2013

ABC Bridges

County Perspective

Collier County

U.S. Department of Transportation
Federal Highway Administration

Bridge Deficiencies

- *Total Bridges in US: 605,086*
- *No. of Local Bridges: 301,095 (50%)*
- *Total Structural Deficient Bridges: 67,526*
- *No. of Local Structural Deficient: 44,862 (66%)*

FHWA: December 2011

Accelerated Bridge Construction

Innovative Planning, Design, Materials and Construction Methods to:

<u>Reduce Onsite Construction Time</u>

Techniques

- Prefabricated Bridge Elements
  - Deck
  - Beam
  - Pier
  - Abutment and Wall
  - Miscellaneous such as approach slabs, parapets, railings, etc
- Engineering Innovation

Buchanan County Iowa
Brian P. Keierleber P.E.

Many of our bridges are old

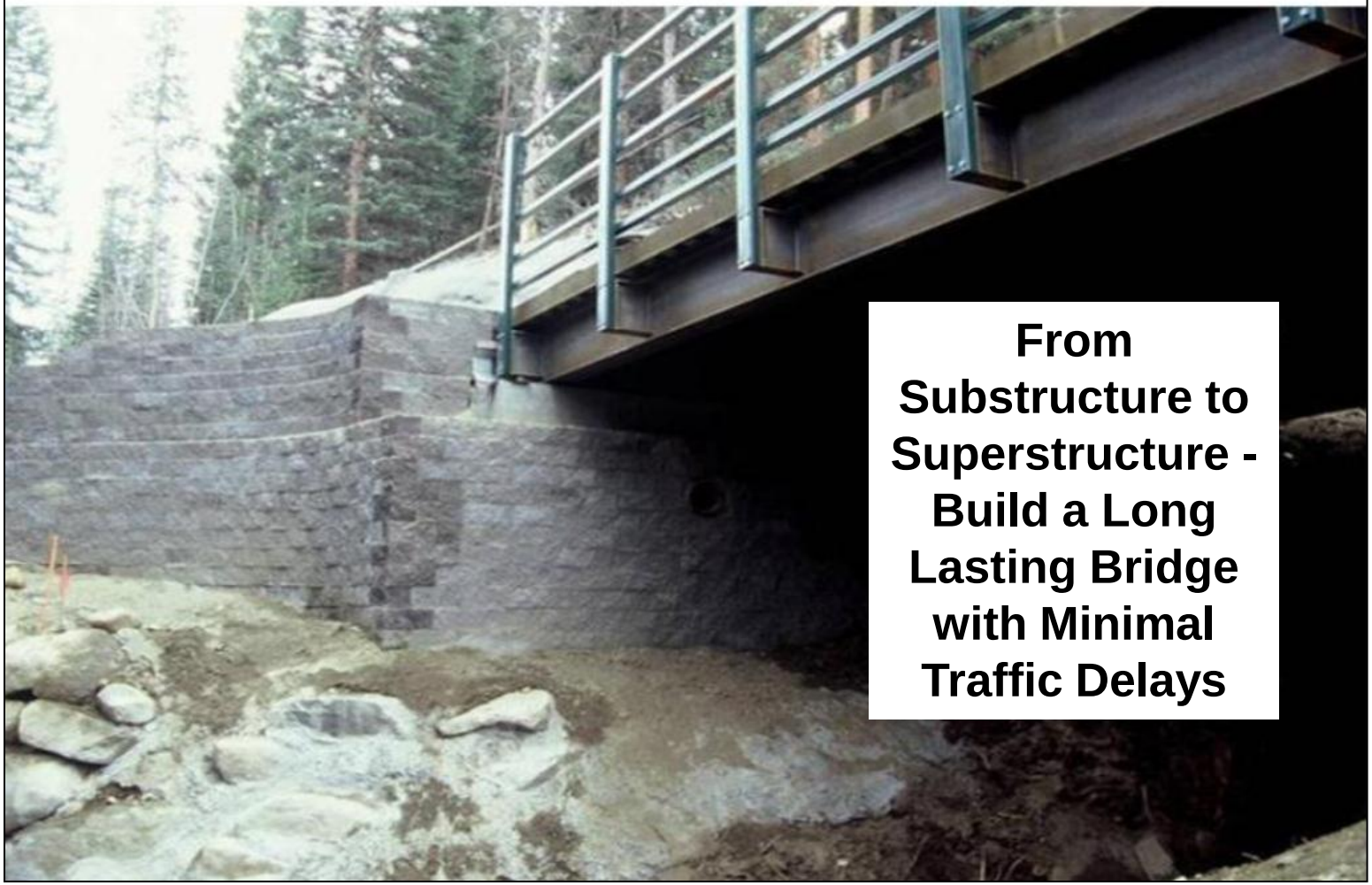
What we are faced with

Our System Cannot meet Today's Demands

We have not kept up with Modern Agriculture

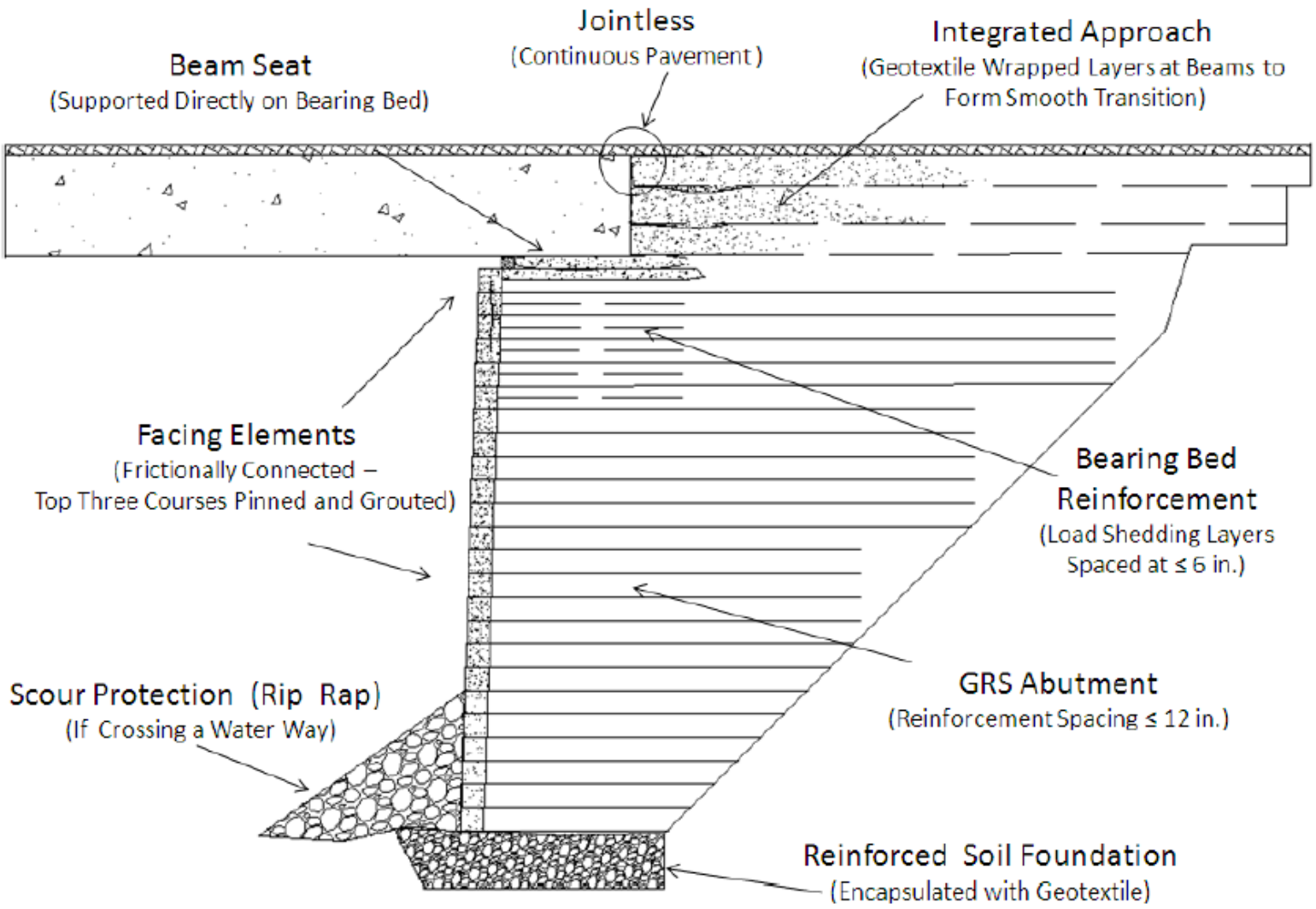
Postings Do **NOT** work

UTILIZE NEW TECHNOLOGIES



Innovative Alternative to Bridge Support

Geosynthetic Reinforced Soil (GRS)



