Project Introduction - Gary Fox

Project Information Meeting
Precast Concrete Pavement
September 16, 2016

US 40 - Des. No. 0013790
US 27 – Des. No. 0100701
Water Mains – Des. No. 1592393
Contract R-30397
City of Richmond, Indiana

First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

Clark Dietz ENGINEERS

Project Overview – Rich Anthony & Rob Gill

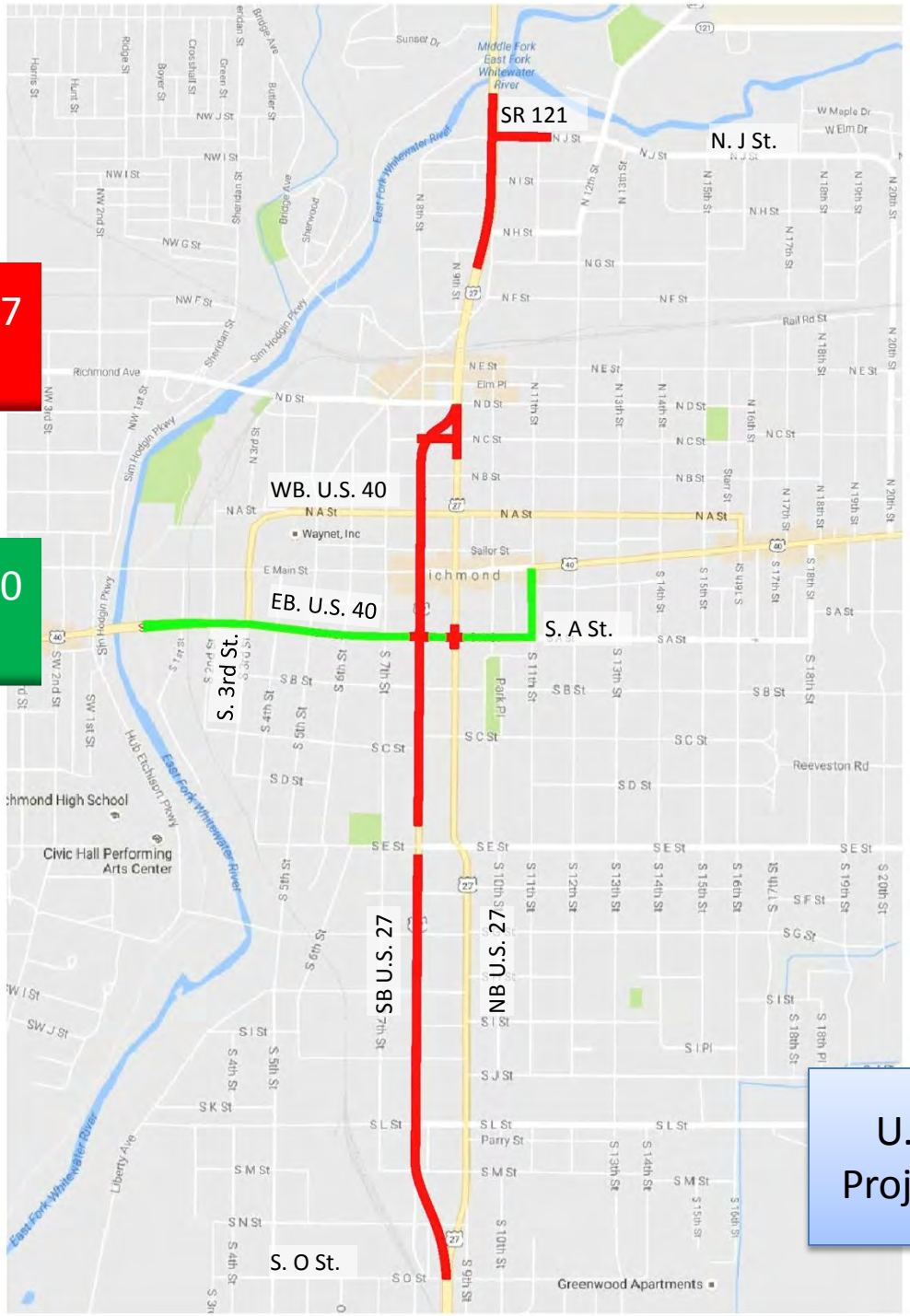
First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

Clark Dietz ENGINEERS

Limits of U.S. 27 Project

Limits of U.S. 40 Project



INDIANA DEPARTMENT OF TRANSPORTATION — INDOT

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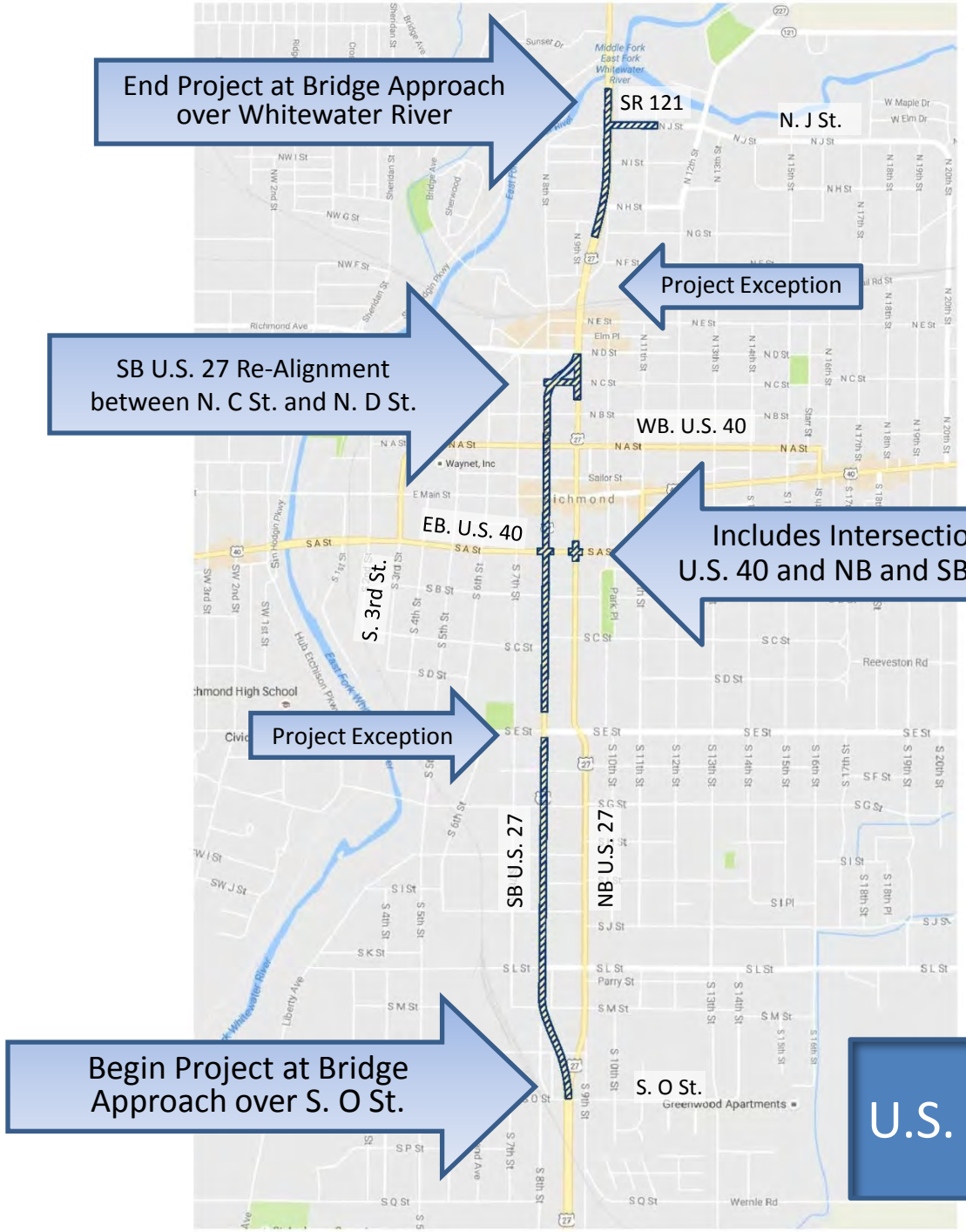
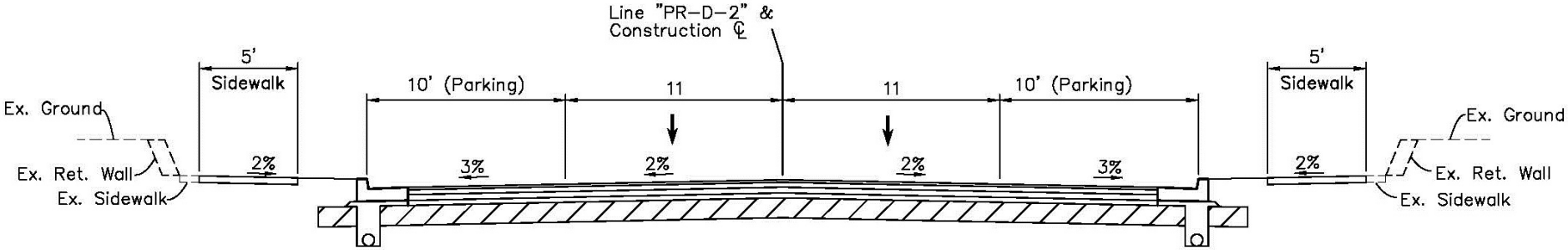
First Group ENGINEERING, INC.

U.S. 27 and U.S. 40 Project Limit Overview


End Project at Bridge Approach over Whitewater River
SR 121
N. J St.
Project Exception
SB U.S. 27 Re-Alignment between N. C St. and N. D St.
WB. U.S. 40
EB. U.S. 40
Includes Intersections at U.S. 40 and NB and SB U.S. 27
S. 3rd St.
Project Exception
SB U.S. 27
NB U.S. 27
Begin Project at Bridge Approach over S. O St.
S. O St.
U.S. 27 Project Limits



US 27 (SOUTHBOUND) TYPICAL SECTION

- Alternate Bid
  - 11” QC/QA-HMA Pavement
  - or
  - 9.5” QC/QA-PCCP
- Subgrade Treatment, Type IC
- 1.89 miles - Net Project Length

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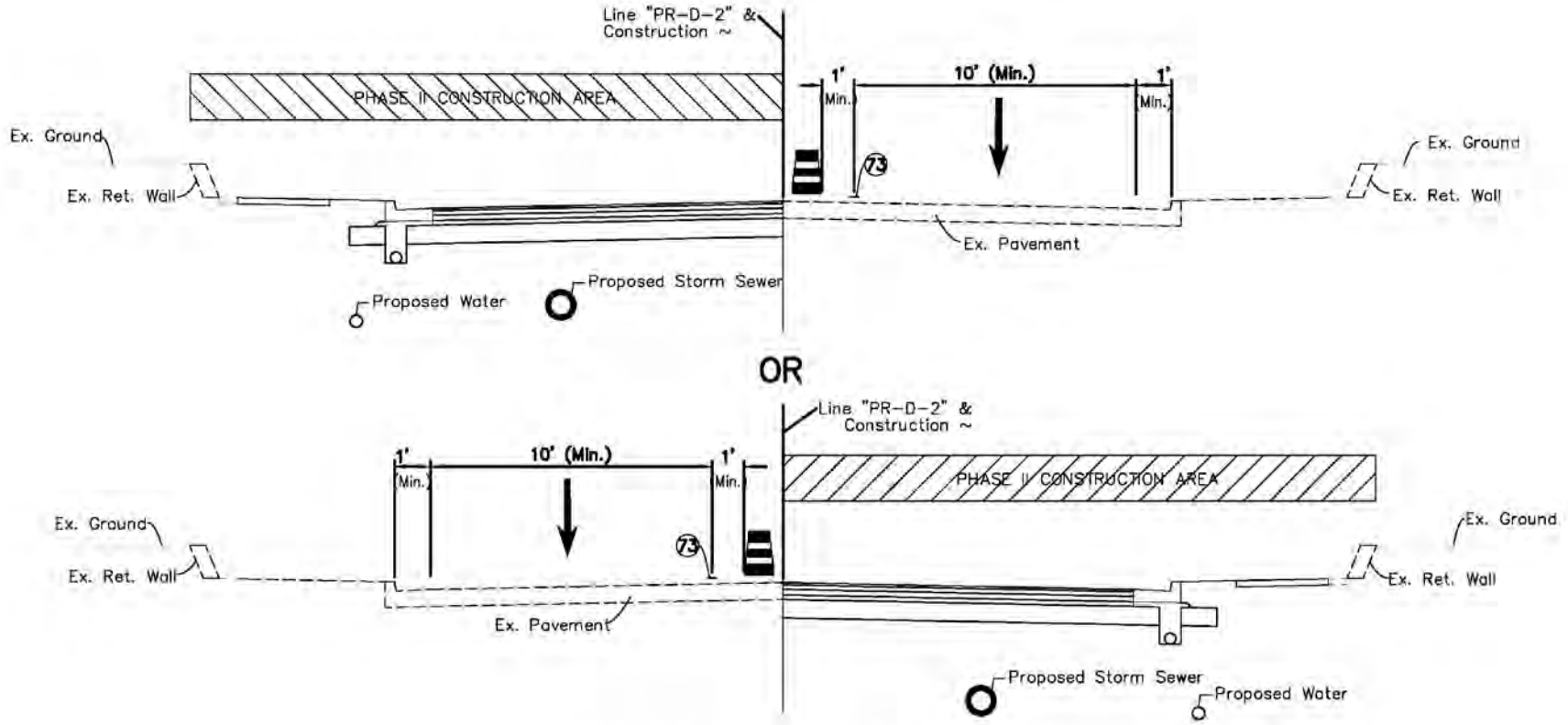
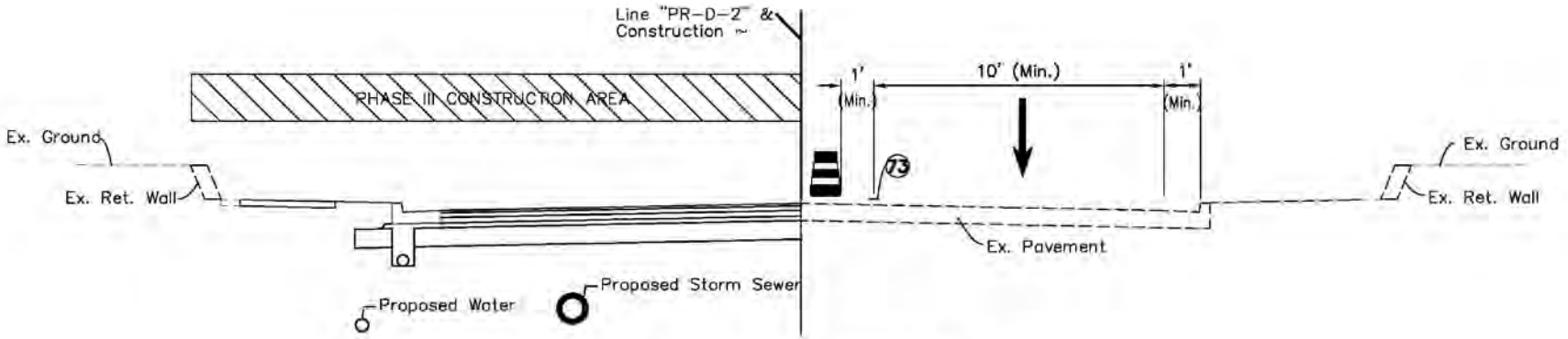
INDIANA DEPARTMENT OF TRANSPORTATION INDOT



US 27 SB – PHASE II

Clark Dietz ENGINEERS

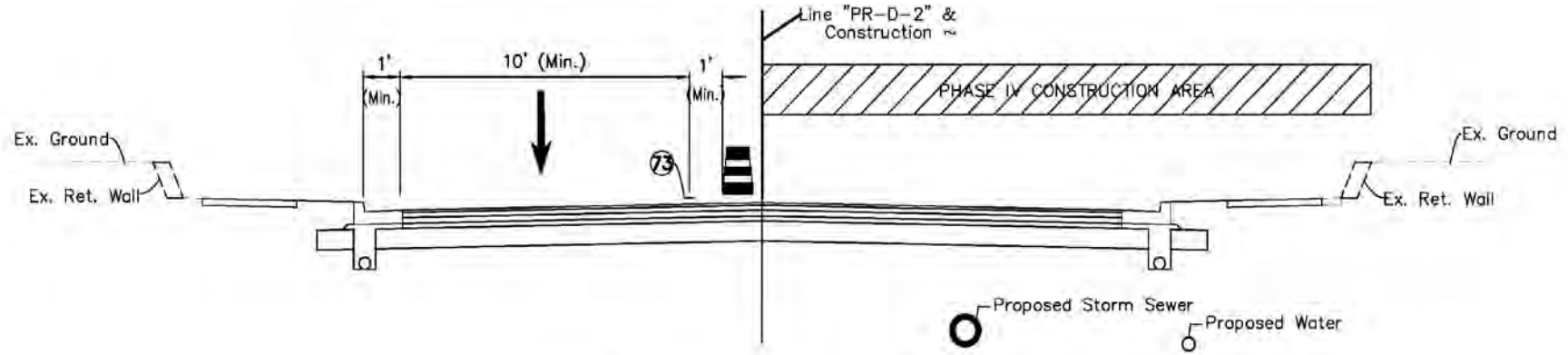
INDIANA DEPARTMENT OF TRANSPORTATION INDOT



US 27 SB – PHASE III

Clark Dietz
ENGINEERS

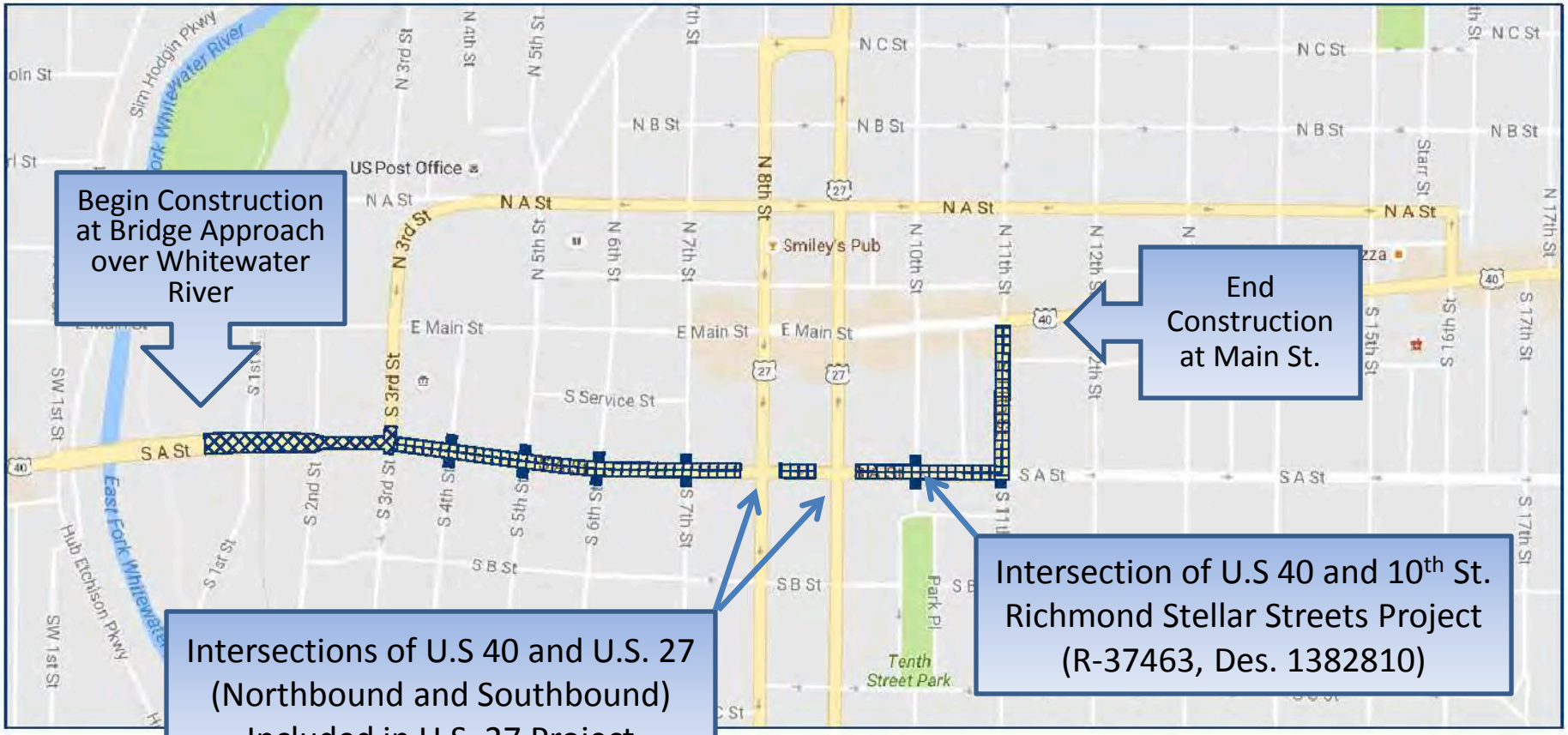
INDIANA DEPARTMENT OF TRANSPORTATION
INDOT



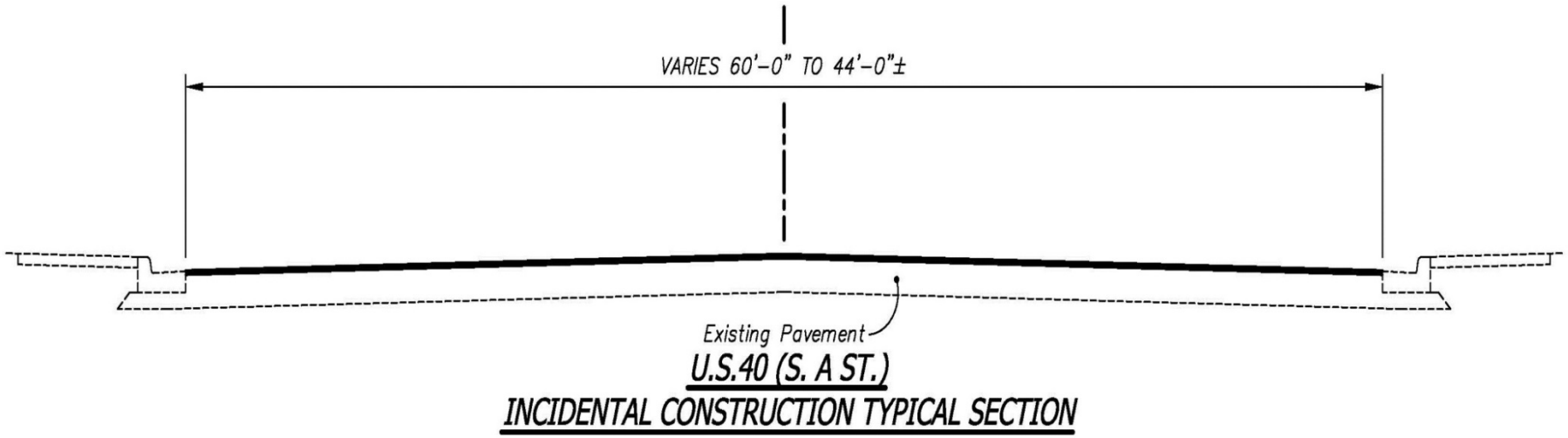
US 27 SB – PHASE IV

Clark Dietz
ENGINEERS

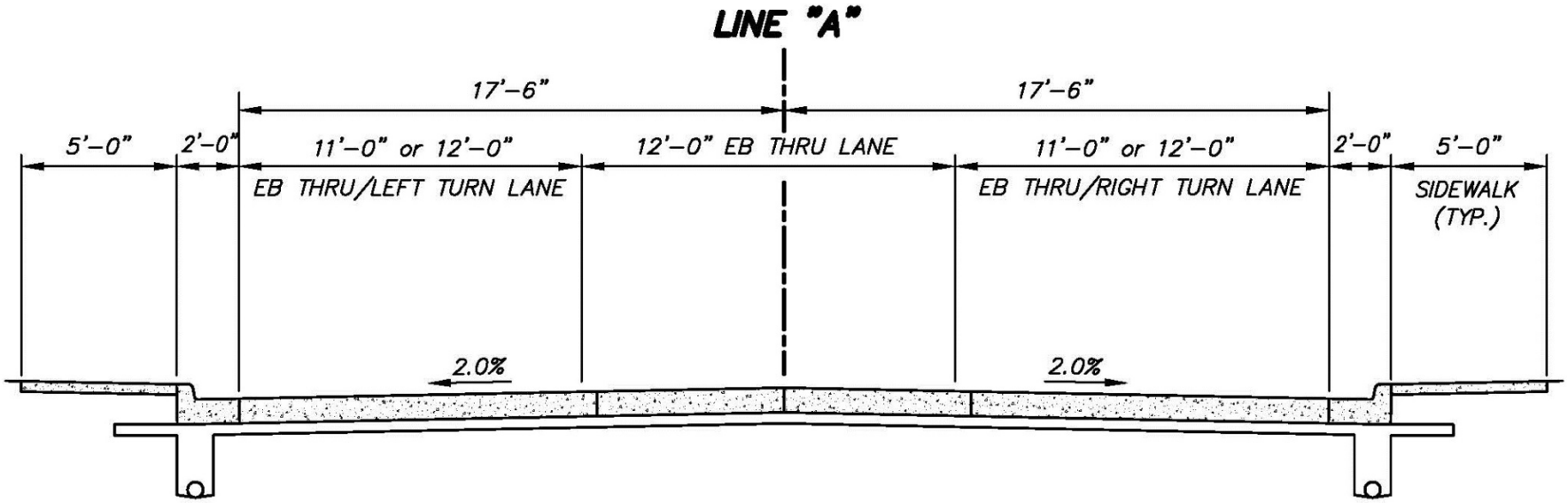
INDIANA DEPARTMENT OF TRANSPORTATION
INDOT


Begin Construction at Bridge Approach over Whitewater River
End Construction at Main St.
Intersections of U.S 40 and U.S. 27 (Northbound and Southbound) Included in U.S. 27 Project
Intersection of U.S 40 and 10th St. Richmond Stellar Streets Project (R-37463, Des. 1382810)
U.S. 40 Project Limits
US Post Office
Smiley's Pub
Tenth Street Park
N A St
E Main St
S A St
S B St
N C St
N B St
N 8th St
S 3rd St
S Service St
East Fork Whitewater
Sim Hodgin Pkwy
Hub Etchison Pkwy

Line “A”



- Incidental Construction – US 40 Bridge over Whitewater River to 3rd St.
  HMA Milling & Resurfacing (0.17 miles)



EASTBOUND U.S.40 (S. A ST.)
TYPICAL SECTION

- Precast Concrete Pavement, Removable
- Total length 0.60 miles along US 40
- US 40 EB (S. A St.) from 3rd St. to 11th St.
- Three Lane Roadway Section
- New ADA Ramps, Sidewalks, Traffic Signals, Radio Interconnect

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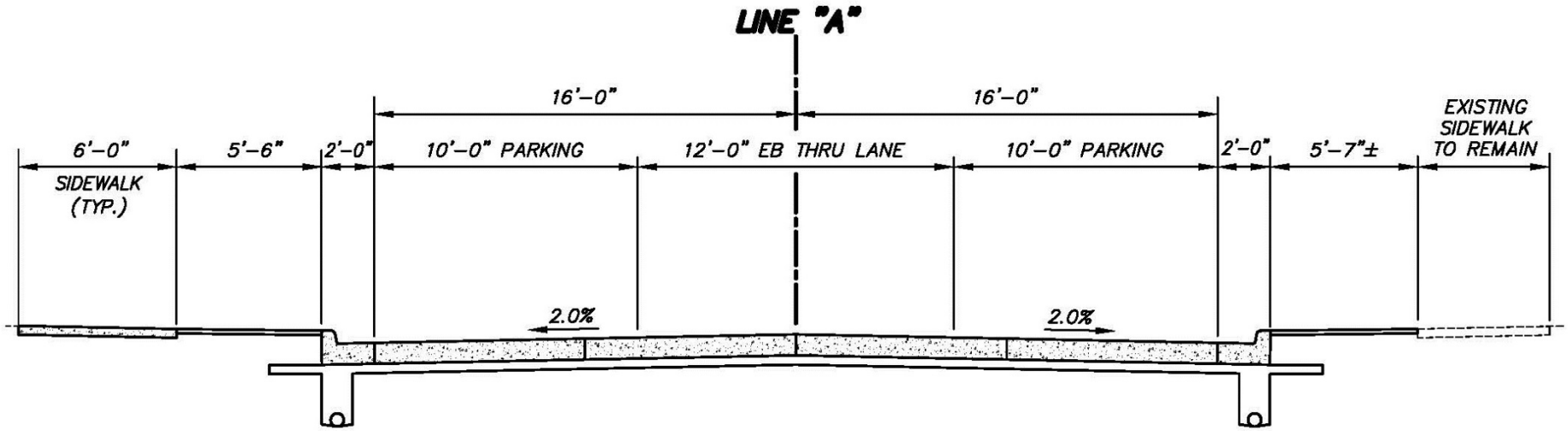
INDIANA DEPARTMENT OF TRANSPORTATION INDOT

