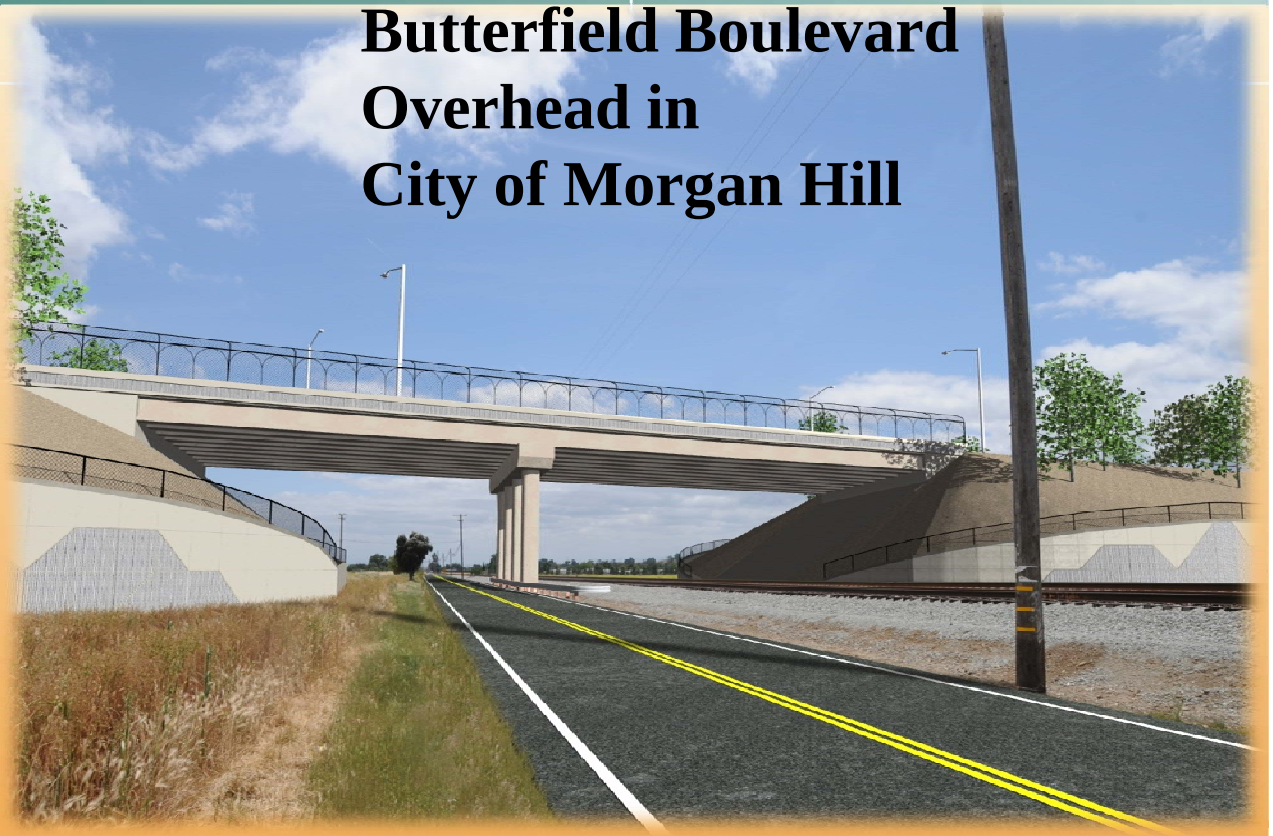
Second Caltrans - PCMAC Workshop
November 17, 2011