Typical Section – GRS Abutment

COMPLETE ONE SIDE

Buchanan County, Iowa

We Took A Different Approach To Constructing GRS Abutments

Buchanan County, Iowa

TIE RIPRAP UNDER STRUCTURE

Buchanan County, Iowa

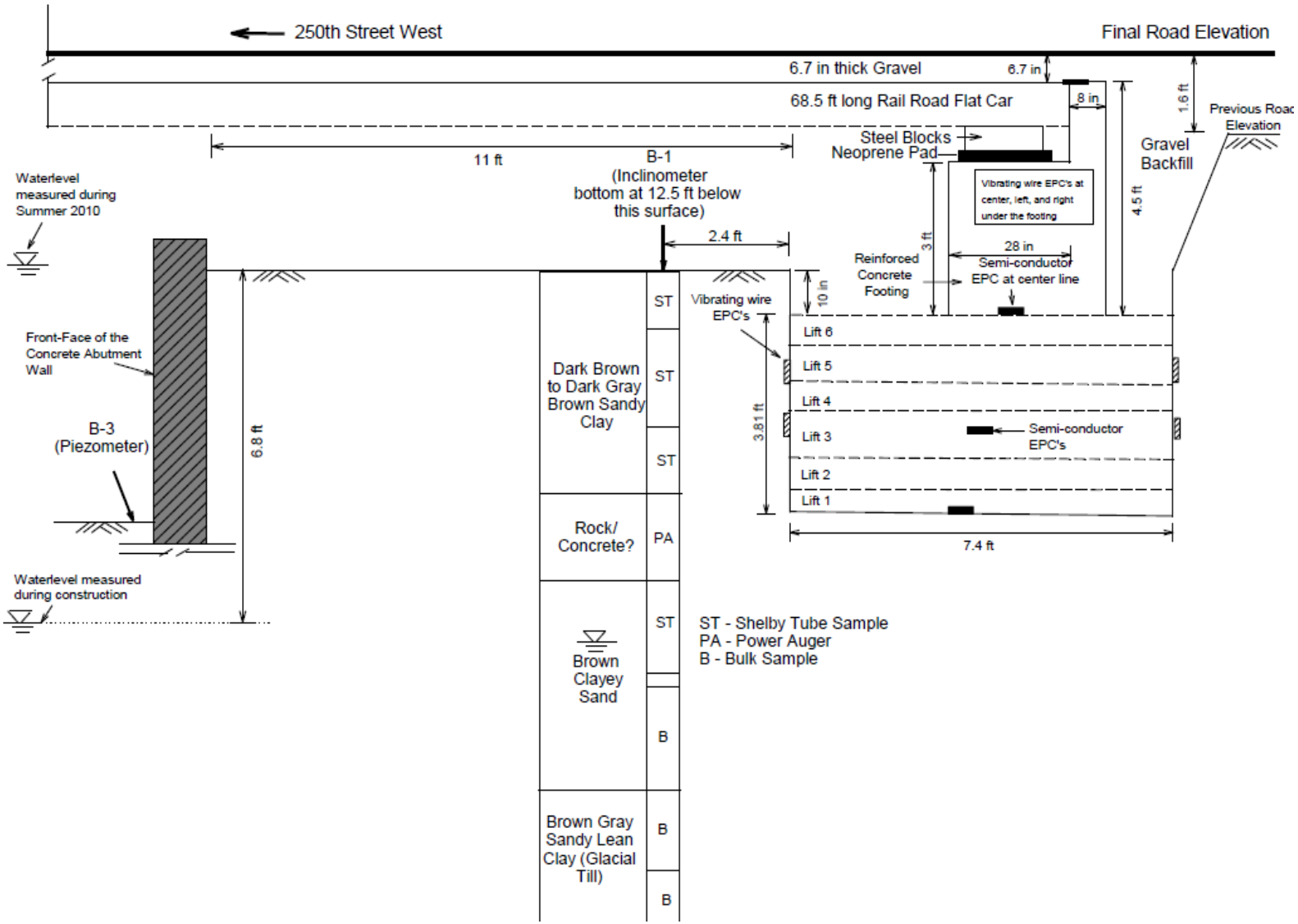
PLACE CURTAIN WALL PAST ABUTMENT

Buchanan County, Iowa

Mechanically constructed concrete on a 1:1slope

Buchanan County, Iowa

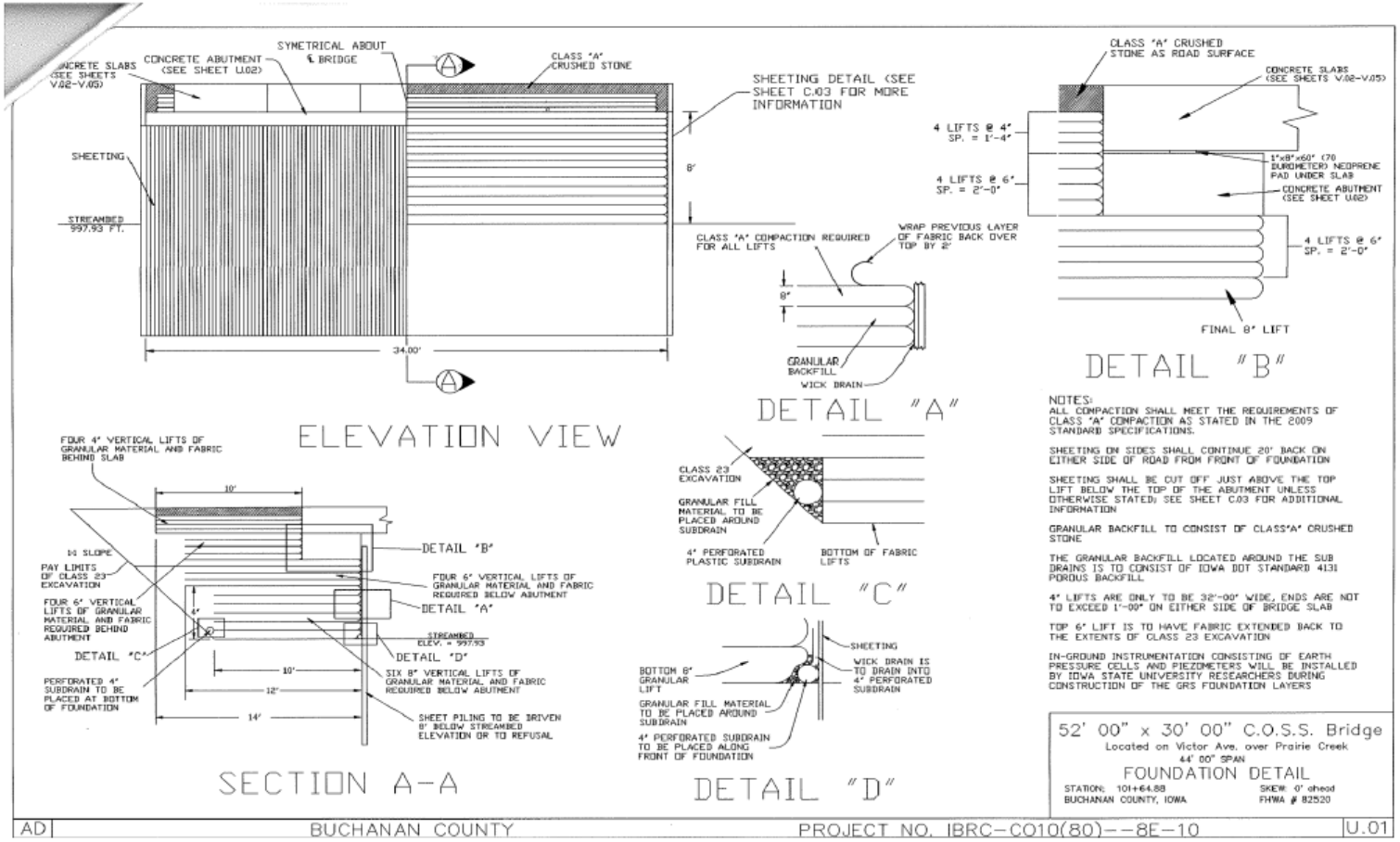
Subsurface Conditions



COMPLETED ABUTMENTS

