

Recent Innovations in Jointed Precast Concrete Pavement Systems

FORT MILLER
THE FORT MILLER CO., INC.



*Precast Concrete
Solutions*

ACI Spring Convention, Milwaukee, WI

April 17, 2016

The Fort Miller Co., Inc.

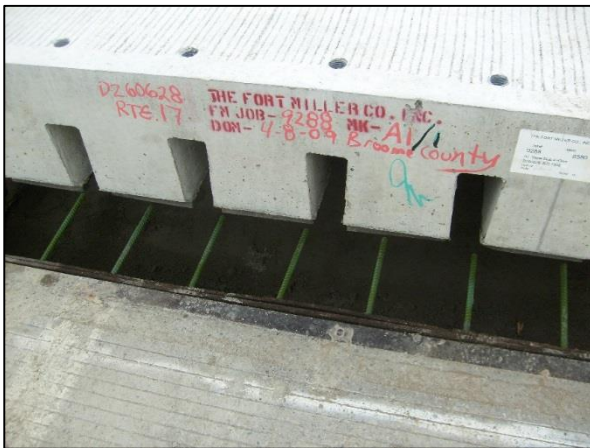
Peter J. Smith, P.E.

**VP Market Development and Product
Engineering**

Minimize Structural Effect of Slots – Make them Smaller!

- Reduces potential for cracking along slots
- Minimizes Grout
- Leaves more concrete over the slots
- More room for reinforcement over slots (and dowels)

Lowered Dowels – Smaller Slots



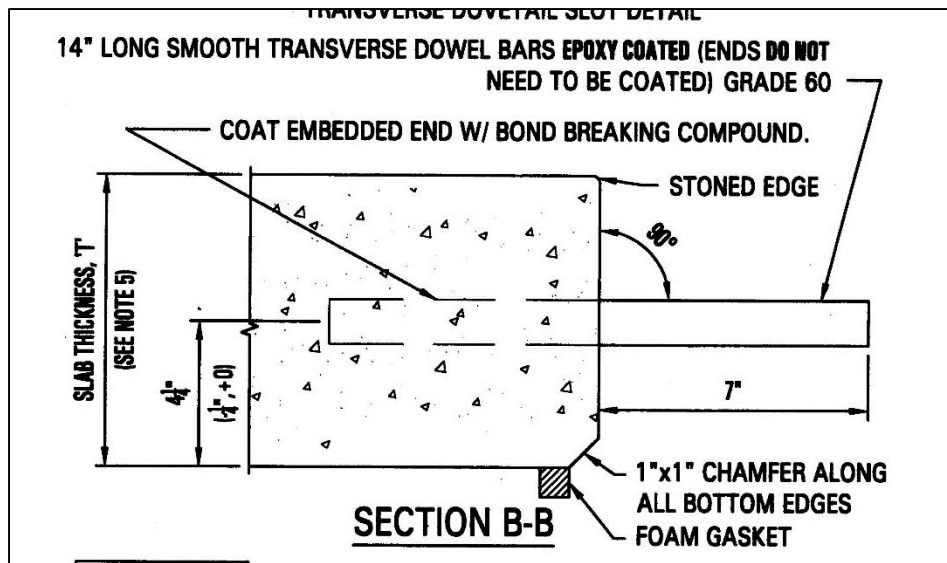
Old Standard
Slot Height = $T/2 + 1.25$



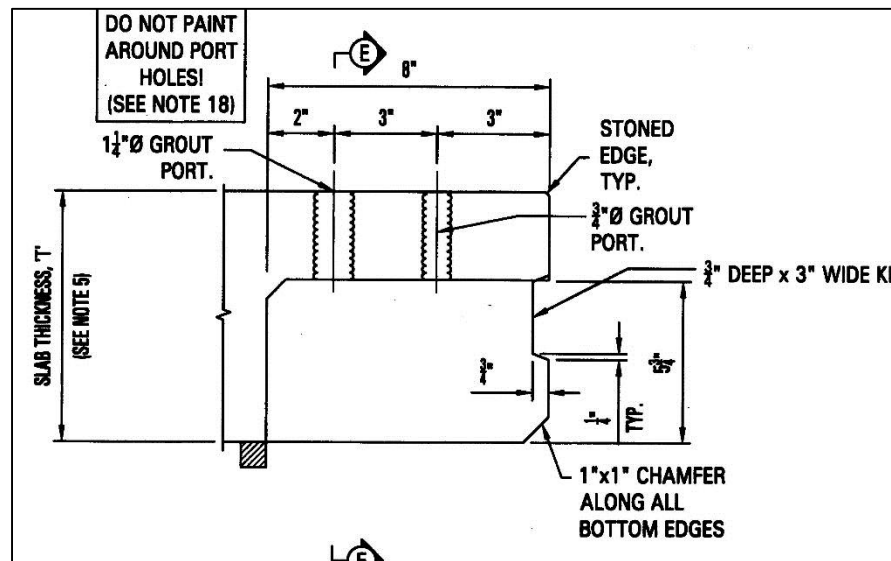
New Standard
5 – 1/2" High Slots
(All Panel Thicknesses)