Butterfield Boulevard Overhead in City of Morgan Hill



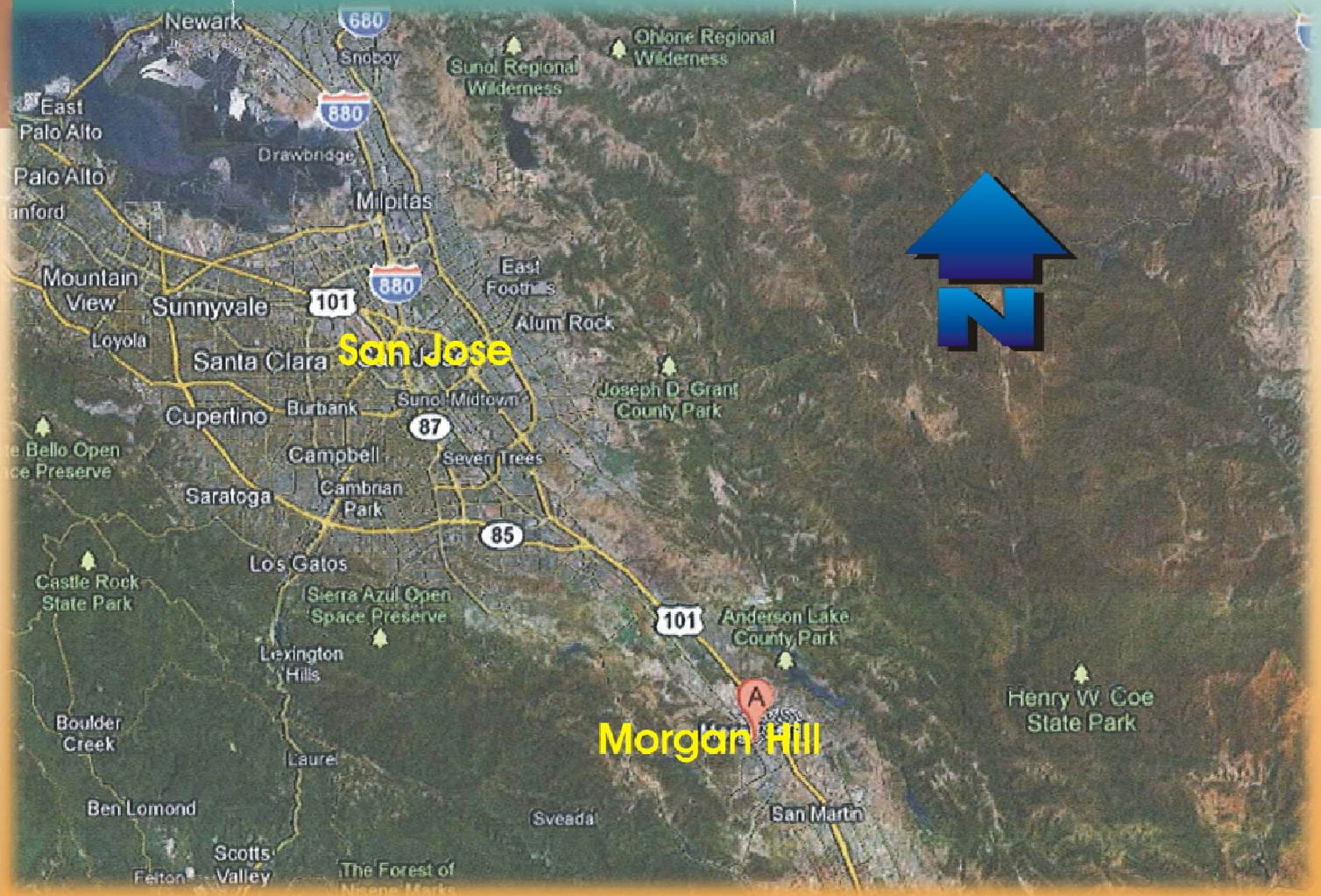
MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Outline

- Project Location & Background
- Project Need and Purpose
- Design Alternatives
- Analysis Considerations
- Cost Estimate
- Constructability Review