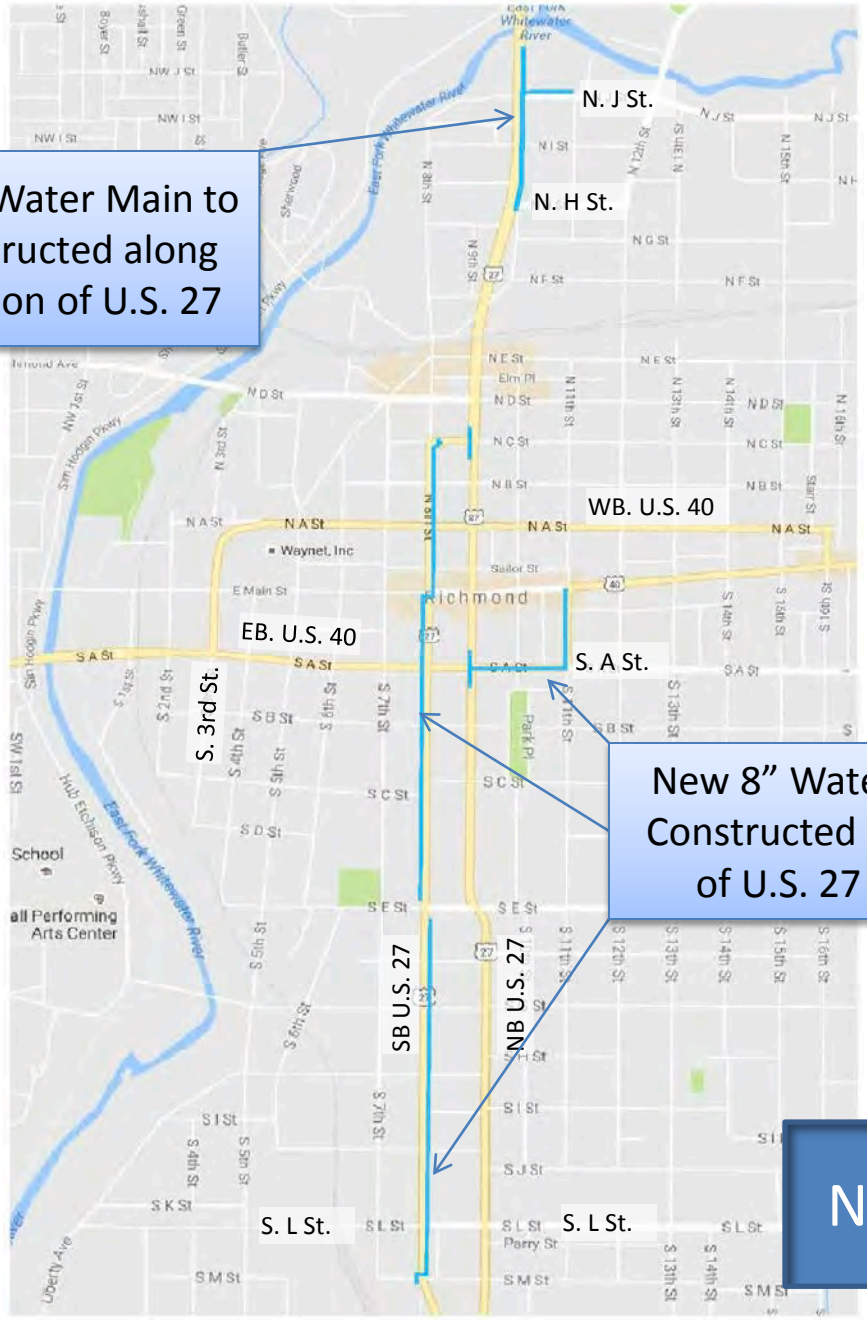


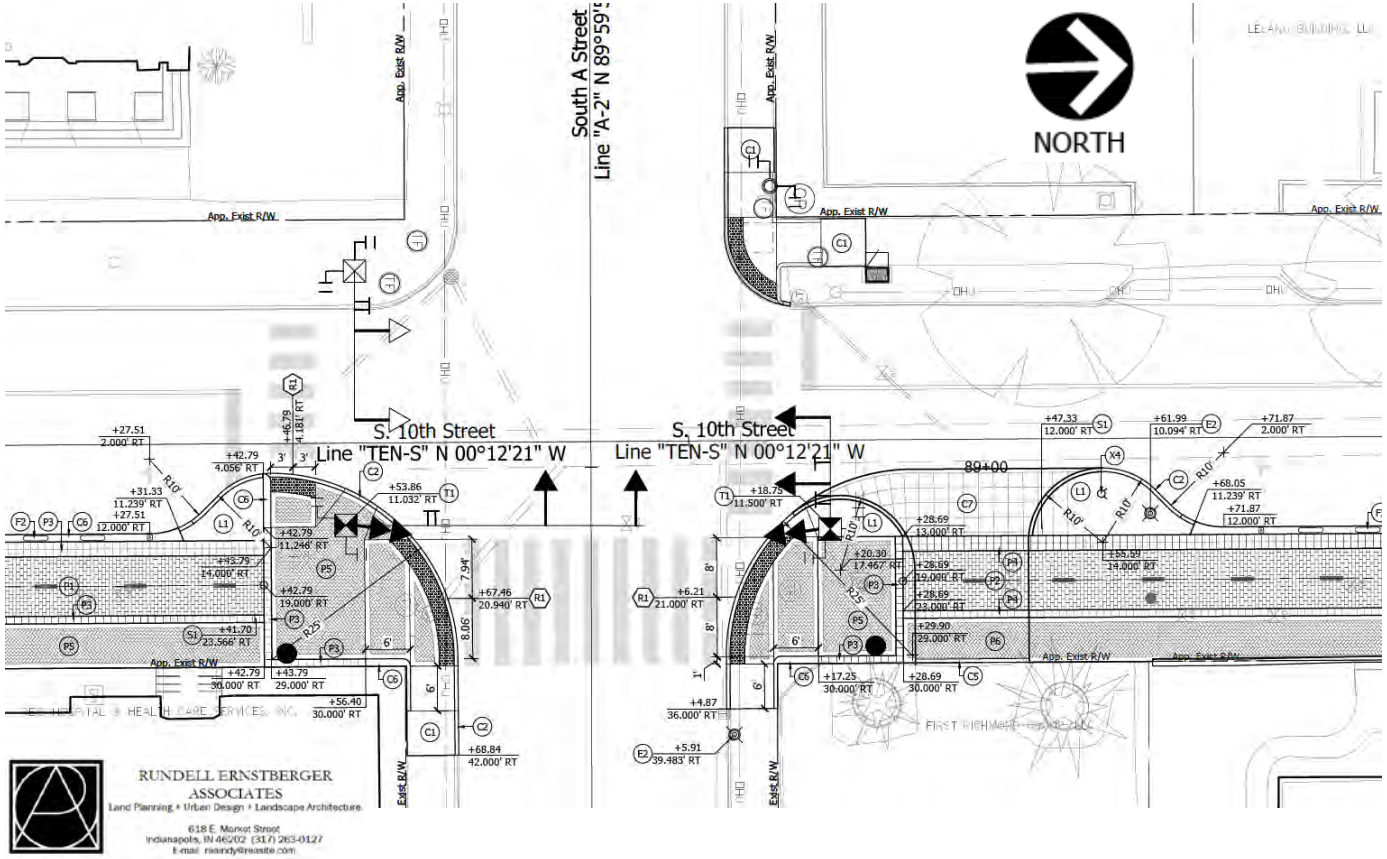
EASTBOUND U.S.40 (S. 11TH ST.)
TYPICAL SECTION

- Precast Concrete Pavement, Removable
- US 40 EB (S. 11th St.) from S. A. St. to Main St.
- One thru lane & on-street parallel parking on both sides

First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT


New 12” Water Main to be Constructed along this Portion of U.S. 27
N. J St.
N. H St.
WB. U.S. 40
EB. U.S. 40
S. A St.
S. 3rd St.
New 8” Water Mains to be Constructed along Portions of U.S. 27 and U.S. 40
SB U.S. 27
NB U.S. 27
S. L St.
S. L St.
Richmond
Waynet, Inc
School
all Performing Arts Center
East Fork Whitewater River
New Water Mains



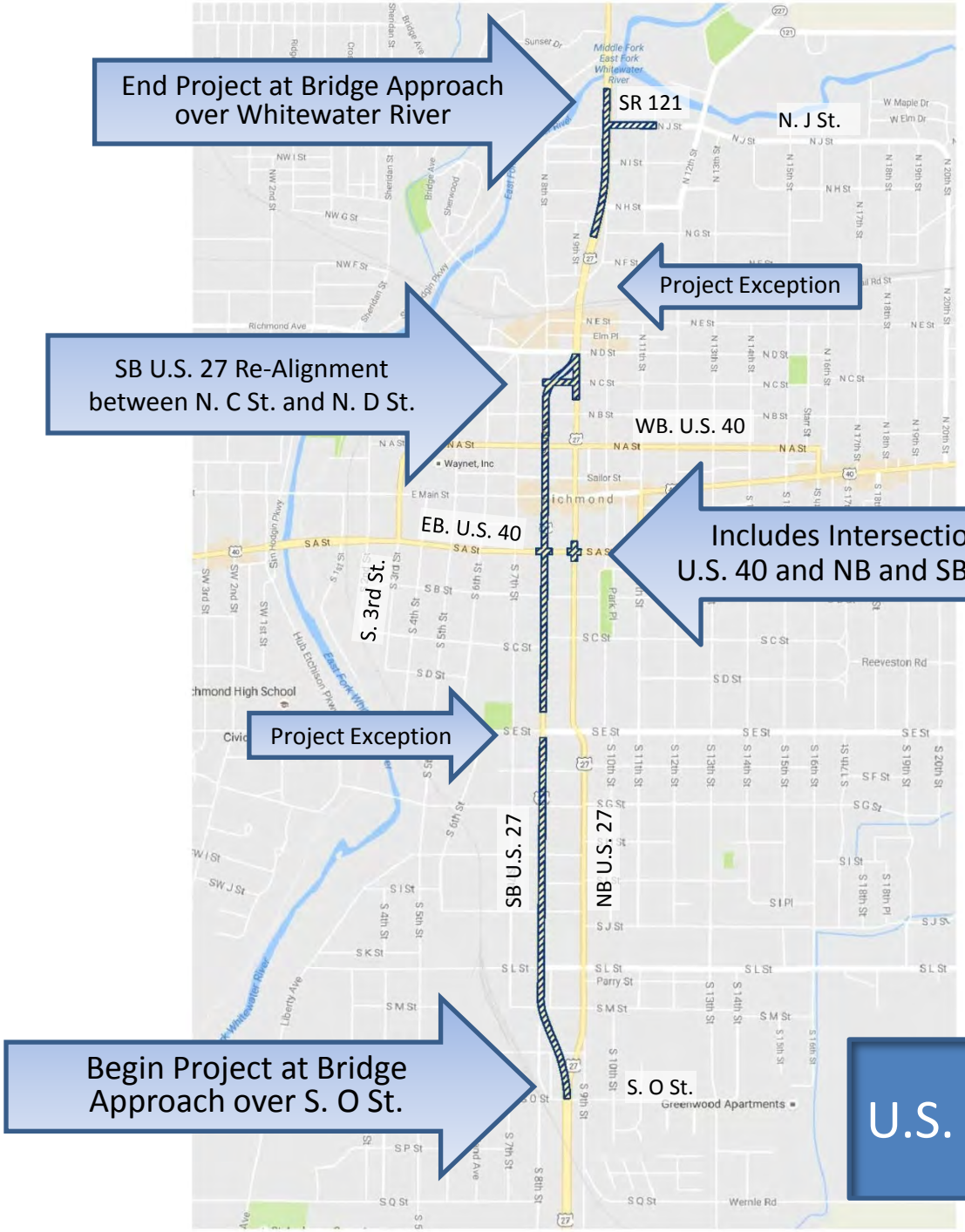
- Intersection of U.S 40 (S. A. St.) and 10th St.
  Richmond Stellar Streets Project
  (Contract R-37463, Des. 1382810)

Project Details – Jeff Brechbill

First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

Clark Dietz ENGINEERS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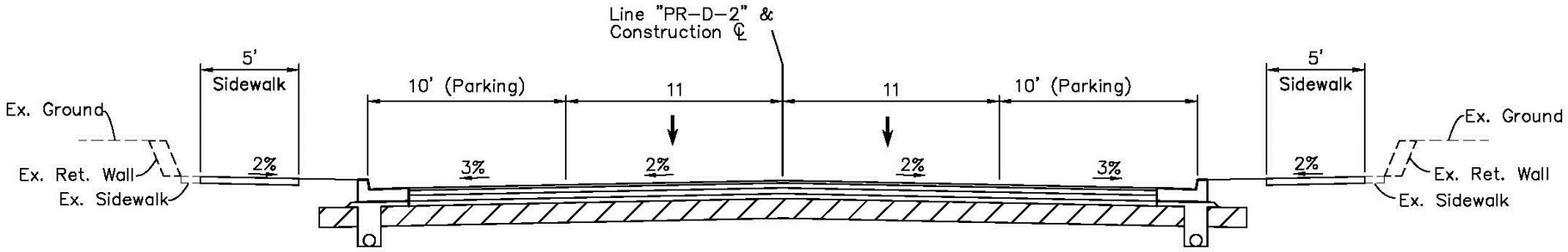
S. O St.
U.S. 27 Project Limits

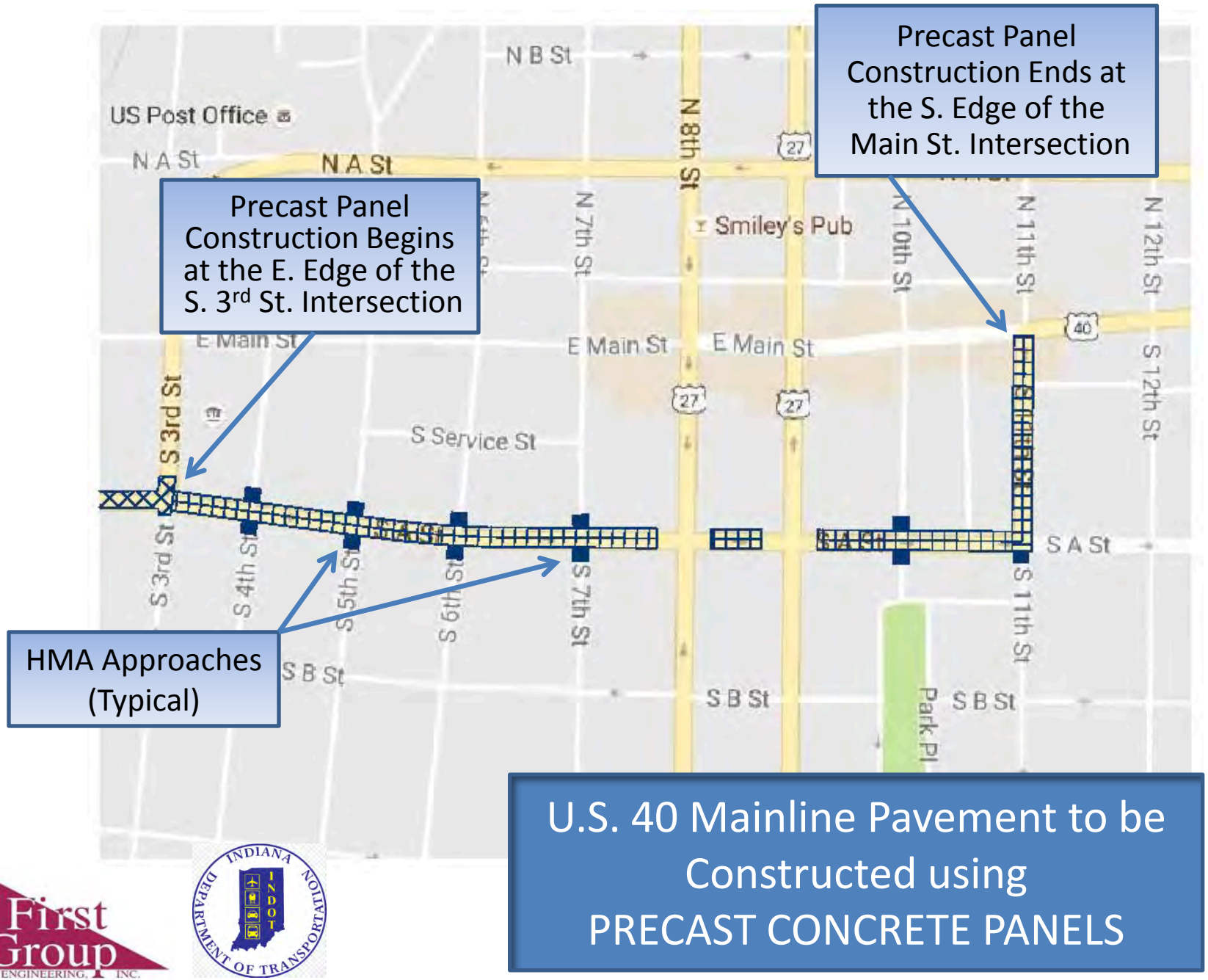


US 27 (SOUTHBOUND) TYPICAL SECTION

- Alternate Bid
  - 165 #/SYD QC/QA-HMA, 3, 70, Surface, 9.5 mm on
  - 330 #/SYD QC/QA-HMA, 3, 70, Intermediate, 19.0 mm on
  - 385 #/SYD QC/QA-HMA, 3, 64, Base, 19.0 mm on
  - 330 #/SYD QC/QA-HMA, 3, 64, Base, 19.0 mm on
  - or
  - 9.5” Plain Jointed QC/QA-PCCP
- Subgrade Treatment, Type IC (12” Comp. Agg. #53)
- 1.89 miles - Net Project Length

Clark Dietz ENGINEERS

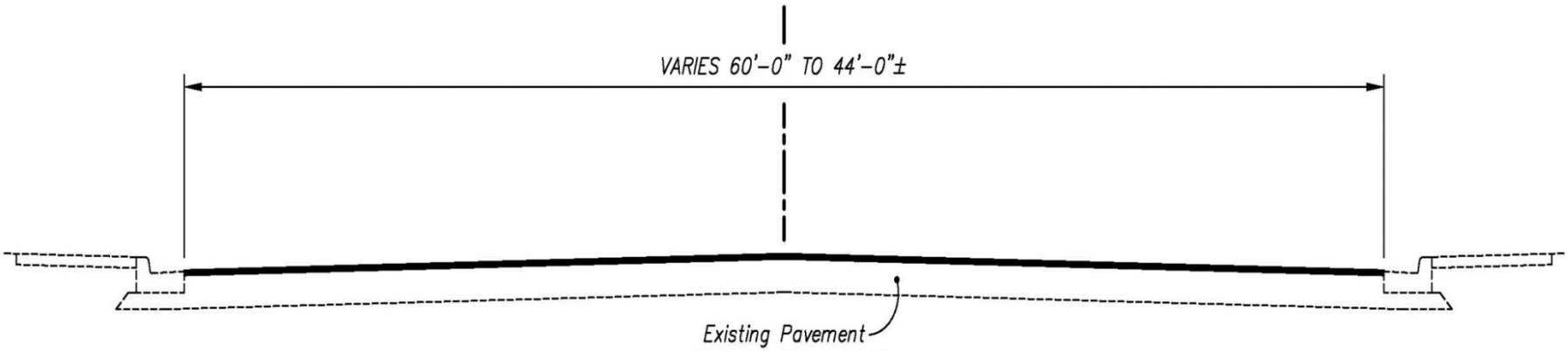
INDIANA DEPARTMENT OF TRANSPORTATION INDOT



First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

Line “A”



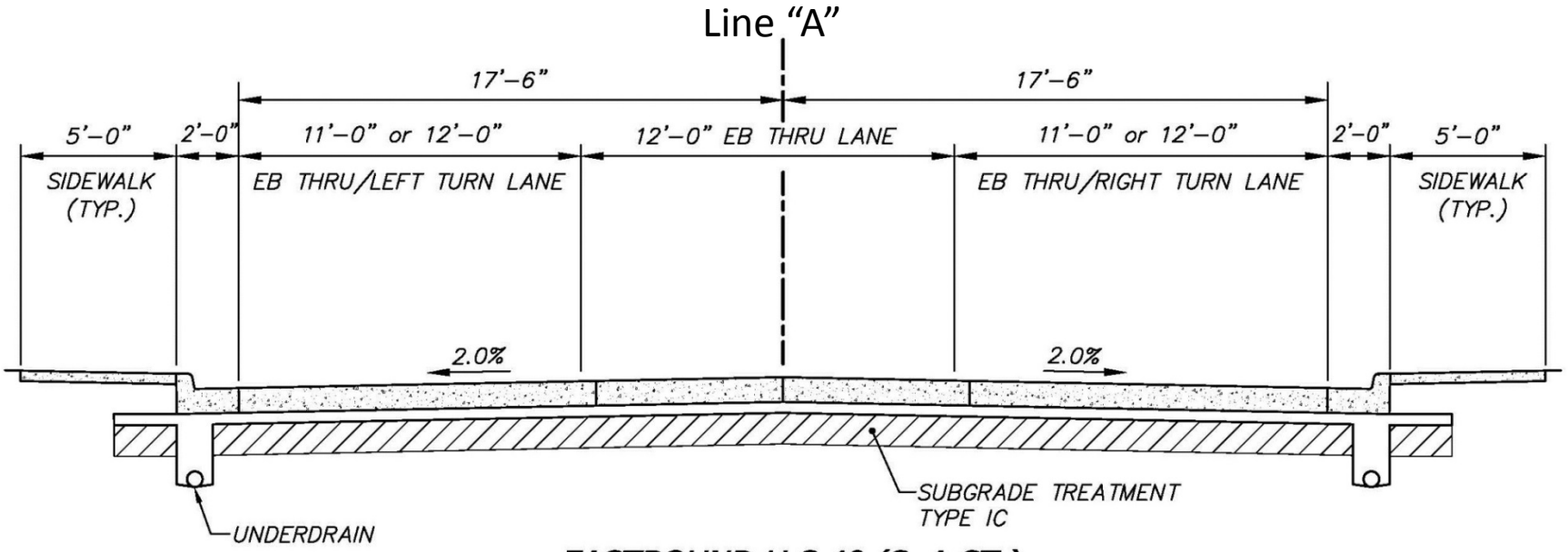
U.S.40 (S. A ST.)

INCIDENTAL CONSTRUCTION TYPICAL SECTION

- 899 ft. (0.17 mile) of Incidental Construction
- 1-1/2” Asphalt Milling
- 165 #/SYD. QC/QA-HMA, 3, 70, SURFACE 9.5 mm

First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT



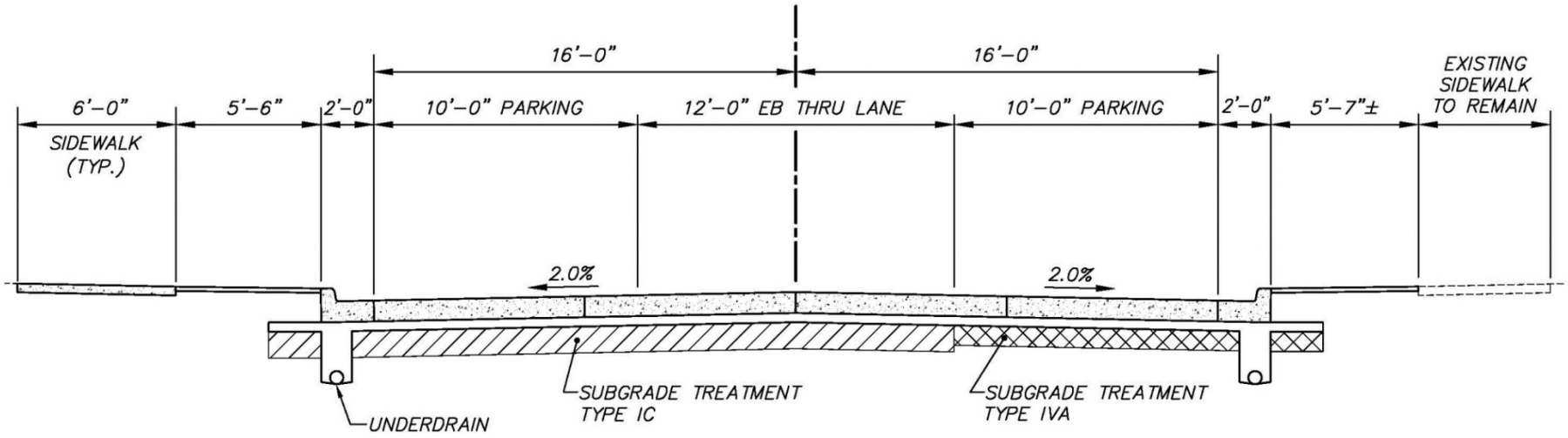
EASTBOUND U.S.40 (S. A ST.)
TYPICAL SECTION

- 9.5" Thickness of Precast Concrete Pavement, Removable
  - Proprietary Product specified:
    Super-Slab® Removable and Reusable Urban Pavement System® RUP
    Fort Miller Co., Inc.
- Precision Grading Fine Aggregate on 4" Comp. Agg. #43 Subbase
- 12,165 SYS of Precast Concrete Pavement (1,424 panels estimated)
- 3,141 ft. (0.60 miles) total length along US 40

First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

Line “A”

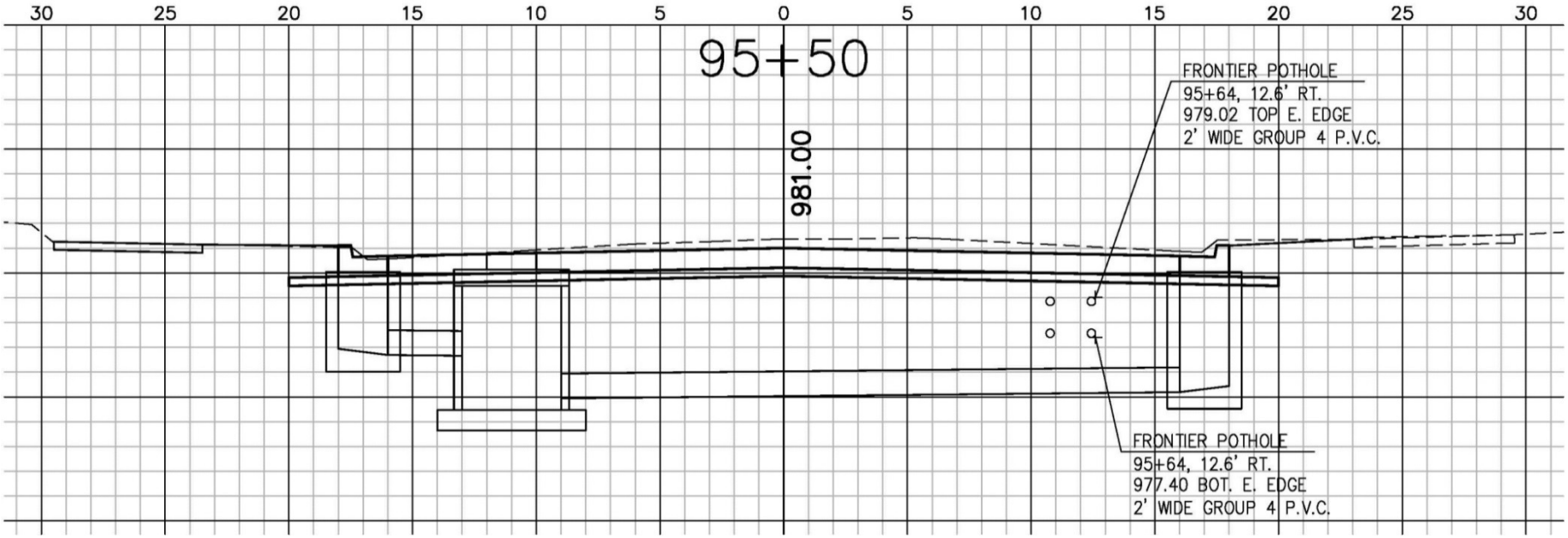


EASTBOUND U.S.40 (S. 11TH ST.)
TYPICAL SECTION

- ¼” tolerance for subgrade and subbase grading is required
- Precast Panel joints are not to be placed in wheel path
- Precast Panel joint at roadway crown (typical)
- Subgrade Treatment Type IC (12” Comp. Agg. #53)
- Subgrade Treatment Type IVA for parking lane (9” Comp. Agg. #53 on geogrid)
- All Street Approaches will utilize HMA – precast concrete only for Mainline

First Group ENGINEERING, INC.