More Concrete and Steel Over Slots

Shorter Dowels – Shorter Slots



Old Standard – 18" Long Dowels

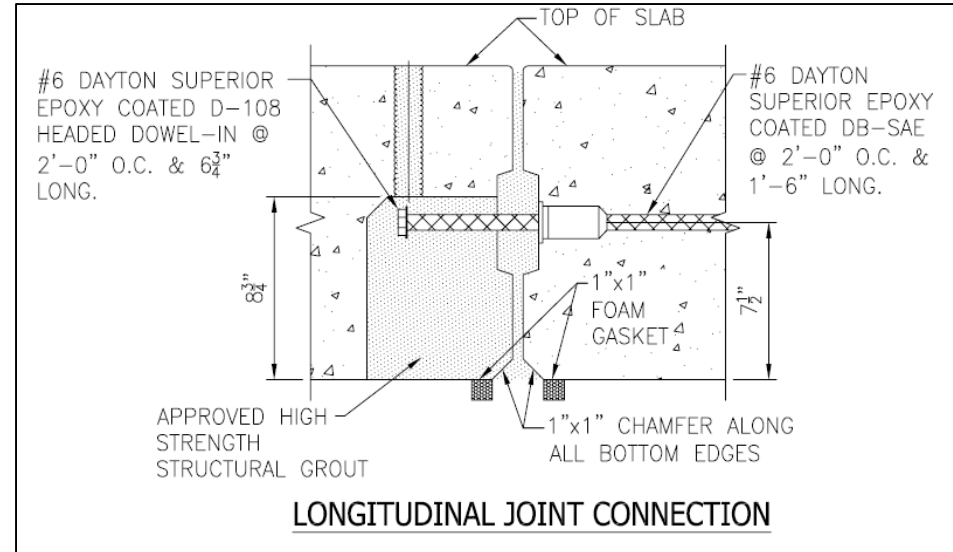


New "Trend" – 14" Long Dowels

Shorter (Headed) Tie Bars – Smaller Slots



**Old Standard – 18” Long
(19” Long Slots)**



**New "Trend" (Standard)
7" Long Headed Tie Bars
(8" Long Slots)**

Complex Bridge Approach Slabs

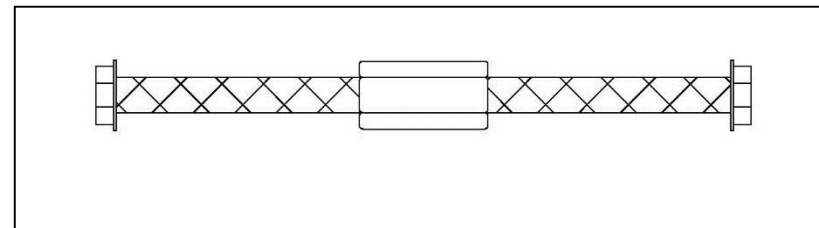
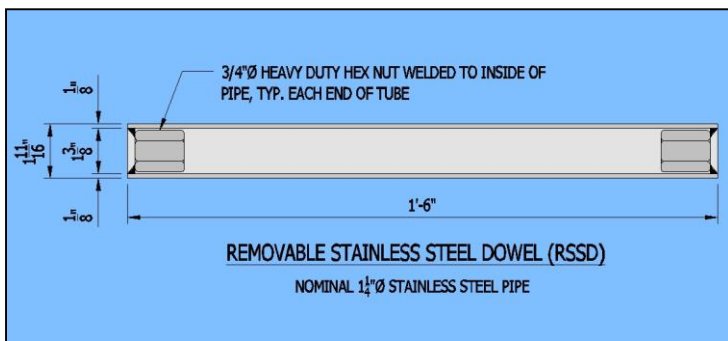
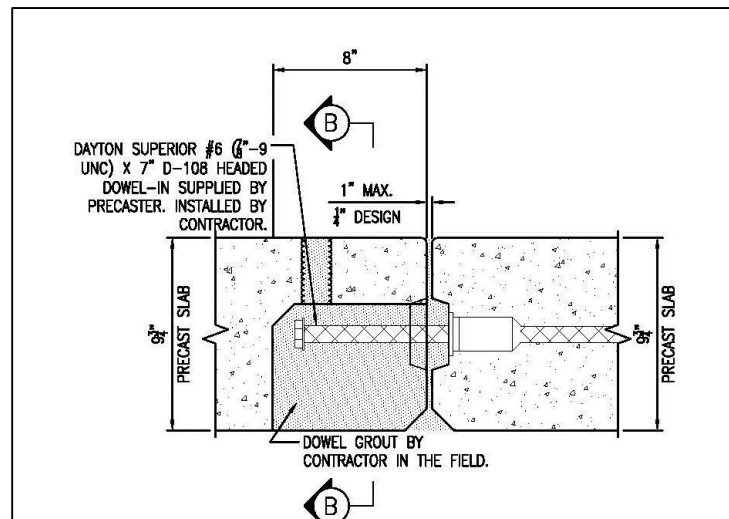