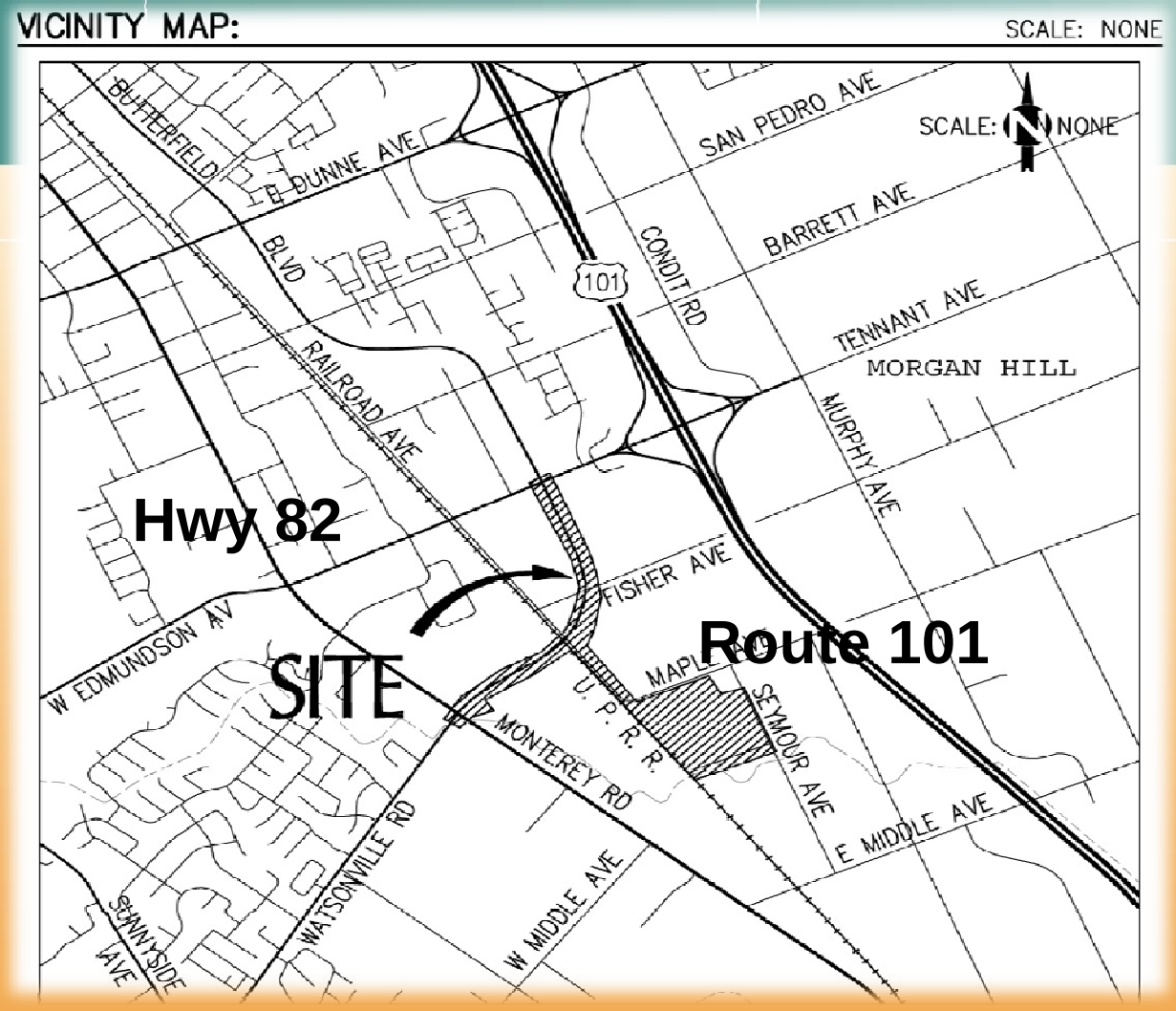
Location Map



MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Vicinity Map



MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Project Site

MARK THOMAS & COMPANY, INC.

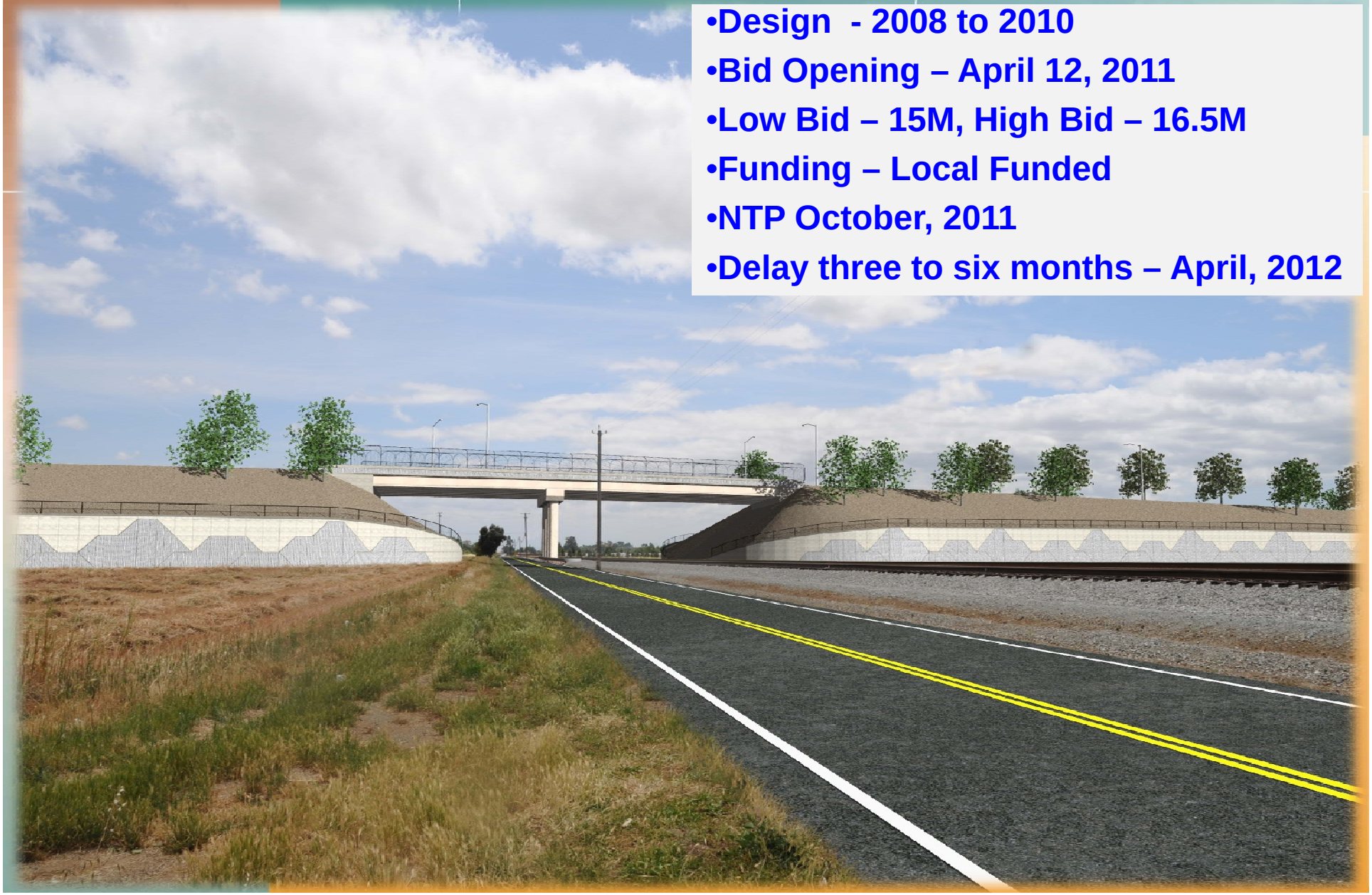
Providing Engineering, Surveying and Planning Services

