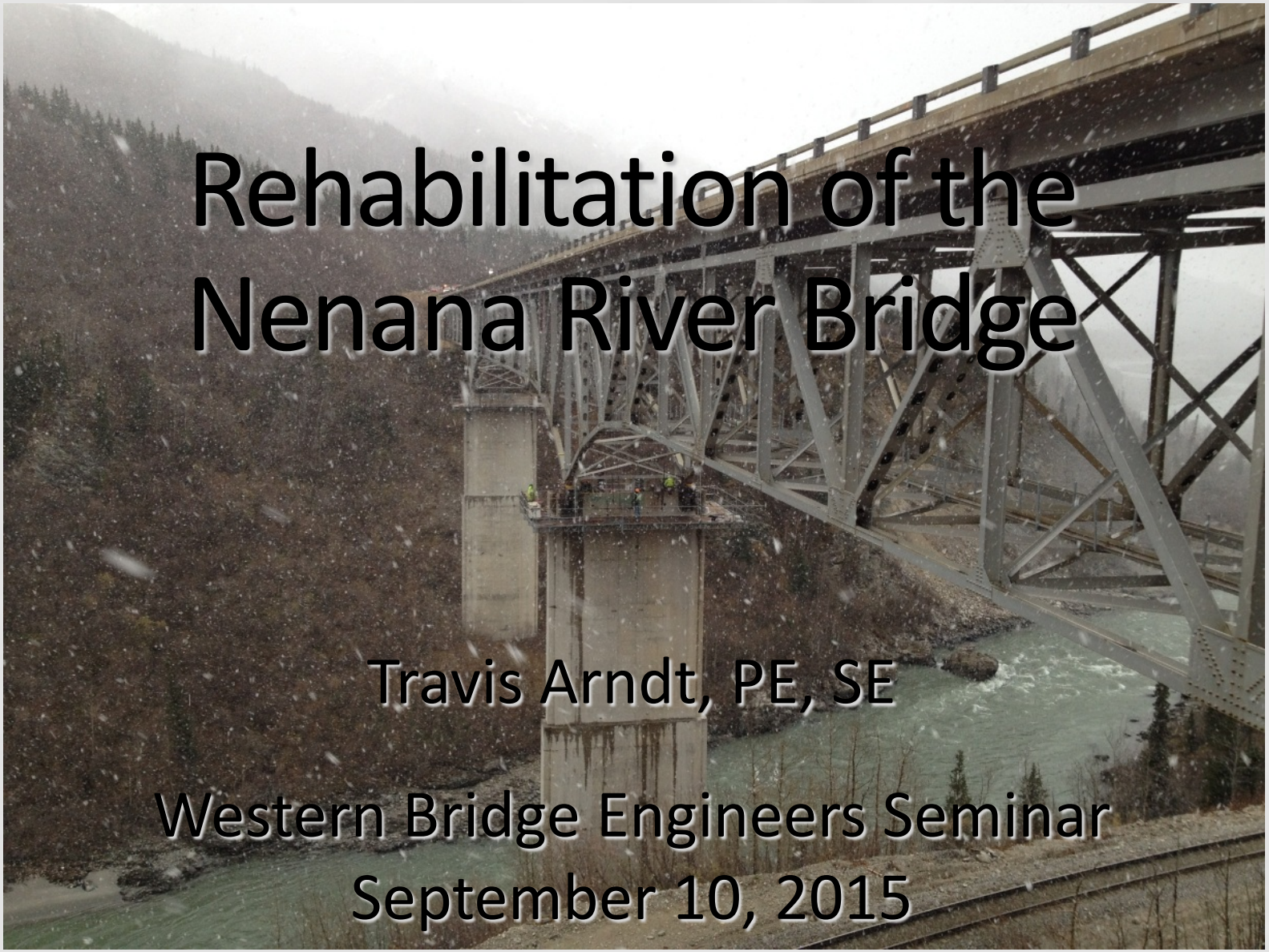


Rehabilitation of the Nenana River Bridge

Travis Arndt, PE, SE

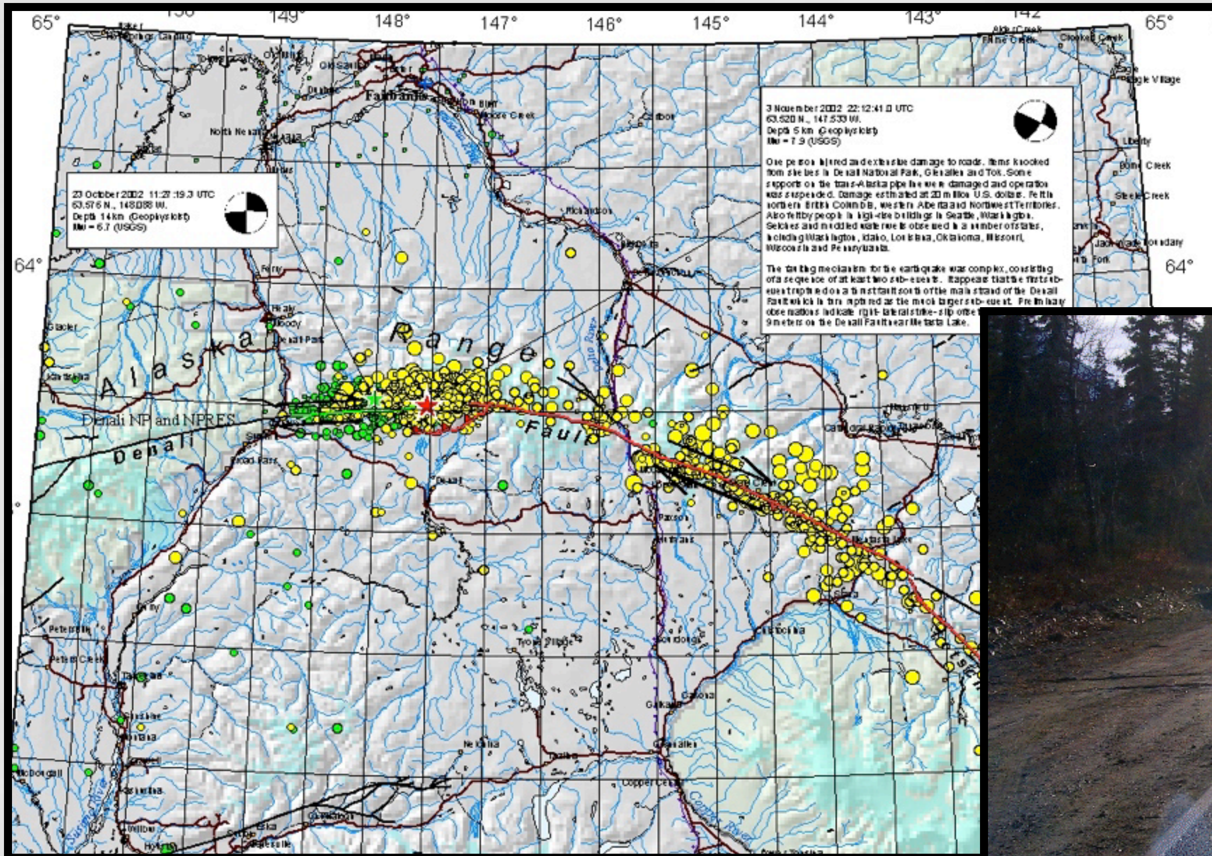
Western Bridge Engineers Seminar
September 10, 2015

Nenana River Bridge

Rehabilitiation

- Formwork Removal from Initial Construction
- Increase Friction on Deck Surface
- Spot Coating Repairs
- Bridge Rail Upgrade
- Extend Catwalks
- Seismic

