr-06 | 31-Oct-06 | 21 |
| 2007 | 08-May-07 | 28-Oct-07 | 25 |
| 2008 | 30-Apr-08 | 20-Oct-08 | 26 |
| 2009 | 25-Apr-09 | 18-Oct-09 | 24 |
| 2010 | 01-May-10 | 08-Oct-10 | 17 |

**Potential for hydro development**

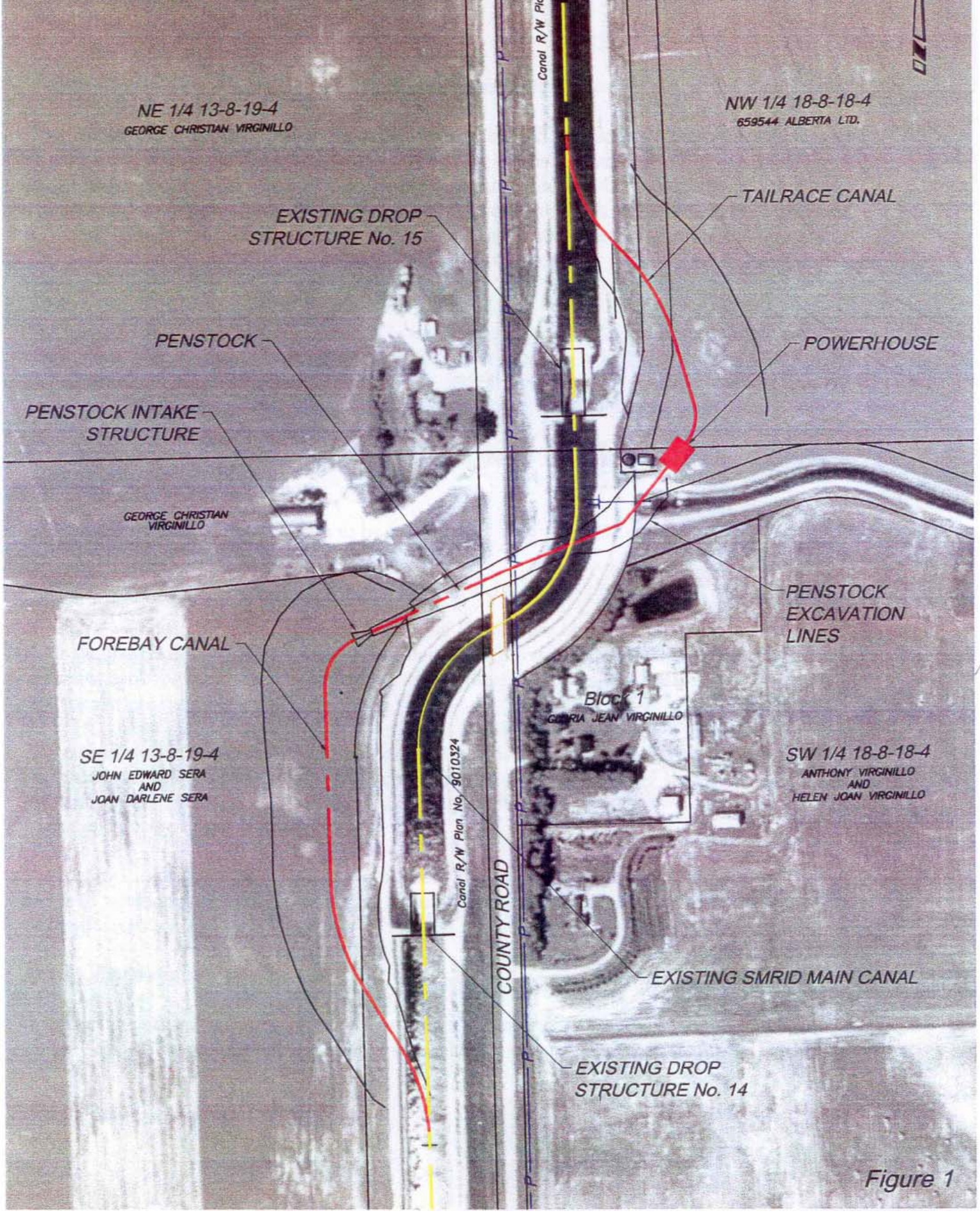
It is envisioned that a 5 to 7 MW run-of the river hydro plant could be constructed at the site, producing between 15,000 to 18,000 MW-hrs per year.