Rendering

MARK THOMAS & COMPANY, INC.

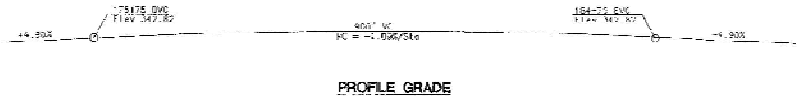
Providing Engineering, Surveying and Planning Services

Project Summary

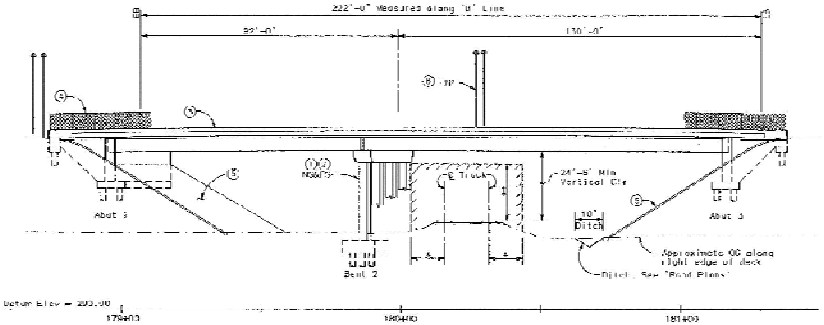


- Design - 2008 to 2010
- Bid Opening – April 12, 2011
- Low Bid – 15M, High Bid – 16.5M
- Funding – Local Funded
- NTP October, 2011
- Delay three to six months – April, 2012