Skewed and Warped Panels



**Haunched & Notched on Top
for Bridge Joint**

New Products – Removable Dowels and Tie Bars



Super-Dowels

**Removable-
Replaceable Tie Bars**

Removable Super-Dowels and Tie Bars Enables:

- **Removable/Replaceable Urban Pavement (RUP)**
 - For utility-intensive arterials and city streets
- **Smart Patching**
 - Incremental addition to precast pavement

Conventional Repair Over Utility Cuts – Cut Anywhere – Repair with Anything!



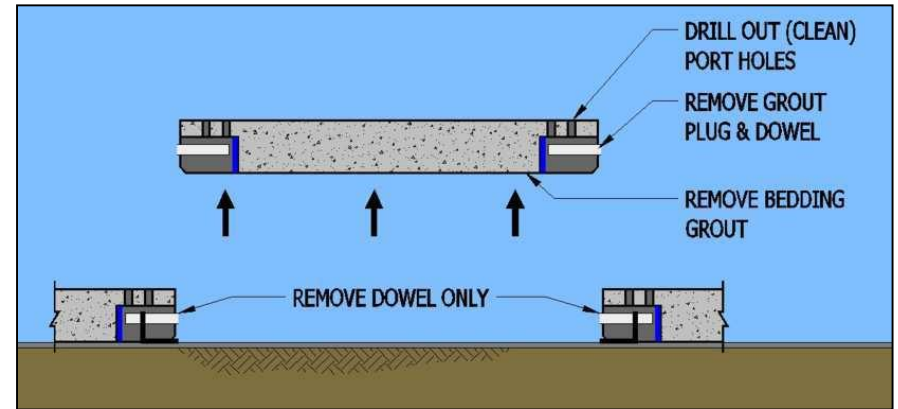
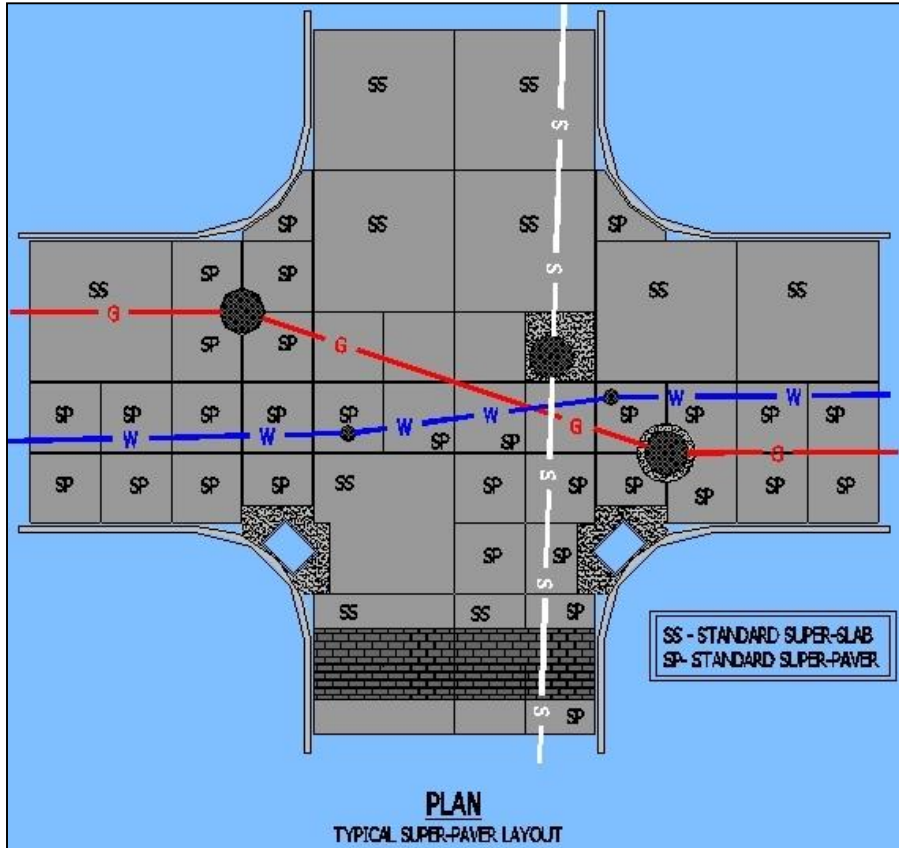
**First Avenue, NY City,
(Manhattan) NY**