### 3.3 Conceptual Design from UMA, 2001

See following page. UMA's layout incorporated the head from Drops 14 (sta 64+040) and Drops 15 (station 64+451). There is another downstream drop structure at station 65+720 that could possibly be incorporated to increase the head by an additional 5.4 metres, (requiring a longer/deeper tailrace canal).

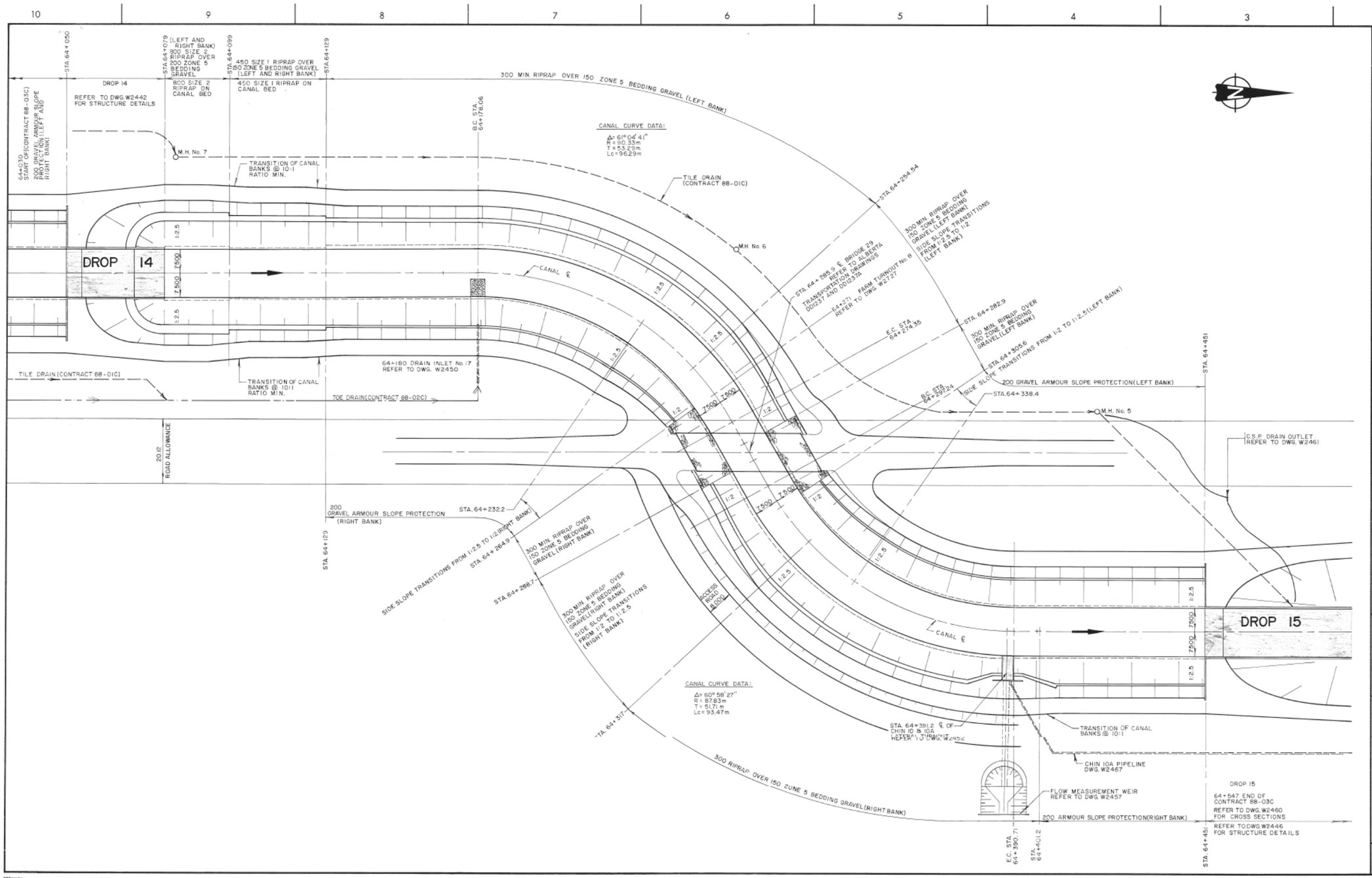
### 3.4 Interconnection

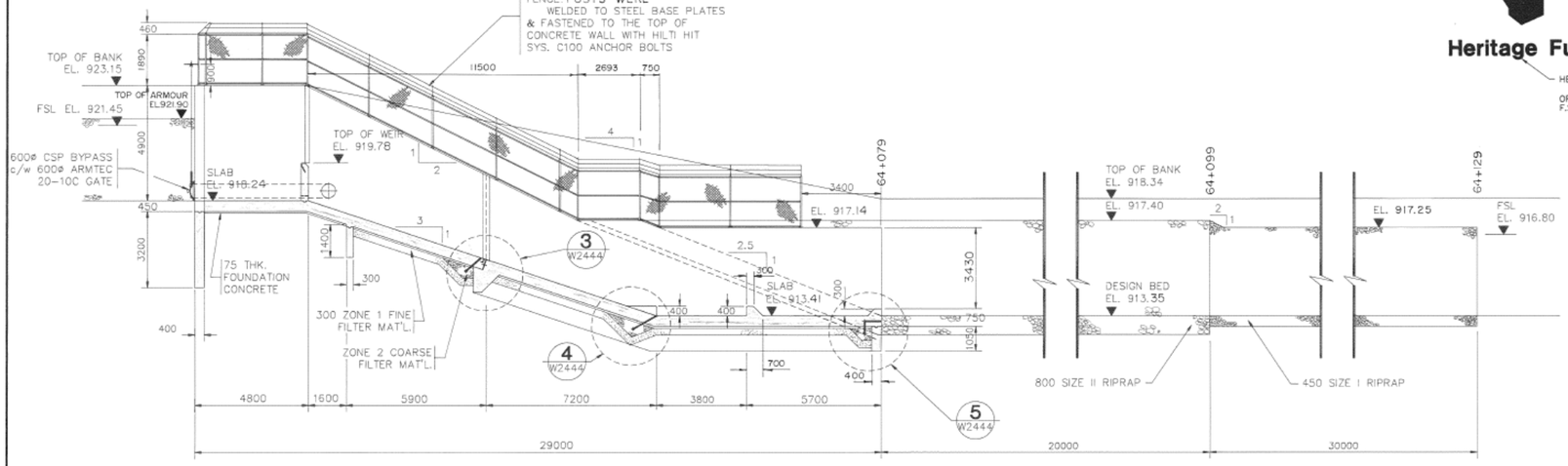