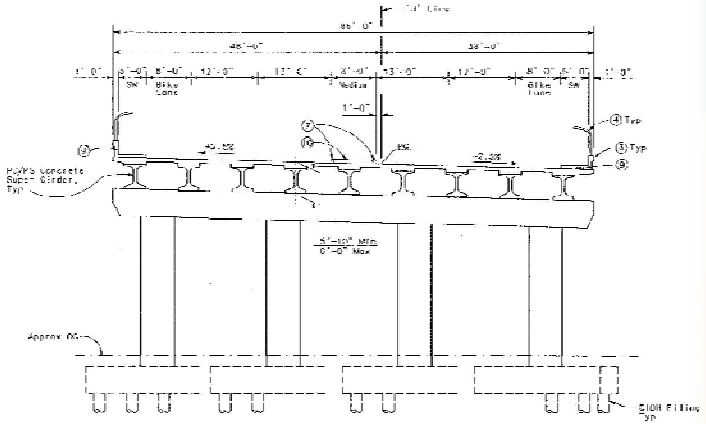
Bridge General Plan



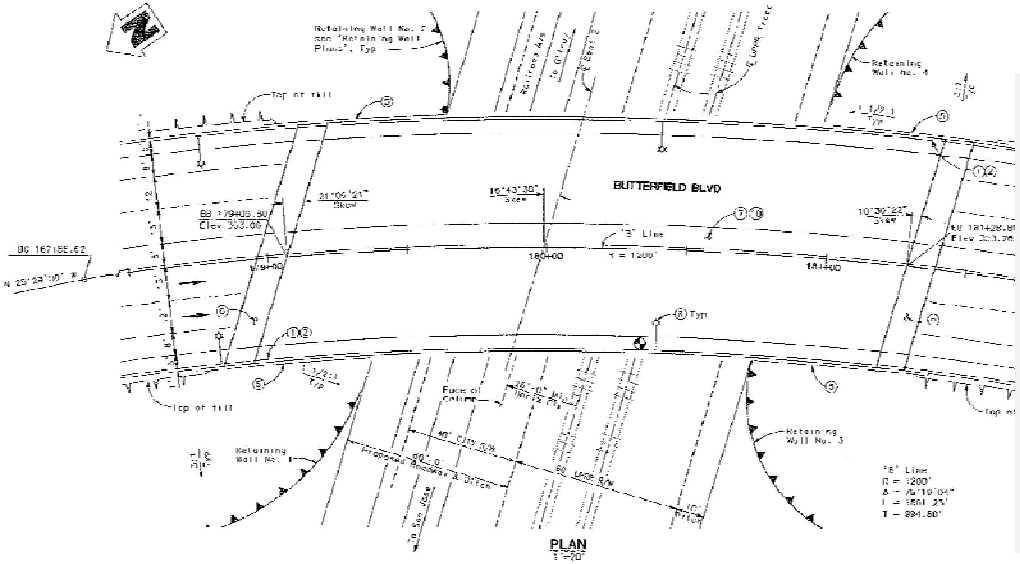
PROFILE GRADE



ELEVATION



TYPICAL SECTION



PLAN

INDEX TO PLANS

- •Span – 92 ft & 130 ft
- •Depth – 6’-0”
- •D/S – 0.046
- •Dropped Bent Cap
- •Seat Type Abutment
- •Pin Connection at Top of Bent Cap
- •CIDH Pile Foundation

REVISIONS

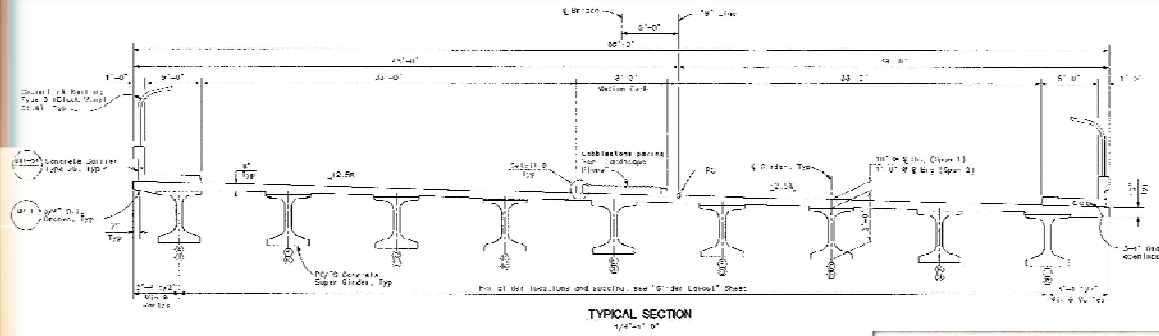
City of Morgan Hill
Public Works Department

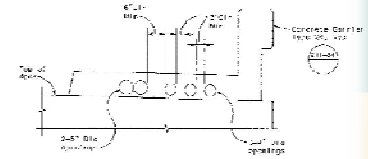
MARK THOMAS & COMPANY, INC.

