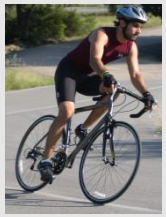
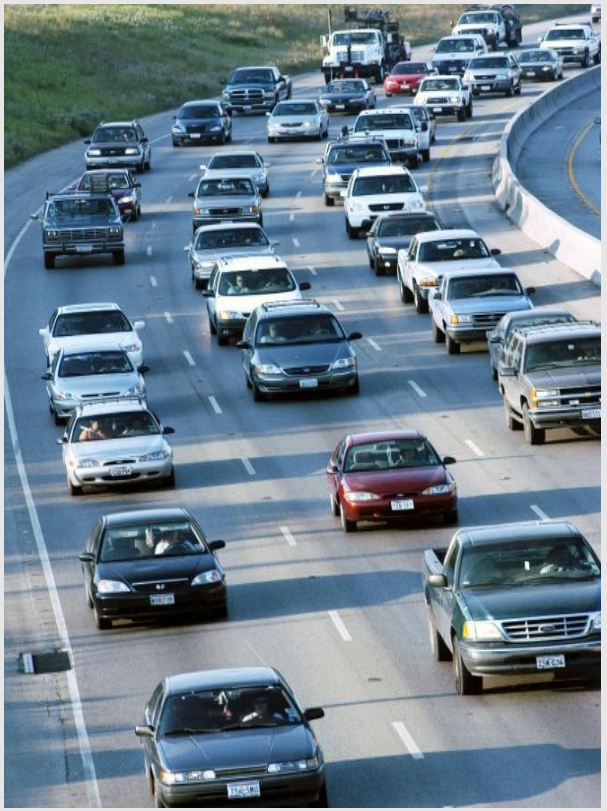


TXDOT BRIDGE MANAGEMENT

BrMUG 2016



September 20, 2016

Howdy!

Texas – Scope and Scale

- Texas has a surface area of 268,596 square miles – bigger than the combined area of 14 other states
- Beaumont to El Paso; 831 miles (east to west)
- Brownsville to Dalhart: 877 miles (south to north)
- Brewster County (6,193 square miles) is bigger than the state of Connecticut

Texas – Scope and Scale

Weather:

- The state is subject to tornados, hurricanes, droughts, flooding and wildfires.
- There are 5 climate zones; from humid subtropical to continental slope.
- East Texas locations may average over 60 inches of rainfall per year, El Paso receives less than 9 inches per year.

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Texas – Scope and Scale

- 2nd most populous state: 27.5 million people
- Average daily VMT = 655 million miles
- Annual VMT = 239 billion miles
- State-owned highway network is the country's largest (80,423 centerline miles), being equal to the combined mileage of the 13 smallest states, plus half of Nevada and D.C.

Texas Bridge Inventory

- Largest bridge inventory in the nation: 53,391 NBIS bridge-length structures (25,000 more than any other state)
  - On-system: 35,214 bridges
  - Off-system: 18,177 bridges

Texas Bridge Inventory

- 36% of inventory are bridge-class culverts
- Statewide there are 528 million square feet (12,121 acres) of bridge deck area, more than the combined bridge inventories of Colorado, Massachusetts, Nebraska, West Virginia, Connecticut, Puerto Rico, Montana, Utah, New Mexico, Idaho, South Dakota, Nevada, Hawaii, Wyoming, North Dakota, Maine, New Hampshire, Delaware, Rhode Island, Alaska, and Washington D.C.

Texas Bridge Inventory

- Average age:
  - On-system: 44 years
  - Off-system: 31 years
- Age Distribution:
  - Built before 1950: 16%
  - Built 1950 to 1970: 28%
  - After 1970: 56%

Highest Bridge

- The Rainbow Bridge (SH 87) near Port Arthur has 176.9 feet of clearance between the bridge and the water.

TxDOT Bridge Facts FY 2009

Longest Bridge

- The longest bridge over water is the Pharr/Reynosa Bridge over the Rio Grande River. It is 15,770 feet long. This off-system bridge is partially owned by Mexico.