Seismic Activity

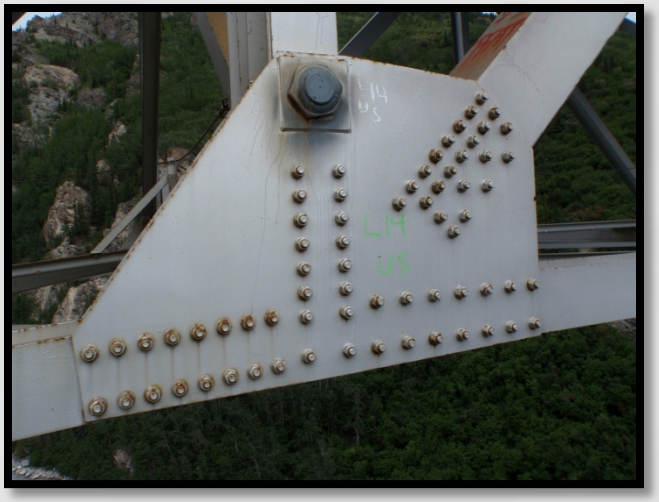


ftp://hazards.cr.usgs.gov/maps/sigeqs/20021103/20021103.jpg

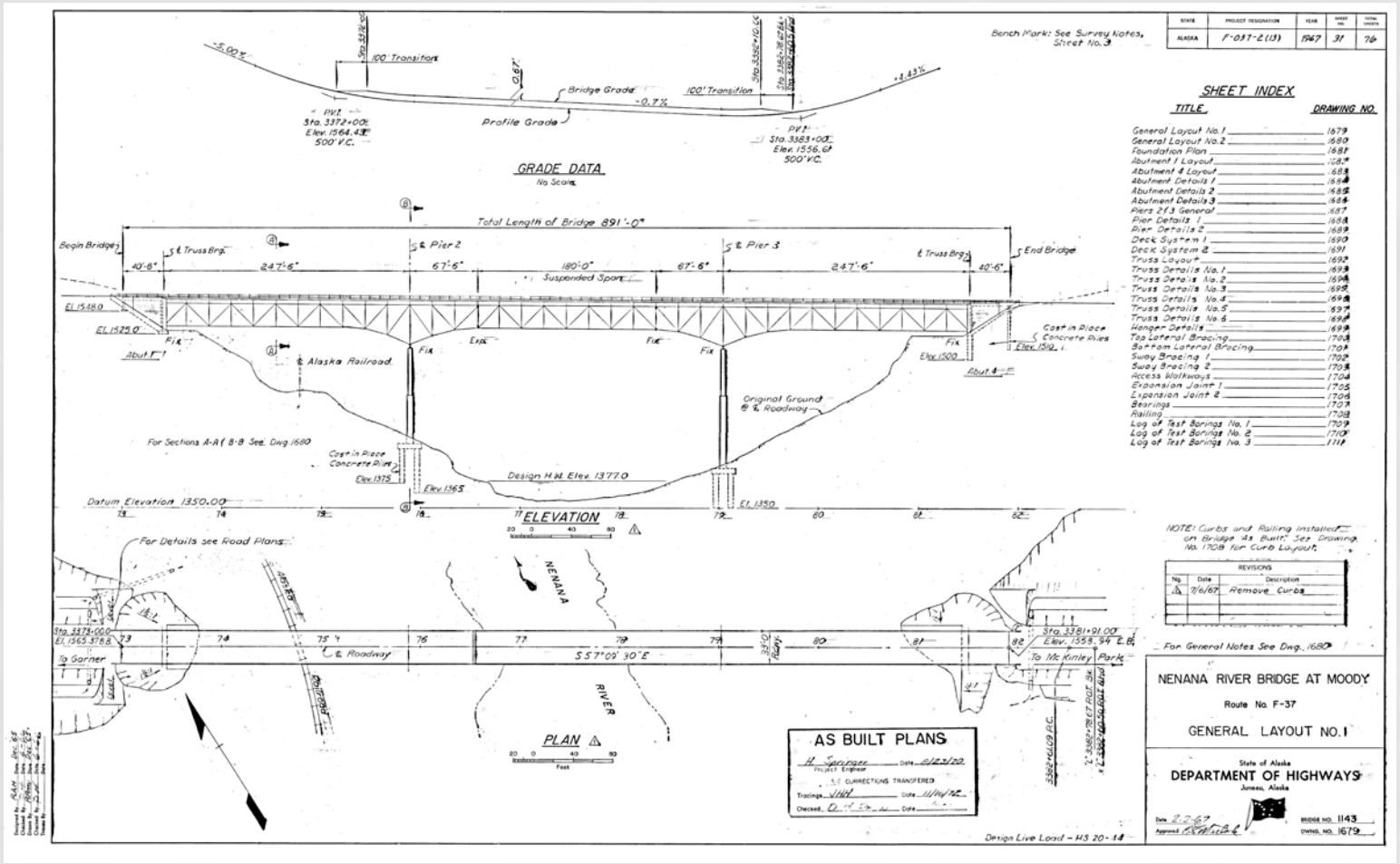
http://earthquake.usgs.gov/earthquakes/eqarchives/year/2002/2002_11_03_images.php