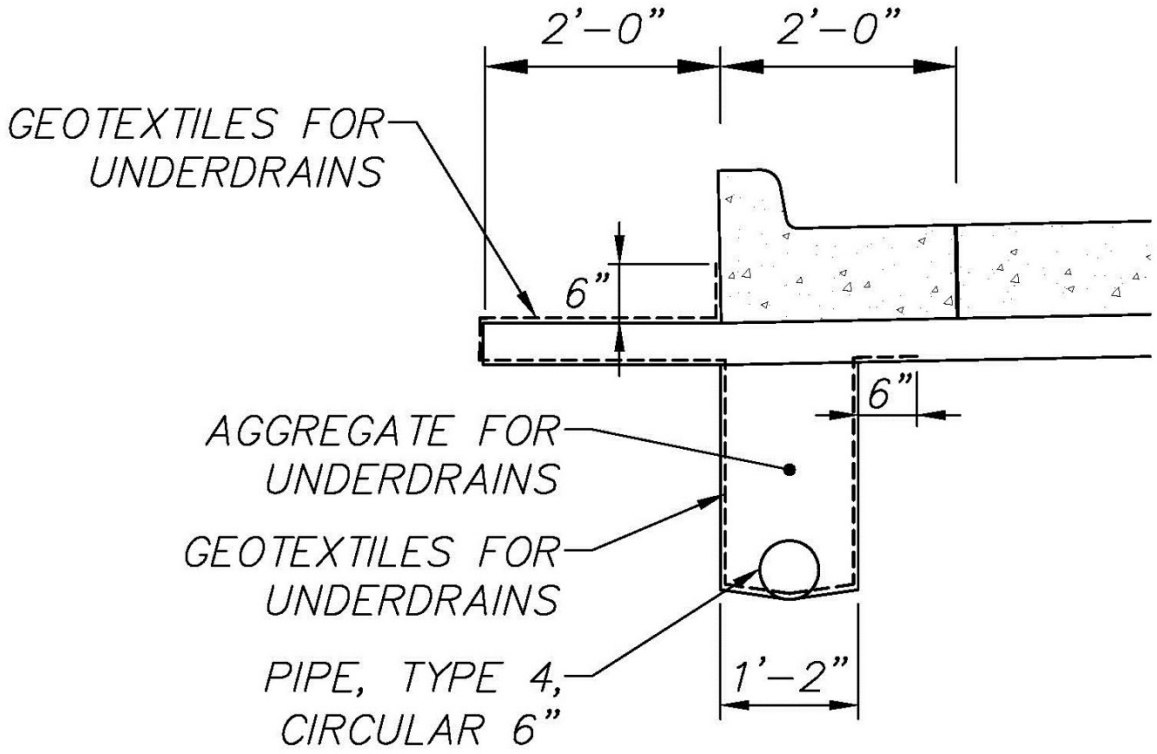
INDIANA DEPARTMENT OF TRANSPORTATION INDOT



- Extensive potholing for utilities has been undertaken
- Frontier has very shallow concrete encased conduits beneath 11th Street
- 2 - 4" PVC conduits to be relocated during construction of US 40
- Frontier Representative will be available 24 hrs/day on short notice

First Group ENGINEERING, INC.

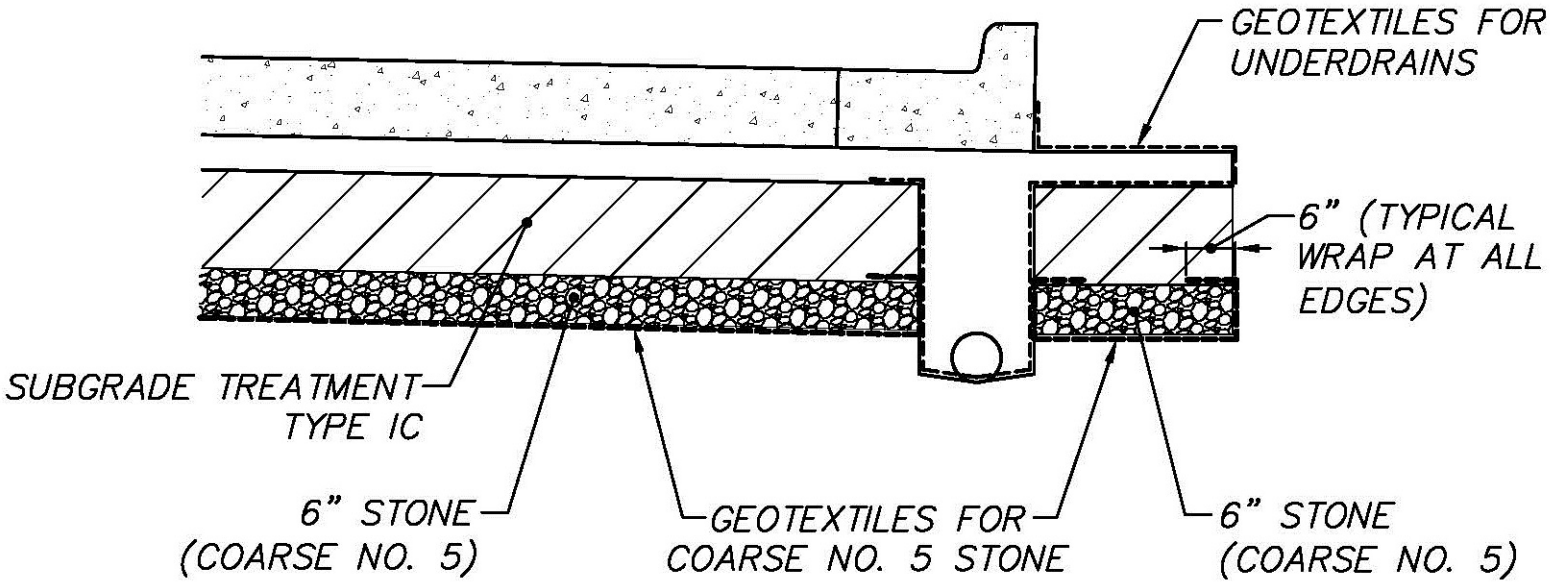
INDIANA DEPARTMENT OF TRANSPORTATION INDOT



- 2' Concrete Curb & Gutter – not attached to Precast Concrete Panels
- Placed after Precast Concrete Panels are in place
- Bituminous Mastic placed between precast panels and gutter

First Group ENGINEERING, INC.

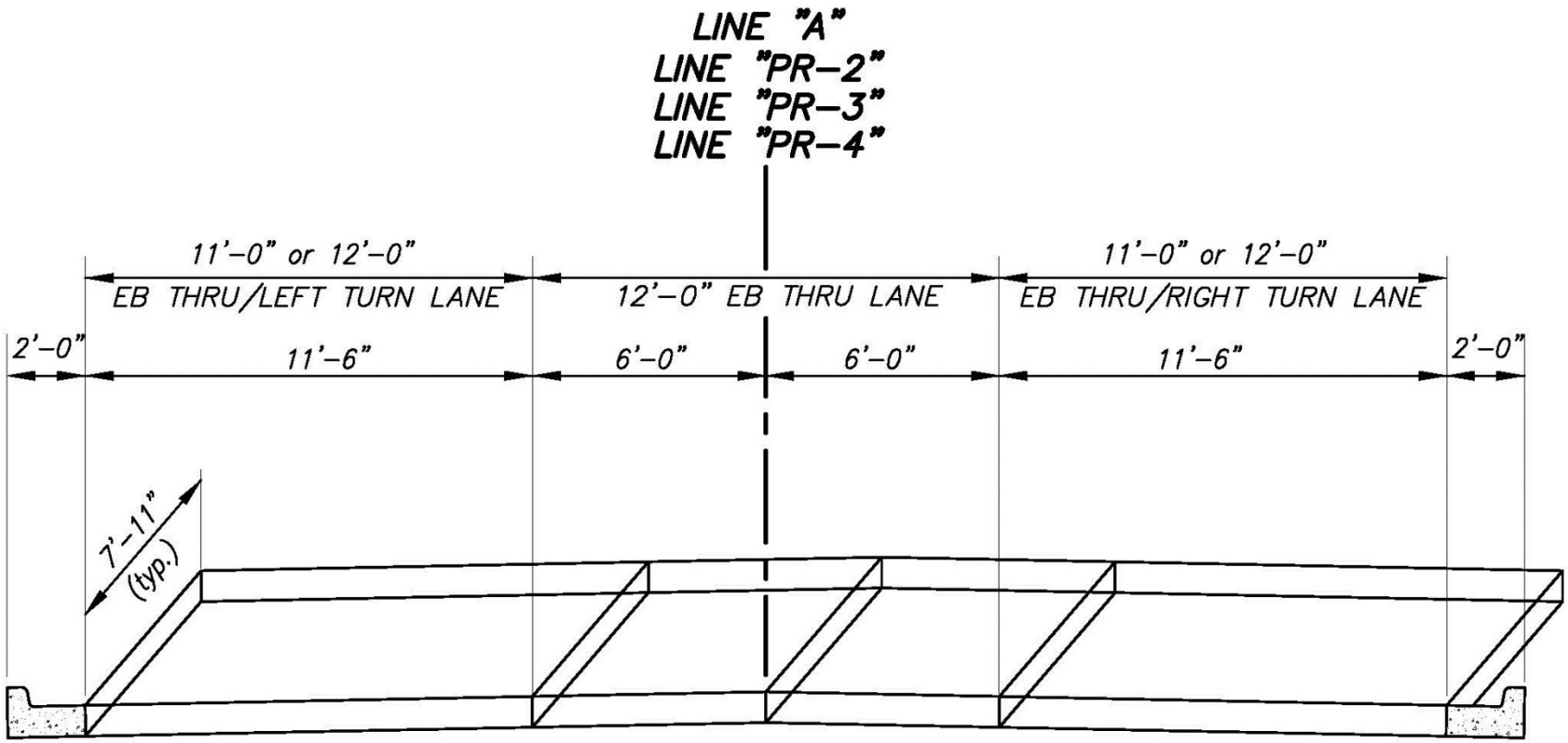
INDIANA DEPARTMENT OF TRANSPORTATION INDOT



COARSE STONE NO. 5 DETAIL

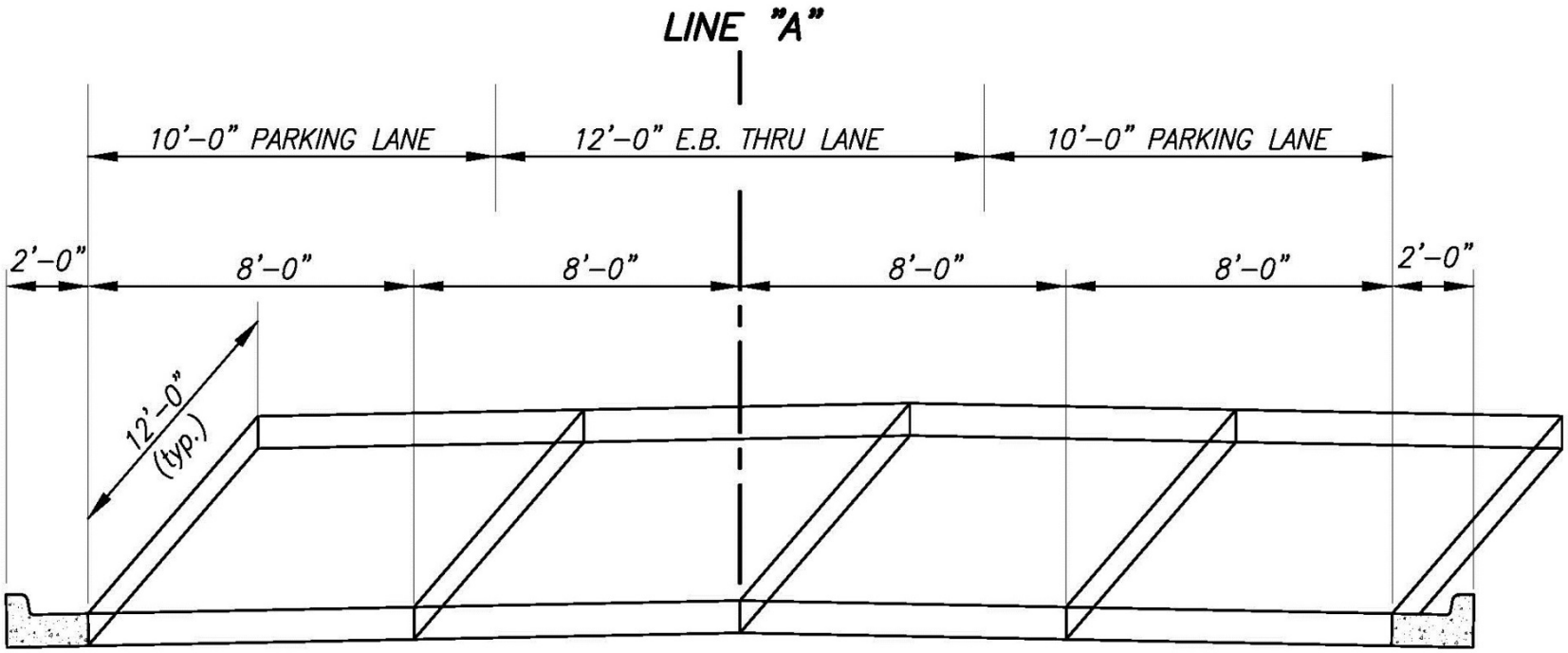
TO BE USED IN AREAS WHERE WET SOILS ARE ENCOUNTERED
(GREATER THAN 2% OVER OPTIMUM MOISTURE CONTENT)

- Undistributed Quantities are included:
  - Coarse Stone #5
  - Geotextiles



EASTBOUND U.S.40 (S. A ST.)
TYPICAL PRECAST PANEL DIMENSIONS

U.S. 40 (S. A St.)
Typical Size and Layout of
Precast Concrete Panels



EASTBOUND U.S.40 (S. 11TH ST.)
TYPICAL PRECAST PANEL DIMENSIONS

U.S. 40 (S. 11th St.)
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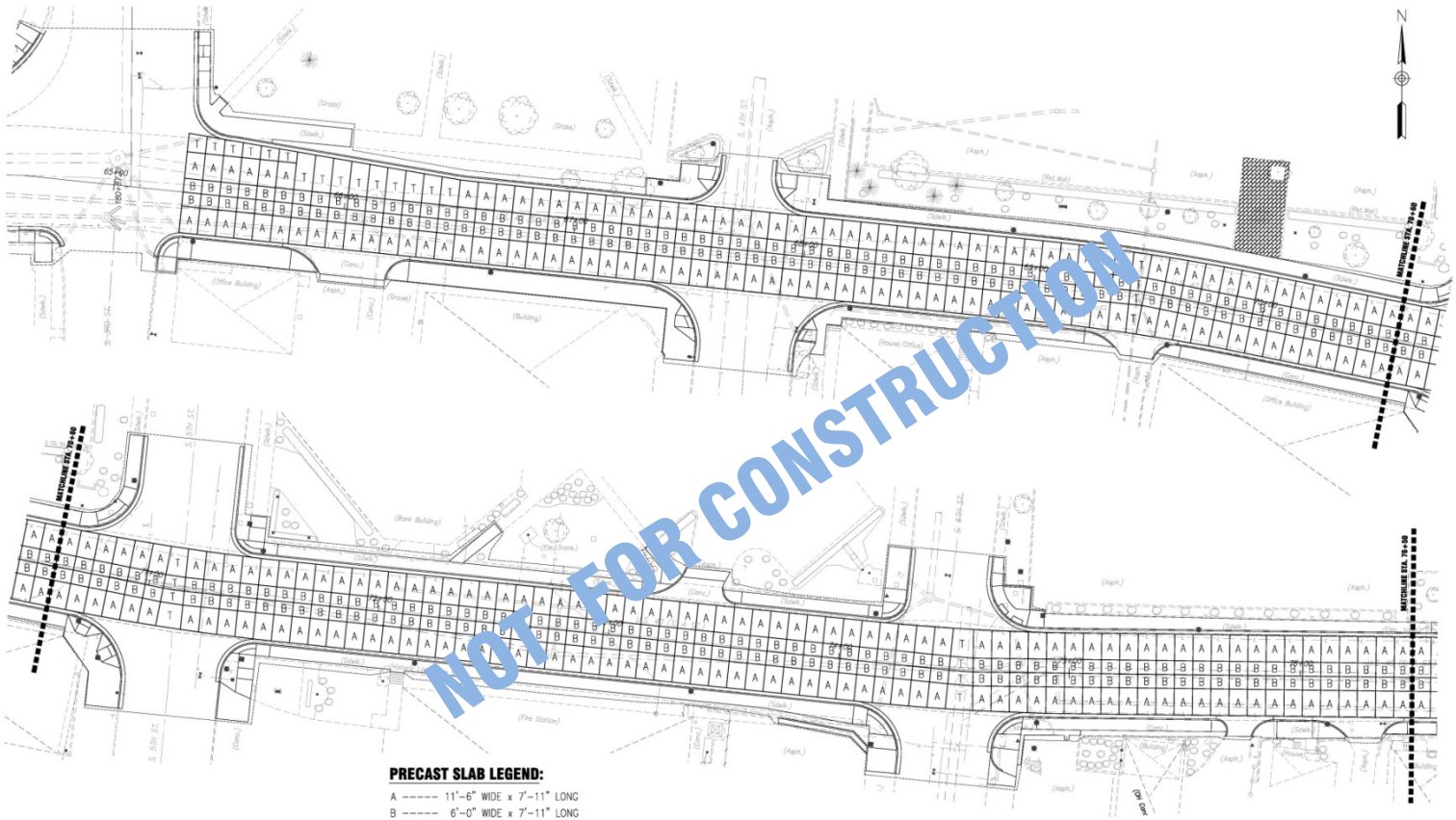


NOT FOR CONSTRUCTION

PRECAST SLAB LEGEND:

A ----- 11'-6" WIDE x 7'-11" LONG
B ----- 6'-0" WIDE x 7'-11" LONG
C ----- 6'-0" WIDE x 7'-4" LONG
D ----- 8'-0" WIDE x 12'-0" LONG
E ----- 8'-0" WIDE x 8'-0" LONG
T ----- TRAPEZOIDAL SLAB – SIZES VARY

10 0 10 20 40

*SUPER-SLAB® IS PROTECTED UNDER AT LEAST ONE OF US PATENT NUMBERS; 6,607,329 B2, 6,663,315, 6,709,192, 6,899,489, 6,962,462, 7,004,674, AND 7,467,778 B2 AND CANADIAN PATENT NUMBER; 2,413,610 OTHER U.S. AND FOREIGN PATENTS PENDING. SUPER-SLAB® IS A REGISTERED US TRADEMARK OWNED BY THE FORT MILLER CO., INC.

The Fort Miller Co., Inc.
P.O. BOX 98
SCHUYLERVILLE, NY 12871
PH: (518) 695-5000
www.fortmiller.com

Stage 3 Plans

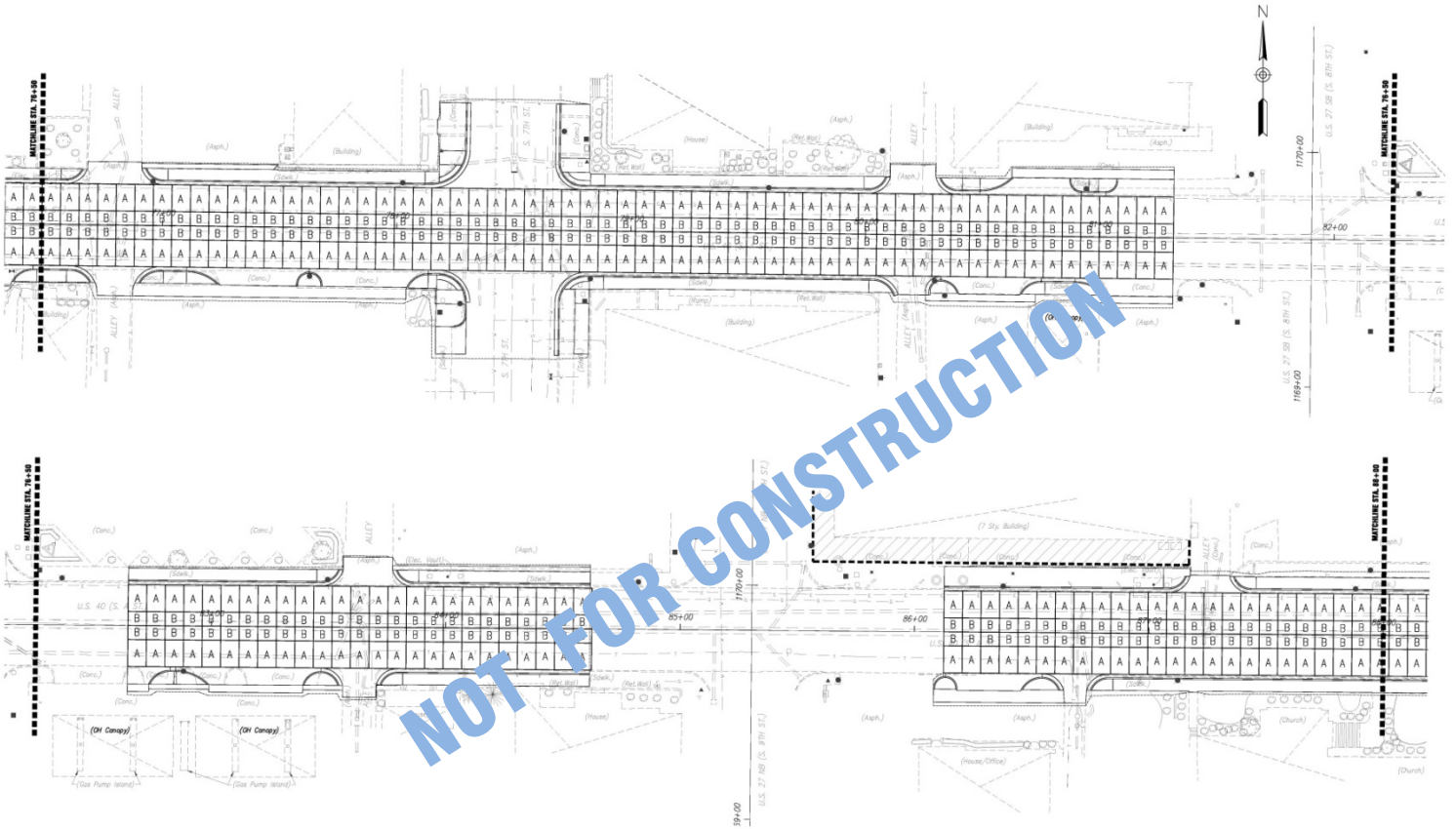
RECOMMENDED FOR APPROVAL
DESIGN ENGINEER DATE

DESIGNED: JCS DRAWN: JCS
CHECKED: DEM CHECKED: DEM

INDIANA
DEPARTMENT OF TRANSPORTATION

PRECAST SLAB LAYOUT - 1

HORIZONTAL SCALE	BRIDGE FILE
N.T.S – U.N.O.	N/A
VERTICAL SCALE	DESIGNATION
N/A	0013790
SURVEY BOOK	SHEETS
17327	33 of 105
CONTRACT	PROJECT
R-30397	0013790



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Stage 3 Plans

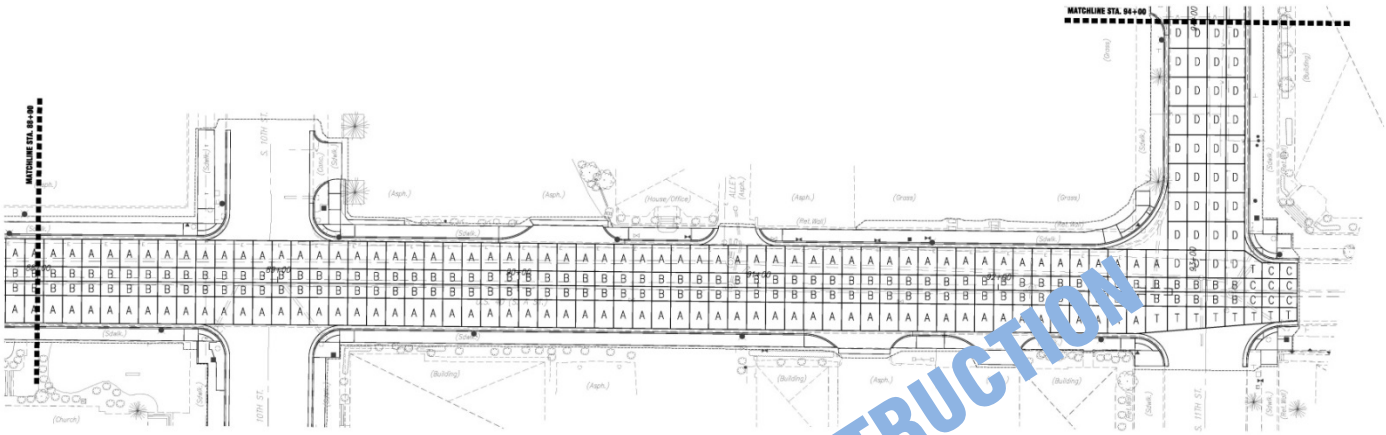
RECOMMENDED FOR APPROVAL
DESIGN ENGINEER DATE

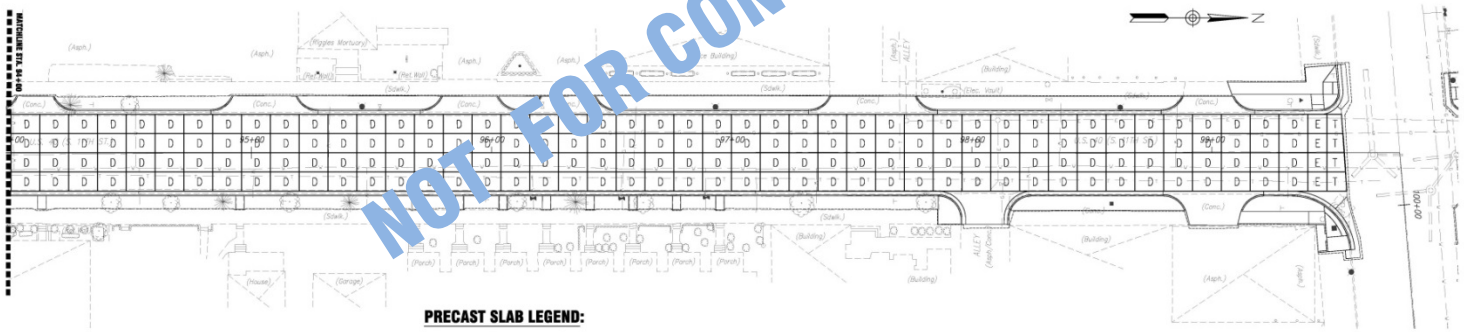
DESIGNED: JCS DRAWN: JCS
CHECKED: DEM CHECKED: DEM

INDIANA
DEPARTMENT OF TRANSPORTATION

PRECAST SLAB LAYOUT - 2

HORIZONTAL SCALE	BRIDGE FILE
N.T.S. – U.N.O.	N/A
VERTICAL SCALE	DESIGNATION
N/A	0013790
SURVEY BOOK	SHEETS
17327	34 of 105
CONTRACT	PROJECT
R-30397	0013790





NOT FOR CONSTRUCTION

PRECAST SLAB LEGEND:

A ----- 11'-6" WIDE x 7'-11" LONG
B ----- 6'-0" WIDE x 7'-11" LONG
C ----- 6'-0" WIDE x 7'-4" LONG
D ----- 8'-0" WIDE x 12'-0" LONG
E ----- 8'-0" WIDE x 8'-0" LONG
T ----- TRAPEZOIDAL SLAB – SIZES VARY