**Cross Bronx Off-
Ramp, NY City,
(Bronx) NY**

Non-durable materials – no load transfer – poor workmanship

New Method – Use RUP – Cut Dowels and Remove Panels As Needed



Remove As Needed



Clean Up Removed Panels

Restore Remaining Half Dowels and Tie Bars and Replace Cleaned-Up Panel



Extracting Half Dowel



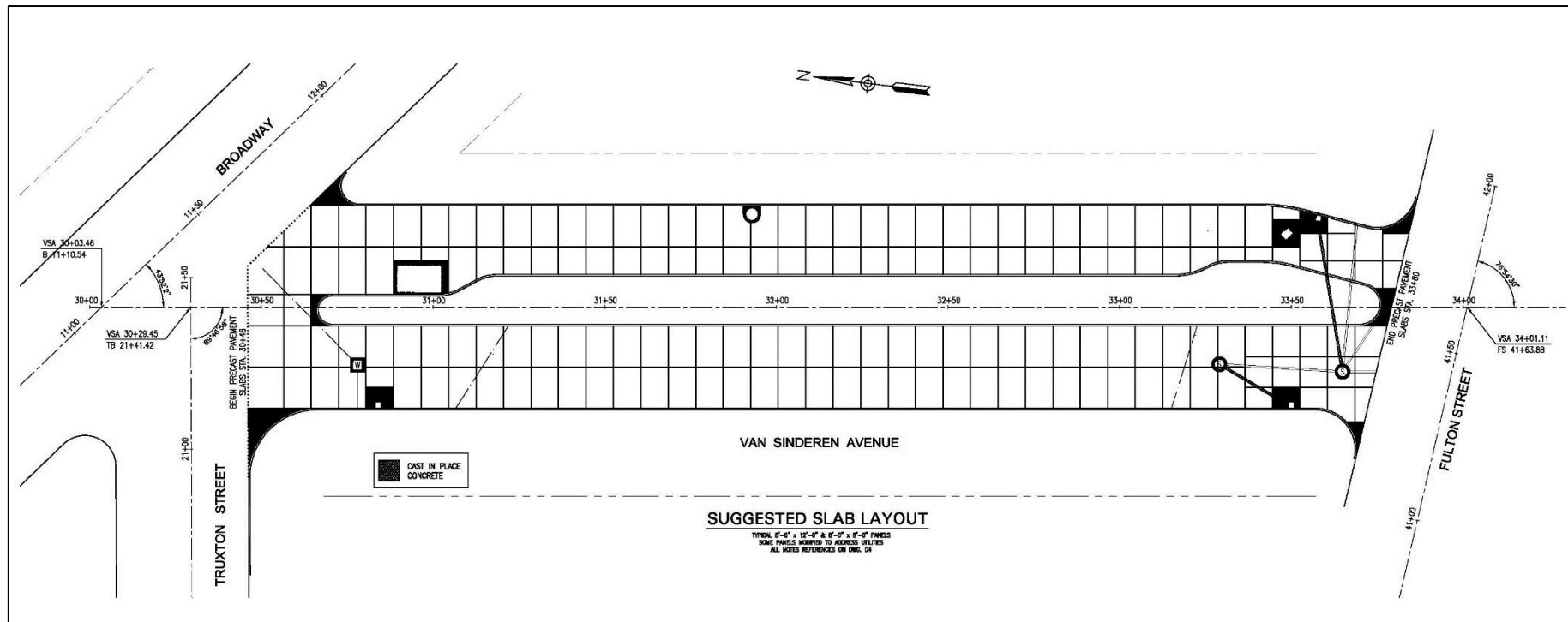
Restoring Tie Bars



Replacing Cleaned-Up Panels