Buchanan County, Iowa

Sheetpiling will be used in the future



Buchanan County, Iowa

Geosynthetic Reinforced Soil (GRS) Benefits

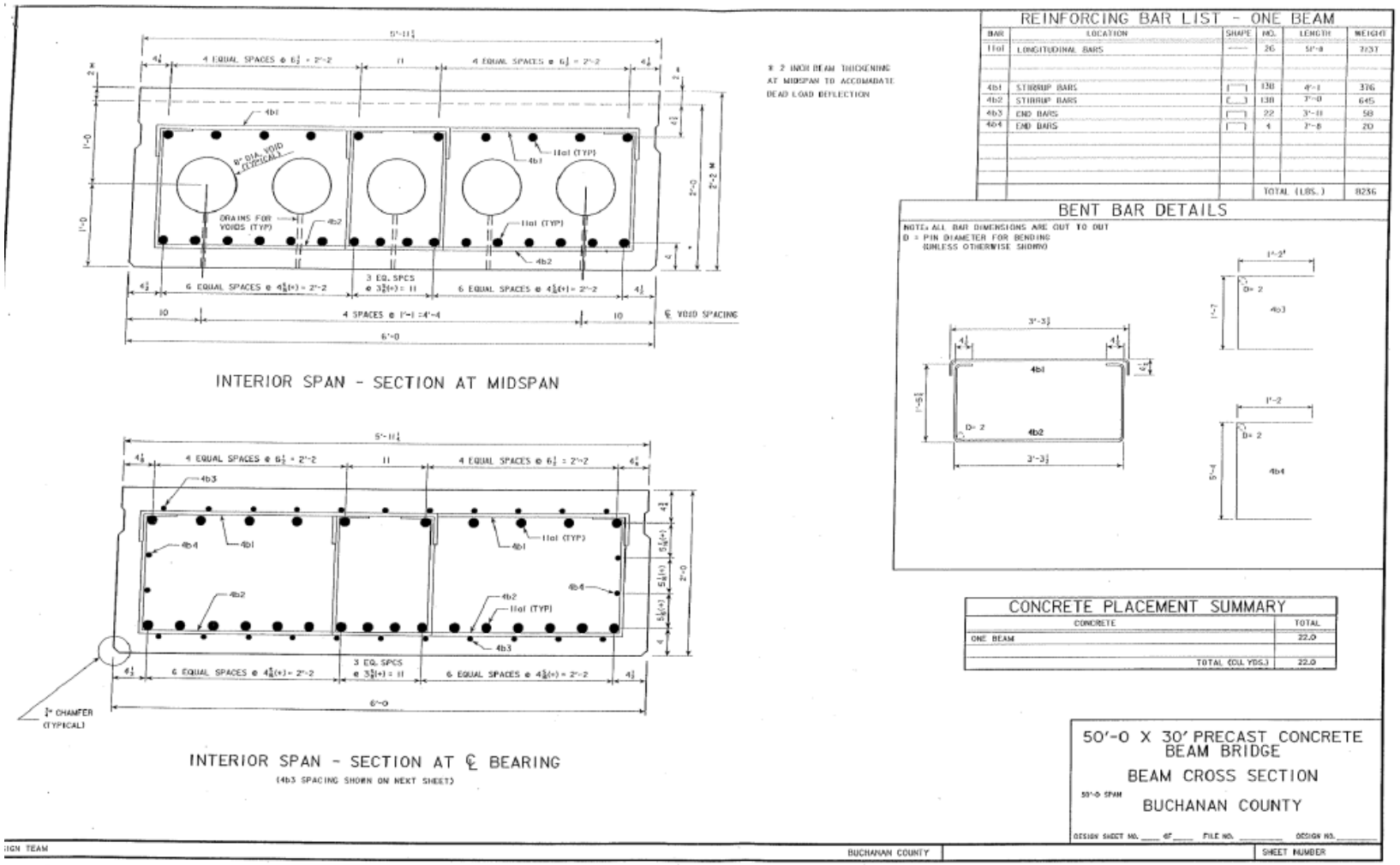
- **Low initial cost**
- **Low life cycle cost**
- **Fast construction (under 30 days for most bridges**
- **Minimal installation labor and equipment**
- **Eliminates the need for approach slabs**

They can save time and money!

Slabs Cast on Site and Launched with Internal Curing on GRS Abutments SUMMER of 2012