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Stage 3 Plans

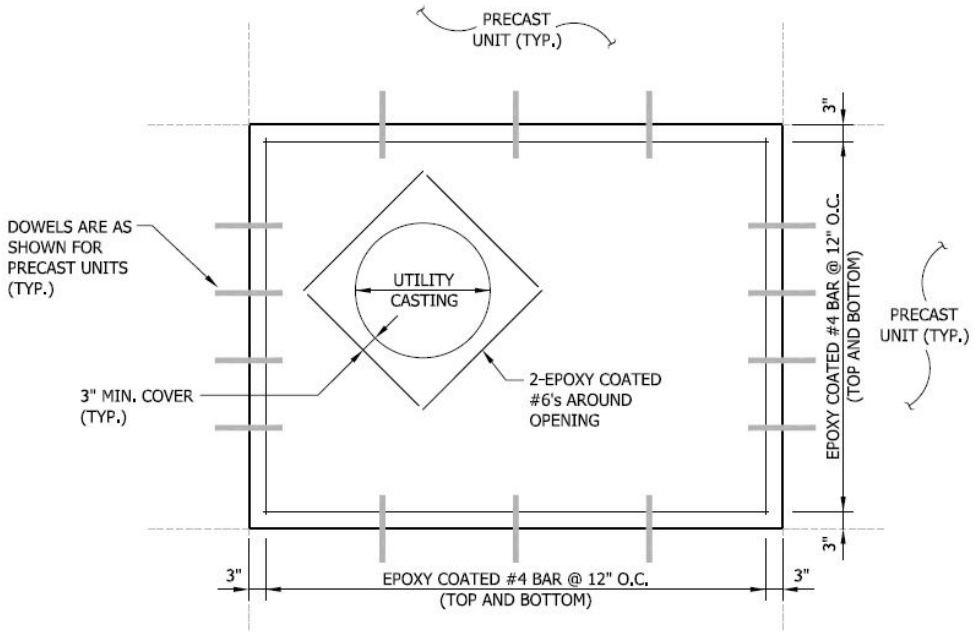
RECOMMENDED FOR APPROVAL
DESIGN ENGINEER DATE

DESIGNED: JCS DRAWN: JCS
CHECKED: DEM CHECKED: DEM

INDIANA
DEPARTMENT OF TRANSPORTATION

PRECAST SLAB LAYOUT - 3

HORIZONTAL SCALE	BRIDGE FILE
N.T.S – U.N.O.	N/A
VERTICAL SCALE	DESIGNATION
N/A	0013790
SURVEY BOOK	SHEETS
17327	35 of 105
CONTRACT	PROJECT
R-30397	0013790



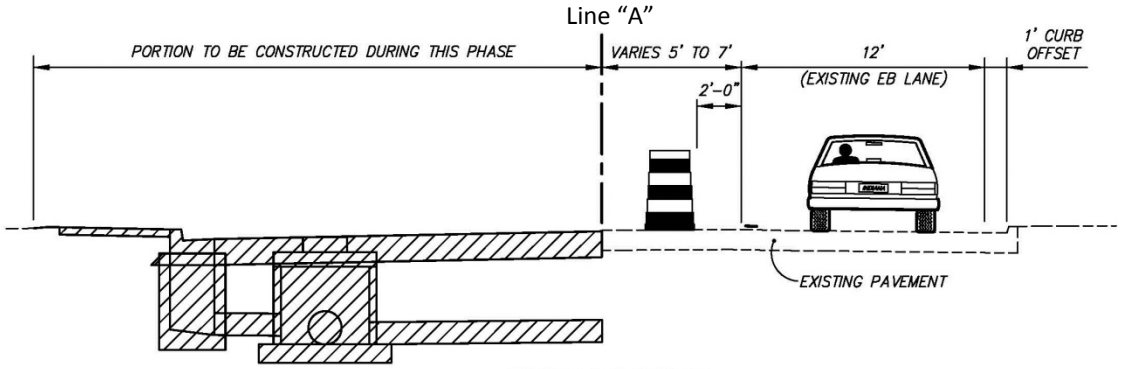
ISOLATION SLAB AT UTILITY CASTINGS
(CAST-IN-PLACE CONCRETE PAVEMENT)

- Manholes, Utility castings, and other appurtenances to be surveyed
- Sections of Precast Concrete Pavement to be omitted
- Cast-in-Place Concrete Pavement with Reinforcing Steel is required

First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

- Existing Brick Sewer
  Center of US 40 EB (S. A St.) from 6th St. to 11th St.
- Lining with Cured-in-place plastic required
- Reconstruct top 2’ of manholes and lining required



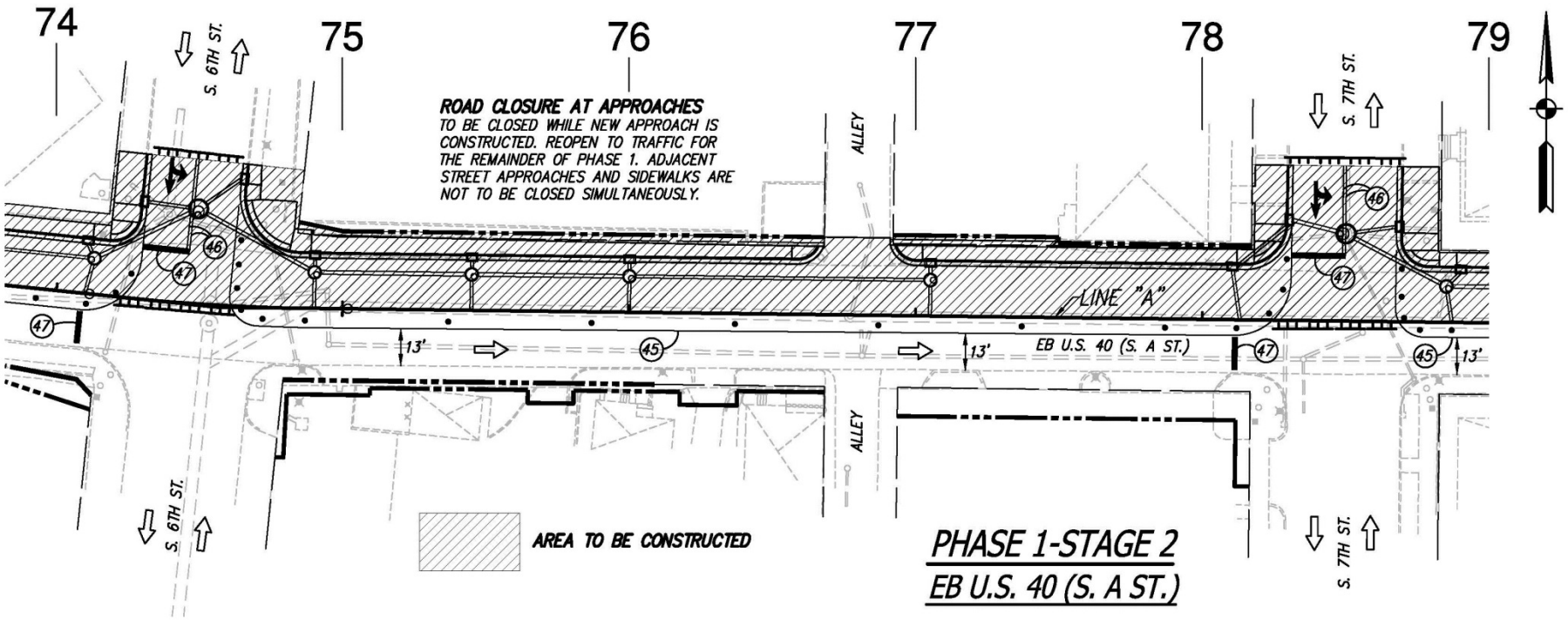
PHASE 1-STAGE 2
EB U.S. 40 (S. A ST.)

- Maintenance of Traffic (All Phases):
  - Maintain access to all adjacent businesses and residences
  - Do not close two adjacent streets simultaneously

- Phase 1-Stage 1 (not shown):
  - Install new manholes & pipe sections for brick sewer
  - Line Manholes & Brick Sewers
- Phase 1-Stage 2 – Construct Storm Trunkline and half of roadway
  - Maintain one lane of traffic on existing pavement
  - Short Term closure of 11th Street (45 days max.)

First Group ENGINEERING, INC.

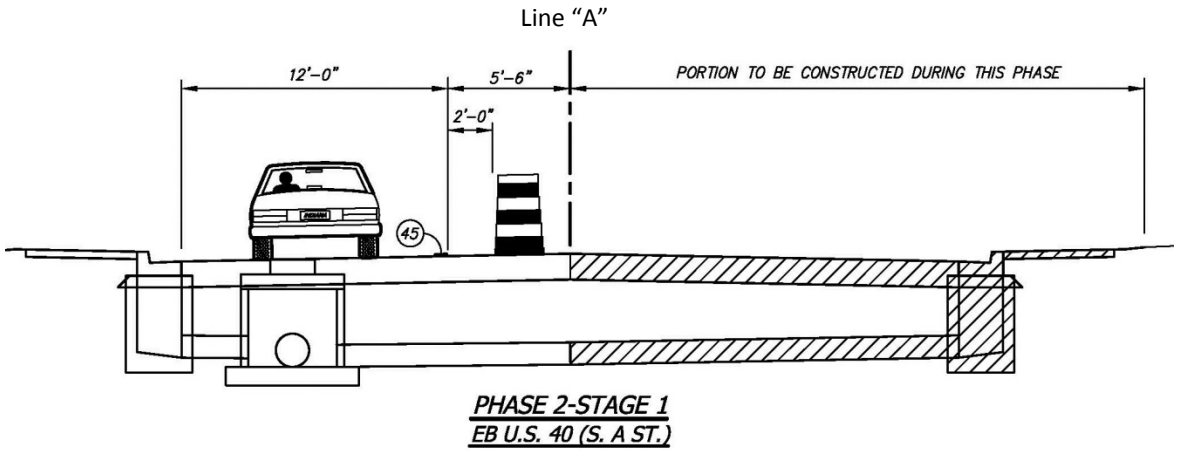
INDIANA DEPARTMENT OF TRANSPORTATION INDOT



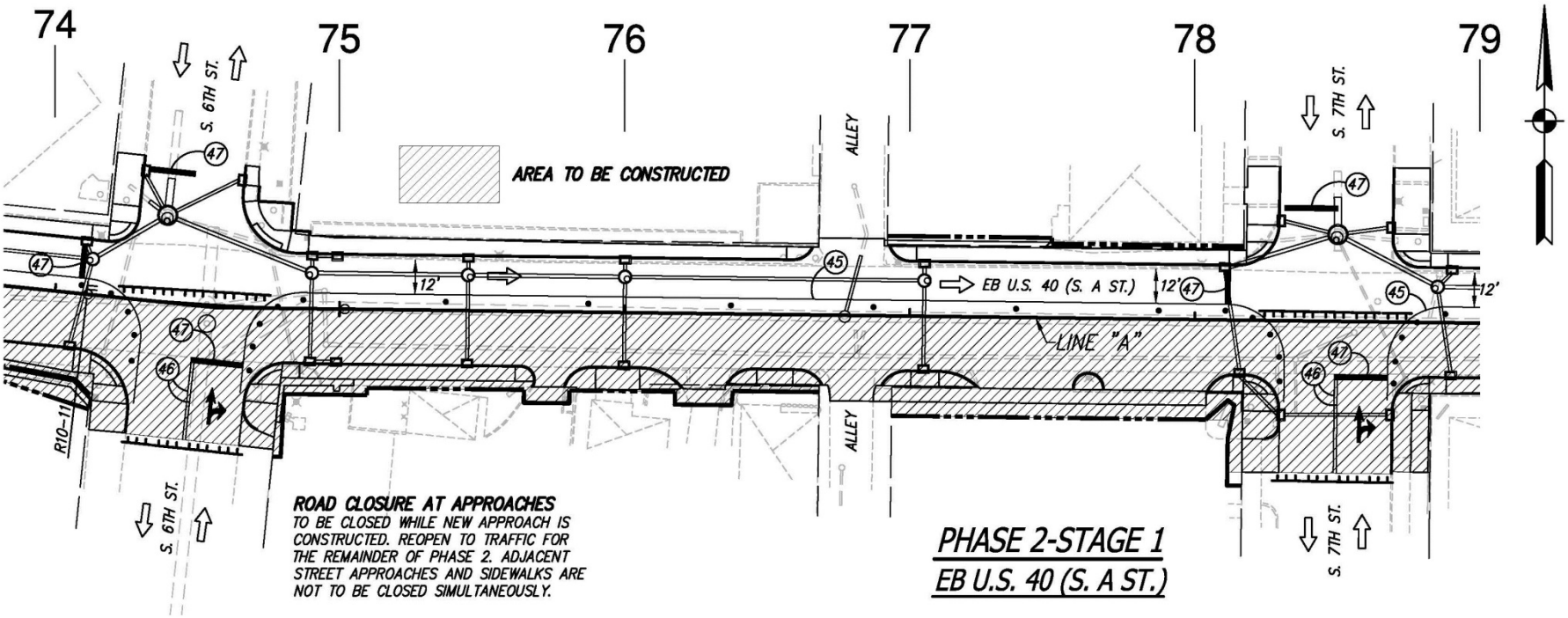
- Phase 1-Stage 2 – Construct Storm Sewer Trunkline and half of roadway
  Maintain one lane of traffic on existing pavement
  Short Term closure of 11th Street (45 days max.)

First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT



- Phase 2-Stage 1:
  - Maintain one lane of traffic on newly constructed roadway
  - Construct remaining portion of roadway



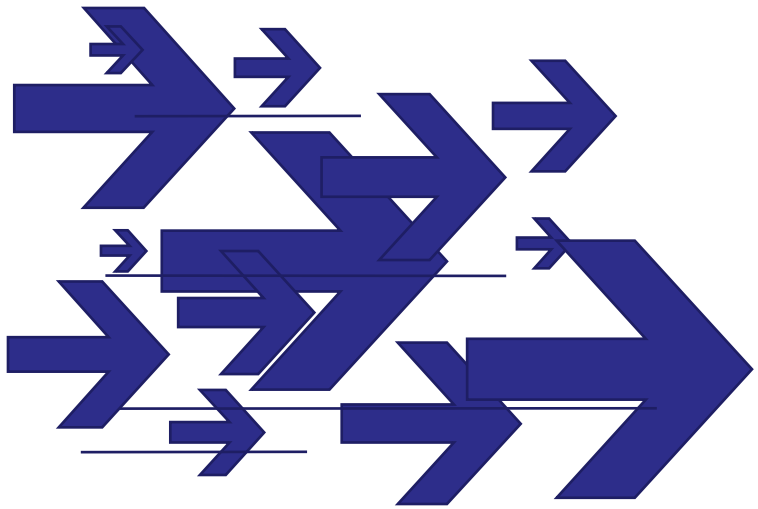
- Phase 2-Stage 1:
  - Maintain one lane of traffic on newly constructed roadway
  - Construct remaining portion of roadway

First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

SUPER-SLAB®

Replacement of Urban Arterials and Streets with Removable Precast Pavement



INDOT Greenfield District
R-30397 US 40 Richmond
Pre-Bid Information Meeting

September 16, 2016

The Fort Miller Co., Inc.

Dan E. Moellman, P.E.

The Fort Miller Co., Inc.

- Located in ***upstate*** New York
- Transportation products
  - Highway barrier
  - Precast retaining walls
  - Bridges
  - Precast pavement slabs
- **Specialize in accelerated bridge construction**
- **Develop and market the Super-Slab® Precast Pavement System**
- **Fort Miller partners with local precasters to make slabs, outside the Northeast**

Precast Concrete Pavement Slabs = Overnight Repairs

145,000 ADT

I-287, Tarrytown, NY

200,000 ADT

I-15, Ontario, CA

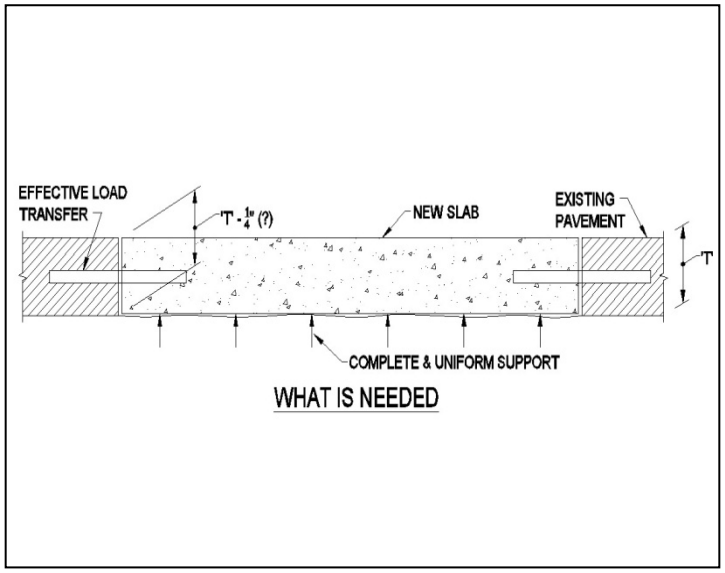
180,000 ADT

I-66, Fairfax, VA

What Does High ADT's Mean For Pavement Repair & Maintenance?

- Heavily-deteriorated pavement
  - Too much traffic for long-term durable repairs
  - Often repaired with fast-setting non-durable materials
- Very short work windows
  - 8 – 5 hour night work windows
  - 55 hour weekend closures
- Real need for durable repairs
- **Summary - Premium pavement required - overnight!**

Precast Pavement Emulates Cast in Place



- Full Bedding Support
- Load transfer Dowels
- Slab Surface Geometry

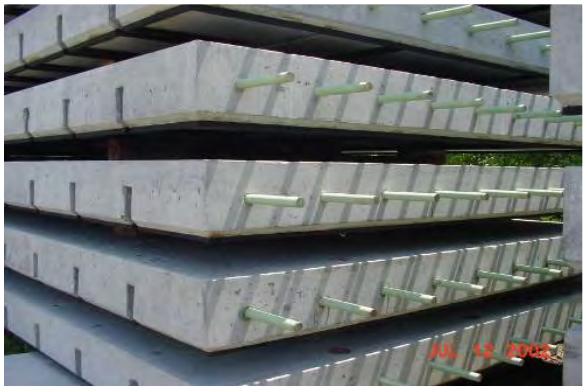
Jointed Precast Pavement in the US

- Full-scale implementation began in 2001 with introduction of the Super-Slab® System
- Can be installed rapidly – overnight
- Versatile
  - Intermittent repair, full lane replacement, bridge approach slabs, ramps and intersections
- Proven
  - Numerous FWD tests
  - Accelerated load (HVS) tests in 2005 – 2006
- Cost effective – compared to fast-track concrete repairs

R-30397 Pre-Bid Information Meeting

- **To provide bidders with information they need about the Super Slab® System to make an accurate and informed bid**
  - **Fort Miller has developed extensive installation expertise on 100+ projects**
  - **Fort Miller provides field support, ensuring the contractor a successful and profitable installation**
  - **Incremental improvements are always being made to the system**

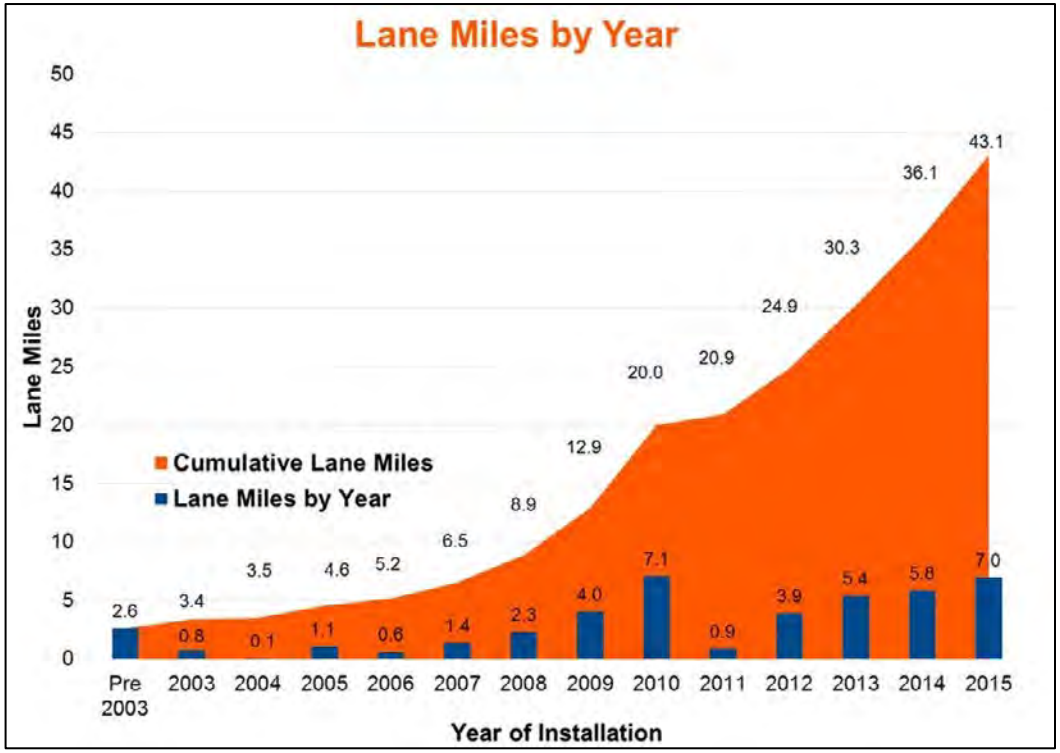
Super-Slab® System – Bottom Slots



- Simple slab-on-grade system
- Standard dowels and tie bars (JRCP)
- Built-in bedding grout distribution
- Precision grading equipment
- Warped and planar surfaces
- 25,000+ slabs & 2,800,000+ SF INSTALLED

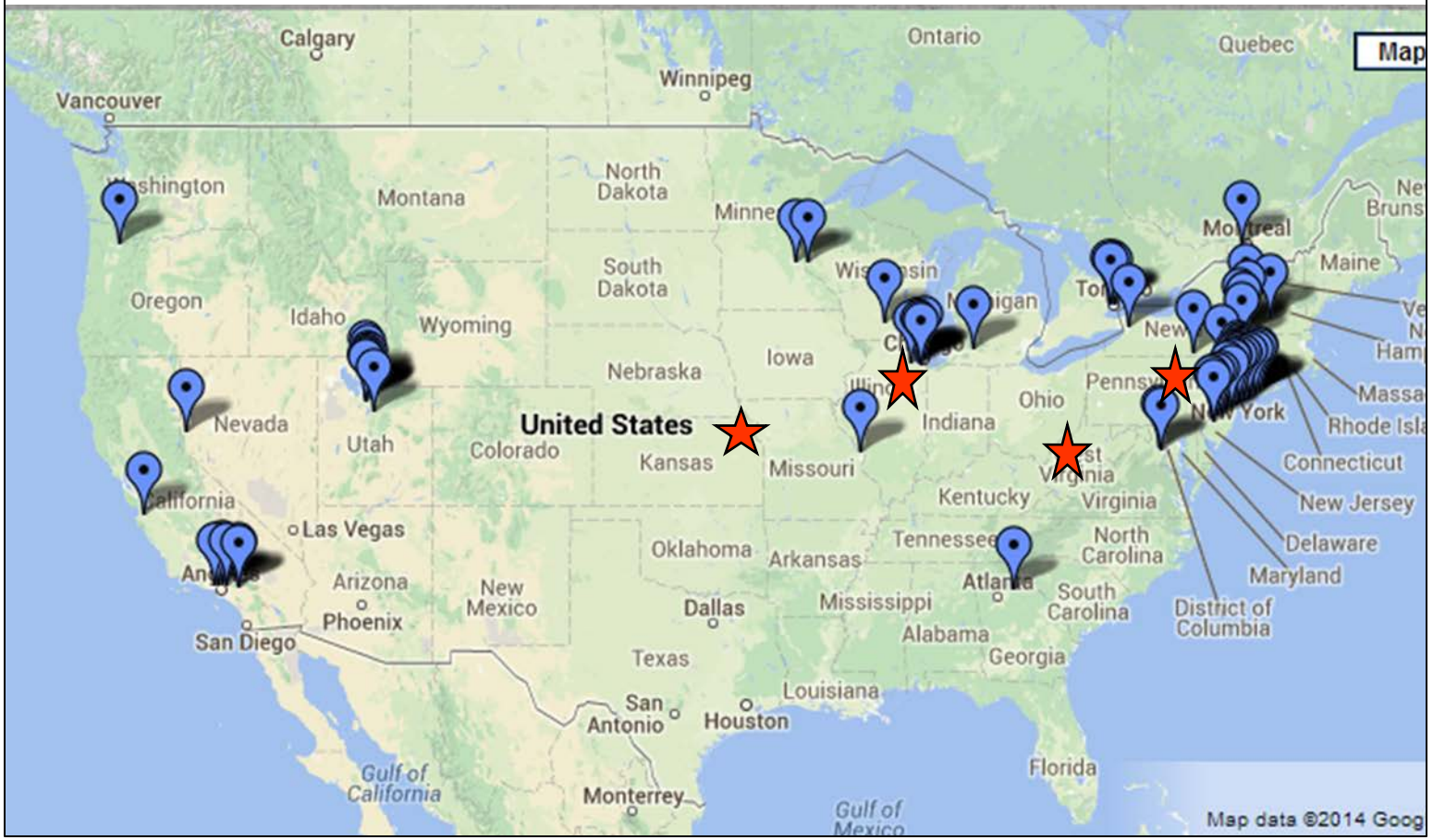
100+ projects, 43 lane-miles completed in 17 States + ON & QC, 29 Owner Agencies

Cumulative Super-Slab Installations



(107 projects, 43 lane-miles in 17 States + ONT & QUE, 29 Agencies)
(25,000 Slabs +/- = 311,000 SY +/-)

Super-Slab® Installations



43 Lane Miles , 2.8+ Million Sq Ft, 25,000+ Slabs

100+ projects in 17 States and 2 Provinces, 29 Agencies

Achieving Full and Complete Bedding
A Two - Step Process

Grade control rails placed to survey marks

Chorded Slab Surface

Precisely-Graded (to ± 1/8”) and Compacted Fine Aggregate Material

Bedding Grout Fills Any Voids

Small Scale Grading

Rail Supported and Hand Operated

Auger H.O.G.

Hand Operated Grader (H.O.G.)