**Restores Esthetics and
Functionality of Original Pavement**

Broadway Junction, Brooklyn, NY - 2016



Van Sinderen Avenue Preliminary Slab Layout Drawing

167 Slabs, 75 flat, 76 non-planar (1 – ¾" max.)

Van Sinderen Avenue Street View



**Looking North
(Subway Station on Right)**



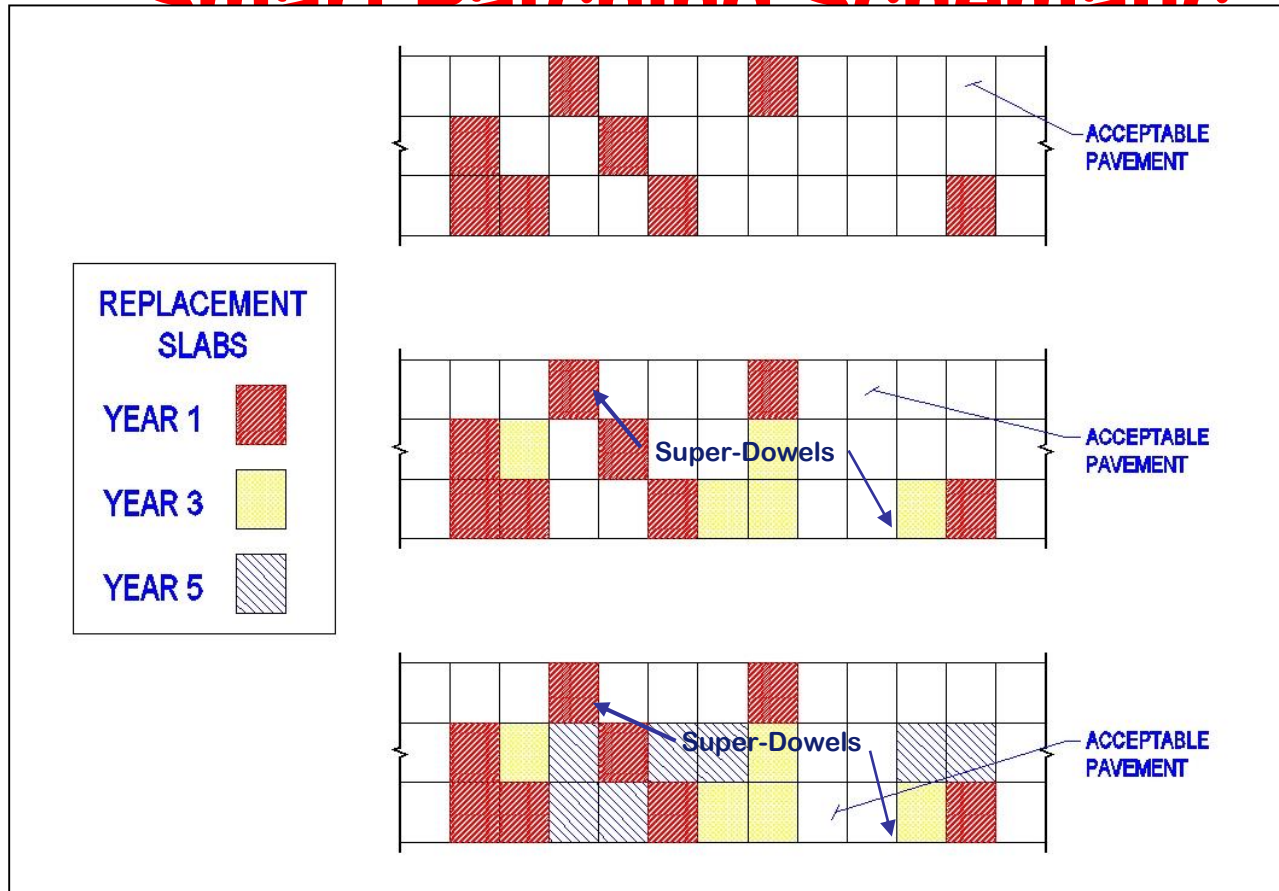
**Looking South
(Bus Pad on Left)**

“Smart Patching”