The power plant would be connected to the existing 25 KV line located in the vicinity of this project (*more information to be provided*). Other requirements consist of the transformer substation, approximately 0.5 km (verify) of power line and an electrical breaker.




**Conceptual Design (from 'Potential Hydroelectric Project Investigations within the St. Mary River Project', UMA, 2001)**

## 3.5 Scan of Drawings main canal cross section drawings, drop structures



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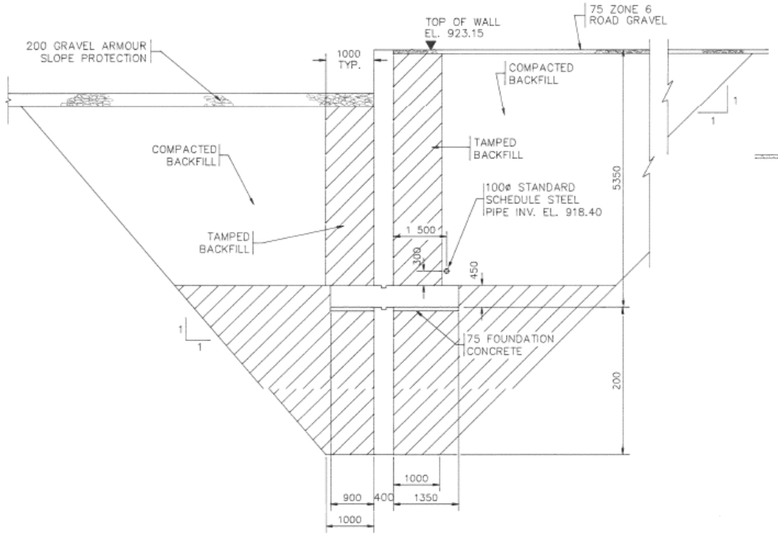