Buchanan County, Iowa

Hollow Core Slab Details



Buchanan County, Iowa

Gerstenbergers Bridge

Buchanan County, Iowa

Cast on site slabs 2’x 6’ x 52’

Buchanan County, Iowa

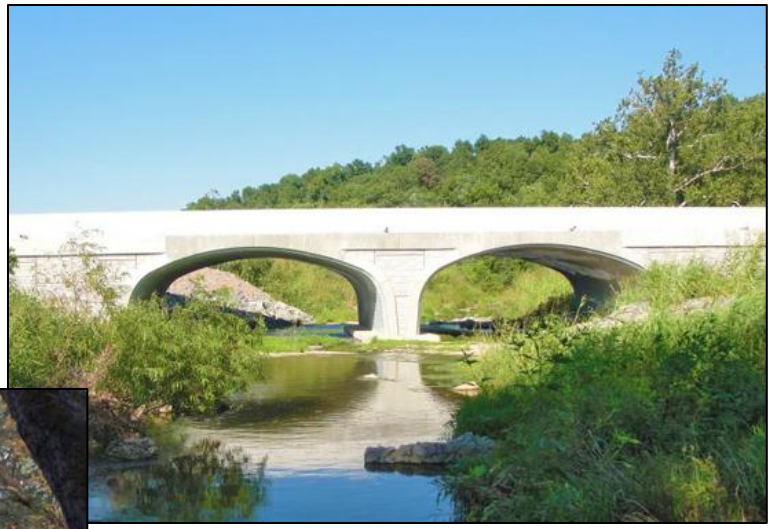
Launching in the Future my Goal

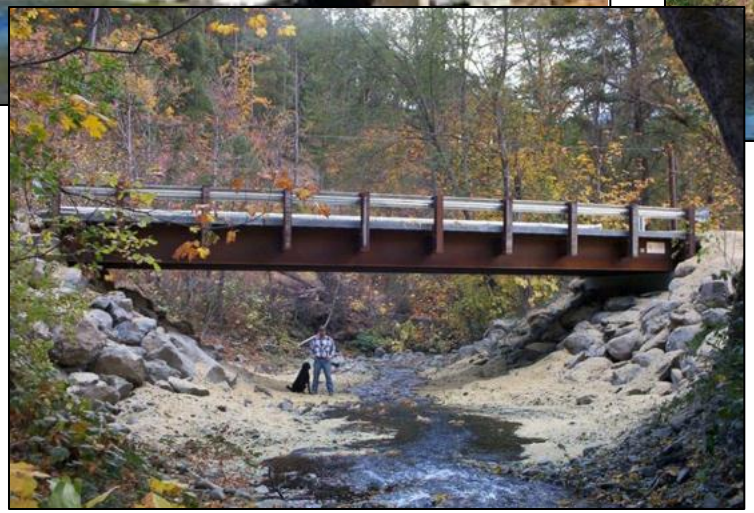
Buchanan County, Iowa

Other ABC Techniques

- Prefabricated Steel Bridges
- Precast Three Sided Box Culverts
- Precast Double Tee