Mini-H.O.G

Shutter Screed

Automated Grading Equipment:

The “Wave of the Future” That’s Here Right Now

- **For large scale grading**
- **Grades single and warped planes**
- **Crawler skid-steer controlled by robotic total station**

Uses same surface model as FM HOG

SUPER-SLAB®

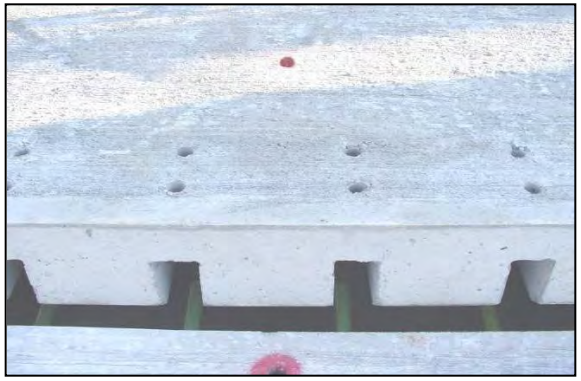
I-78 Interchange 14C Toll Plaza – NJTA
Jersey City, NJ – Baker / GPI

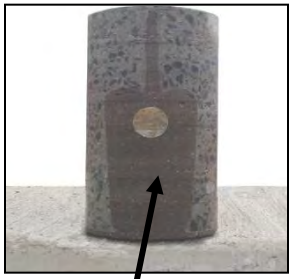
SUPER-SLAB®

Illinois Tollway I-88 Ramp A
Level Best - Skid Steer Box Blade

Super-Slab®
Load Transfer Dowel System

- Dowels engage slots in adjacent slab
- Pump dowel group into ports
  - Grout reaches 2500 psi in about 2 hours
- Fill slots and joint between slabs
- Dove-tail slot resists bar pop out





Dovetail slot

Indicators for Long Life
Full scale load testing in California

Falling Weight Deflectometer

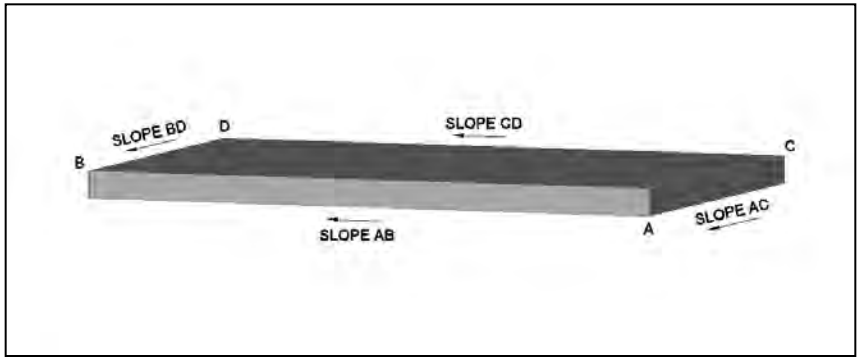
Test results show no cracks or distress

Heavy vehicle simulator

143 Million ESALs (100 KN Load)
4.3 Million Cycles

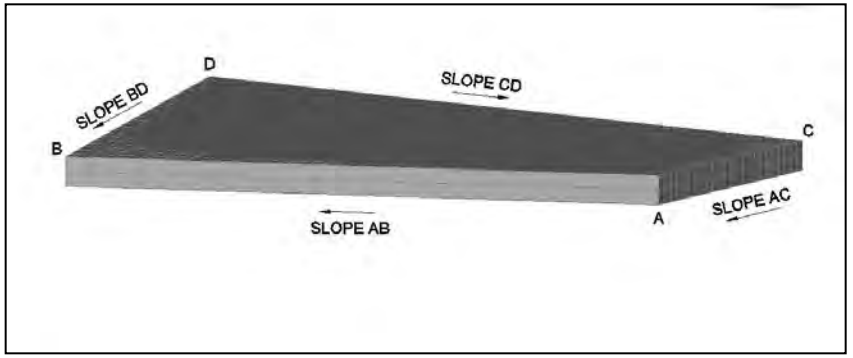
Result - 38 year life expectancy

Slab Surface Geometry



Single Plane

- **Slopes of opposite sides are equal**



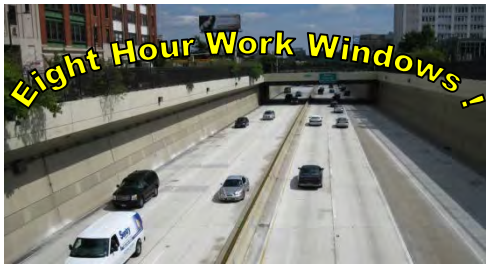
Warped Plane

- **Slopes of opposite sides are un-equal**

Intermittent Repairs (CPR)

I- 90

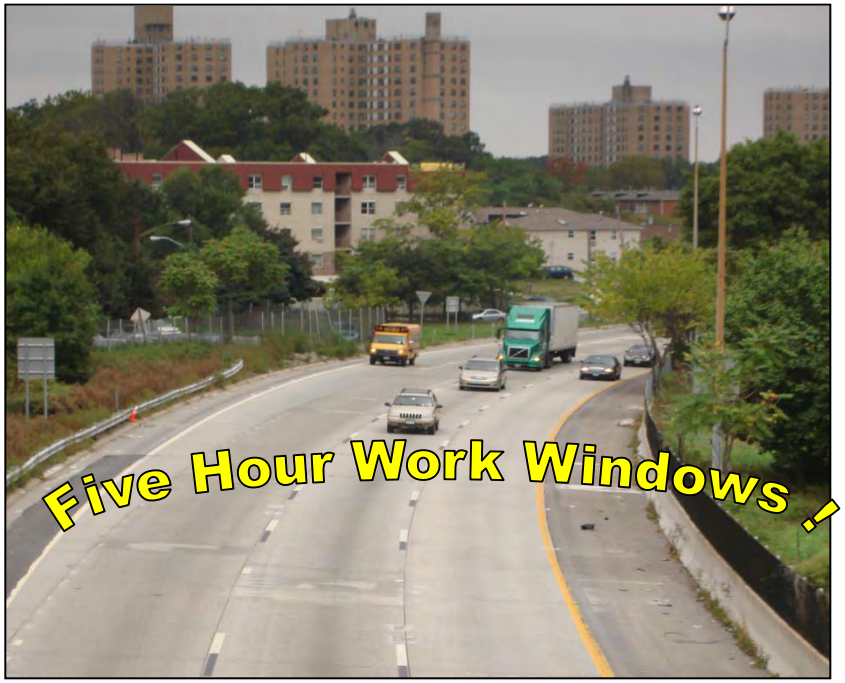
Albany, NY



I-676 Vine St Expressway

Philadelphia, PA

I-15 Salt Lake City, Utah



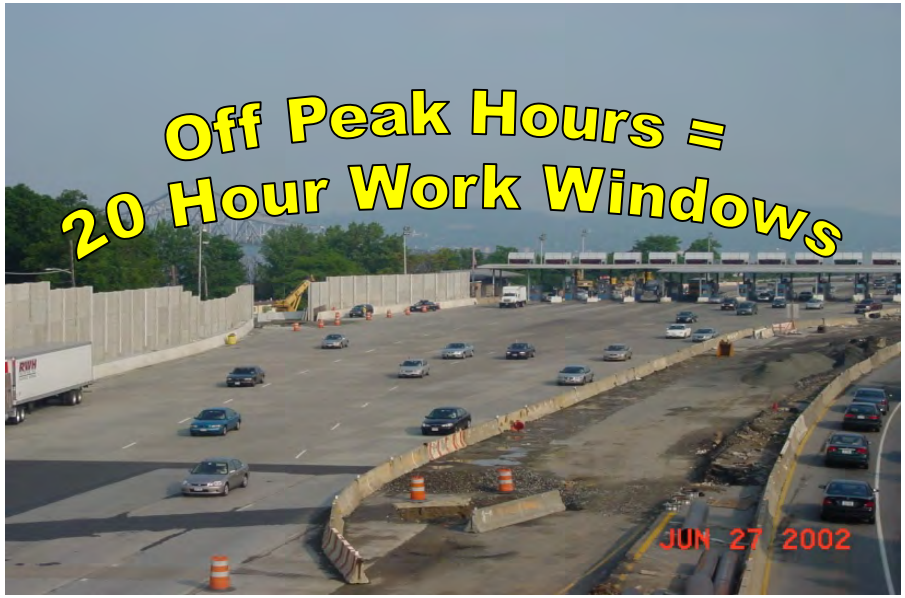
I-95, New Rochelle, NY

I-295 Pav't Repair, Burlington Co., NJ
NJDOT 2007 to date: 14 jobs = 4500+ slabs

SUPER-SLAB®

I-64/I-77 Exit 97 WV DOH
Charleston, WV - 2015

Continuous - Tappan Zee Bridge Toll Plaza



3,000 SF / 8 Hour Shift

(Within ± 1/8”)

2001 - 2002

Open for Rush Hour

(135,000 ADT)

Continuous - Mainline Placement

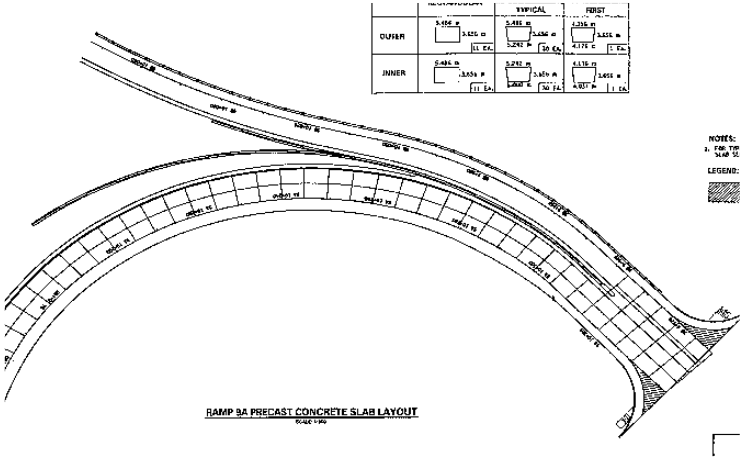
Mainline I-15, Ontario, CA

(200,000 VPD)

SUPER-SLAB®

Ramps

Oak Brook, IL



Plan - Tarrytown Ramp A

Brooklyn, NY

Tarrytown, NY

SUPER-SLAB®

NJDOT Bridge & Approach Slabs
US 46 Over Broad St. - Clifton, NJ

- **Bridge replaced over two weekends - April 2011**
- **Two-span (40.2’, 40.2’) continuous, 28.76° skew**
- **Precast Approach Slabs - tied to prefabricated bridge units**

Accommodating Utilities

Curb Inlet

CIP Closure Pour

Water Valve – CIP Closure Pour

Drop Inlet CIP Closure Pour

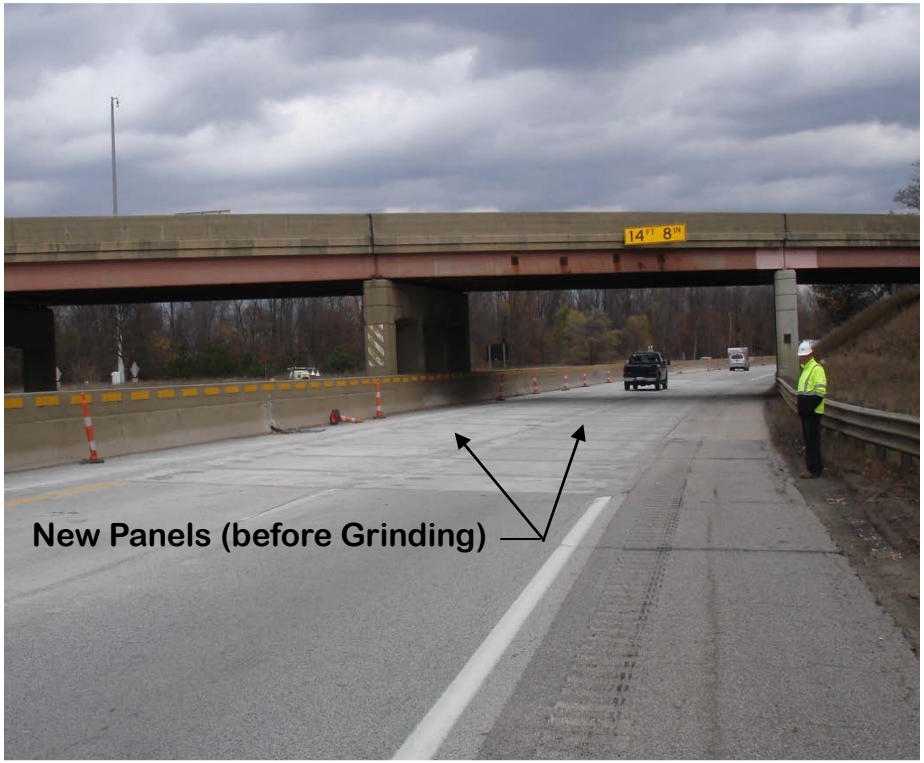
Precast Crosswalk Slabs - Port Jefferson, NY

Two Methods - Block-outs for Manhole or Cast Manhole Frame in Slab

Casting in manhole frame logistically difficult

I-94 MDOT Low-Clearance Bridges
Kalamazoo, MI - 2014

Installation



Two Lanes

VDOT I-66 WB Ramp to US 50 WB
FHWA Highways for LIFE - 2009

- 184,000 ADT, 5% Trucks
- (3) Repair Types:
  CIP, JPCP & PPCP
- Rt. Lane Super-Slab®
  224 Slabs: 12’x16’x8.75”

Super-Slab® Fabrication

- Fort Miller provides a complete formwork package and in-plant technical support to move new fabricators through the “learning curve” as fast as possible

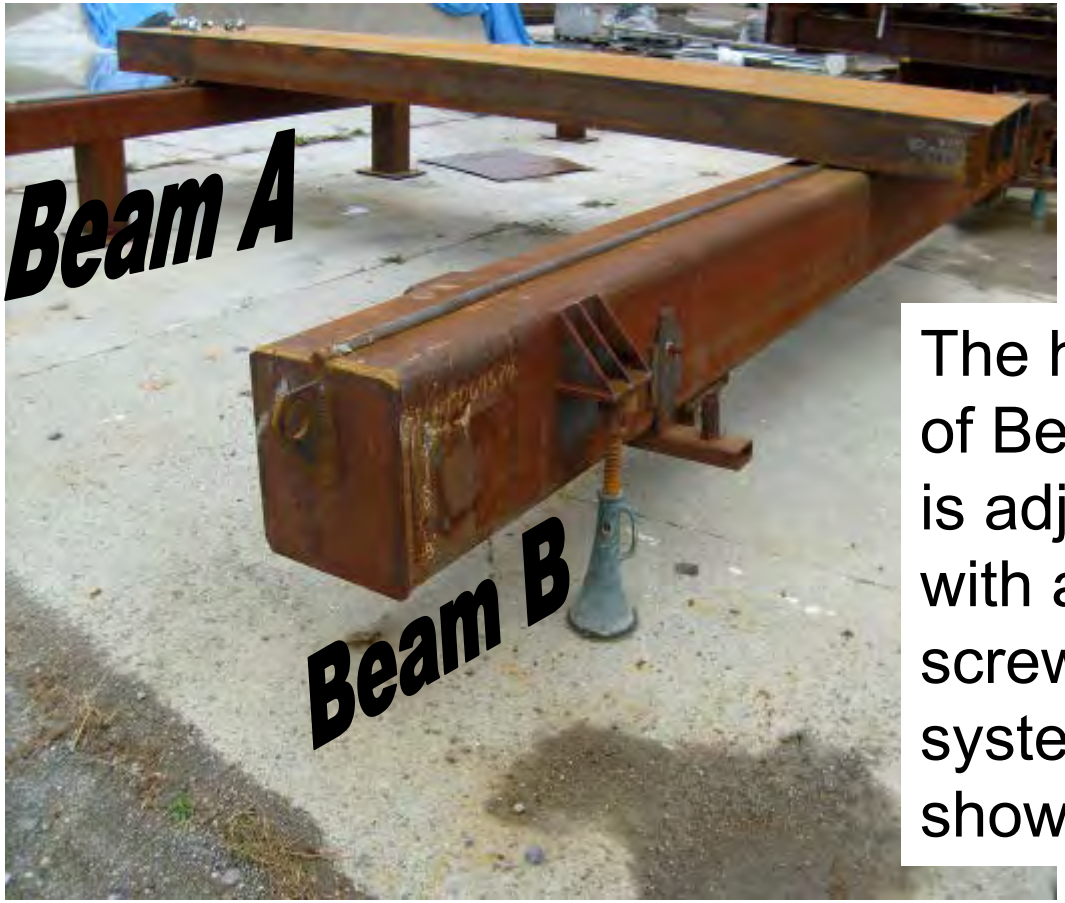
Super-Slab® Formwork

Fort Miller Provides:

- Steel Tables:
  Flat and/or warped
- Side Forms
- Magnets
- Dowel Bar Supports
- Dovetail Slot Forms
- Bedding Grout
  Distribution System
- 1”x1” edge chamfer

Warped Slab Form Supports

Beam A is fixed beneath one side of slab form

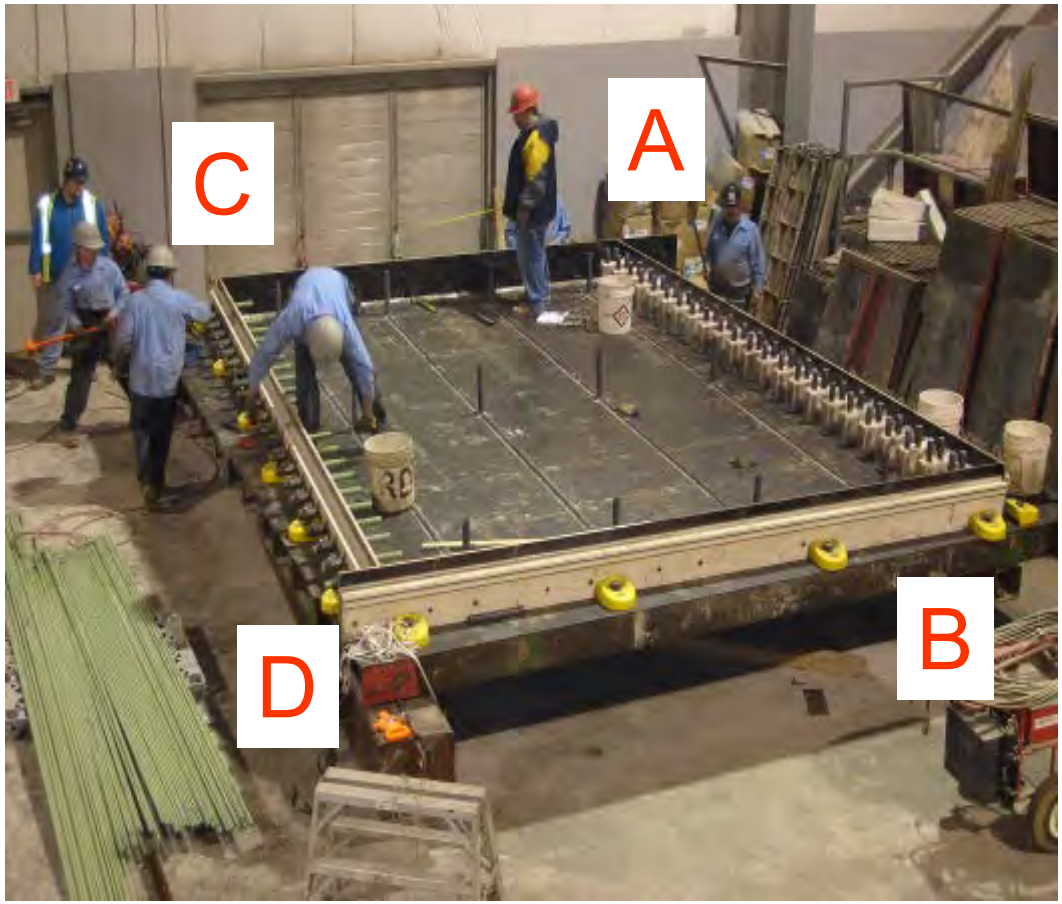


The height of Beam B is adjusted with a screw jack system as shown

Warped Slab Form

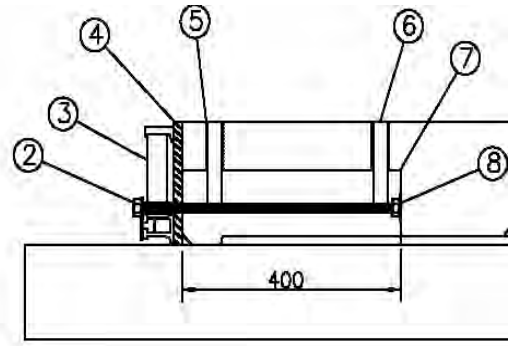
A,B,C corners are all in same plane

D Corner is displaced up, or down, from that plane



Dovetail Slot Formers

2. ¾” coil bolt
3. Aluminum side frame
4. Plywood form surface
5. Corrugated plastic grout riser
6. 1-1/4” solid steel riser
7. Dovetail slot former wood body
8. Coil nut w/ flat washer



Elevation view of slot former

Maintaining Proper Slab Flatness and Thickness

To achieve the required slab thickness tolerance of +/- 1/8” (3 mm), it is necessary to use a roller screed.

Surface Texture

Applying AstroTurf Drag Finish

Standard finishes:

- AstroTurf drag
- Broom finish
- Tine finish.

Challenge - Maintaining Quality Pavement on Heavily-Traveled Urban Streets and Arterials Over Multiple Utilities

First Avenue, New York City

Cross Bronx Expressway, NYC

Non-durable materials – no load transfer – poor workmanship

Concrete Pavement Reconstruction Goals

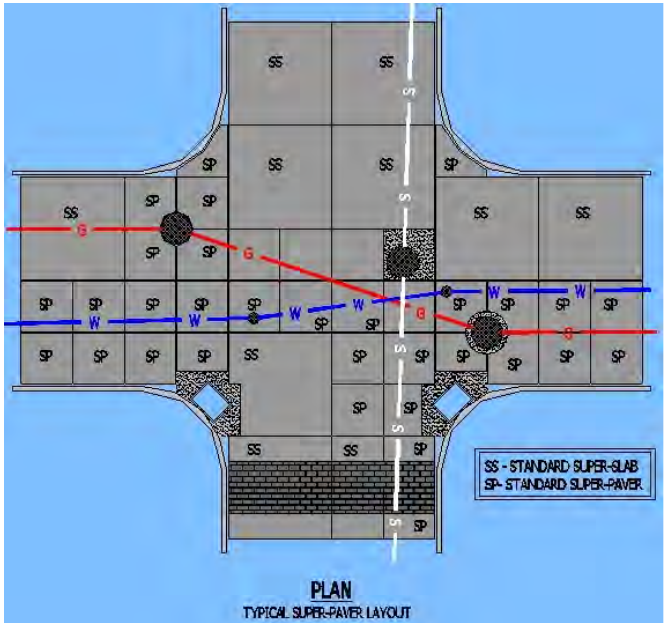
- Maintain traffic on half of the roadway
- Upgrade existing utilities
- Upgrade subgrade and subgrade drainage
- Install long-lasting durable concrete pavement
- Use dowels for load transfer
- Use a modular pavement system that is easily removed and replaced to maintain underground utilities and restore pavement to original condition

Removable Urban Pavements (RUP) - A New Tool For Consideration

- Pavement that can be removed and replaced rapidly
  - To original condition in appearance & functionality
- Durable concrete precast concrete pavement slabs
- Vertically-removable and replaceable units
- Full load transfer re-established between slabs

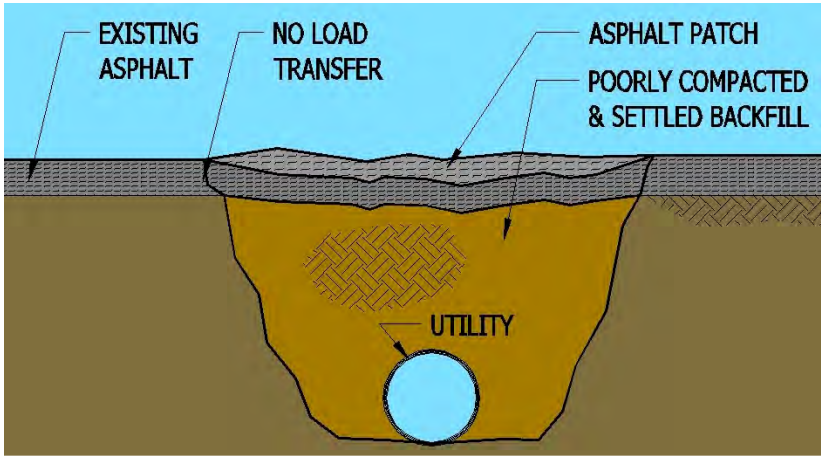
Two Approaches to Access Underground Utilities

Randomly Cut, Remove and Replace Pavement

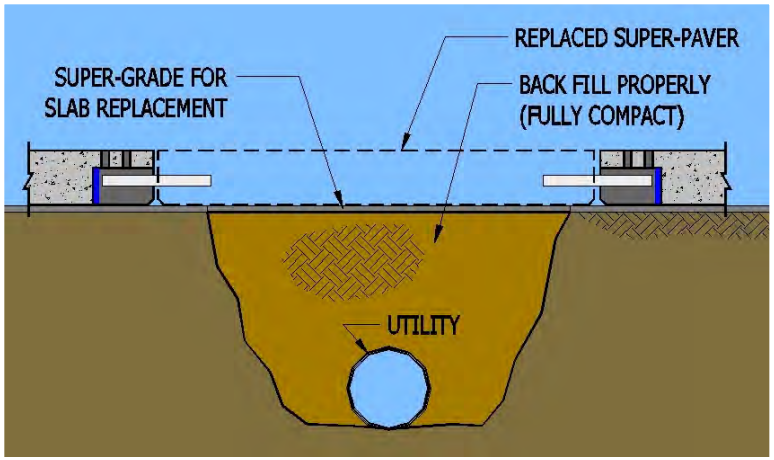


Size Slabs and cut at Joints to Access Underground Utilities

Replacing Pavement



Asphalt Repair



Precast Pavement

– a Better Repair

Case Studies of Urban Arterials Replaced with Precast Pavement

- **Nassau-Queens Expressway, Rockaway Boulevard, Jamaica, NY - 2009**
- **GDOT Broad Street, Winder GA – 2013**
- **Kansas DOT Route 73, Leavenworth, KS – 2015**

SUPER-SLAB®

Rockaway Blvd., Jamaica - Queens, NY
2009 – 2010 Installation

- 2390 slabs
- 29,000 SY
- Replaced full-depth asphalt
- 300 lane-ft in 8-hour shift

Intersection Approaches

Farmers Blvd.

Guy R. Brewer Blvd.

Gannett Fleming

Excellence Delivered As Promised

SUPER-SLAB®

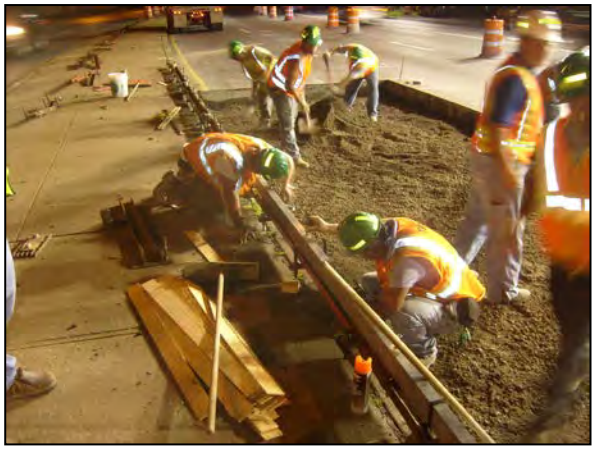
Brookville Blvd. to Eastern Project Limit

½ Mile of Rockaway Blvd. - Full Depth Asphalt Replaced with Precast Concrete

Gannett Fleming

Excellence Delivered ***As Promised***

Night Construction



Setting Grading Rails

DGB Compaction

Maintaining Traffic

8 hour (night) work windows

Rockaway Blvd. – Two Years Later (2011)

One-Half Mile Stretch - Two Lanes in Each Direction

Guy R. Brewer Intersection Approach

GDOT Reconstruction Broad Street Winder, GA - 2013

Hills and Curves

Heavy Truck Traffic

Pavement Removal & Subbase Preparation

Removing Multiple Layers of Old Pavement

26 Inches

Installing Aggregate Subbase

Grading and Compacting New Aggregate Subbase

Compaction Test

Installing & Super-Grading Bedding Material

Installing Bedding Material Over Aggregate Base

(1” max. thickness)

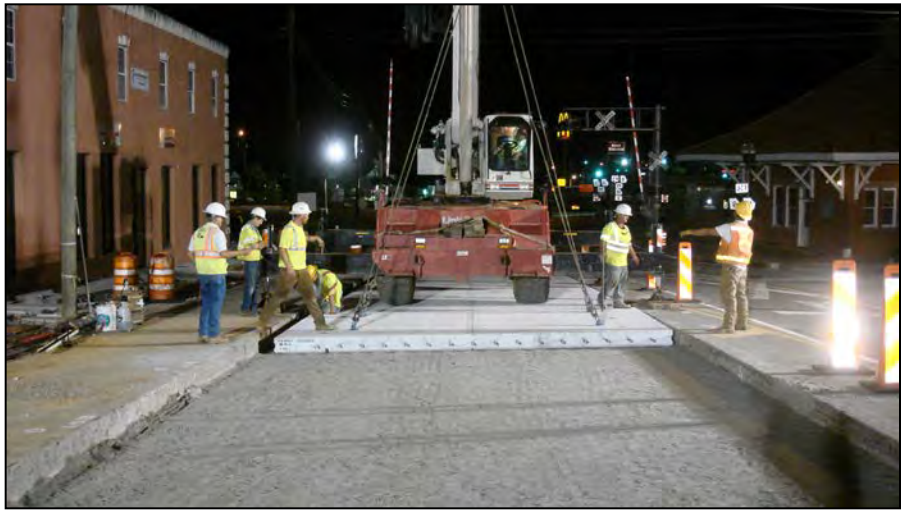
Super-Grading With Hand Operated Grader (H.O.G.) to +/- 1/8” Accuracy

Key Operation!