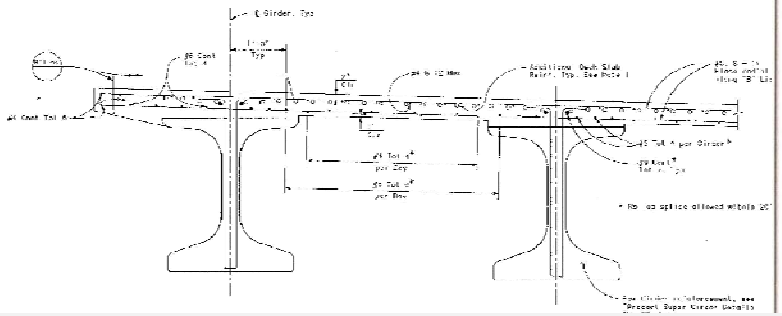
GENERAL PLAN
BUTTERFIELD BOULEVARD OVERHEAD
BUTTERFIELD BLVD SOUTH EXTENSION

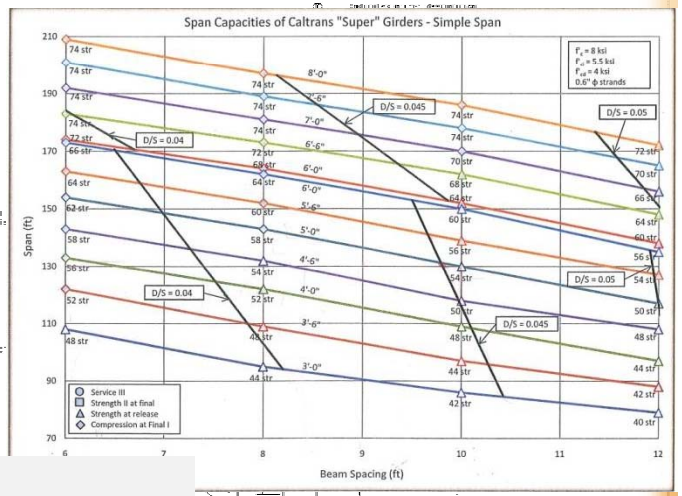
102

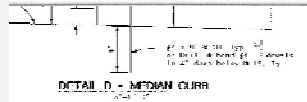
Bridge Typical Section











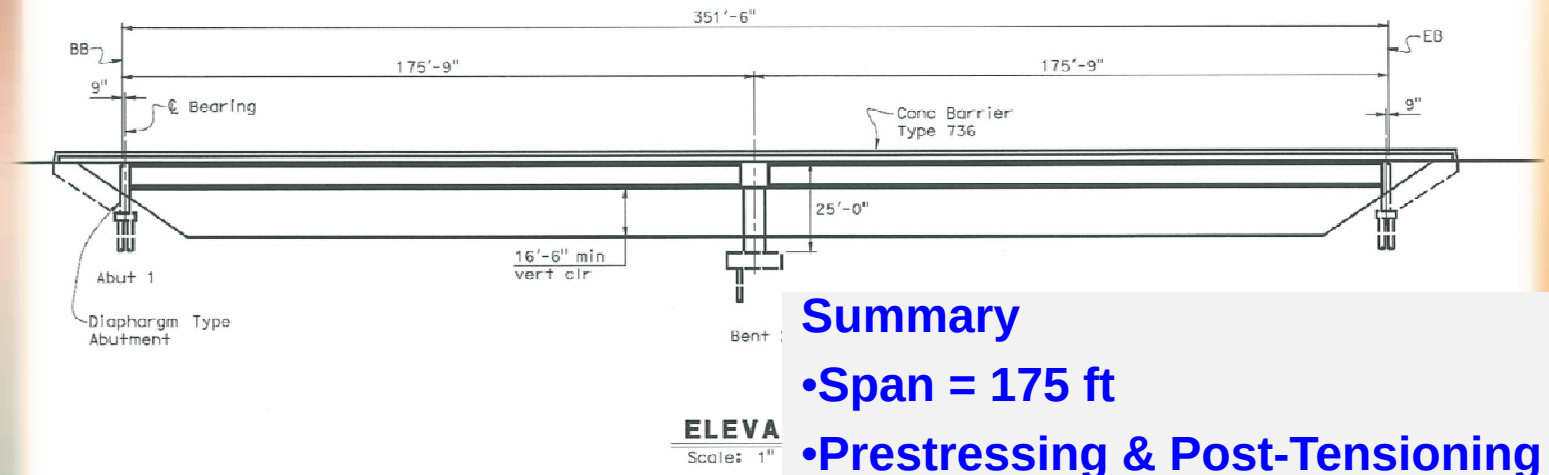
- Girder Spacing – 10 ft
- Girder Depth – 5 ft
- Total Superstructure Depth – 6 ft (D/S = 0.046)
- Fc’ <=8,000 psi

MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

PBSJ Bridge Example

Layout



Summary

- **Span = 175 ft**
- **Prestressing & Post-Tensioning**
- **D/S = 0.04**
- **Girder Spacing=12ft**
- **Integral Abutments & Bent**

MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

PBSJ Bridge Example

First Bridge: Pacific Street Bridge over I-680, Omaha, NE

- 10 NU900 girders spaced 10 ft -8 in
- 30-0.7 in straight strands spaced 2 in horizontally and 2.5 in vertically.
- Two spans 98 ft each with TR continuity
- Opened to traffic in August 2008
- ***D/S = 0.038***

MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Transport I-Girder – 111 ft long

- 5 ft deep girder @ 6.5 ft
- D/S 0.052

MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Transport Super Girders

- Truckers brought in girders from Tacoma, WA put in place at the US 2/97 Peshastin East Interchange on July 2, 2008.
- The super girders are about 173 feet long, 7 feet wide, and weigh 175,000 pounds.

MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Transport Super Girders

NU 2800 (9.25 ft) 213 ft
Shipped in Calgary

MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Cost Analysis

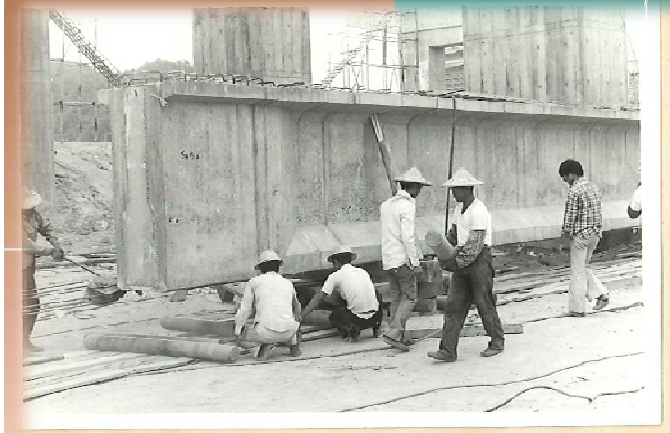
- **For 92’ Long Super Girder: $23,000 to $26,000 (9 EA)**
  22.6 CY - $1,084/CY

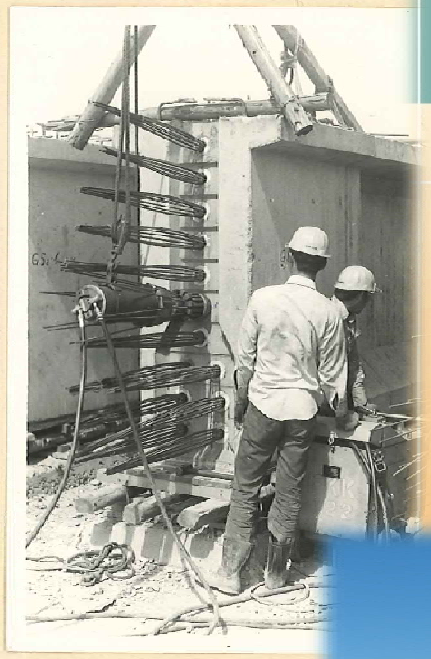
- **For 130’ Long Super Girder: $$27,000 to $37,000 (9 EA)**
  32 CY - $1,000/CY

- **Erection 18 girders over UPRR - $50,000**

Constructability

Yuan Shan Bridge, Taipei, Taiwan (1975)