Existing Seismic Deficiencies

Existing Seismic Deficiencies



Seismic Analysis



Alaska Department of
Transportation & Public Facilities

Seismic Improvements

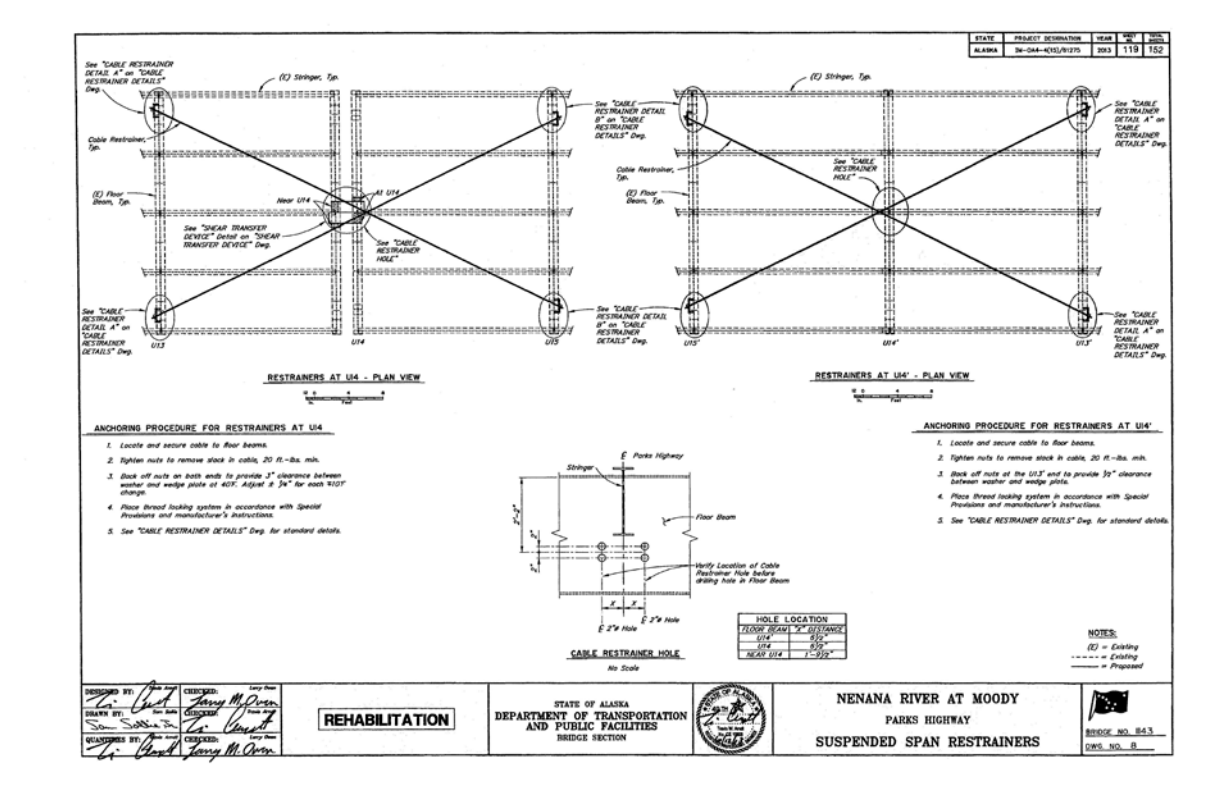
- Increase Shear Transfer Device
- Restrainer Cables
- Bearing Replacement