Installing Slabs – At Night

Placing First Slab

18’ wide x 11’-3” long x 8-1/2” thick



Crane Occupies Previously Placed Slabs

GDOT Winder - Unique Challenges

Change In Grade – 5” lower on Right

Cross Slope Change & Horizontal Curve

Recipient of Several Awards

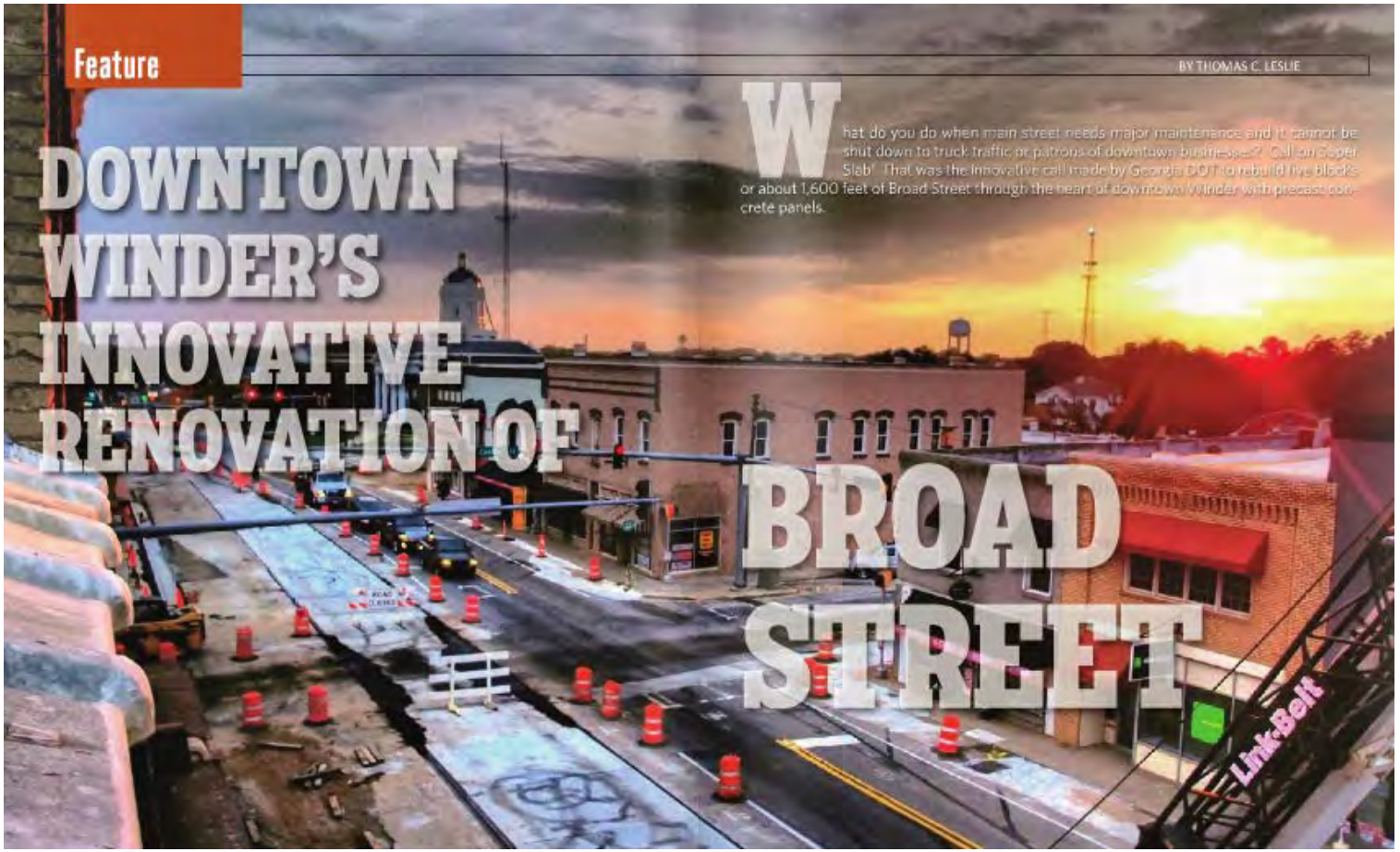
Ribbon Cutting 2014

Two Pavement Materials

SUPER-SLAB®

GDOT Winder, GA

Georgia Engineer - Feb-Mar 2014



Reconstruction Metropolitan Ave. (US-73) Leavenworth, Kansas

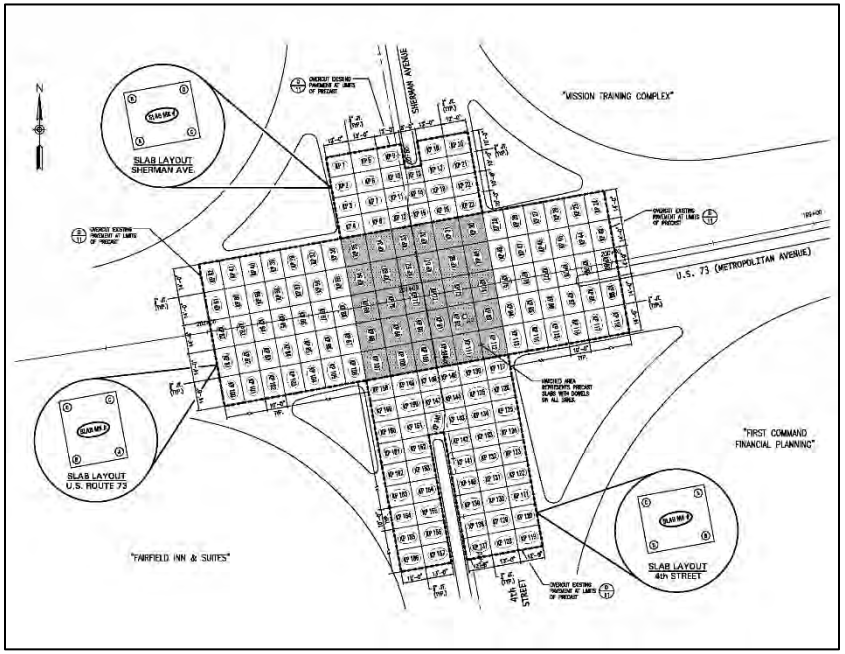
- 294 slabs
- 4,555 SY
- 8-hour night work windows
- Part of larger cast in place project

Two Intersections and One Bridge Approach

SUPER-SLAB®

Re-Construction Metropolitan Ave. (US-73) Leavenworth, Kansas

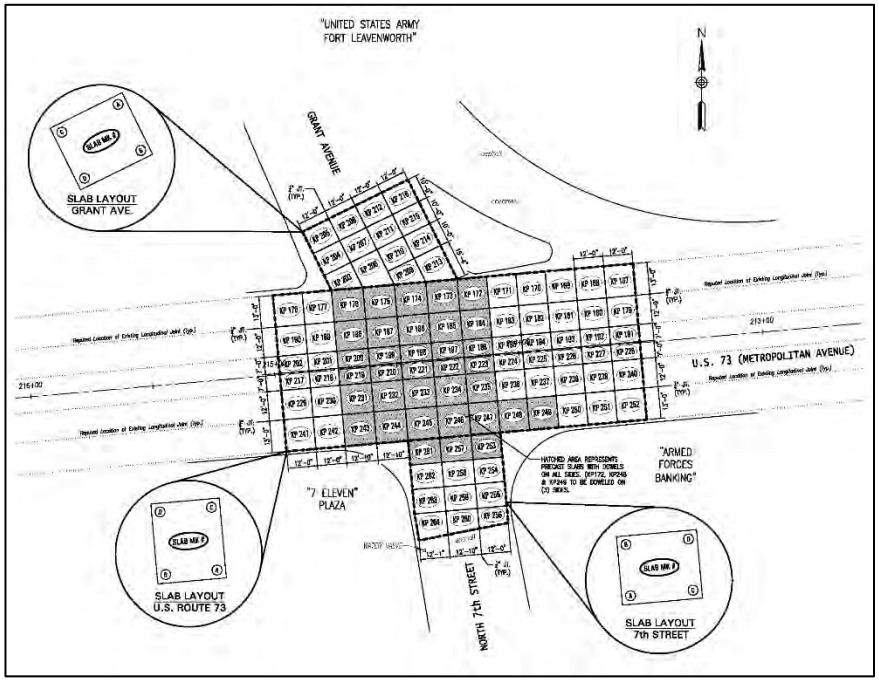
4th Street Intersection



Slab Layout Drawing

Reconstruction Metropolitan Ave. (US-73) Leavenworth, Kansas

7th Street Intersection

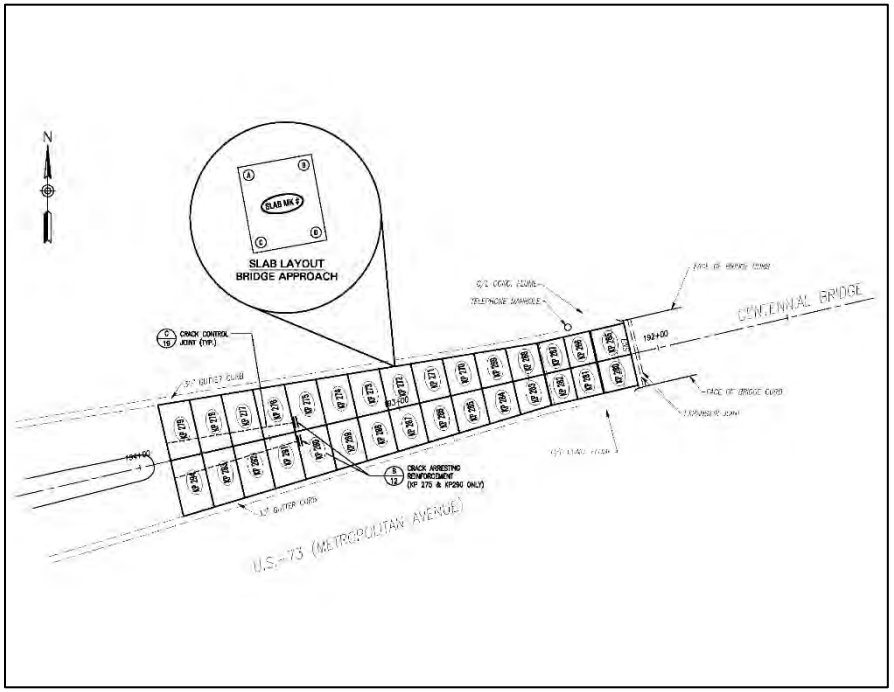


Slab Layout Drawing

SUPER-SLAB®

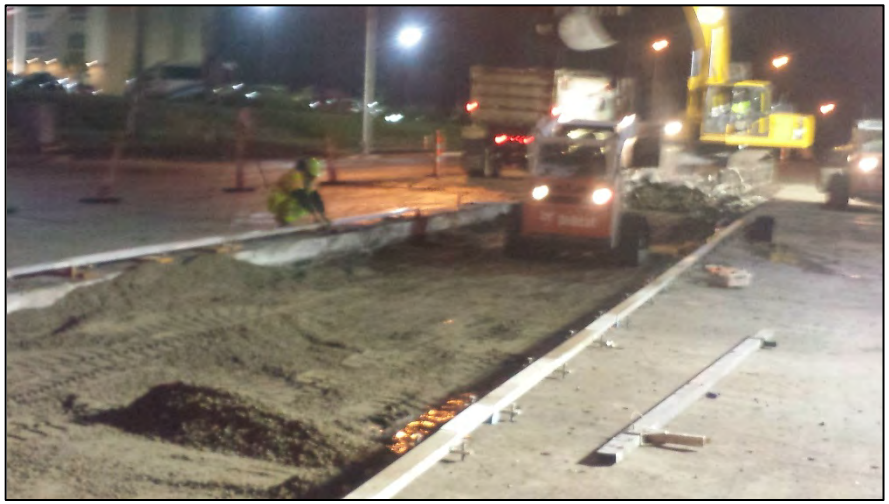
Reconstruction Metropolitan Ave. (US-73) Leavenworth, Kansas

Centennial Bridge Approach



Slab Layout Drawing

Installing Slabs – At Night



Removing Old Base, Placing New Cement-Treated Bedding Material

Grading Cement-Treated Bedding Material

294 Slabs – 24 Nights

SUPER-SLAB®

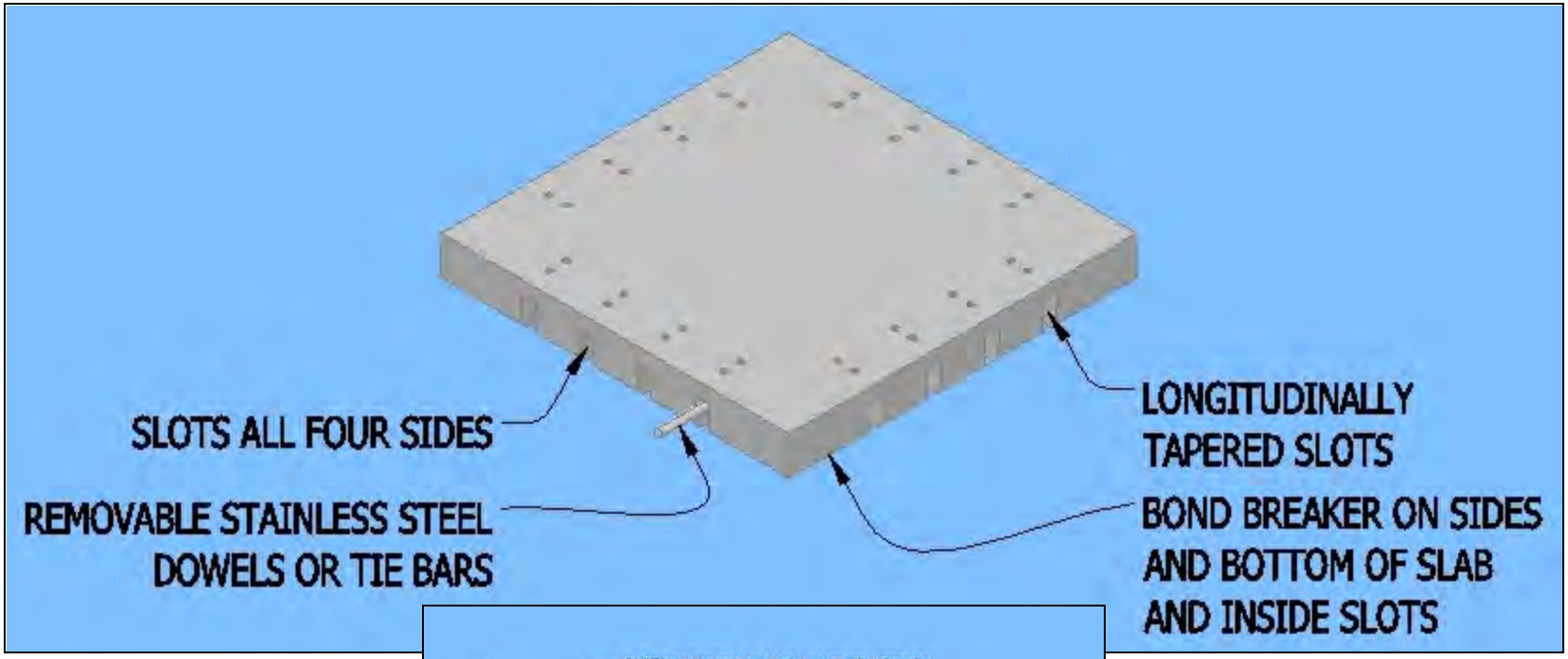
Excellence In Paving Award

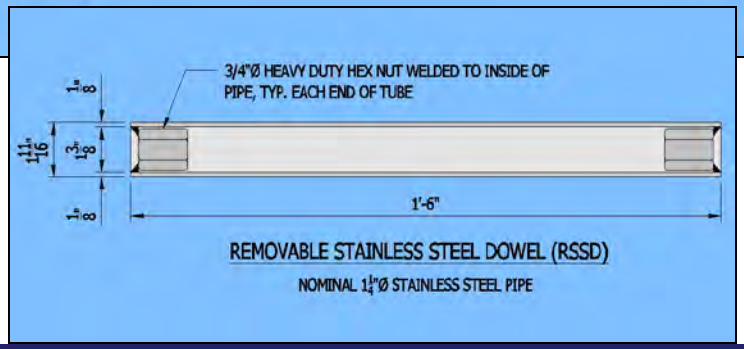
Presented By
Missouri/Kansas Chapter, ACPA
Kansas Department of Transportation

- **MILES EXCAVATING, INC.**
- **THE FORT MILLER GROUP, INC.**
- **KANSAS DEPARTMENT OF TRANSPORTATION BUREAU OF DESIGN**
- **KANSAS DEPARTMENT OF TRANSPORTATION BONNER SPRINGS CONSTRUCTION OFFICE**
- **GEIGER READY-MIX**
- **CRETEX CONCRETE PRODUCTS, INC.**

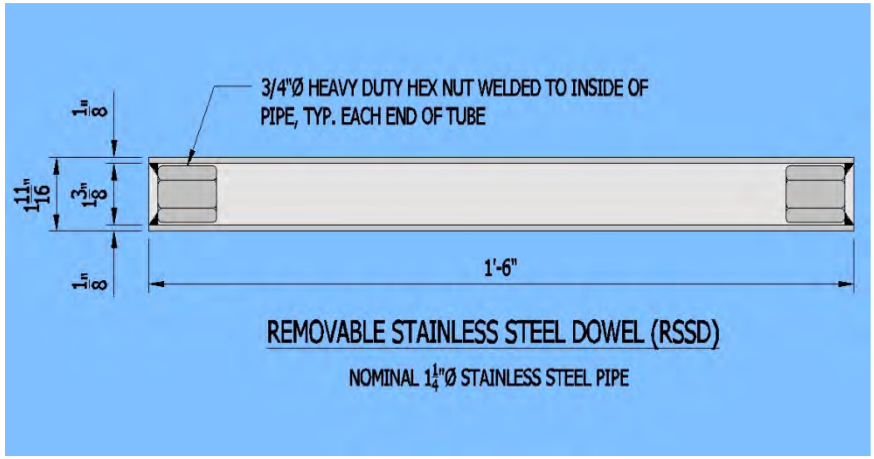
The Fort Miller Co., Inc.

The Super Paver System – a Removable and Reusable Urban Pavement (RUP) System



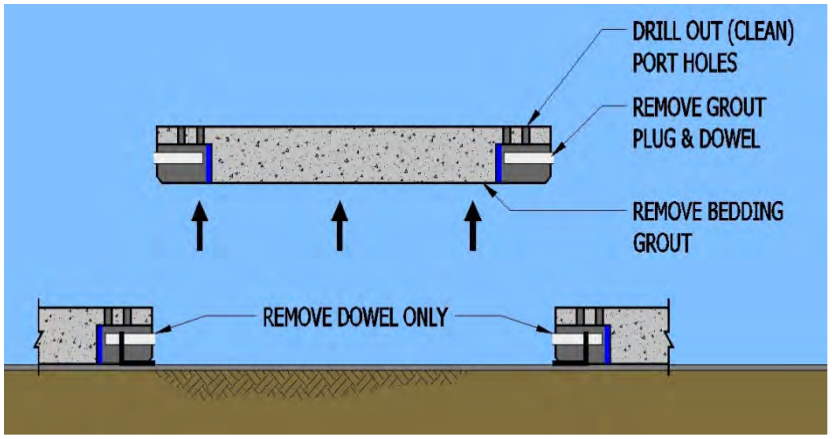


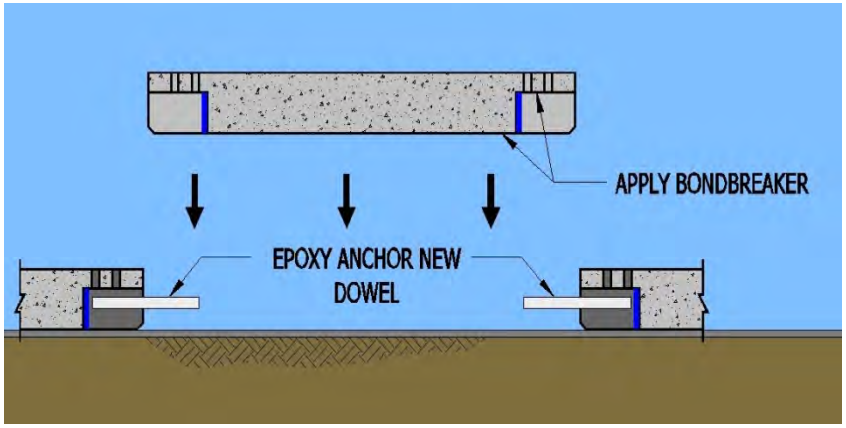
Super-Dowel (Patented)



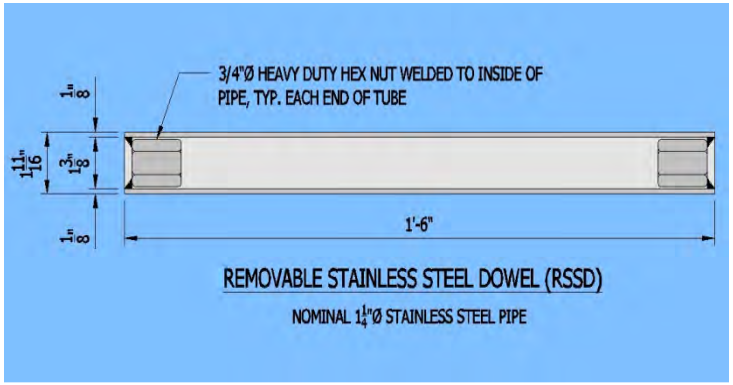
- Precast Pavement Add-ons
- Removable & Re-usable Precast Pavement

Slab Removal & Replacement





Replacing Cleaned-up Slab Over New Dowels



Super-Dowel

SUPER-SLAB®

Reusable Urban Pavement Workshop
Nov. 9, 2011

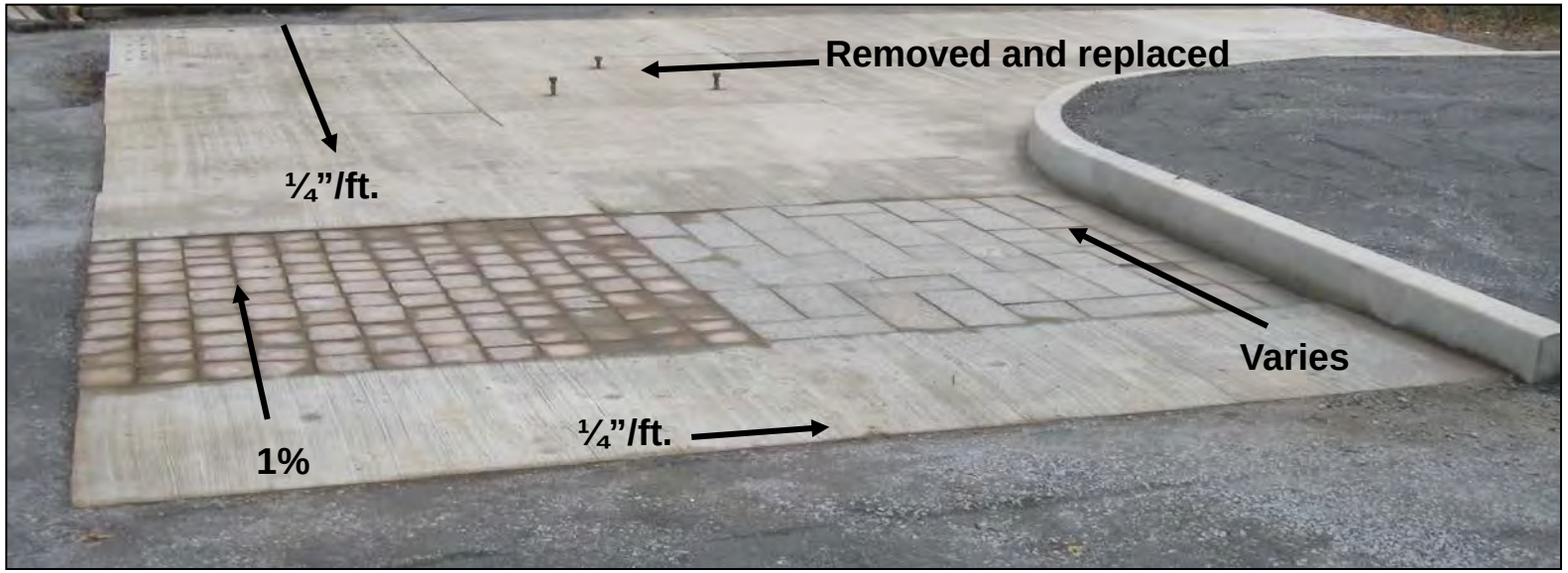
Each Paver Set to a Mark

Independent Dowels Placed in Slots

Utility Blockout

Initial Placement

Intersection Quarter



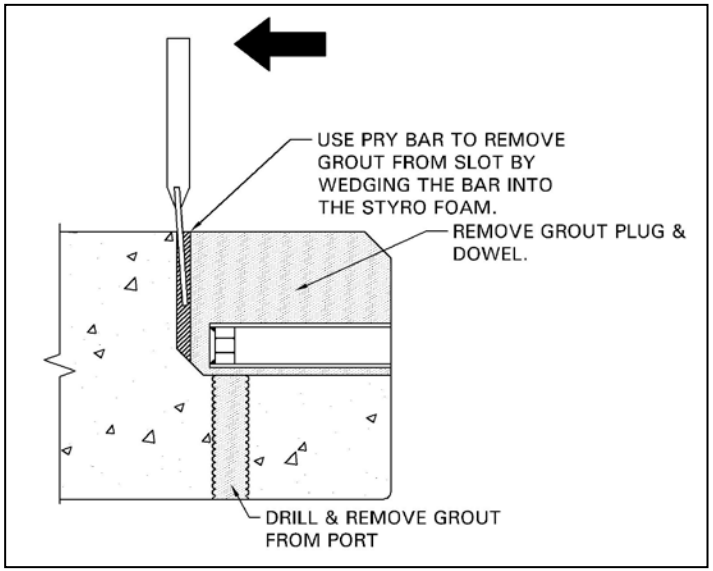
Varying Cross Slopes

(Crosswalks of Any Texture – Also Removable)