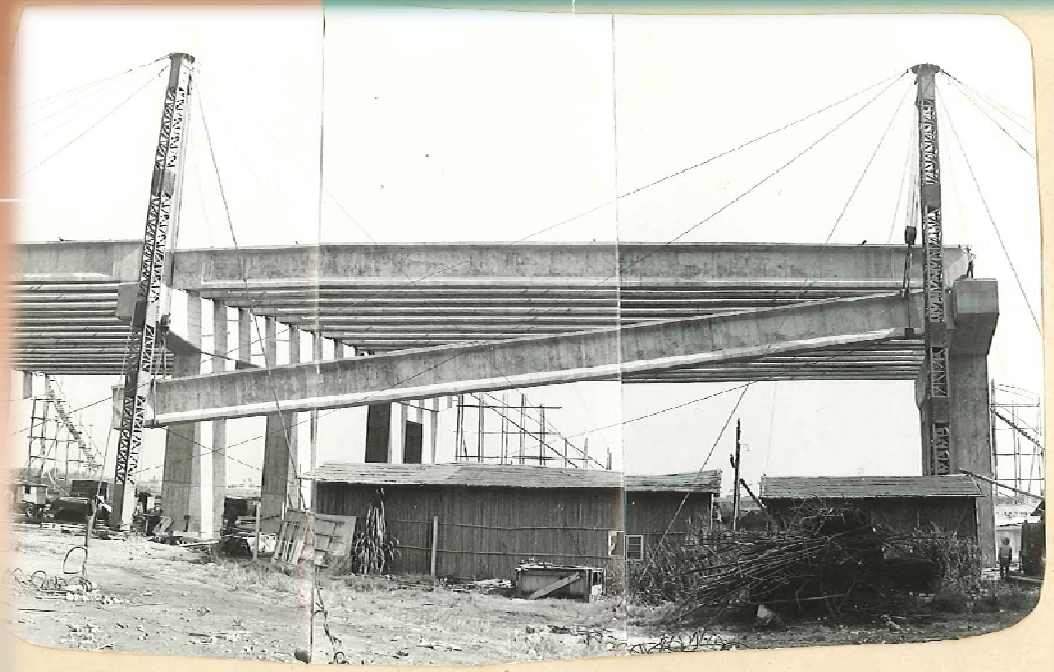


MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Constructability

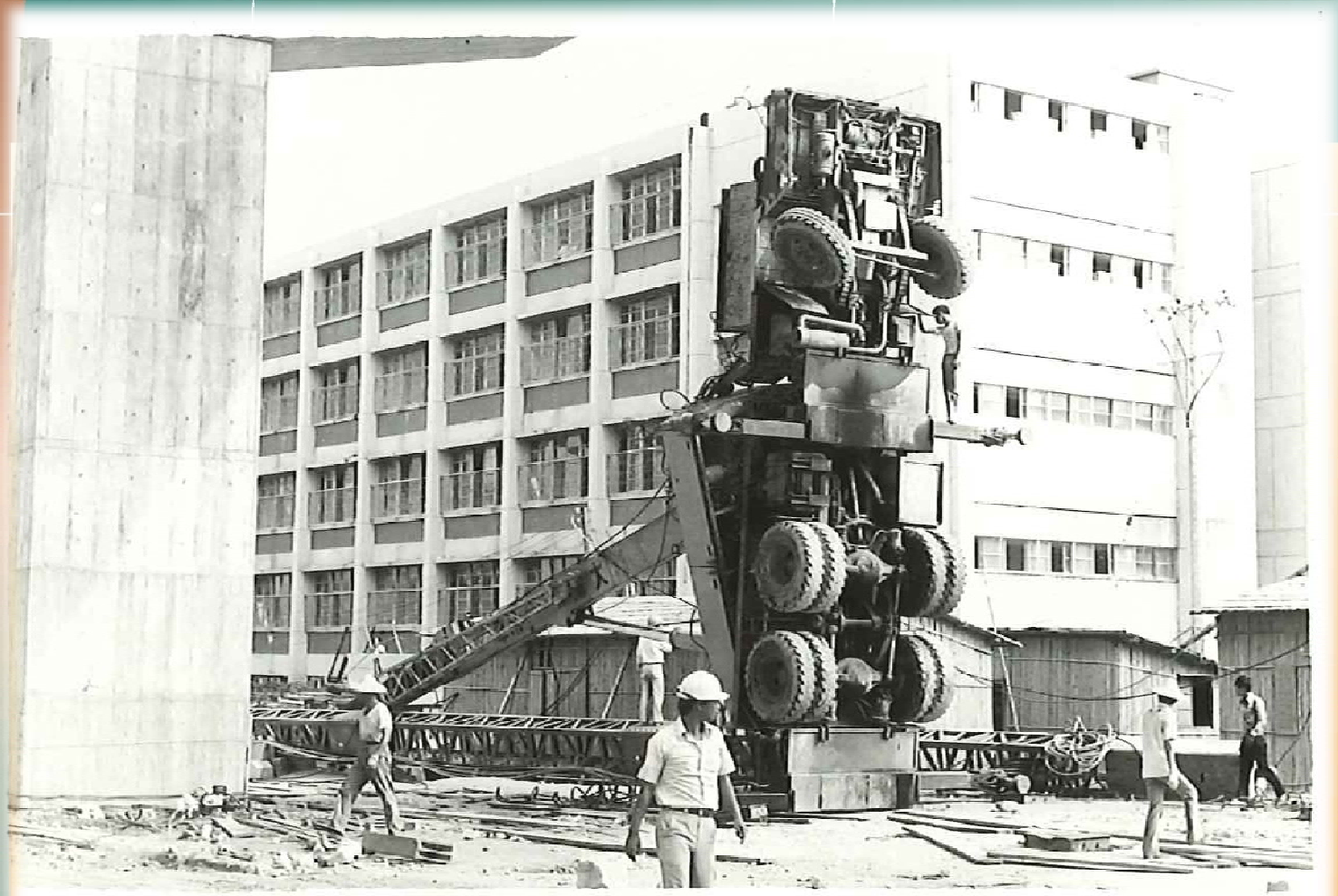
1975 Yuan-Shan Bridge, Taipei, Taiwan



MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Constructability



MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Constructability

M

Providing Engineering, Surveying and Planning Services

Constructability

River Oaks Pedestrian/Bike Bridge in San Jose

- 230’ Long Steel Truss
- Over Guadalupe River
- Temporary Ramp Constructed
- Environmental Impact

MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

CIP Box Girder vs. PC/PS Girder

Coyote Creek Bridge/ Route 880, San Jose

- **Original Design – PC/PS I Girder (No FW in the Creek/Winter)**
- **CRIP was Proposed**
  1. **CIP Box Girder – was designed and constructed**
  2. **FW can be left in the Creek during winter**
  3. **No sub-structure revisions**
  4. **Two Seasons Construction**

MARK THOMAS & COMPANY, INC.

Providing Engineering, Surveying and Planning Services

Summary

- Wide Range of Application
- D/S Ratio
    1. Traditional Design >0.04
    2. Integral Design <=0.04
    3. Cost and Schedule

Sometimes it is contractor's Choice

Where to next ?