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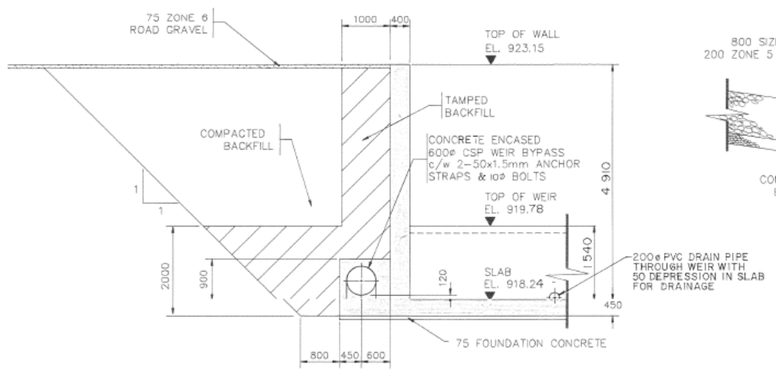


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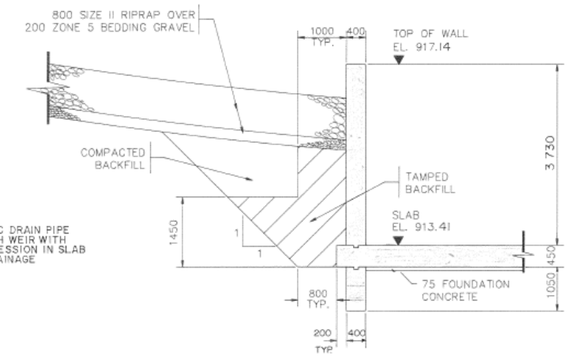


## SECTION D
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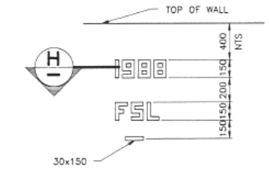
**Heritage Fund**

HERITAGE FUND LOGO PLAQUE
HILTED ONTO FACE OF
OPPOSITE WALL OF UPSTREAM
F.S.L. MARK.




## DETAIL G
SCALE 1:20 W2446

NOTE:
YEAR AND F.S.L. INSET IN
CONCRETE AS SHOWN.


GENERAL NOTES

1. ALL MISCELLANEOUS STEEL SHALL BE TO CSA G40.21 M. GRADE 300 W UNLESS OTHERWISE NOTED.
2. HOLLOW STRUCTURAL SECTIONS SHALL HAVE A MINIMUM YIELD STRENGTH OF 350 MPa.
3. ALL MISCELLANEOUS STEEL SHALL BE HOT DIPPED GALVANIZED UNLESS OTHERWISE NOTED.
4. HOT DIP GALVANIZING SHALL BE IN ACCORDANCE WITH CSA G164-M 1981.
5. CONTRACTOR SHALL PROVIDE ALL ANCHOR BOLTS IN STRICT ACCORDANCE WITH THE RELEVANT EQUIPMENT SUPPLIER'S CERTIFIED DRAWINGS.
6. ALL WELDING SHALL BE PERFORMED IN ACCORDANCE WITH CSA W59 - 1984, AND ALSO UNDER CSA W47.1 AND CSA W48 SERIES.
7. FABRICATION TOLERANCES AND BOLTED CONNECTIONS SHALL BE IN ACCORDANCE WITH CSA S16 SERIES.
8. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 30 MPA AT 28 DAYS. TYPE 50 CEMENT SHALL BE USED. AIR CONTENT 5% TO 7%. MAXIMUM SLUMP 80 MM.
9. CHAMFER ALL EXTERIOR CONCRETE CORNERS 25 MM.
10. ALL MECHANICAL EQUIPMENT AND ANCHOR BOLTS SHALL BE INSTALLED IN ACCORDANCE WITH CERTIFIED SHOP DRAWINGS SUPPLIED BY THE EQUIPMENT SUPPLIER AND EXAMINED BY THE ENGINEER. ANCHOR BOLT PLACEMENT TOLERANCE SHALL BE +/- 3 MM.
11. ALL REINFORCING STEEL SHALL BE NEW BILLET STEEL, GRADE 400, DEFORMED BARS CONFORMING TO CSA G30.12.
12. ALL REINFORCING STEEL IN SLABS MUST BE SUPPORTED ON 1,200 MM CENTRES MINIMUM.
13. CONCRETE COVER FOR REINFORCING STEEL SHALL BE:
    A) UNFORMED CONCRETE AGAINST GROUND — 75mm CLEAR
    B) FORMED CONCRETE EXPOSED TO WEATHER, WATER, OR GROUND — 50mm CLEAR
14. EMBEDDED MATERIALS SHALL BE IN POSITION AND SECURELY FASTENED IN PLACE BEFORE PLACING CONCRETE.
15. ALL CONCRETE CONSTRUCTION TO BE IN ACCORDANCE WITH CSA CAN3-A23.
16. ALL FORMED CONCRETE SURFACES SHALL BE STANDARD SURFACE FINISH TYPE 6, UNLESS OTHERWISE NOTED.
17. ALL EXPOSED WALLS SHALL BE TYPE 5 SACK RUBBED FINISH.
18. SANDBLASTING THE JOINT TO EXPOSE THE COARSE AGGREGATE MAY BE USED AS AN ALTERNATE TO KEYWAYS.