TxDOT Bridge Facts FY 2008

Bridge with Longest Span

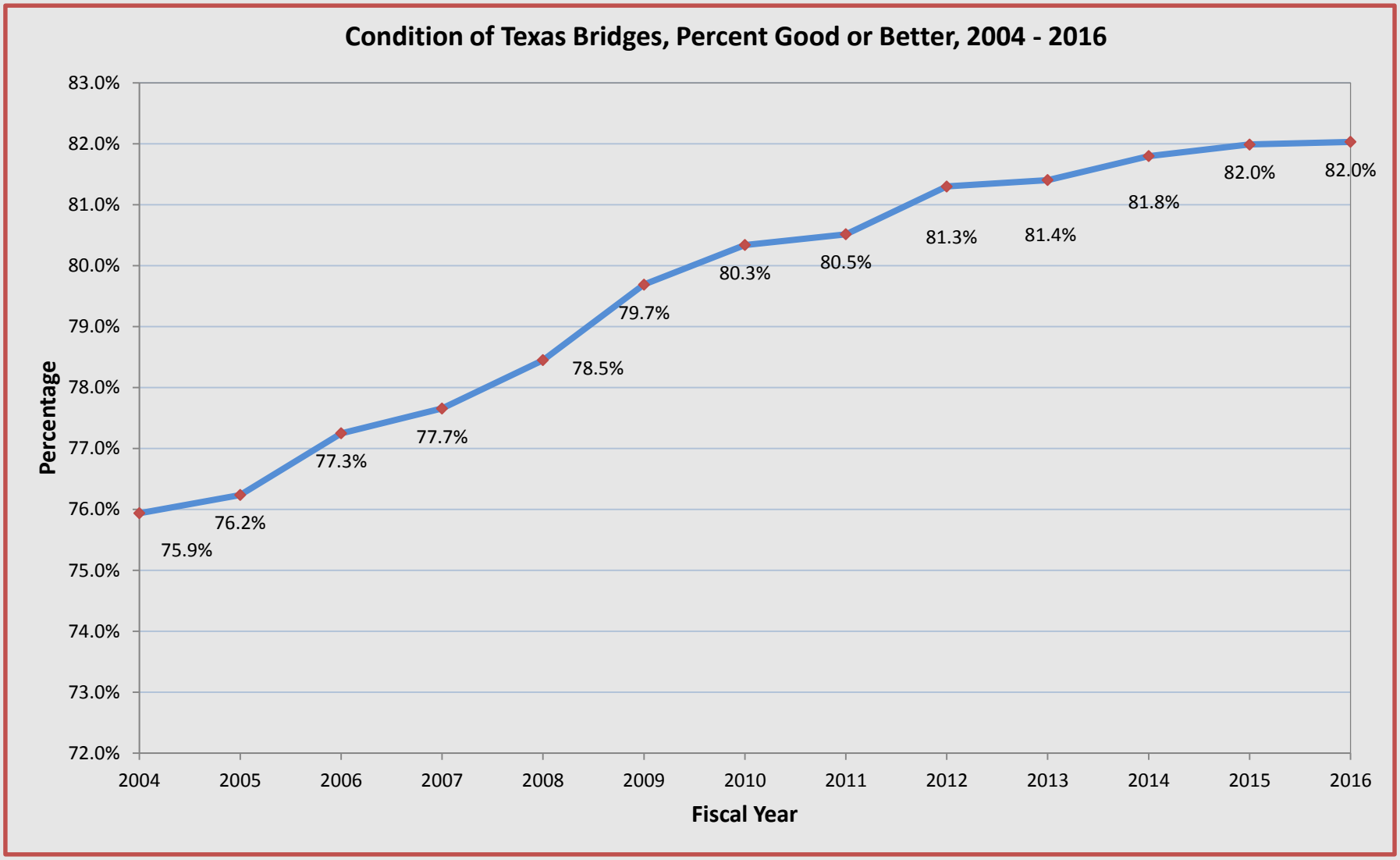
- The main span of the Fred Hartman Bridge (SH 146) over the Houston Ship Channel is 1,250 feet long.

