

# Small Scale Hydroelectric Generation

Bend, Oregon  
May 16, 2007

## DEFINITION

- 10 MW or Less: FERC License
- 5 MW or Less: FERC License Exemption

## FEASIBILITY STUDY

## RESOURCE

## PERMITS

- FERC License
- State and Local

## SITE

## AGREEMENTS

## PRELIMINARY EVALUATION

- Resource and Revenue
- Plant Configuration
- Site Conditions

- Developer and Owner
- Owner and Federal or State Agencies
- Utility (PURPA) Contract

# RESOURCE

- At Existing Water Conveyance
- Water Right
- Head and Flow
- Records: 20 year preferred
- Site
  - Plant
  - Access
  - Transmission Line

# PRELIMINARY EVALUATION

- Feasible Site
- Generation and Revenue Estimates
- Capital Cost and Financial Analysis
- Favorable Environmental and Utility Sales Conditions

# Feasibility Study

## GENERATION ESTIMATES:

- Monthly Head and Flow

## REVENUE PROJECTION:

## OWNERSHIP:

- Site and Resource Owner
- Developer: Build – Own – Transfer
- Lease

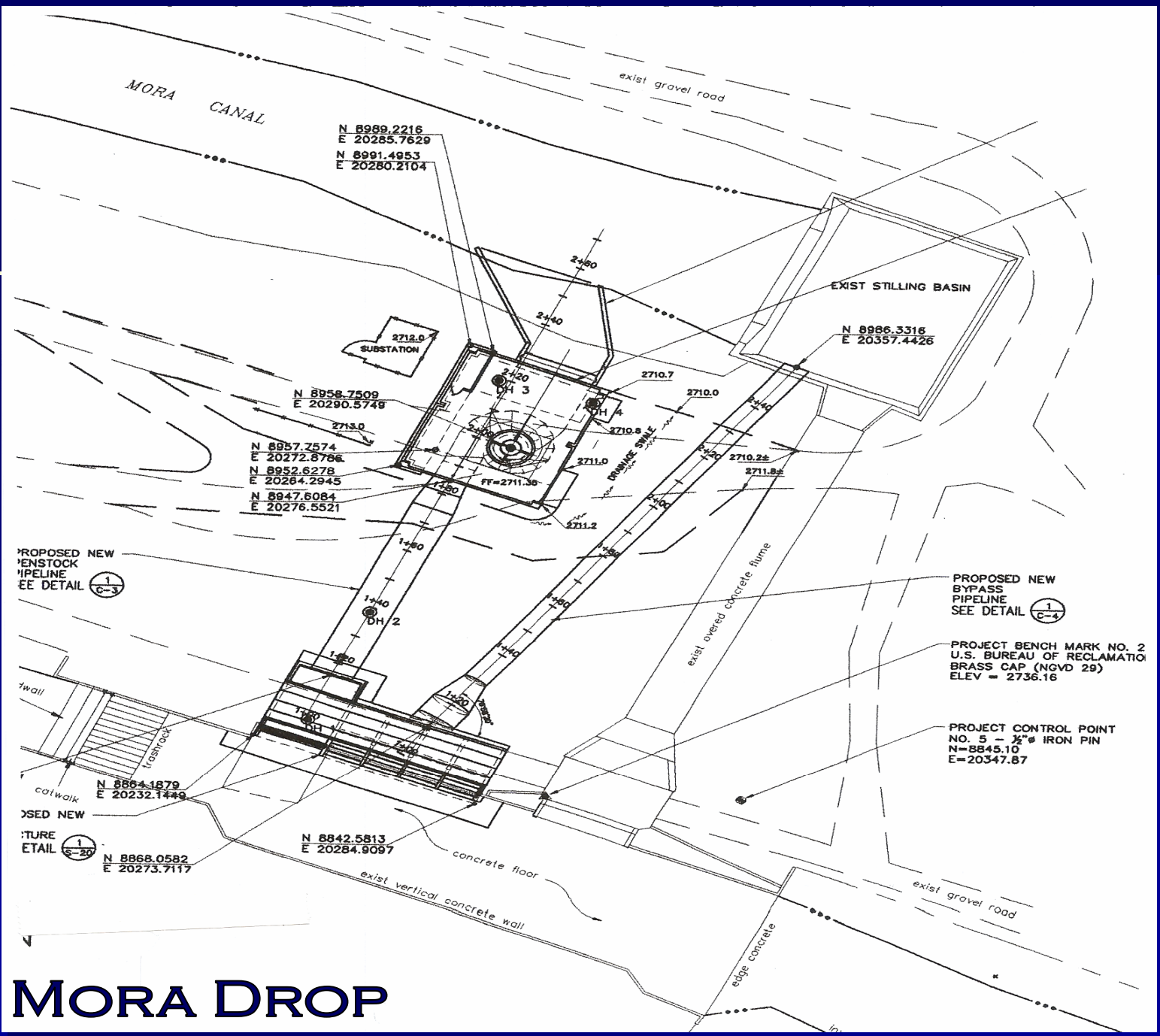
## PRELIMINARY LEVEL DESIGN

- Site and Access
- Plant Components
- Transmission line
- Permits

## INCENTIVES

- Federal
- State

## FINANCIAL ANALYSIS



N 8989.2216  
E 20285.7629  
N 8991.4953  
E 20280.2104

EXIST STILLING BASIN

N 8986.3316  
E 20357.4426

2712.0  
SUBSTATION

N 8958.7509  
E 20290.5749

N 8957.2574  
E 20272.8766  
N 8952.6278  
E 20264.2945  
N 8947.6084  
E 20276.5521

PROPOSED NEW  
PENSTOCK  
PIPELINE  
SEE DETAIL (1)  
C-3

PROPOSED NEW  
BYPASS  
PIPELINE  
SEE DETAIL (1)  
C-4