Slab Removal

Remove Vertically

Grout Plug Removal



Use Pry Bar To Remove Grout Plug in Inverted Slab

Cleanup of Removed Slabs

Removing Original Bedding Grout

Extracting Half Dowel with Battery-Powered Drill

Extracting Half Dowels Left Behind

SUPER-SLAB®

Reusable Urban Pavement Workshop
Sept. 22, 2015

Removable/Replaceable Longitudinal Joint Tie

Removable/Replaceable Longitudinal Joint Tie

Core and Remove Coupler

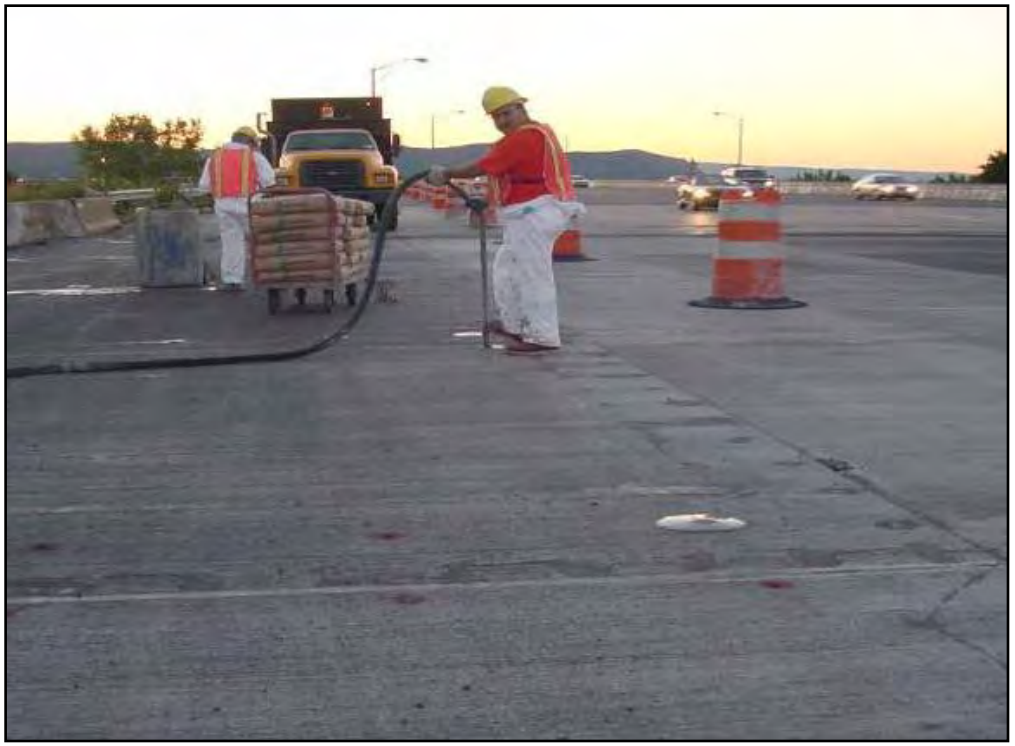
Replace Coupler and Headed Tie

Installing Restored Slab

New Super-Dowels and Restored Longitudinal Joint Ties

Installing Grout

Dowel Grout



Bedding Grout

SUPER-SLAB®

Super-Pavers for Broadway Junction – Brooklyn, NY

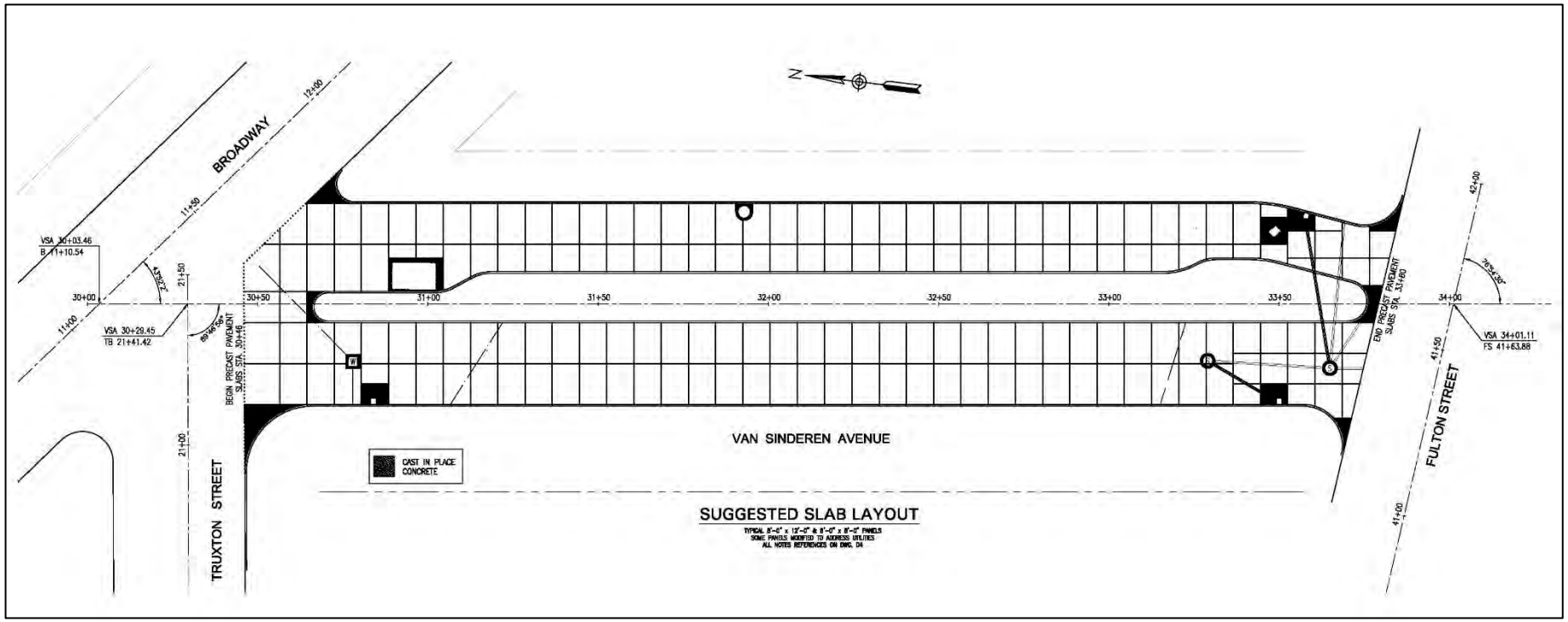
Looking North

Looking South

167 Super-Paver Slabs
Installing May-June 2016

SUPER-SLAB®

Broadway Junction, Brooklyn, NY



Van Sinderen Avenue Preliminary Slab Layout Drawing

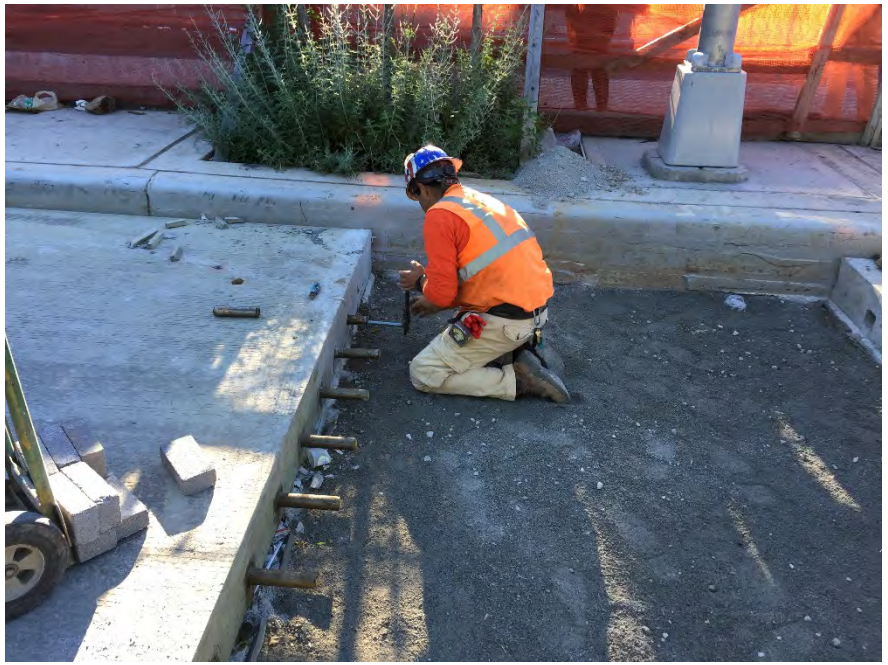
<u>167 Slabs – all removable and replaceable, 91 flat, 76 non-planar</u>

Broadway Junction, Brooklyn, NY

SUPER-SLAB®

Broadway Junction, Brooklyn, NY

Broadway Junction, Brooklyn, NY



Broadway Junction, Brooklyn, NY

Broadway Junction, Brooklyn, NY

R-30397 US 40 Richmond

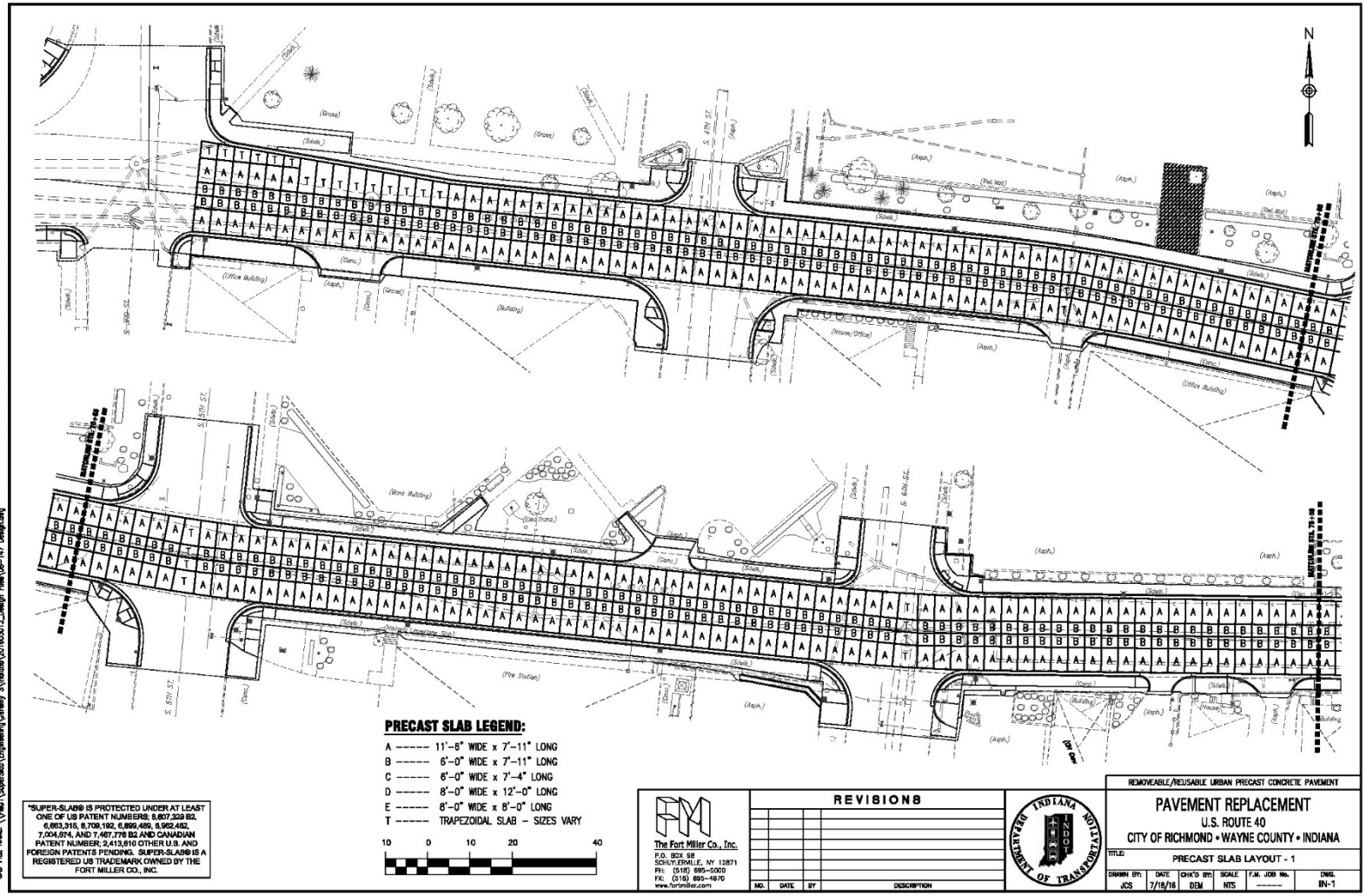
- Following are the typical steps that would be involved in organizing and completing a project such as the US 40 Richmond job

Step 1: Initial Survey Required

- Schedule road or lane closures as necessary
- Record accurate existing and new utility opening location
- Send completed measurement sheets to Fort Miller Engineering Department for conversion into Shop Drawings
- Contractor reviews and checks shop drawings, then forwards to INDOT for approval
- Slab fabrication starts upon receipt of approved drawings

SUPER-SLAB®

R-30397 US 40 Richmond



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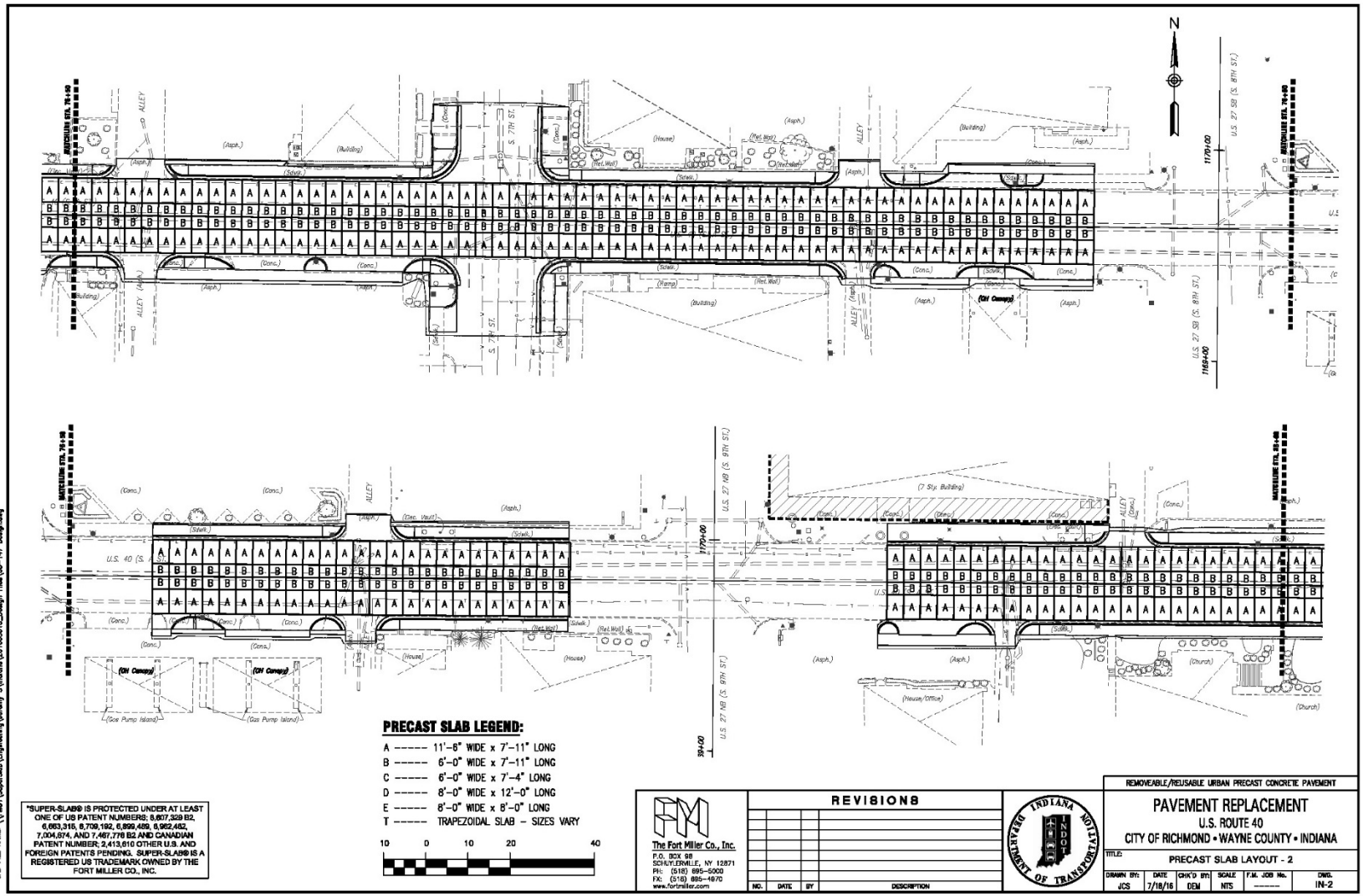
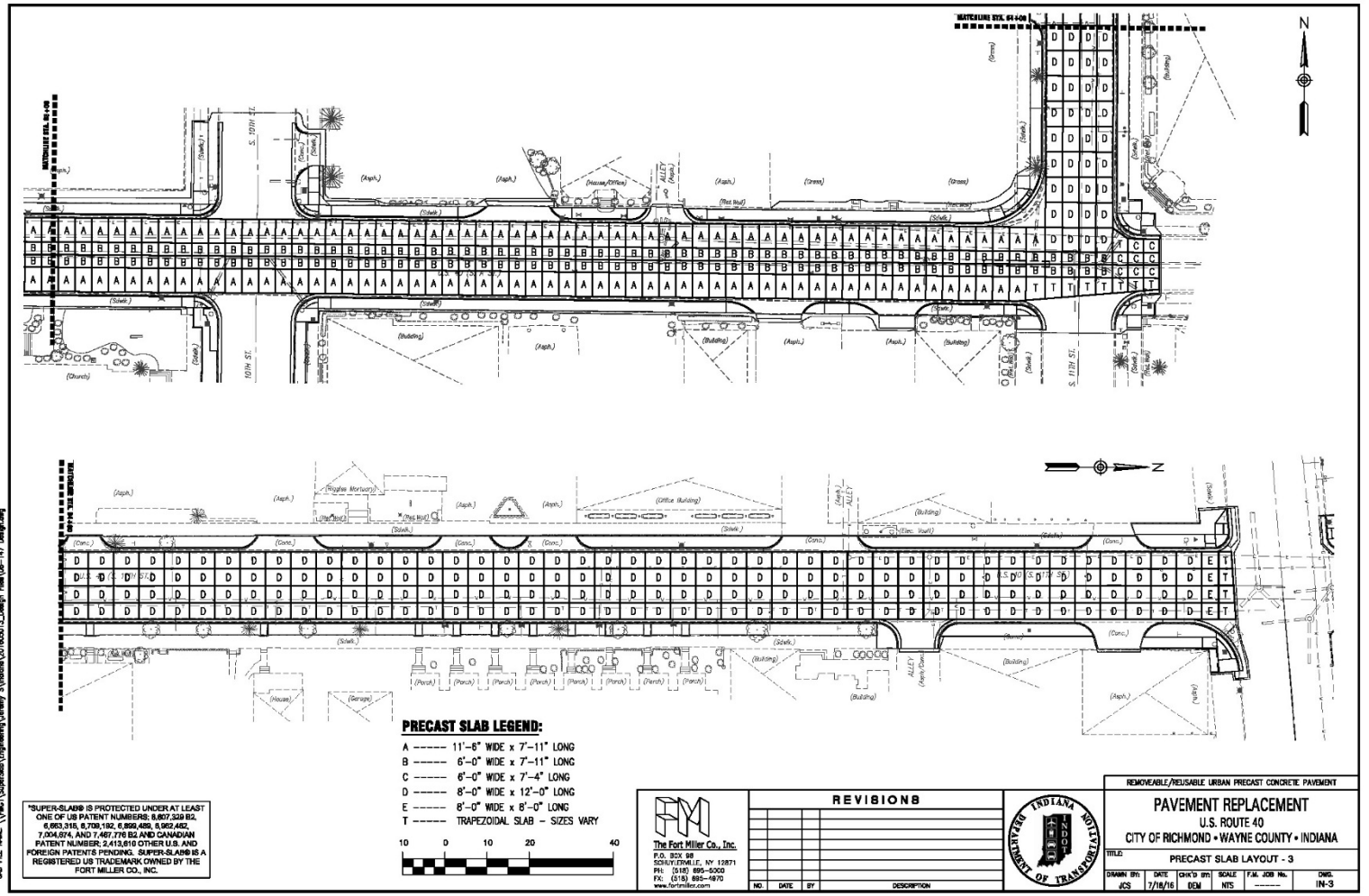
R-30397 US 40 Richmond



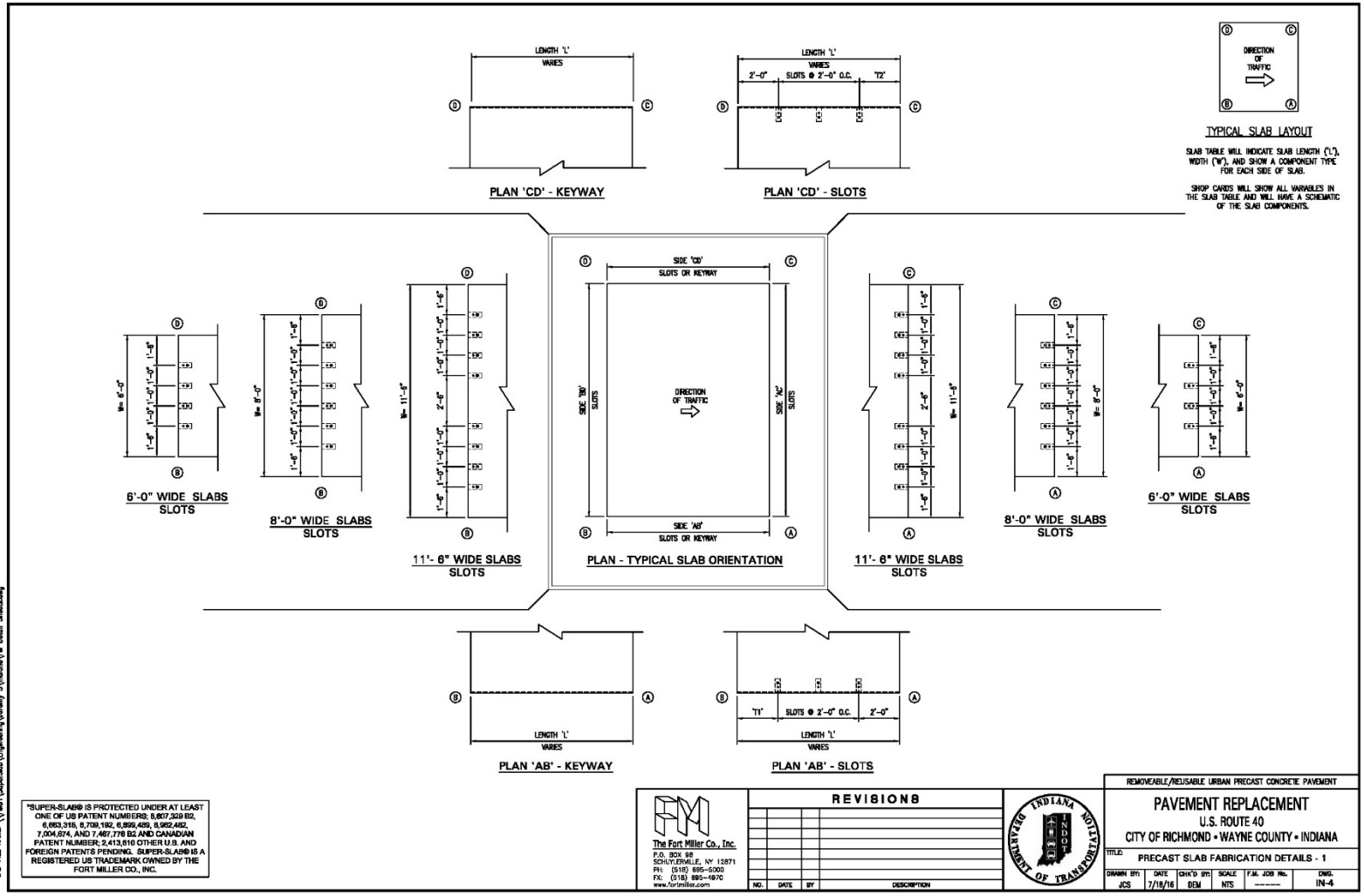
SUPER-SLAB®

R-30397 US 40 Richmond



SUPER-SLAB®

R-30397 US 40 Richmond



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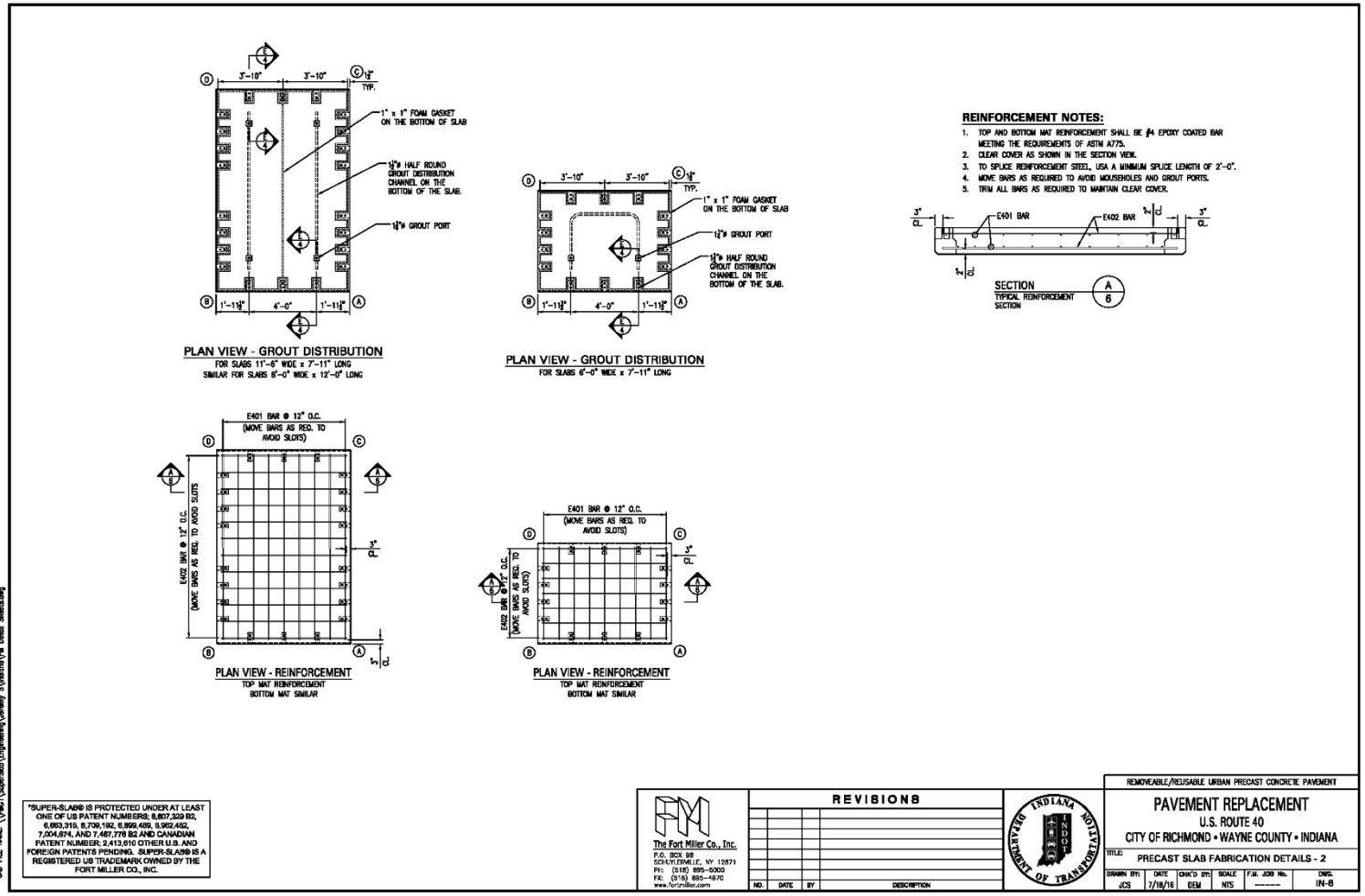
R-30397 US 40 Richmond



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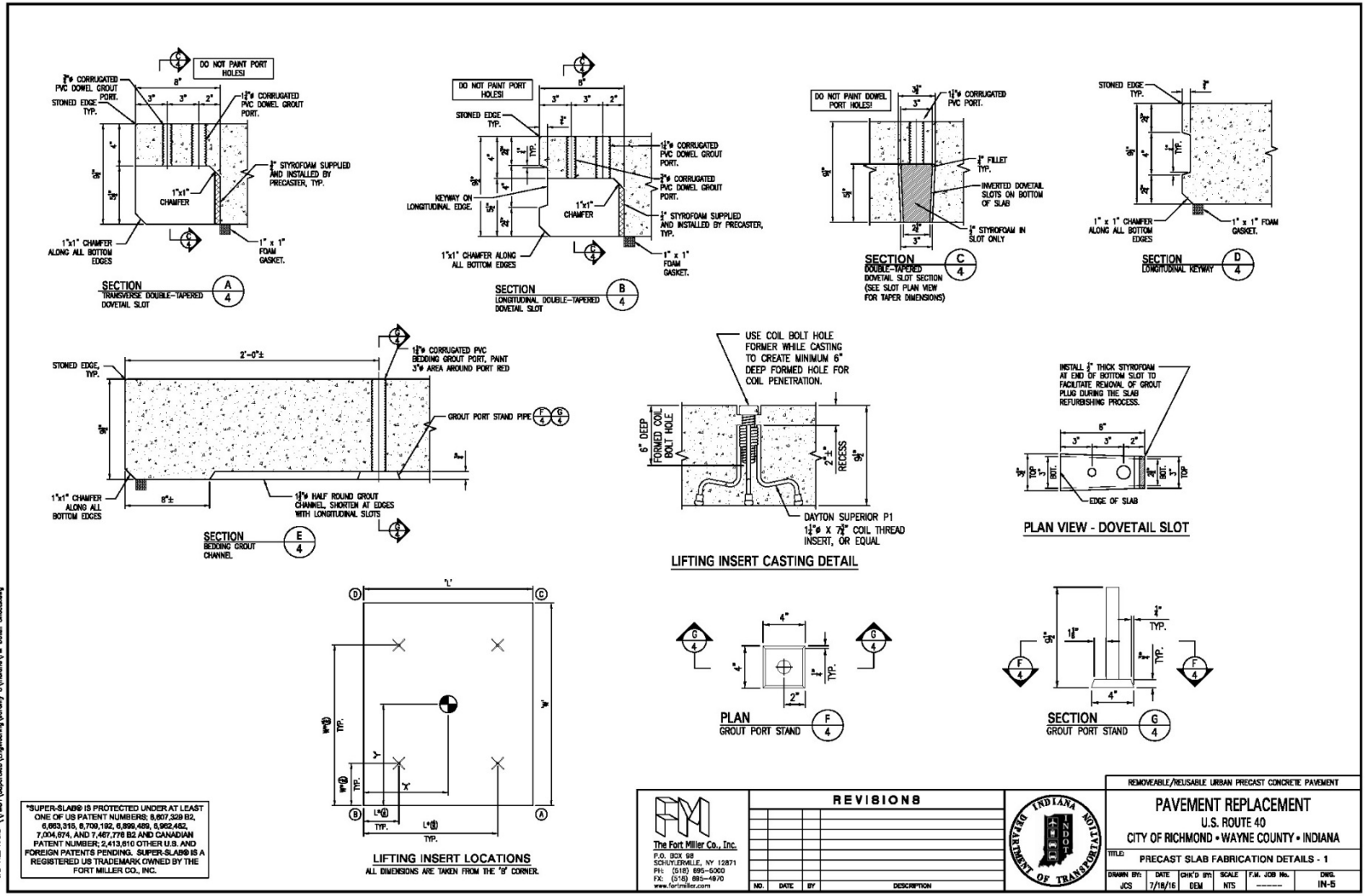
R-30397 US 40 Richmond



*SUPER-SLAB® IS PROTECTED UNDER AT LEAST ONE OF US PATENT NUMBERS: 8,607,329 B2, 6,863,315, 8,709,192, 8,999,489, 5,952,452, 7,004,674, AND 7,467,776 B2 AND CANADIAN PATENT NUMBER: 2,413,610 OTHER U.S. AND FOREIGN PATENTS PENDING. SUPER-SLAB® IS A REGISTERED US TRADEMARK OWNED BY THE FORT MILLER CO., INC.