ST. MARY RIVER IRRIGATION DISTRICT

ALBERTA ENVIRONMENT

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RECORD DRAWING
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PROJECT SUPERVISOR

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ENGINEER / R.E.T.

PROFESSIONAL ENGINEER KENNETH B. ROYCE ALBERTA

PERMIT

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Signature
Date 22/07/88
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Engineers & Planners

# ST. MARY RIVER IRRIGATION DISTRICT
## MAIN CANAL REHABILITATION
## RIDGE RESERVIOR TO CHIN RESERVIOR REACH
## km.64 TO km.65
## DROP 14 - STA. 64+050
## SECTIONS

SHT. 4 OF 31

| PROJECT No. | CODE | | DRAWING No. | ISS./REV. |
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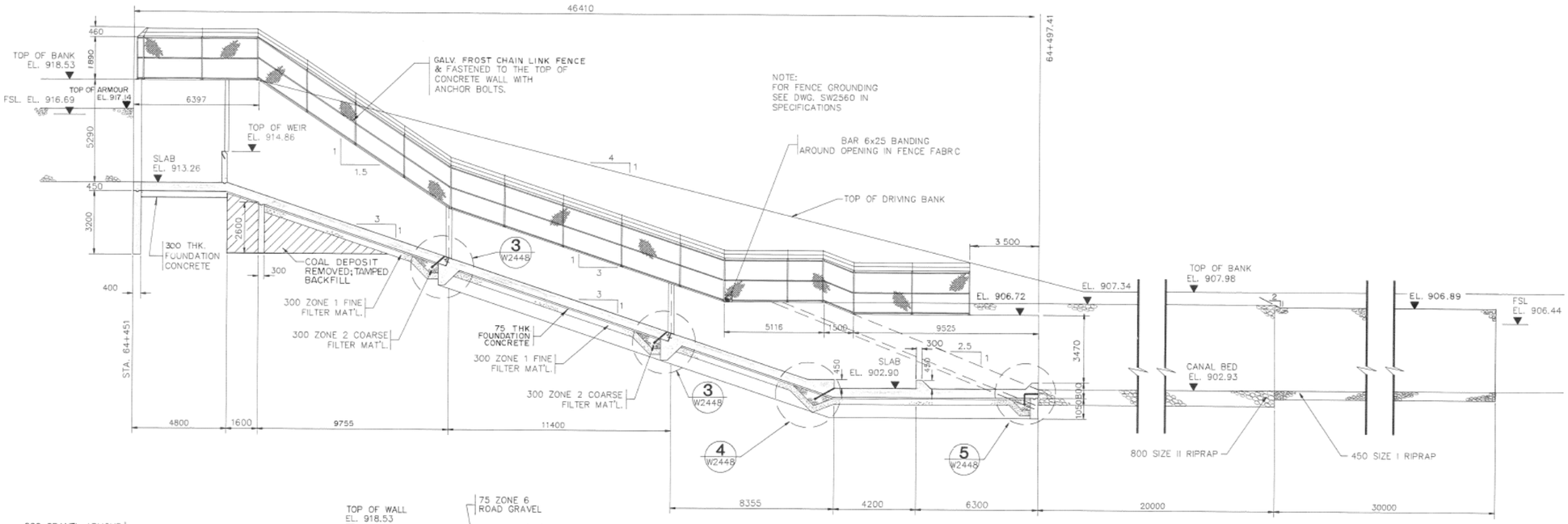