PROJECT BENCH MARK NO. 2  
U.S. BUREAU OF RECLAMATION  
BRASS CAP (NGVD 29)  
ELEV = 2736.16

PROJECT CONTROL POINT  
NO. 5 - 1/2" IRON PIN  
N=8845.10  
E=20347.87

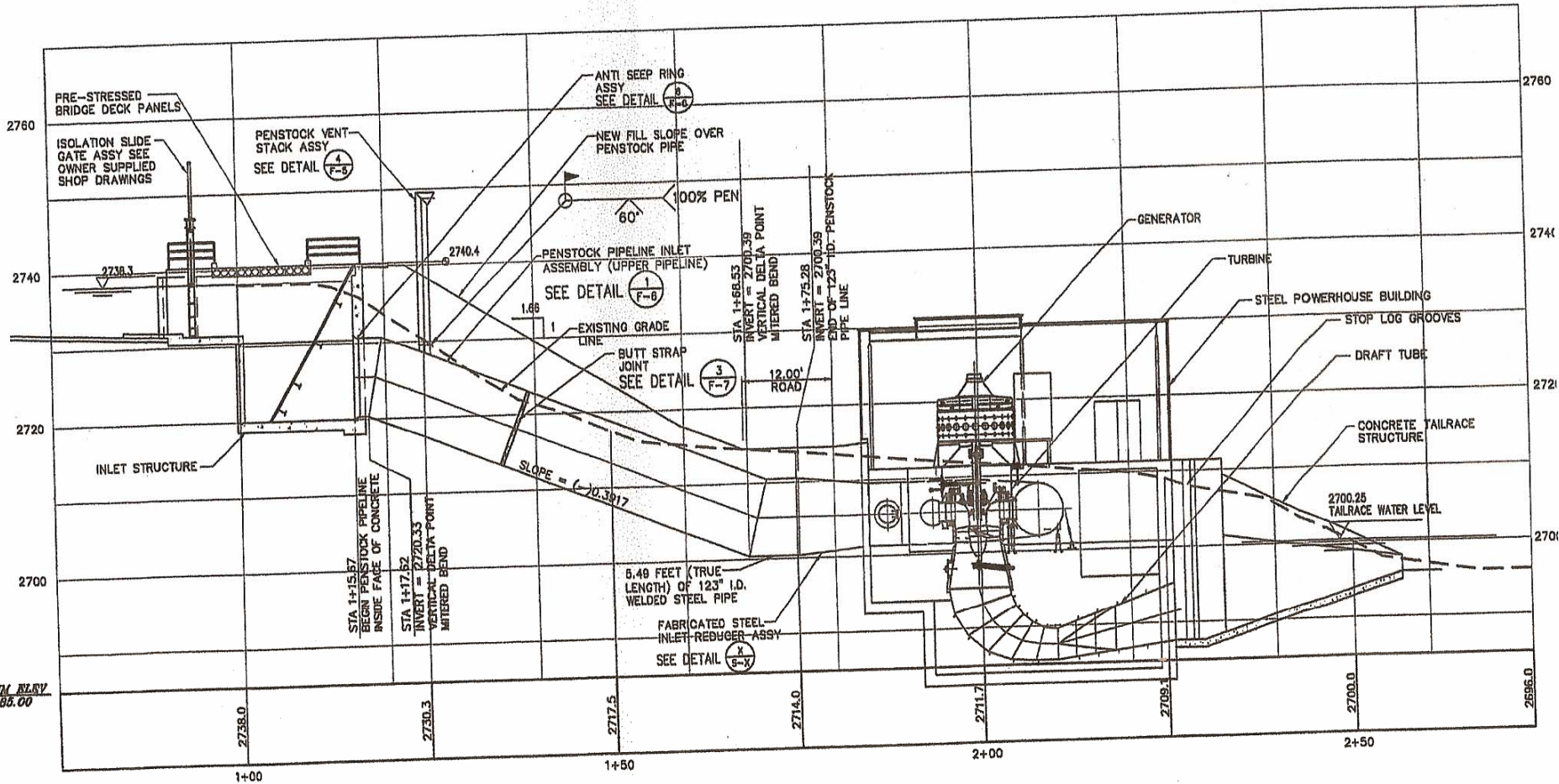
N 8854.1879  
E 20232.1449

PROPOSED NEW  
STRUCTURE  
SEE DETAIL (1)  
C-20

N 8868.0582  
E 20273.7117

N 8842.5813  
E 20284.9097

# MORA DROP



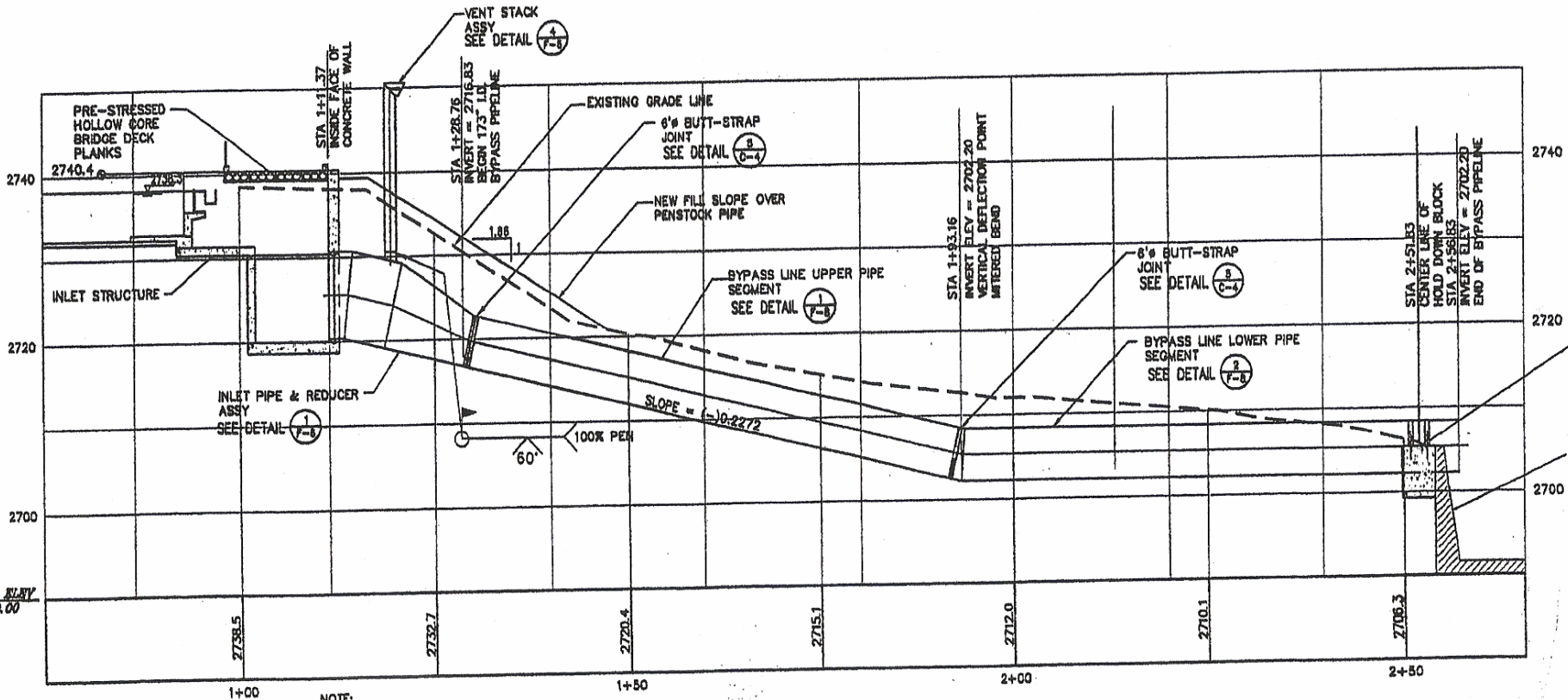
NOTE:  
ALL PIPE JOINTS SHALL BE BUTT STRAP TYPE  
IN ACCORDANCE WITH THE DETAILS SHOWN ON  
SHEET C-4.

**PENSTOCK PIPELINE  
PROFILE**

SCALE: 1" = 10'

(2)  
C-3

**MORA DROP**



NOTE:  
ALL PIPE JOINTS SHALL BE BUTT STRAP TYPE  
IN ACCORDANCE WITH THE DETAILS SHOWN ON  
THIS SHEET.

BYPASS PIPELINE  
 PROFILE  
 SCALE: 1" = 10'  
 (1)  
 C-4

MORA DROP

# Financial Analysis

## CAPITAL COST ESTIMATE

- Quantities
- Civil Costs: Quantity x Unit Price
- Equipment Costs
- Project Management Cost
- Engineering Cost
- Owner Cost

## REVENUE

- Levelized / Non-Levelized
- Seasonal
- Peak / Non-Peak

## OWNERSHIP AND OPERATING COST

- Equity and Risk
- Financing and Debt Service
- O and M Cost
- Insurance, Taxes and Other

## PROFIT

## PROFIT DISTRIBUTION

# Agreements/Contracts

## OWNER AND DEVELOPER

- Management
- Engineering
- Construction
- Cost
- Revenue
- Profit
- Distribution of Profit:
  - % Sharing
  - Royalty

## UTILITY- Power Sales

- Rates
- Obligations
- Security

## AGENCY

(Bureau of Reclamation), (corps of Engineers), etc.

- Design Review
- Construction Oversight
- Operating Agreement