TxDOT Bridge Facts FY 2009

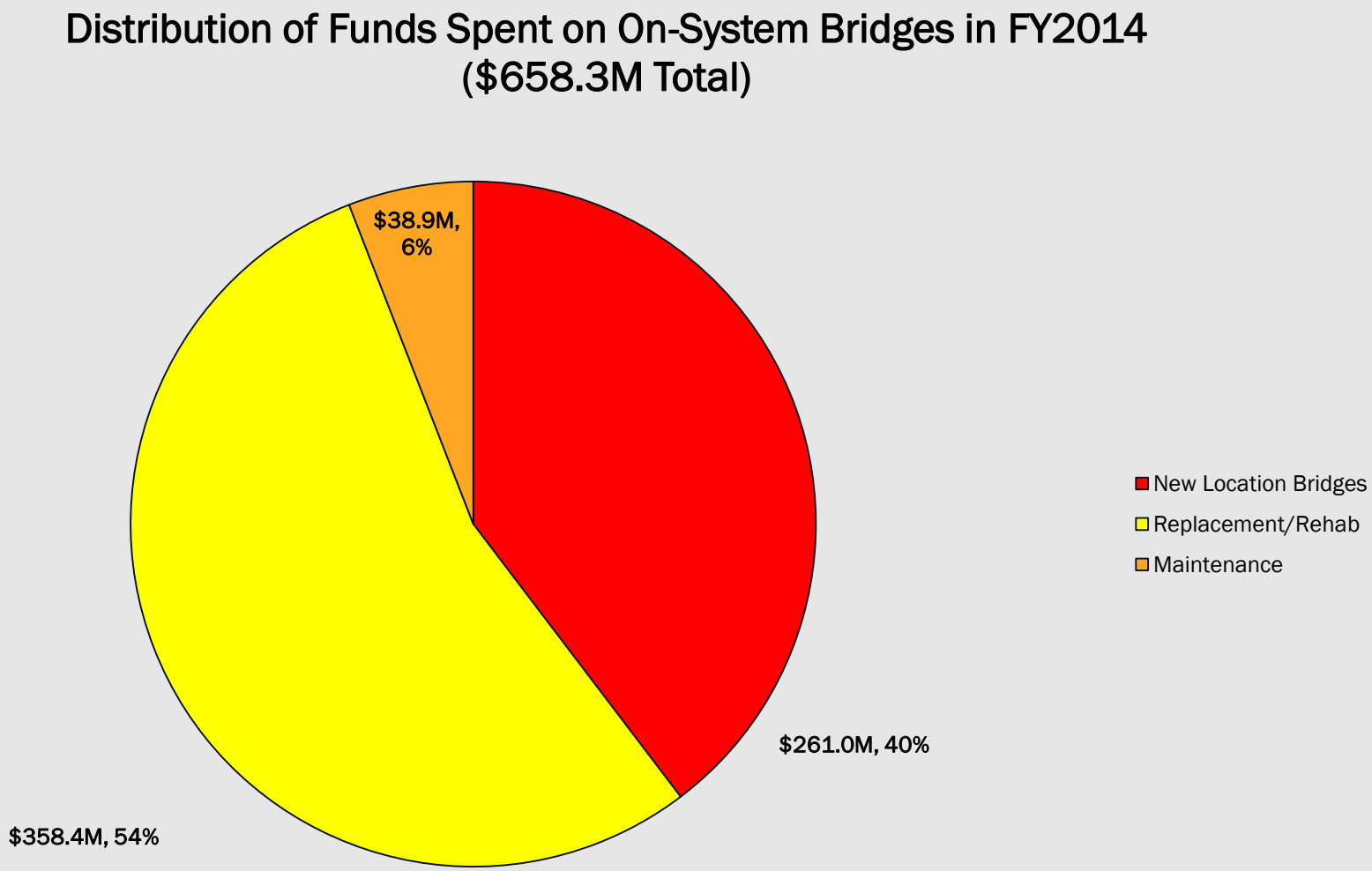
Texas Bridge Conditions

- Overall, Texas bridge conditions are among the best in the nation
- 1.6% of inventory (865 bridges) classified as SD – third lowest in the nation
- Texas has lowest percentage of VMT on SD bridges of any state
- 14% of inventory (7,782 bridges) classified as FO
- 1.9% of inventory (1,033 bridges) classified as “Substandard for Load Only”
- Less than 1% of the NHS deck area is classified as SD
- Somehow, the largest bridge inventory in the nation is also in one of the best conditions in the nation – all without a “bridge management system”.