**Adding to Previously-
Placed Precast Panels – As
Needed**

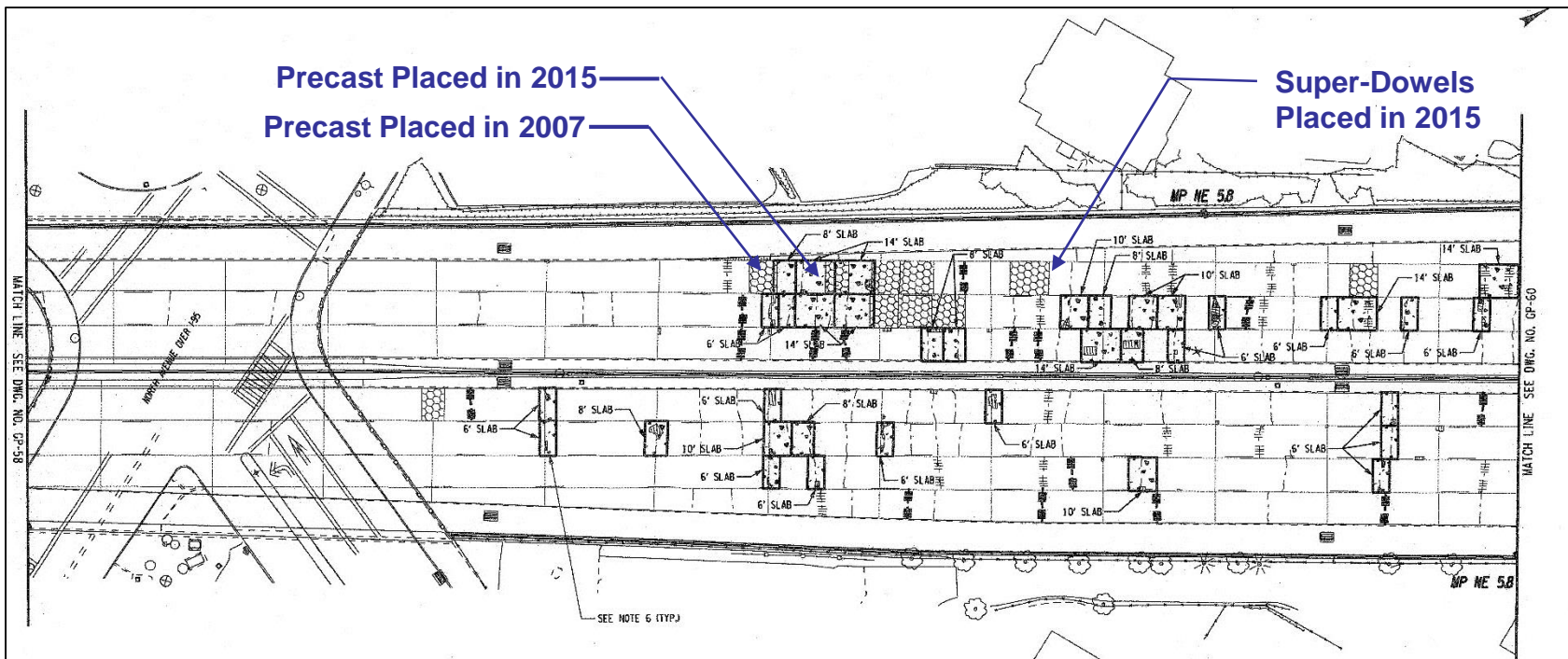
**(that will last another 35
years)**

Smart Datching Schematic



**Makes The Most of Original Concrete Pavement
– Restores it as Needed**

I-95 Replacement Plan for 2015

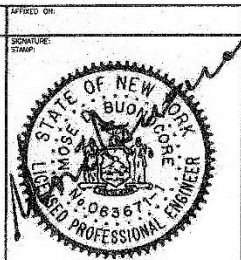
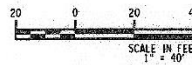


LEGEND

	EXISTING	PROPOSED
SOIL BORING OR PAVEMENT CORE		
LONGITUDINAL & TRANSVERSE JOINTS		
CONCRETE PAVEMENT CRACKS		
SAW AND SEALED CONCRETE PAVEMENT CRACKS		
SPALL AREA		
PREVIOUS ASPHALT/CONCRETE REPAIRS		
DOREL BAR RETROFIT		
FULL DEPTH REPAIR		

NOTES:

1. SEE DRG. TS-01 THRU TS-03 FOR TYPICAL SECTIONS.
2. SEE DRG. MD-01 THRU MD-08 FOR REPAIR DETAILS.
3. SEE DRG. MT-01 AND MT-02 FOR DIAMOND GRINDING AND MILLING TABLES.
4. SEE TRAFFIC CONTROL PLAN SHEETS FOR WORK ZONE TRAFFIC CONTROL.
5. SLAB SIZES SHOWN ARE SUGGESTED, ACTUAL SIZES SHALL BE DETERMINED BY THE CONTRACTOR AND FABRICATOR.
6. ALL WORK NEAR NORTH AVE. BRIDGE SHALL BE COMPLETED IN 2014.



IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS THEY ARE ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR, TO ALTER AN ITEM IN ANY WAY, IF AN ITEM BEARING THE STAMP OF A LICENSED PROFESSIONAL IS ALTERED. THE ALTERING ENGINEER, ARCHITECT, LANDSCAPE ARCHITECT, OR LAND SURVEYOR SHALL STAMP THE DOCUMENT AND INCLUDE THE NOTATION "ALTERED BY" FOLLOWED BY THEIR SIGNATURE, THE DATE OF SUCH ALTERATION, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

REVISIONS			
DATE	DESCRIPTION	BY	SPN

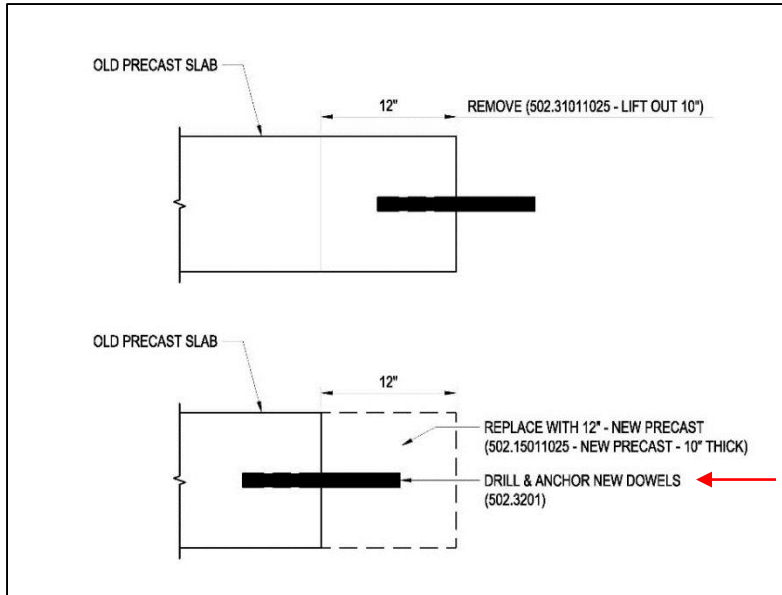


NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING
200 SOUTHERN BLVD., ALBANY, N.Y. 12208