Steel Bridges





Photos: Big R Bridge

Precast Concrete Box

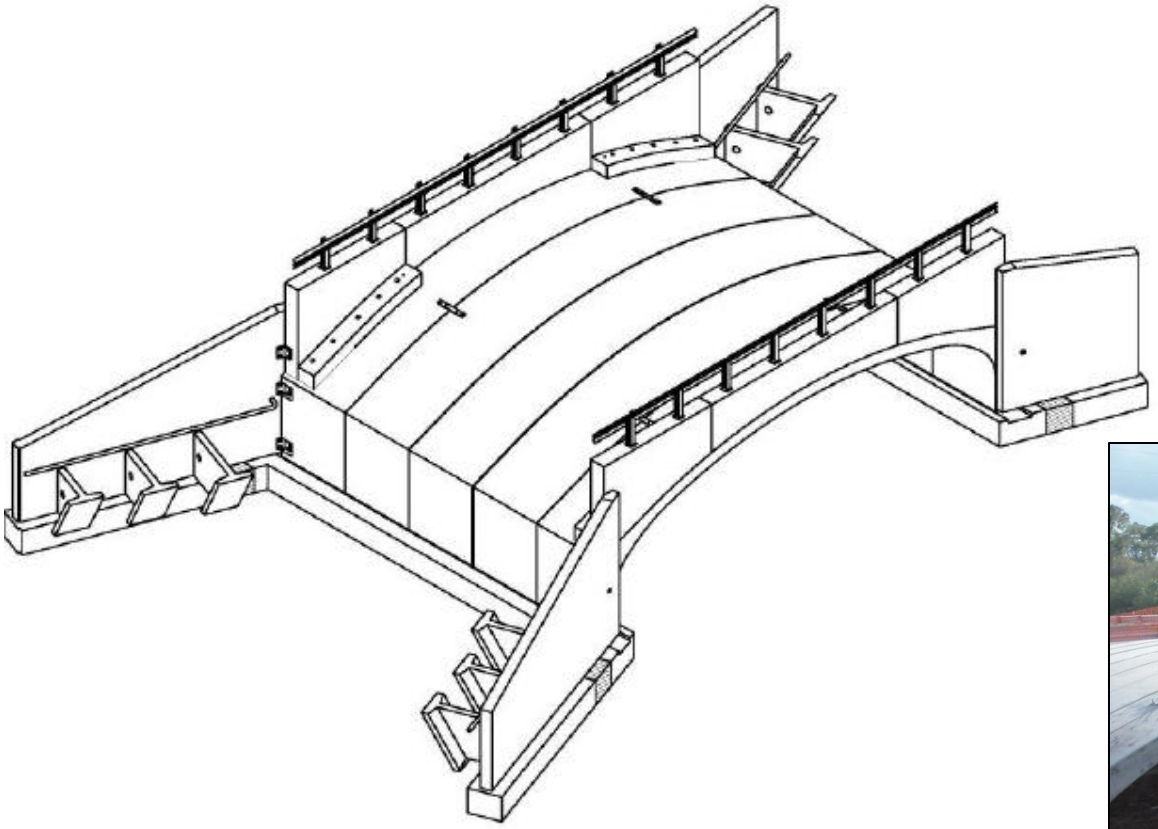


Figure 5.3.4.1-1 Con/Span® Bridge System
(source: Contech Construction Products, Inc.)

Collier County's ABC Project

White Boulevard (CR-896) Bridge

Marlene Messam, P.E.

Objective

***To implement Accelerated Bridge Construction (ABC) techniques in the repair/replacement of County Bridges and to standardize the design and construction of new bridges*.**

Program Goals

1. **Safety**
2. **Efficiency**
3. **Durability and**
4. **Quality**
5. ***Innovative***

What is Driving the Change for Collier County?

- Our infrastructure is aging

Goal: A minimum 75- yr service life

Currently:

1. Average bridge life is 42 years
2. Average bridge deck life is 20-25 year

- Standardization to achieve lower costs

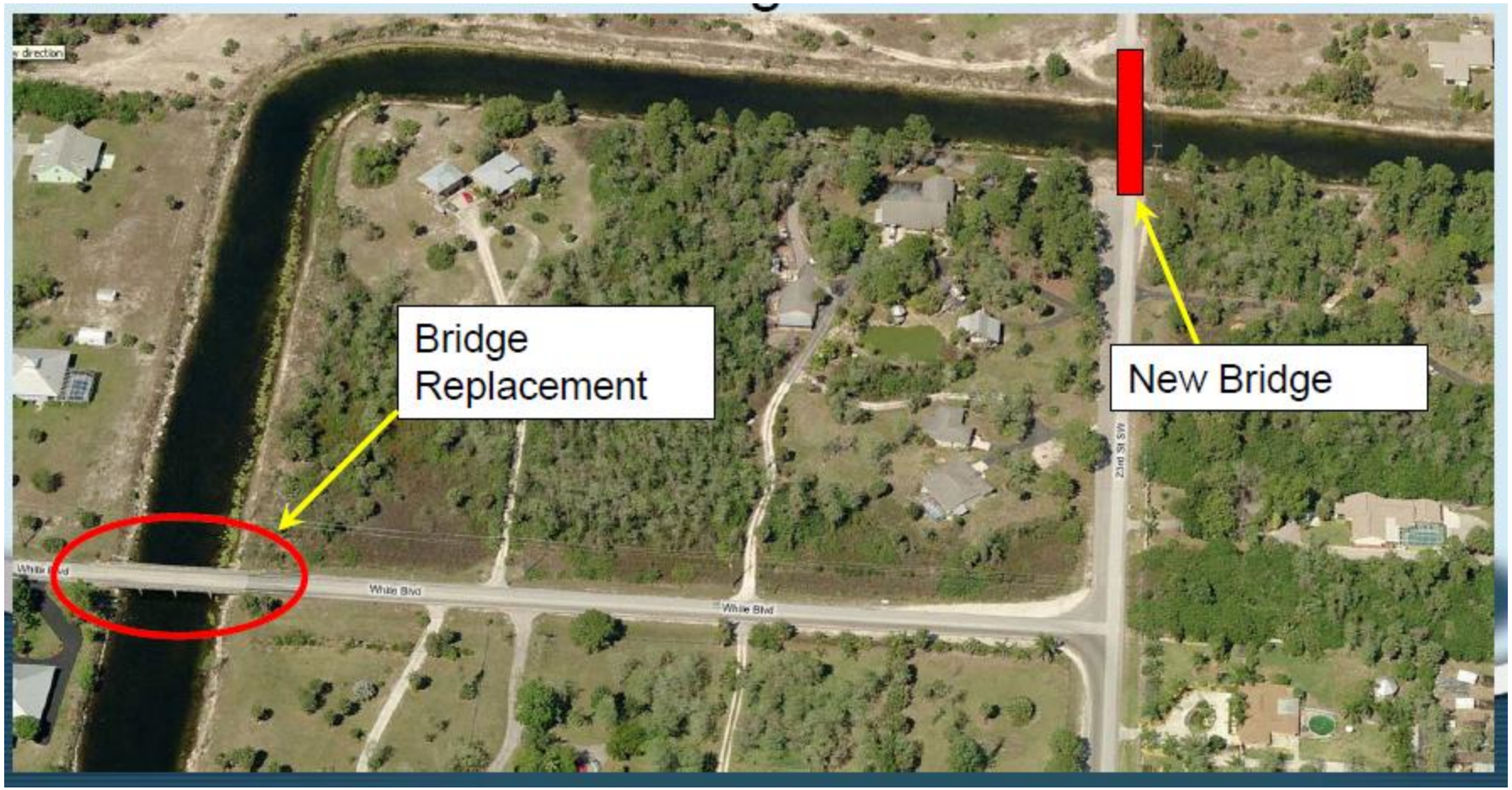
3 Phased ABC Pilot Project Approach

- **Phase 1 – Develop ABC Standards**
- **Phase 2 – Develop Pilot Project**
- **Phase 3 – Construction of Pilot Project**