The Fort Miller Co., Inc.
P.O. BOX 98
SCHUYLERVILLE, NY 12871
PH: (518) 695-5000
FX: (518) 695-4970
www.fortmiller.com

REVISIONS

NO.	DATE	BY	DESCRIPTION

REMOVEABLE/REUSABLE URBAN PRECAST CONCRETE PAVEMENT

PAVEMENT REPLACEMENT
U.S. ROUTE 40
CITY OF RICHMOND • WAYNE COUNTY • INDIANA

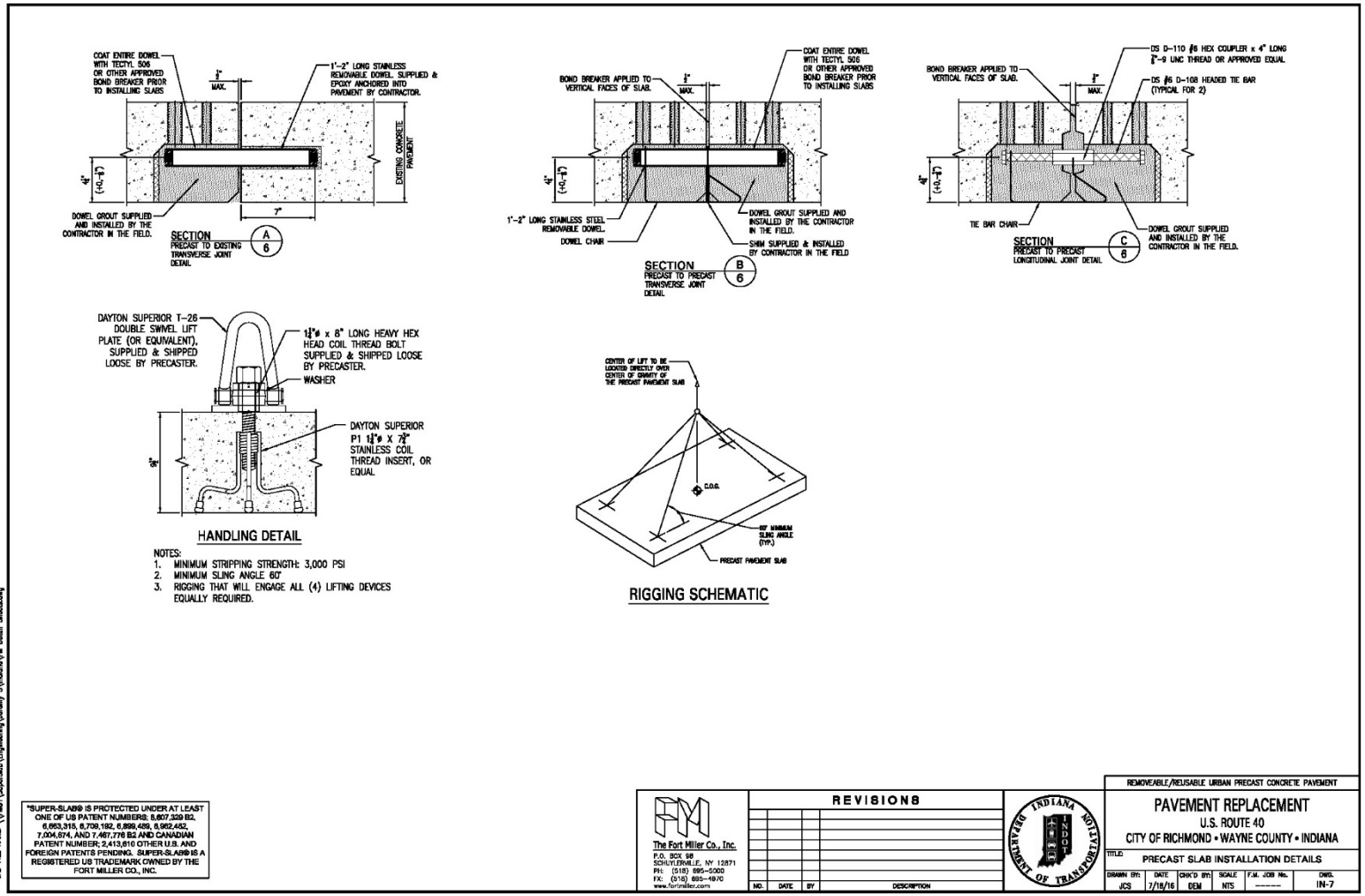
TITLE: PRECAST SLAB FABRICATION DETAILS - 1

DRAWN BY:	DATE	CHK'D BY:	SCALE	F.M. JOB No.	DWG.
JCS	7/18/16	DEM	NTS	———	IN-5

DATE: July 20, 2016
FM PROJECT: 7770
PLOT DATE: 7/20/2016 3:58:25 PM
CAD FILE NAME: \\fmfs1\Data\Engineering\Jeremy S\Indiana\Pw Detail Sheets.dwg

SUPER-SLAB®

R-30397 US 40 Richmond



Step 2: Lay out for Sawcutting with Right-Angle Laser

- Use Hilti PMC 46 Right-angle laser to get accurate rectangles

Step 3: Sawcutting

- Sawcut slabs longitudinally into 6’ widths (or less) for easy placement into trucks
- Sawcut perimeter completely
- Sawcut “separation strip” so remaining pavement edges are not spalled during slab removal
- Saw and remove 2” along asphalt shoulders

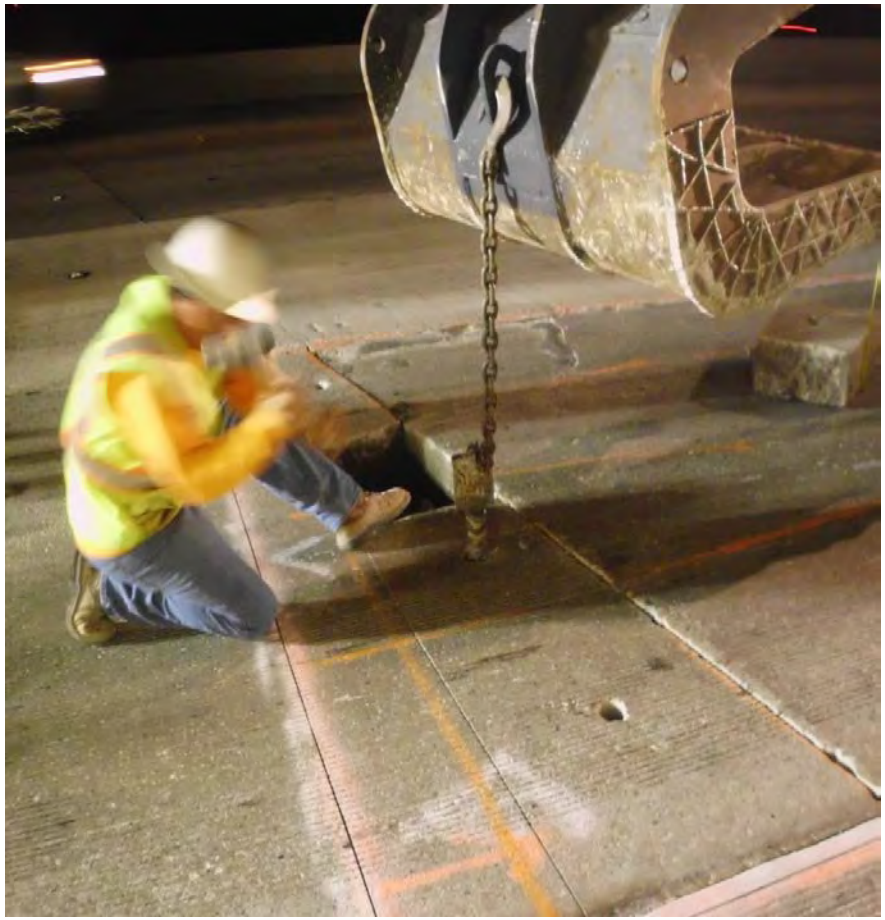
Step 4: Slab Lift-out & Removal

- Speed of slab removal often governs total job production. Therefore, attention should be paid to developing an efficient removal operation
- “Lewis Pins” or other lifters frequently used for slab lift-out

monkey fist

Step 4: Slab Lift-out & Removal

- Lift out initial pieces
- Use “Slab Crab” bucket to remove remainder of pieces



Step 5: Install Bedding Material

Intermittent Patching

Laborers Shovel Stone Dust into Patch

Continuous Installations

Stone Dust can be placed with heavy equipment

Step 6 – Precision Grading (Super Grading)

- Super-Grading
  - The process of grading fully-compacted bedding material to a **surface accuracy** of

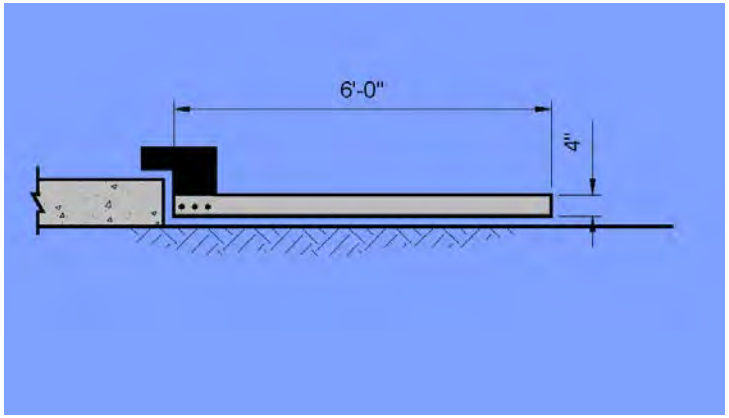
    + 1/8”
- Requires specialized grading and checking equipment
  - Using an accurate frame of grade reference
    - The grade of the adjacent pavement rarely accurate

Prior to Placing Slabs

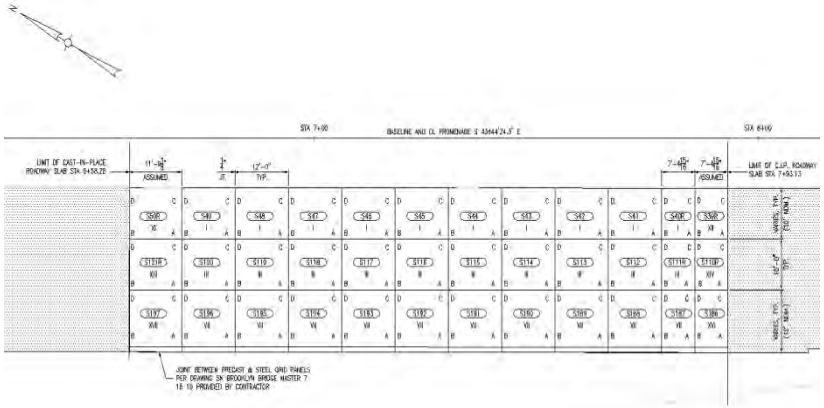
Install Corner Shims to prevent spalling. On individual slab patches, insert shims after slab is set

Spray form oil on Dowels and Vertical Edge of Concrete

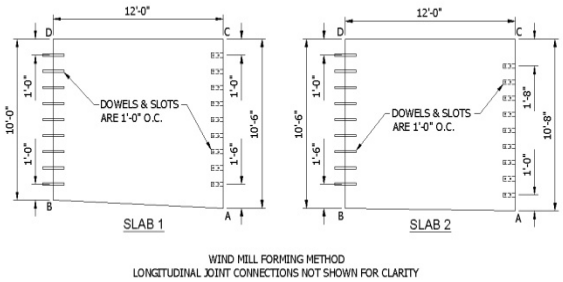
Prior to Placing Slabs



Check Edges with Depth Gage



Pick the Right Mark Number



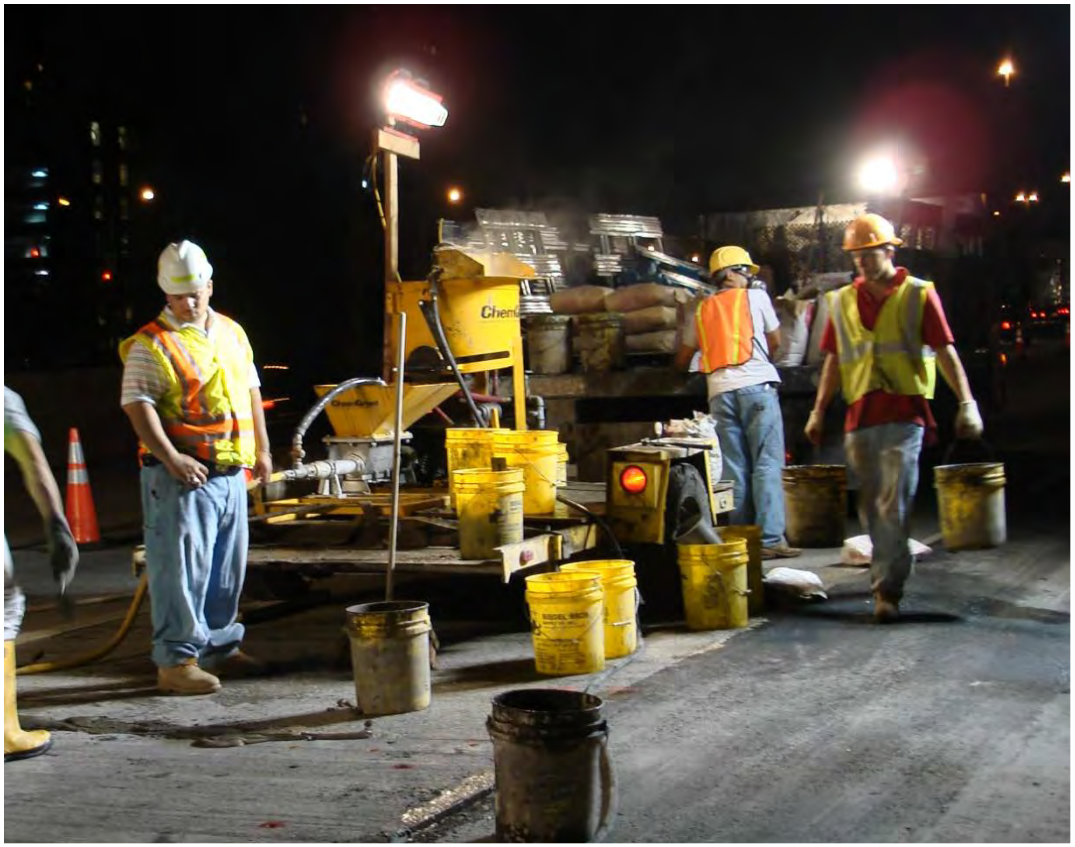
Not All Slabs are the Same

Step 7 - Placing Slabs

- Use proper size crane or excavator
  - Do not place outrigger on slab corners!
- Rig properly
  - So all four corners hit at once
- Set slabs to leading edge and leading end
  - Do not worry about joint width behind!
- Check for match
  - Correct if necessary before setting next slab

Checking for Match

Step 8 - Grout



- Truck w/ grout material, power supply, & reliable water system
- Trailer for grout mixer/pump
- 25’ hose & FMC-supplied nozzle
- Pails (for water measuring)
- Barrels (for washwater)
- Supply of cones to mark off grouted slabs

Requires Reliable and Efficient Grout Rig

Grout Pumps

ChemGrout Batch Mixer Pump

Volumetric Mixer Pump
(continuous mixing and pumping)

Examples of Efficient Grout Rigs

Trailer Grout System

Truck-Mounted Grout System

Always Complete Dowel Grouting First

- Dowel Grout is “hot grout”
  - Reaches 2,500 psi in two hours
- Keep mixture below 70 degrees
  - Use tank of fresh water from source each shift
- Use 25’ hose and proper nozzle
- Keep Dowel Grout Moving
  - Do not let it sit in hoses
- Takes about 10 minutes per slab

Installing Dowel Grout

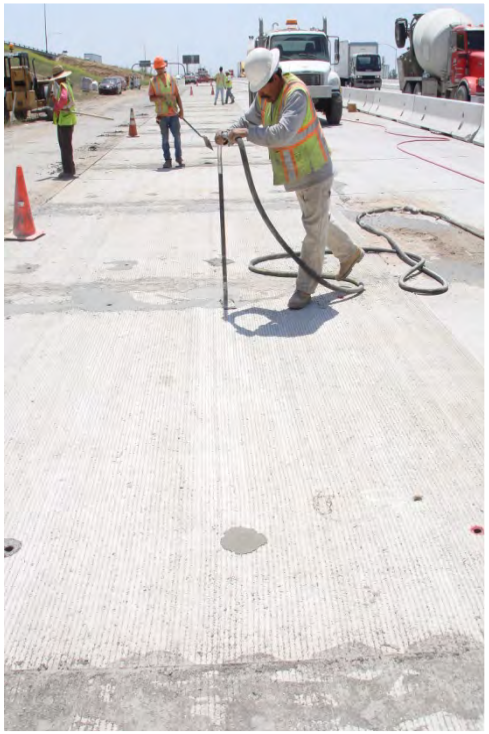
Fill Dowel Slots and Joints First
(keep it moving)

Bedding Grout

- Mixture of Cement, Water & Fluidifying Admixture
  - Flow rate of 17 - 20 seconds
  - Must flow into thin voids
- Reaches 600 psi ± in 12 hours
- Use proper nozzle (from Fort Miller)
- Keep Holes filled by “topping off” as grout level drops when it disperses beneath slab
- Cap off bedding grout ports with 2” of dowel grout

Installing Bedding Grout

Pre-bagged Bedding Grout



Flow Rate

15 - 20 Seconds Max.

Keep Ports Full by "topping off"

Step 9 : Diamond Grinding

- Small differences between slabs are to be expected
  - There are tolerances allowed (by necessity) in the slabs
  - There are tolerances allowed in the grading
- Specifications require finished surfaces ± 1/8”
  - May be acceptable for slow speed traffic
- For best International Roughness Index - grind
  - Grinding is a known and accepted practice

Step 10: Install Joint Sealant

- Install in accordance with the Special Provisions
- When sawcutting joints for sealant, ALL dowel grout must be removed from the joint so that sealant adheres to concrete on both sides
- This does take some care, as joint widths will vary

Bad Pavement Over Utility Cuts – Now Preventable

Fordham Rd., Bronx

I-87 Major Deegan Off Ramp - Bronx

Fordham Rd., Bronx

Benefits of Precast Pavement

Reduce construction-related traffic congestion

Longer lasting pavement repairs – Asset Preservation

- **40+ years**
- **Reduced (long-term) repair costs**
- **“Get in, get out and stay out”**
- **“Total Incremental Replacement” – now possible**

Reduces field inspection time and cost

- **Precast slabs – plant inspected**

Pre-engineered, pre-inspected slabs result in a superior finished pavement

Fort Miller Provides

- Design and engineering support
- Super Paver Specifications
- Standard and special slabs as required
- Specialized hand-grading equipment
- On-site technical assistance
- Installation guidance

Presentation Take-A-Ways

- Long-life precast pavement can be installed overnight
- Drainage and subgrade can be up-graded in the process
- Precast pavement installation - minimum impact on traffic
- Precast pavement may be designed to be removable and replaceable to maintain utilities below
- Precast may be part of CIP project
  - Use precast in most critical areas
- Precast RUP allows restoration of original pavement after a utility repair event
  - Preserves appearance and functionality
  - May save cost in the long run

Keys to Success

(Still More to Learn)

Good engineering

Open minds

Real partnering

www.super-slab.com

SUPER-SLAB®

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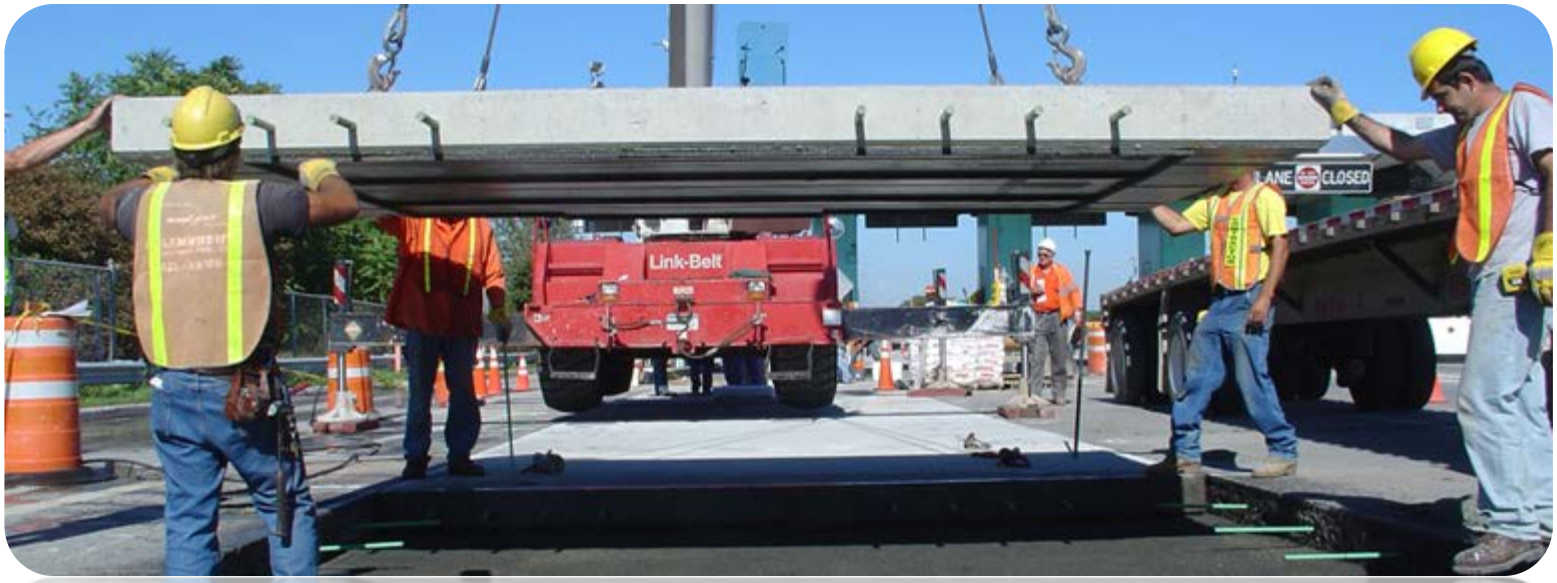
Meeting Conclusion– Gary Fox



First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

Clark Dietz ENGINEERS

Remaining Project Development Schedule:

Final Tracings (100% Plans)…… 10/10/16
Ready For Contracts…… 11/9/16
Bid Letting…….. 1/19/17

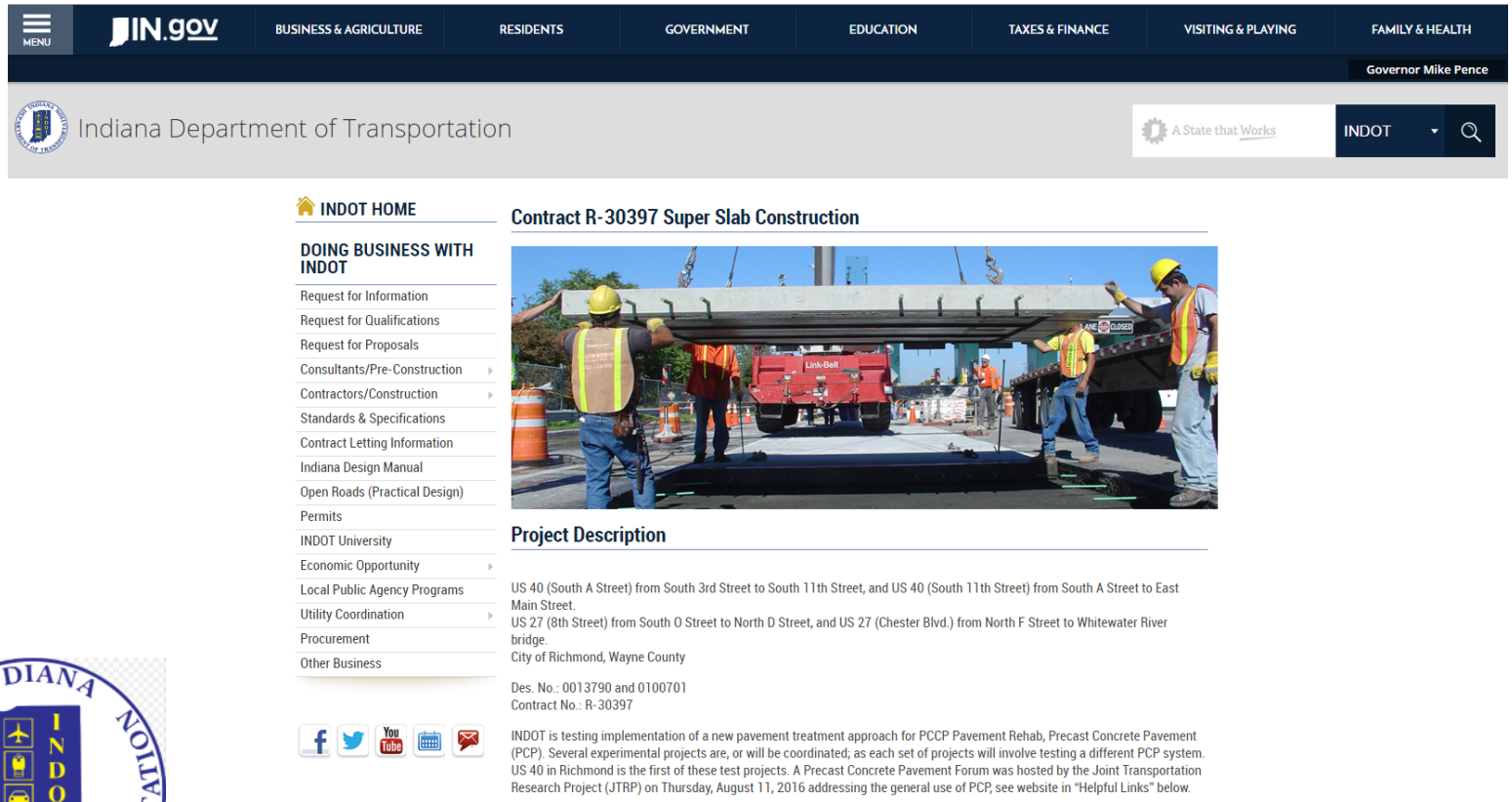
First Group ENGINEERING, INC.

INDIANA DEPARTMENT OF TRANSPORTATION INDOT

Clark Dietz ENGINEERS

For More Information
Contract R-30397 website:

http://www.in.gov/dot/div/contracts/slab/30397.htm



Questions??

Questions may also be submitted by e-mail through 9/30/16

JWooldridge@indot.in.gov

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