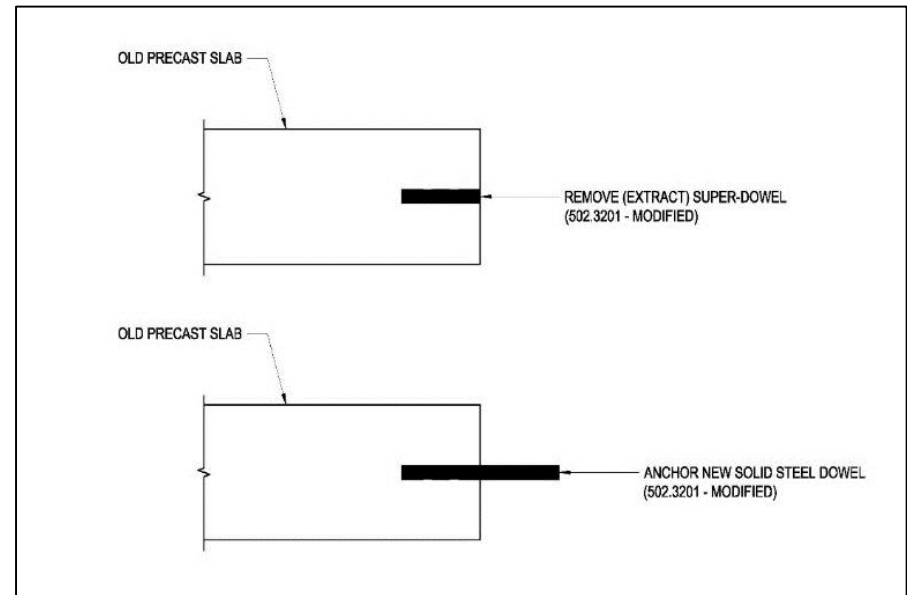


TITLE OF PROJECT I-95 NEW ENGLAND THRUWAY RENOVATION
LOCATION OF PROJECT M.P. NE 0.17 TO W.P. NE
TITLE OF DRAWING GENERAL PLAN MP NE 5.8 NB

Present vs. New Method of Addition



Present Method



New Method

Saving per Eight Dowel Joint - \$ 788.96 (New Method)

I-95 Savings (in 2021) Using Smart Method

OPERATION	“Q”	UNIT	COST/SAVINGS	TOTAL COST/SAVINGS
ESTIMATED POTENTIAL COST OF DOWELS IN 2015 (3125 JOINTS)	25,000	EA	\$ 10.30 (UP-CHARGE PER DOWEL)	\$ 257,500 (C)
ASSUME 13.8% OF 3125 JOINTS = 462 JOINTS in seven years (2021)	431	EA	\$ 788.96 (SAVINGS PER JOINT)	\$ 340,042 (S) (= 1,333 lane feet new pavement)
ASSUME 25% OF 3125 JOINTS = 462 JOINTS in seven years (2021)	781	EA	\$ 788.96 (SAVINGS PER JOINT)	\$ 616,178 (S) (= 2,415 lane feet new pavement)
100% OF JOINTS OVER TIME = 3125 JOINTS (OVER TIME)	3125	EA	\$ 788.96 (SAVINGS PER JOINT)	\$ 2,465,500 (S) (= 9,664 lane feet new pavement)

PROPOSED THRUWAY EXTRA EXPENDITURE IN 2015 = \$ 257,500
TOTAL POTENTIAL SAVINGS = \$ 2,465,500 = 9,664 Lane Ft.

Full-Depth Replacement Asphalt Intersections



Farmers Blvd



Guy R. Brewer Blvd.