County Challenges

- **Cost: PCI Next Beam vs. Florida Double Tee**
- **MOT: Total road closure without detour was not possible.**
- **Construction Considerations: no room demo and for staging prefab pieces.**

Pilot Project focus Area

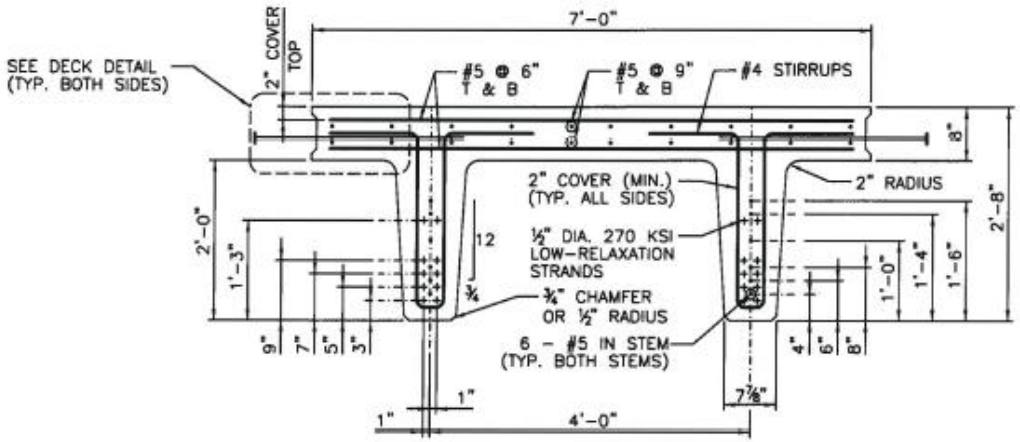


Pilot Project Overview

1. *Minor Rural Collector, Built in 1965*
2. *4 – Spans pre-stressed Concrete*
3. *Functionally Obsolete*
4. *Sufficiency Rating of 44.2*

County Solution

1. ***Modified Florida Double Tee*** **– Suppliers had forms.**
2. ***Detour*** **– Build Second Bridge and Close White Boulevard.**
3. ***Construction Phase*** **– Early procurement of bridge elements**



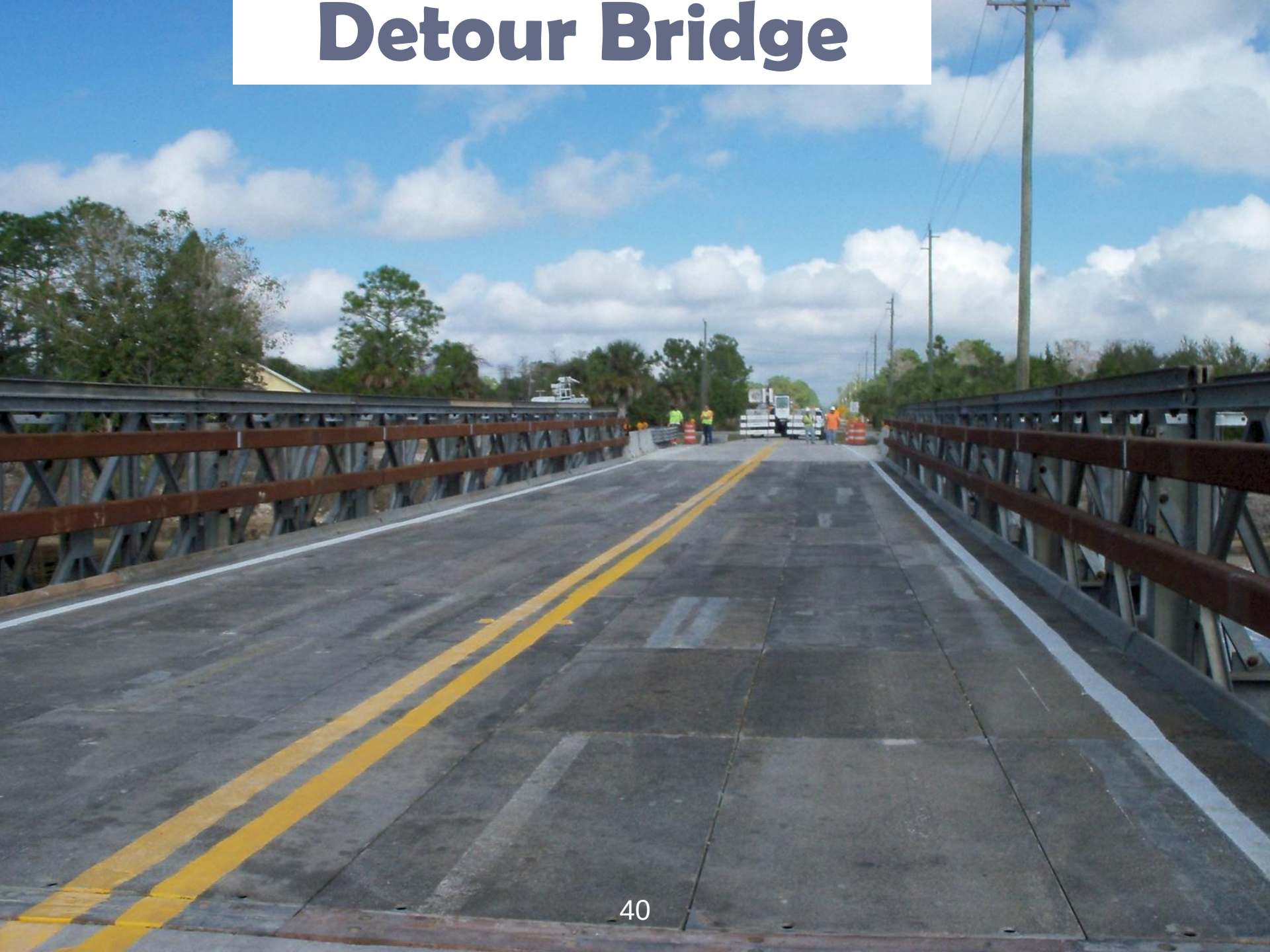
TYPICAL INTERIOR BEAM REINFORCING

SCALE: ½" = 1'-0"