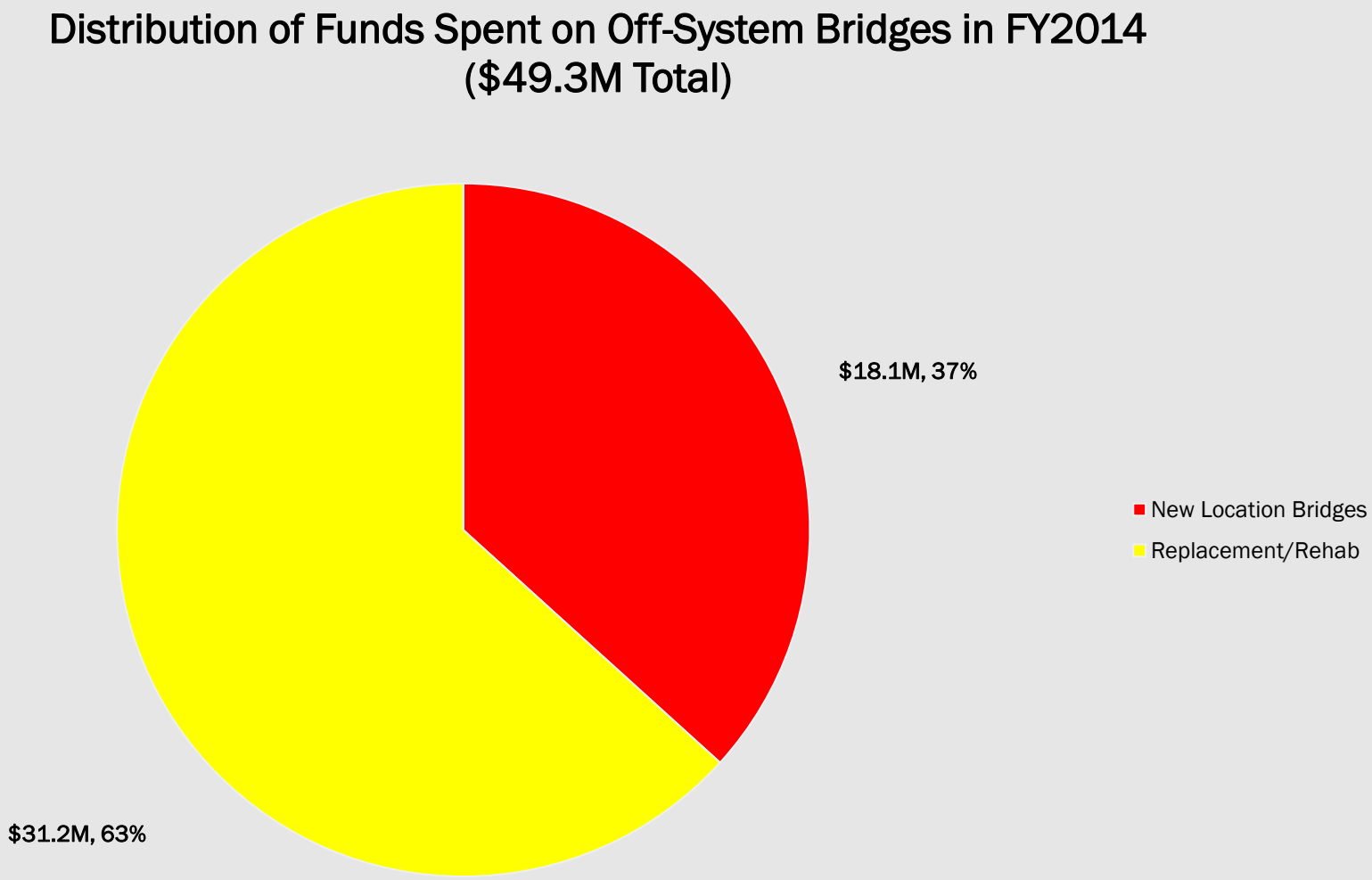
Texas Bridge Conditions – Percent Good or Better Bridges