Seismic Improvements

- Increase Shear Transfer Device

Seismic Improvements

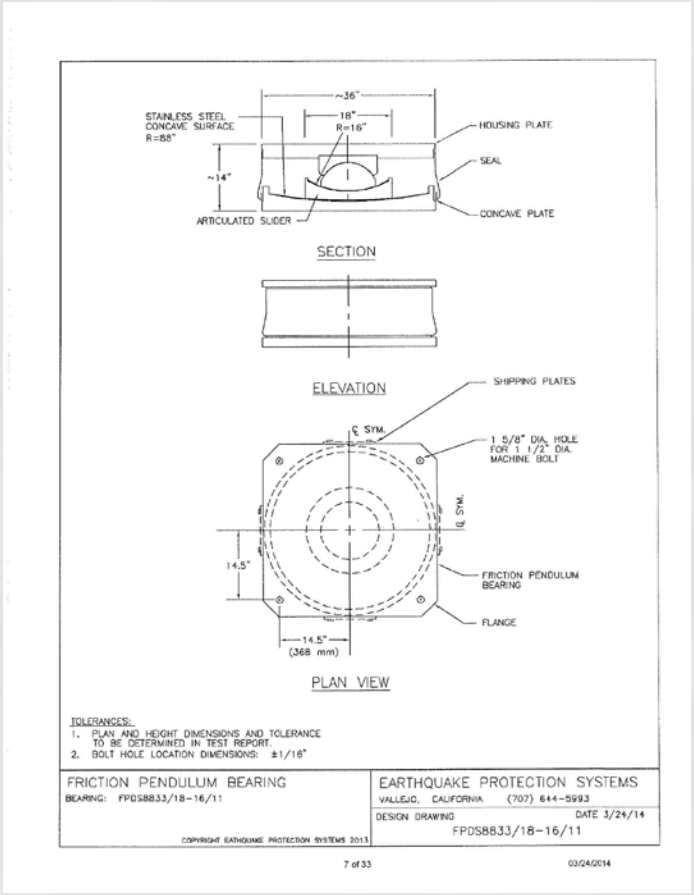
- Increase Shear Transfer Device
- Restrainer Cables



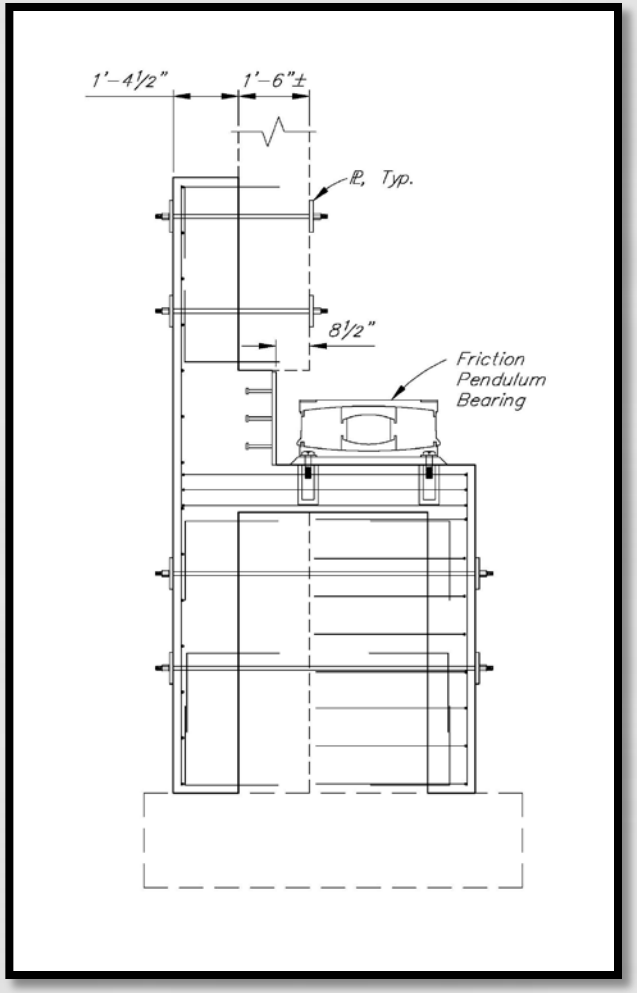
Alaska Department of Transportation & Public Facilities