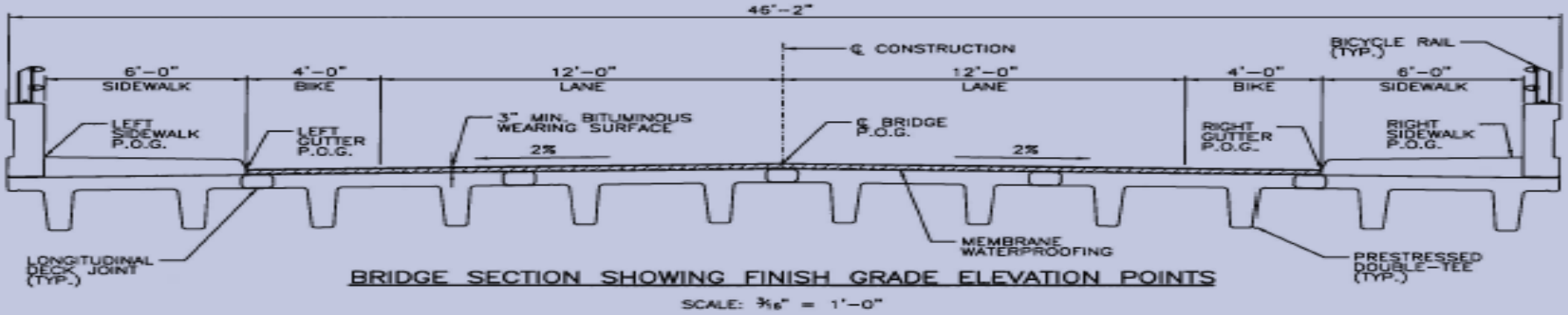
+ DENOTES STRAIGHT STRANDS

• DENOTES BLACK BARS

Detour Bridge



Proposed Typical Section



End Segment FL DT

Intermediate Bent Cap (End View)

Intermediate Bent Cap (Bottom View)

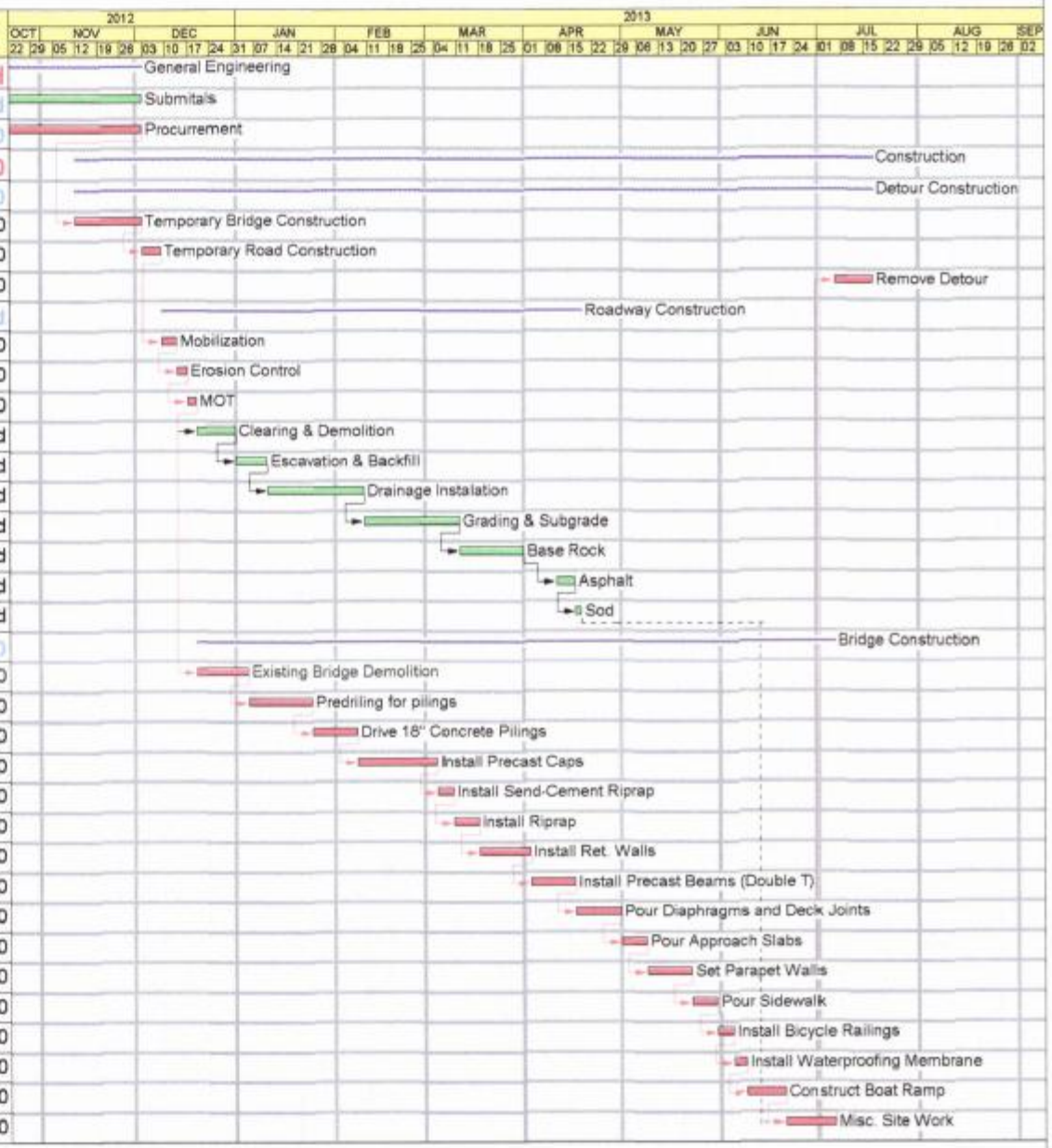
Intermediate Bent Cap

Proposed Project Timeline

Activity	Duration
Demolition	14 days
Foundations	21 days
Beams	7 days
Railings & Sidewalk	14 days
Paving	2 days
Misc. Work & approaches	32 days
Total Construction time	**90 days**