Rockaway Blvd., Queens, NY 2010

Hardening-Up Asphalt Pavement In Toronto – Pilot Project 2016



341,000 ADT

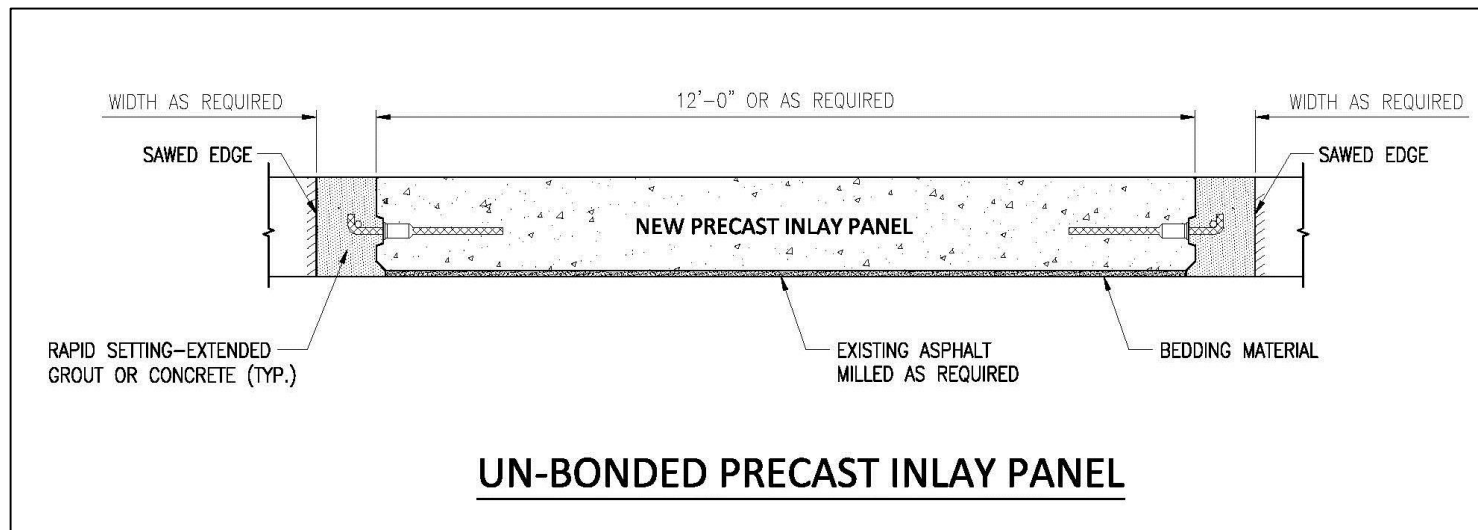
Highway 427



374,000 ADT

Highway 401

Pilot Project – Un-bonded Precast In-Lays



Cross Section for Consideration

(For Rut Remediation and “Hardening-up” Asphalt Pavement

Acid-Resistant Polymer Concrete Slabs



**Mixing Polymer
Concrete**

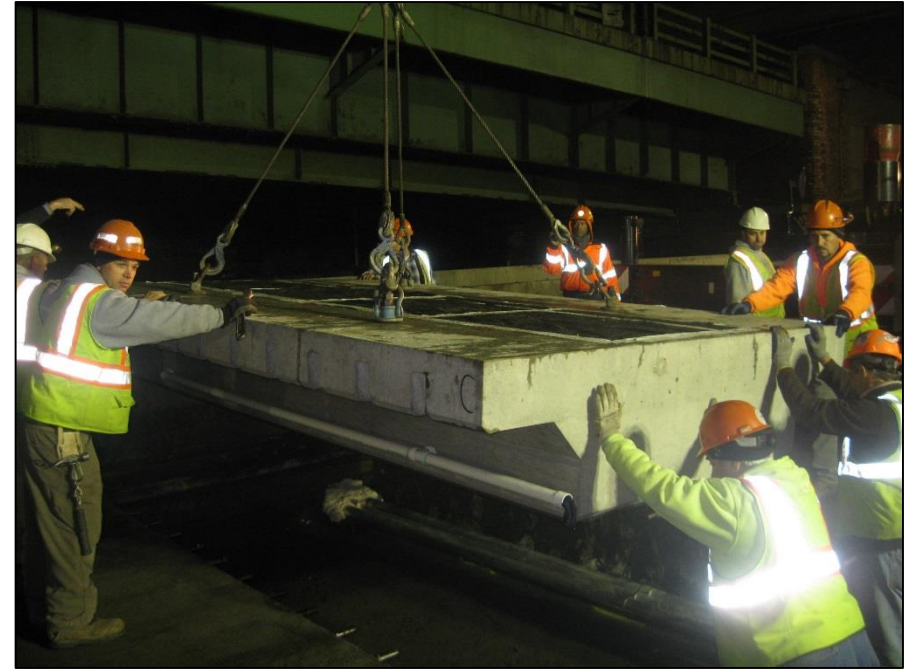


Finished Slabs
**(stainless steel
dowels and rebar)**

Weigh-In-Motion Panels – I-95 Manhattan, NY



**Fabrication
Stainless Steel Reinforcing and
Dowels**



**Installation
(Overnight)**

Plug and Play (Overnight)

Instrumented Precast Panels – Spring Valley, NY



Open Road Tolling



Shop-Installed Treadles

Future Applications

- Charging Panels
- Heated Panels
- Solar Generating Panels

Keys to Success

(Still More to Learn)

Good engineering

Open minds

Real partnering





Thank You

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