Seismic Improvements

- Increase Shear Transfer Device
- Restrainer Cables
- Bearing Replacement

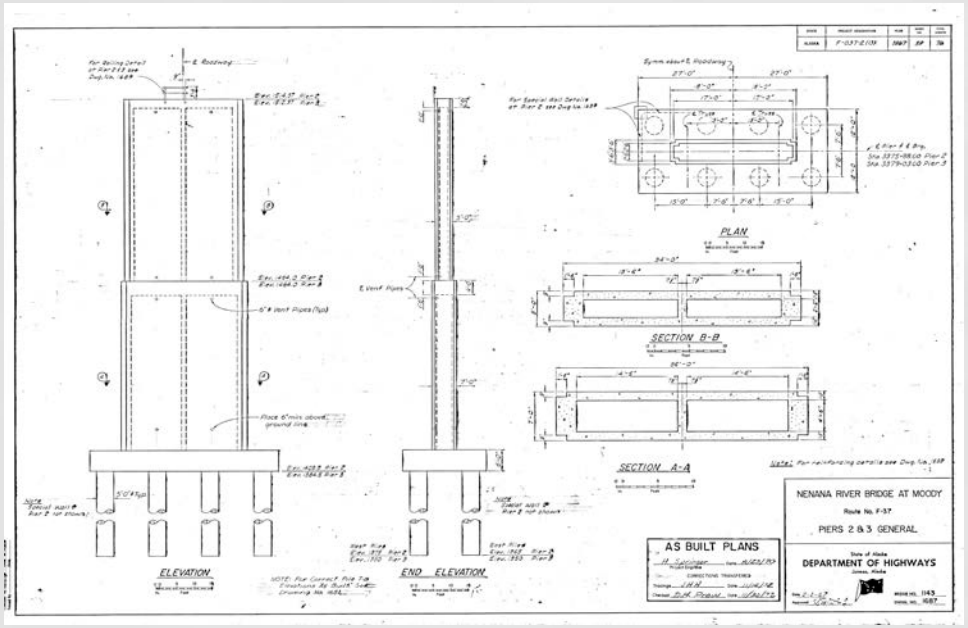


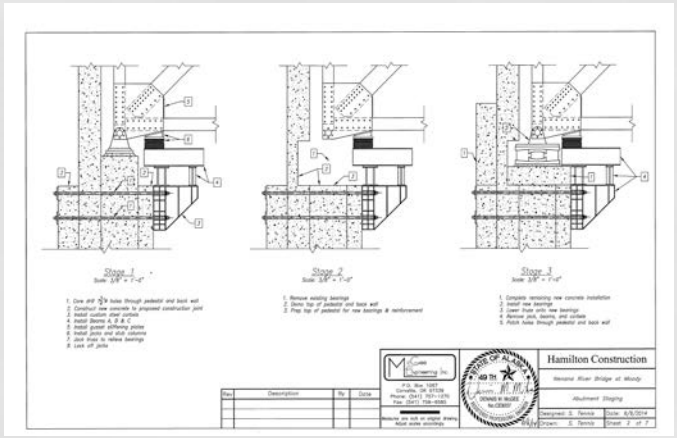
Abutment Pedestal Modifications

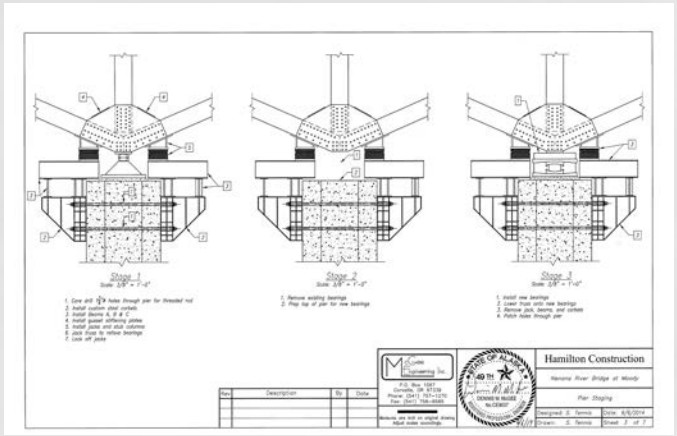


Grout Placement Mock-up

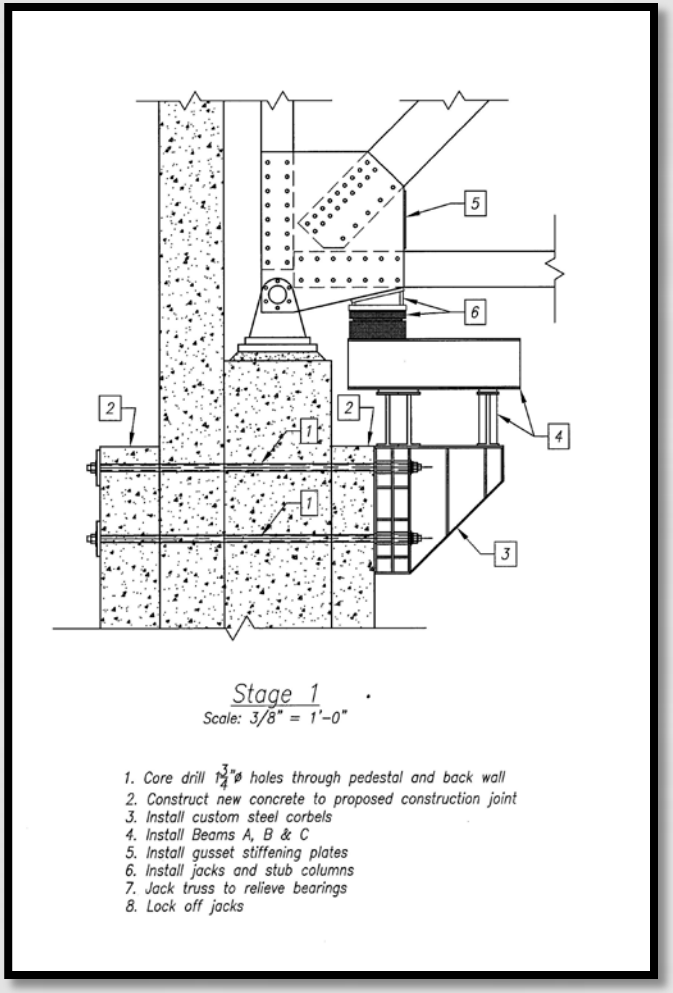
Lifting Methods







Jacking Frame Installation



Bearing Installation

Bearing Rotation

Frictional Comparison

Material 1	Material 2	Clean & Dry	Lubricated
Steel	Steel	.50 - .80	.16

Table 1: Friction Coefficients for FPDS8833/18-16/11 Bearings 01-08

Production Quality Control Tests

Individual Tolerance	f1	f2	f3
Min.	0.040	0.080	0.080
Max.	0.100	0.150	0.150

Individual Averages

Bearing	f1	f2	f3
1	0.053	0.110	0.110
2	0.053	0.109	0.109
3	0.059	0.107	0.107
4	0.060	0.103	0.103
5	0.058	0.101	0.101
6	0.049	0.106	0.106
7	0.051	0.101	0.101
8	0.053	0.115	0.115

Individual Acceptance Criteria Check

f1	f2	f3
Pass	Pass	Pass
Pass	Pass	Pass
Pass	Pass	Pass
Pass	Pass	Pass
Pass	Pass	Pass
Pass	Pass	Pass
Pass	Pass	Pass
Pass	Pass	Pass