Bridge Funding – On-system



Bridge Funding – Off-system



Challenges

Population Growth and Mobility Demands: TxDOT faces unprecedented population growth and mobility demands: Texas has experienced a 27% increase in population since 2000 and is one of the most rapidly growing states in the country

Aging inventory: 44% of bridges constructed prior to 1970

2014 Report on Texas Bridges

Challenges

Load-Posted Bridges

- Load-posted bridges restrict commerce and often impact school bus routes and the availability of emergency services.
- Currently there are 194 on-system and 2,077 off-system bridges that are load posted or have been recommended for load posting
- While these 2,271 bridges make up less than 5% of all bridges in the state, they represent approximately $2.0 billion in needed funding.

2014 Report on Texas Bridges

Challenges

Land-Locking Bridges

- Land locking bridges are structures which serve as the only way for vehicular traffic to access certain land parcels.
- There are currently 428 land locking bridges in Texas.
- Vehicles that exceed posted limits but have a **weight-tolerance permit** may legally use land-locking bridges. However, the use of land-locking bridges for excess loads increases the risk of damage to the bridge.

2014 Report on Texas Bridges

TxDOT Bridge Inspection Overview

TxDOT Bridge Inspection Overview

- Routine inspection of 53,875 structures
- Element-level inspections performed on all on-system and NHS off-system bridges
- Approximately 2,000 routine bridge inspections are performed every month
- Routine inspections performed mostly by bridge inspection consultants (~25 firms) and managed at the District level (25 District Inspection Coordinators)
- FC and UW inspections mostly performed by in-house inspectors, although some are outsourced.
- ~ 920 bridges receive FC inspections
- ~ 750 bridges receive UW inspections.
- All FC and UW inspections are managed at the Bridge Division level.

TxDOT Bridge Inspection Overview

- Bridge Division negotiates routine bridge inspection contracts every two years,
- Work authorizations are then issued on a rotating basis to contracted inspection firms. Around 400 bridges are included in each work authorization
- Bridges are assigned for inspection by associating them a with work authorization.
- District personnel are responsible for scheduling, assigning, reviewing, and approving routine inspections for bridges within their district boundaries.

TxDOT Bridge Inspection System History

- BRINSAP is the legacy mainframe inspection system.
- BRINSAP only holds NBI data – no element-level inspection data, or attachments, comments, etc.
- TxDOT investigated PONTIS ten years ago for bridge inspection but felt it was not flexible enough for agency needs.
- TxDOT developed the PONTEX system in-house to meet the agency's needs (deployed 2010)
- PONTEX was loosely based on the data format of PONTIS.
- BRINSAP has never been retired – other legacy systems consume bridge data from BRINSAP, so a nightly "snapshot" of NBI data is still exported from PONTEX to BRINSAP.

PONTEX

- TxDOT developed application based on Pontis
  - Database tables similar to Pontis
  - Oracle, Windows 7
  - CoRe Element Collection
- Access to TxDOT network via Citrix
- User roles control access to fields and features
  - User can be assigned multiple roles but can only be logged in with one role at a time.
- Bridge assignments based on contracts
  - Team Leaders associated to Consultant, Consultant associated to Contract, Contract associated to Assets via Work Authorizations