Collier County Project No.66066

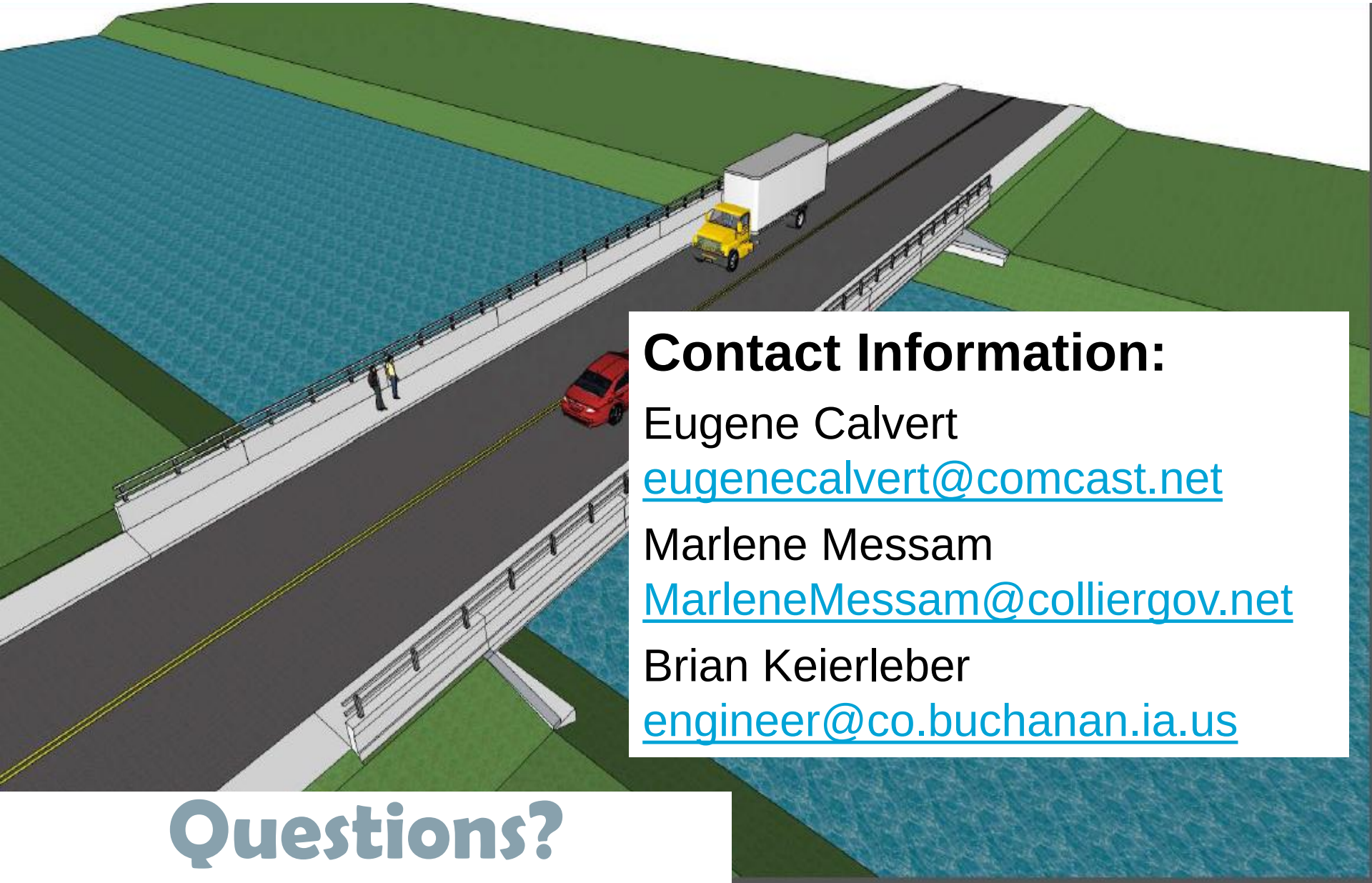
Activity ID	Activity Description	Rem Dur	Early Start	Early Finish	Total Float
1000	General Engineering	40 *	22OCT1	02DEC1	227d
1010	Submitals	40	22OCT12	02DEC12	227d
1320	Procurrement	40	22OCT12	02DEC12	0
1020	Construction	248 *	12NOV1	17JUL13	0
1021	Detour Construction	248 *	12NOV12	17JUL13	0
1022	Temporary Bridge Construction	21	12NOV12	02DEC12	0
1023	Temporary Road Construction	6	03DEC12	08DEC12	0
1024	Remove Detour	12	06JUL13	17JUL13	0
1030	Roadway Construction	131 *	09DEC12	18APR13	63d
1035	Mobilization	5	09DEC12	13DEC12	0
1040	Erosion Control	3	14DEC12	16DEC12	0
1045	MOT	3	17DEC12	19DEC12	0
1060	Clearing & Demolition	12	20DEC12	31DEC12	63d
1070	Escavation & Backfill	10	01JAN13	10JAN13	63d
1080	Drainage Instalation	30	11JAN13	09FEB13	63d
1090	Grading & Subgrade	30	10FEB13	11MAR13	63d
1100	Base Rock	20	12MAR13	31MAR13	63d
1110	Asphalt	6	11APR13	16APR13	63d
1120	Sod	2	17APR13	18APR13	63d
1140	Bridge Construction	198 *	20DEC12	05JUL13	0
1150	Existing Bridge Demolition	16	20DEC12	04JAN13	0
1160	Predriling for pilings	20	05JAN13	24JAN13	0
1170	Drive 18" Concrete Pilings	14	25JAN13	07FEB13	0
1180	Install Precast Caps	25	08FEB13	04MAR13	0
1190	Install Send-Cement Riprap	5	05MAR13	09MAR13	0
1200	Install Riprap	8	10MAR13	17MAR13	0
1210	Install Ret. Walls	16	18MAR13	02APR13	0
1220	Install Precast Beams (Double T)	14	03APR13	16APR13	0
1230	Pour Diaphragms and Deck Joints	14	17APR13	30APR13	0
1240	Pour Approach Slabs	8	01MAY13	08MAY13	0
1250	Set Parapet Walls	14	09MAY13	22MAY13	0
1260	Pour Sidewalk	8	23MAY13	30MAY13	0
1270	Install Bicycle Railings	5	31MAY13	04JUN13	0
1280	Install Waterproofing Membrane	4	05JUN13	08JUN13	0
1290	Construct Boat Ramp	12	09JUN13	20JUN13	0
1300	Misc. Site Work	15	21JUN13	05JUL13	0



CT12
JL13
CT12

Early bar
Progress bar
Critical bar

Thank You!!



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Questions?