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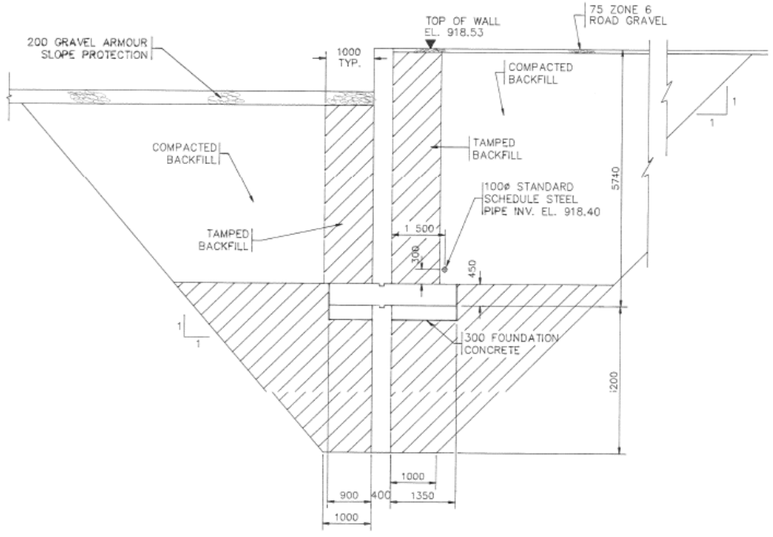


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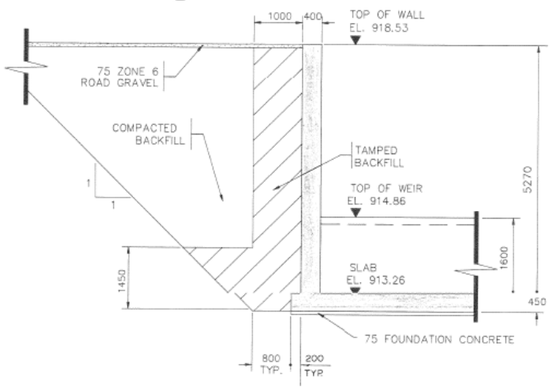


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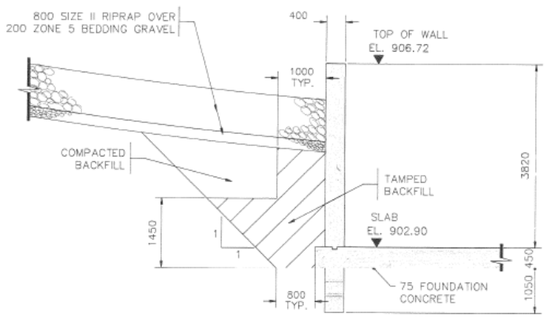


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**ST. MARY RIVER IRRIGATION DISTRICT**

**ALBERTA ENVIRONMENT**

Heritage Fund

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Engineers & Planners

# ST. MARY RIVER IRRIGATION DISTRICT

MAIN CANAL REHABILITATION

RIDGE RESERVOIR TO CHIN RESERVOIR REACH

km.64 TO km.65

DROP 15 - STA. 64+451

SECTIONS — SHT. 8 OF 31

| PROJECT No. | CODE | | DRAWING No. | ISS/REV |
|---|---|---|---|---|
| 1758-060-00 | CONTRACT 88-03C | R | W2447 | 2 |

3.6 Potential Hydroelectric Project Investigations within the St. Mary River Project (UMA, 2001)

**[Hard copy available upon request]**

3.7 Relevant Historical Data **[CD available upon request]**

Daily Flows, 1994-2009

Daily reservoir elevation data, 1994-2009

Scan of main canal cross sections and drop structures