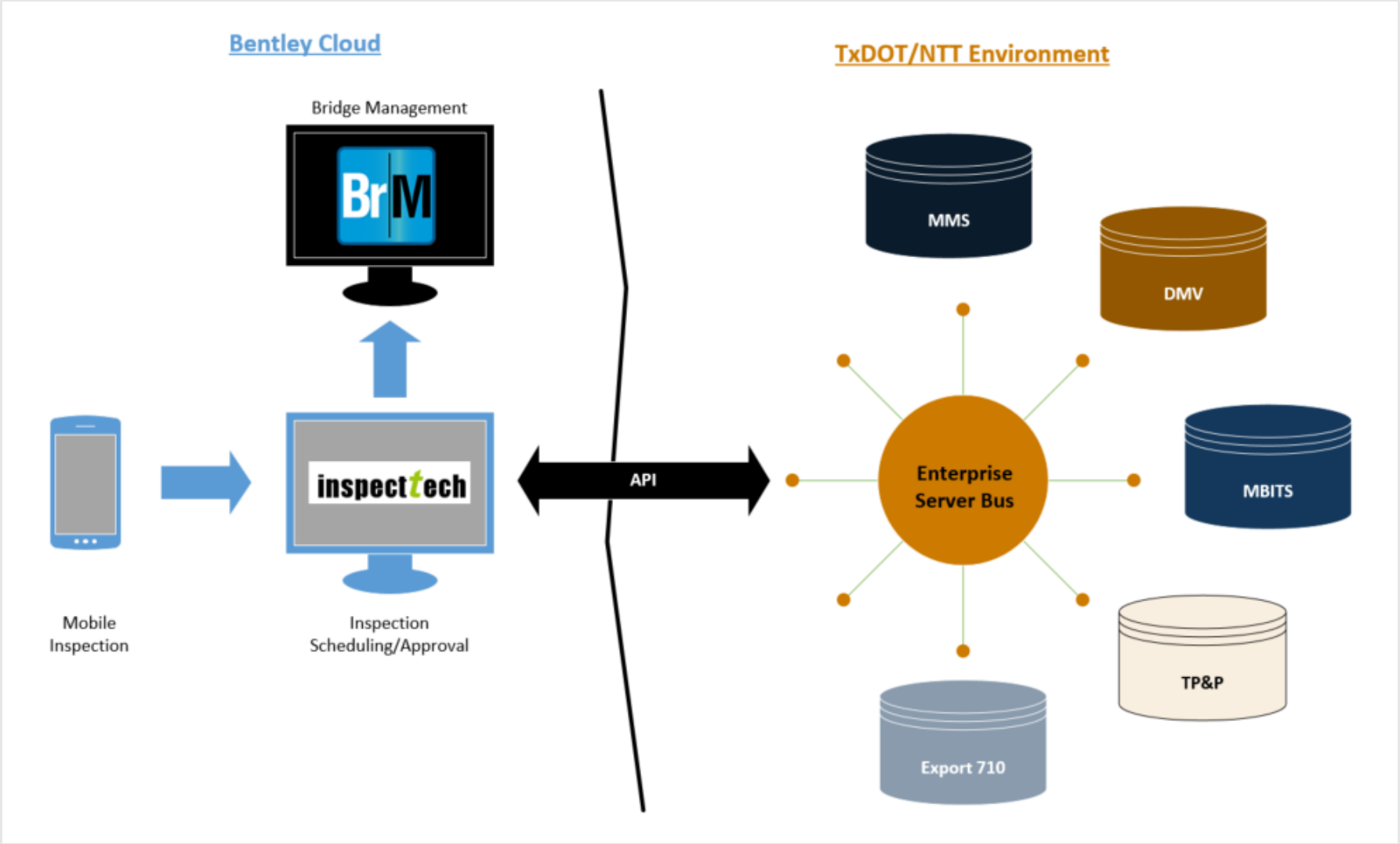
Drivers for Change

- All IT services outsourced to NTT DATA in 2014, limiting the ability to enhance and maintain PONTEX.
- Needed to keep up with internal and external bridge data needs and FHWA reporting requirements.
- Reporting changes required with MAP 21 (NBEs) as well as the analytic tools available.