Total Averages

f1	f2	f3
0.055	0.107	0.107

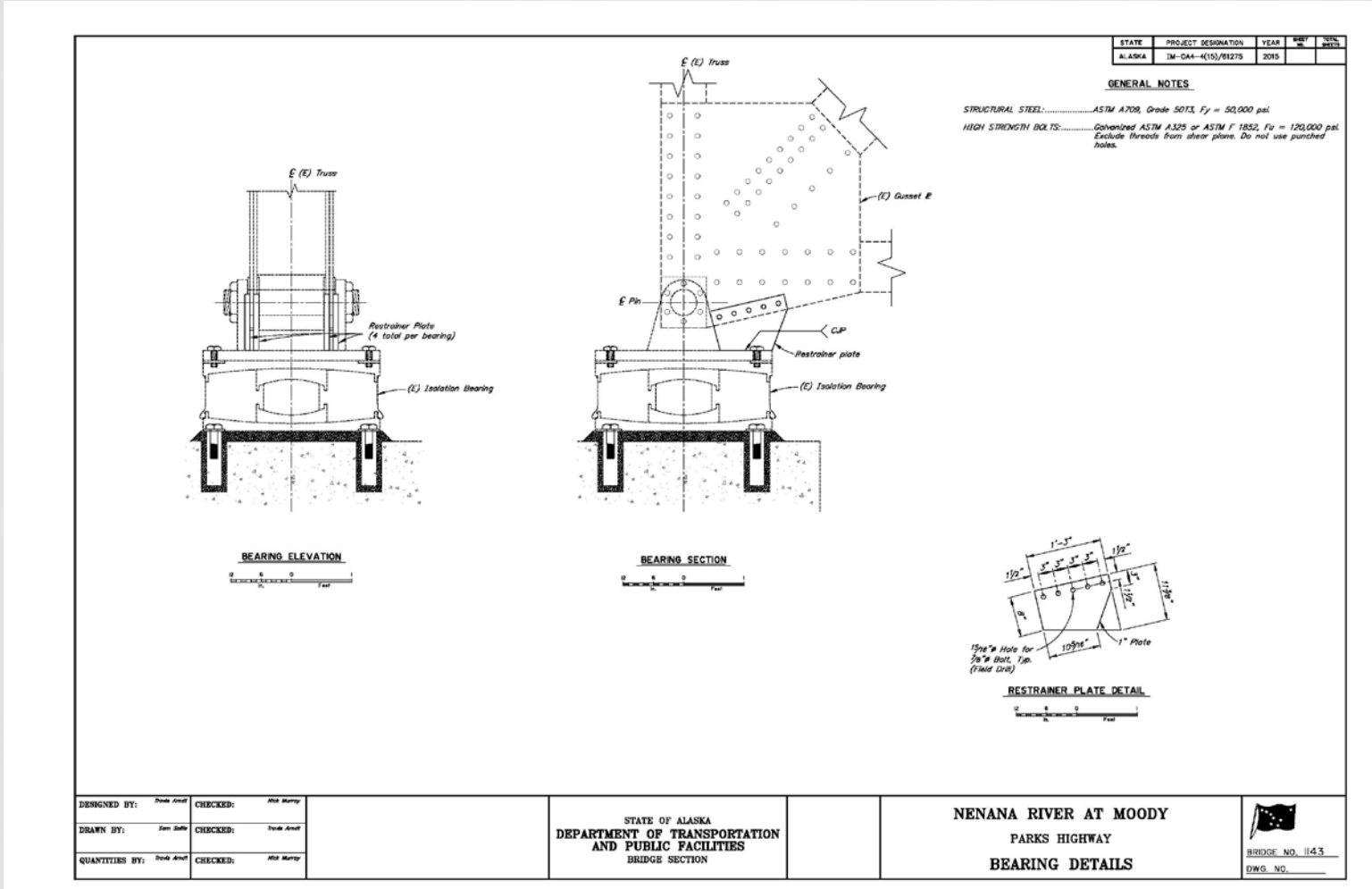
Average Tolerance	f1	f2	f3
Min.	0.050	0.090	0.090
Max.	0.090	0.140	0.140

Average Tolerance Criteria Check

Pass	Pass	Pass

Existing Pin-Pin Bearing

Retrofit of the Retrofit



Retrofit of the Retrofit

Completed Bearing Retrofit

Abutment Bearing Assemblies

Questions?

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907-465-8892