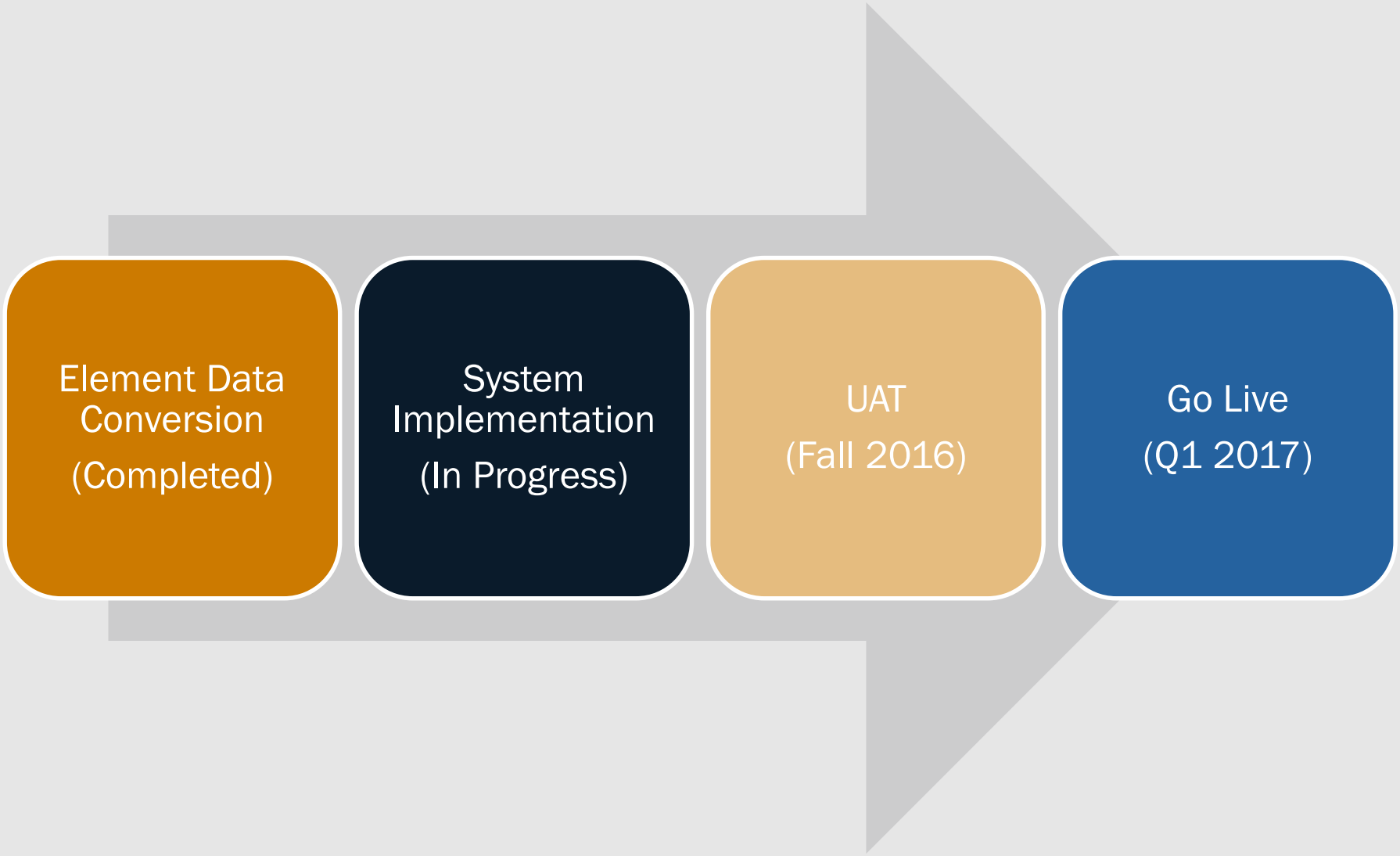
Inspection System Wish List

- National Bridge Elements
- Record Multiple Under records
- Offline Data Collection
- Ad Hoc Query
- Improved Cross Channel Profile Drawing
- Access to Field Histories within report
- Electronic signatures
- Plotting query results on map (GIS, KMZ)
- Organize uploaded files
- Better Report and Track Critical Findings/Maintenance
- Email Alerts
- Collect Clearance Data for all under records
- User Certifications

Inspection and Bridge Management Solution

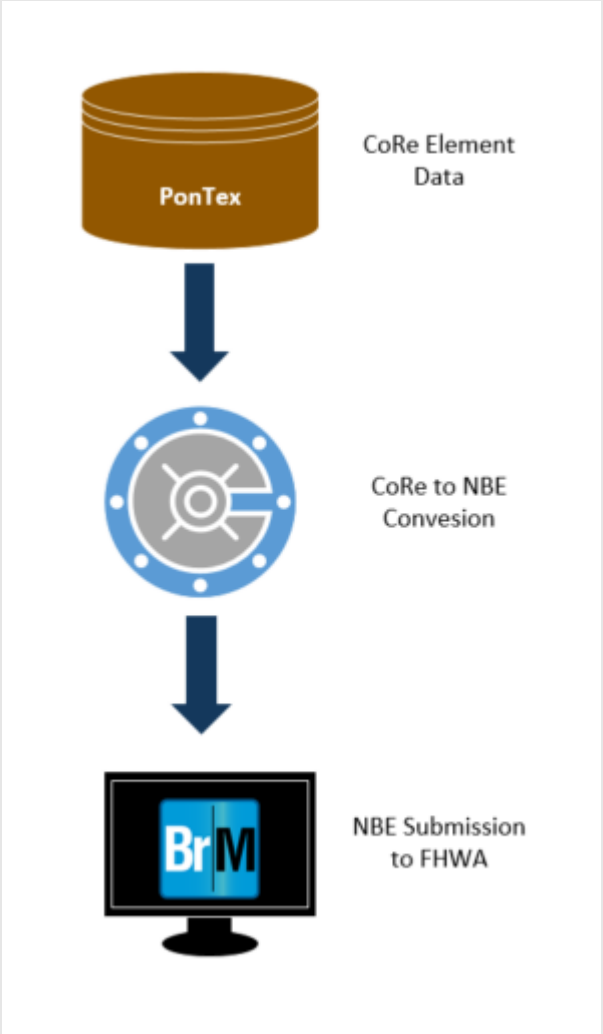


Implementation Timeline



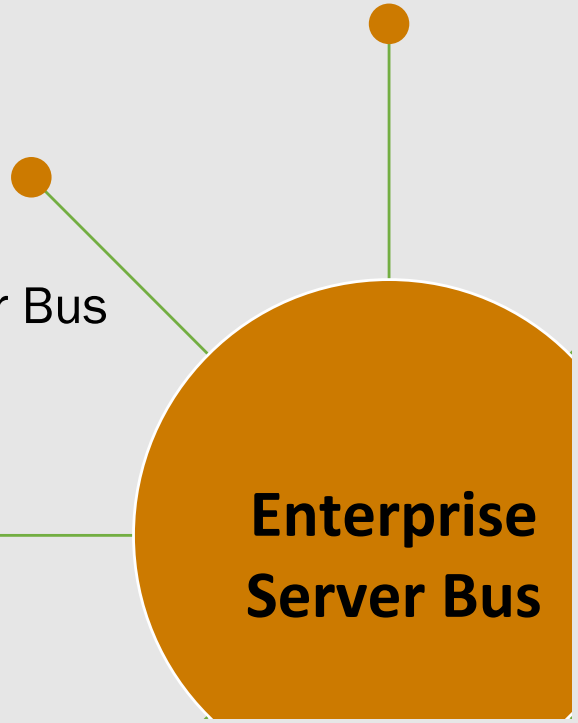
NBE Element Conversion and Submission

- 2014
  - Converted all historic CoRe Element data to NBE
  - Imported NBE data to BrM
  - Submitted 2014 NBE data to FHWA
- 2015
  - Converted all 2015 Core Element Data
  - Imported NBE Data to BrM
  - Submitted 2016 NBE data to FHWA
- 2016
  - Will convert YTD CoRe Element Data
  - Import NBE Data to BrM and InspectTech
- 2017
  - Inspectors will collect NBE Data



Data Integration

- Pontex data integrations included file-based transfers and custom extracts:
  - TP&P (AADT, Functional Classification, Reference Marker and Displacement, etc.)
  - Export 710 File (NBI data consumed by other TxDOT systems)
  - MMS
  - DMV (for issuing oversize and over weight permits)
  - MBITS (reads last inspection report)
- New data integration utilizes API and Enterprise Server Bus (ESB/Data warehouse) for scalable data retrieval
  - TxDOT internal systems can 'self-serve' data using agreed-upon data structure in the ESB



Summary

- TxDOT is currently working with Bentley for a customized version of InspectTech.
- Bentley will also set up BrM for TxDOT, using InspectTech to feed bridge inspection data.
- Both systems will be hosted on Bentley servers.
- Deployment of both InspectTech and BrM are currently scheduled for early 2017.
- To Do List:
  - Testing, testing, testing (InspectTech)
  - Creating custom reports
  - InspectTech training for inspection personnel
  - NBE training for inspection personnel
  - BrM training for Bridge Management staff (all 3 of us)

Thank you!