



***Gannett Fleming***

*Excellence Delivered **As Promised***

# Asset Management for MAP-21

Gary Lasham, P.E.

Jonathan Pollack





- **Replaced Intermodal Surface Transportation Efficiency Act (ISTEA)**
- **MAP-21 is transforming the policy and programmatic framework for investments to guide the system's growth and development, creates a streamlined and performance-based (Asset Management) surface transportation program and builds on many of the highway, transit, bike, and pedestrian programs and policies established in 1991 ISTEA.**
- **GASB 34 – Governmental Accounting Standards Board for State and Local Governments**



# **GASB 34**

## **Governmental Accounting Standards Board for State and Local Governments**

- **Identifies the most important objectives of financial reporting by governments**
- **Requires governments to report information about "major" funds, including a general fund.**
- **Fund statements also measure and report the "operating results"**
- **Shows budgetary compliance**
- **Reports all capital assets, including infrastructure assets, and reports depreciation expense**

## MAP-21 Key Objective

**Improving transportation investment decision making through performance-based planning and programming.**

**Doubling funding for infrastructure safety to make significant progress in reducing highway fatalities.**

**Timely delivery of transportation projects through innovations in delivering projects. Do you need a 5 year TIP?**

**5 Year TIP vs. 3 Year TIP**

# MAP-21 - 5 Major Programs

- **National Highway Performance Program (NHPP):**  
**~\$21.8 billion**
- **Surface Transportation Program (STP):**  
**~\$10.0 billion**
- **Highway Safety Improvement Program (HSIP):**  
**\$2.4 billion**
- **Congestion Mitigation Air Quality Program (CMAQ):** **~\$3.3 billion**
- **Transportation Alternatives (TA):** **~\$2 billion**
- **Transit Funding:** **~\$10.5 billion**



# Key Themes

- **Accelerated Project Delivery**
- **Asset Management**
  - Performance based management
- **Performance Measures**
- **Risk Management**
- **3D Modeling**
- **Innovative Project Delivery**
  - Public Private Partnerships
- **Transparency**

Accelerated Bridge Construction Manual for New Jersey Turnpike Authority



D/B/F Sonoran Desert Drive City of Phoenix



BIM/Innovative Project Delivery Navajo Transit System Maintenance Facility

# Transportation Agencies Started in the Construction Business



# Focus is Shifting to Asset Preservation & Optimization



**Aging Infrastructure**



**Focus on Safety**



**Growing Congestion**



**Reporting on System Performance**



# Is Your Transportation System in Compliance with MAP-21?

- **MAP-21 establishes national performance goals for Federal highway programs:**
  - ✓ **Safety** - To achieve a significant reduction in traffic fatalities and serious injuries on all public roads.
  - ✓ Infrastructure **condition** - To maintain the highway infrastructure asset system in a state of good repair.
  - ✓ **Congestion reduction** - To achieve a significant reduction in congestion on the NHS.
  - ✓ System **reliability** - To improve the efficiency of the surface transportation system.

# What is an Asset?



- Roadways
- Bridges
- Pathways
- Pavement markings
- Culverts
- Guardrail
- Signs

- Traffic signals
- Street lighting
- Intelligent Transportation Systems (ITS) infrastructure
- Rest areas
- Landscaping
- Right-of-way, etc.

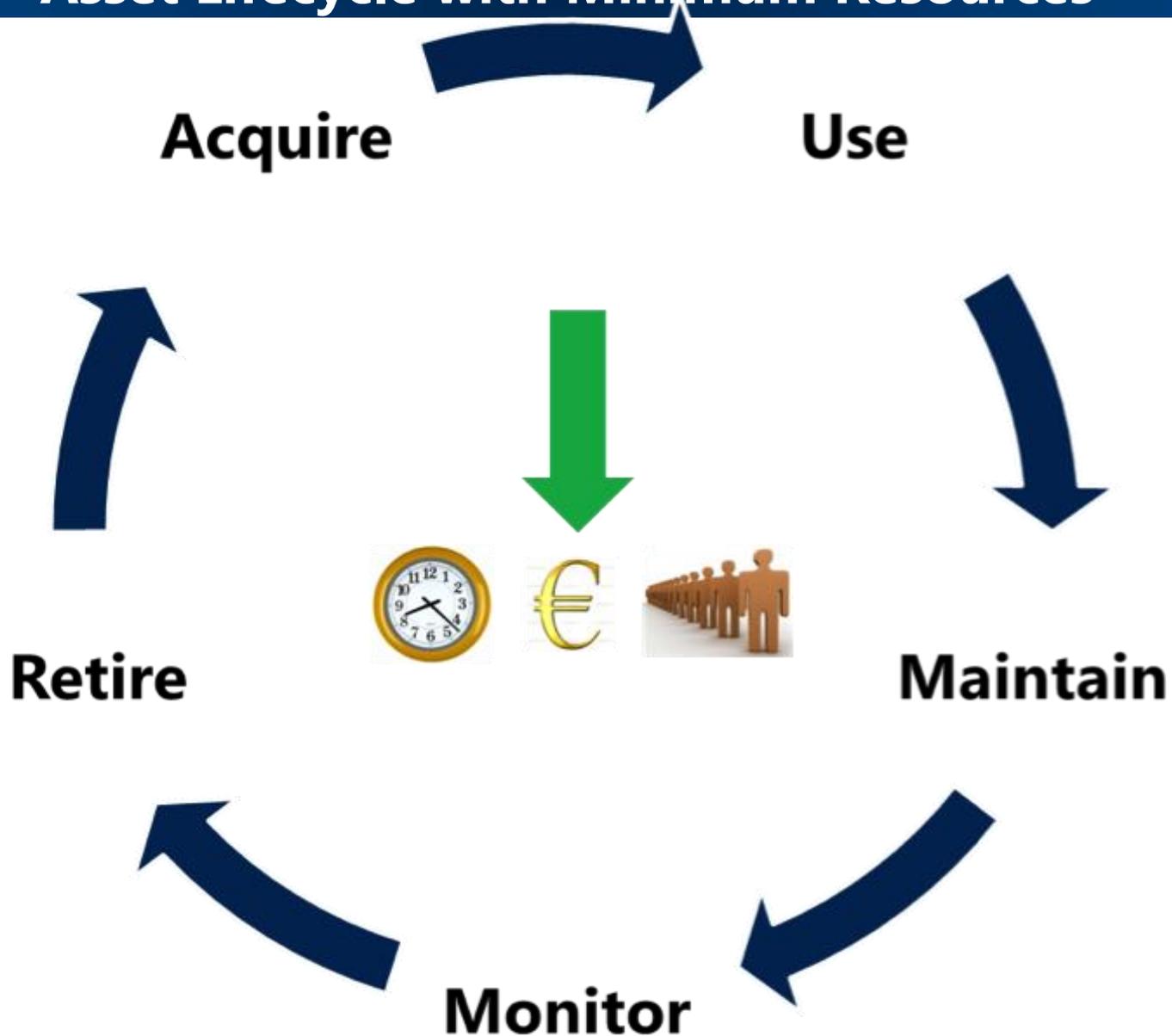
# Asset Management

***A strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost.***

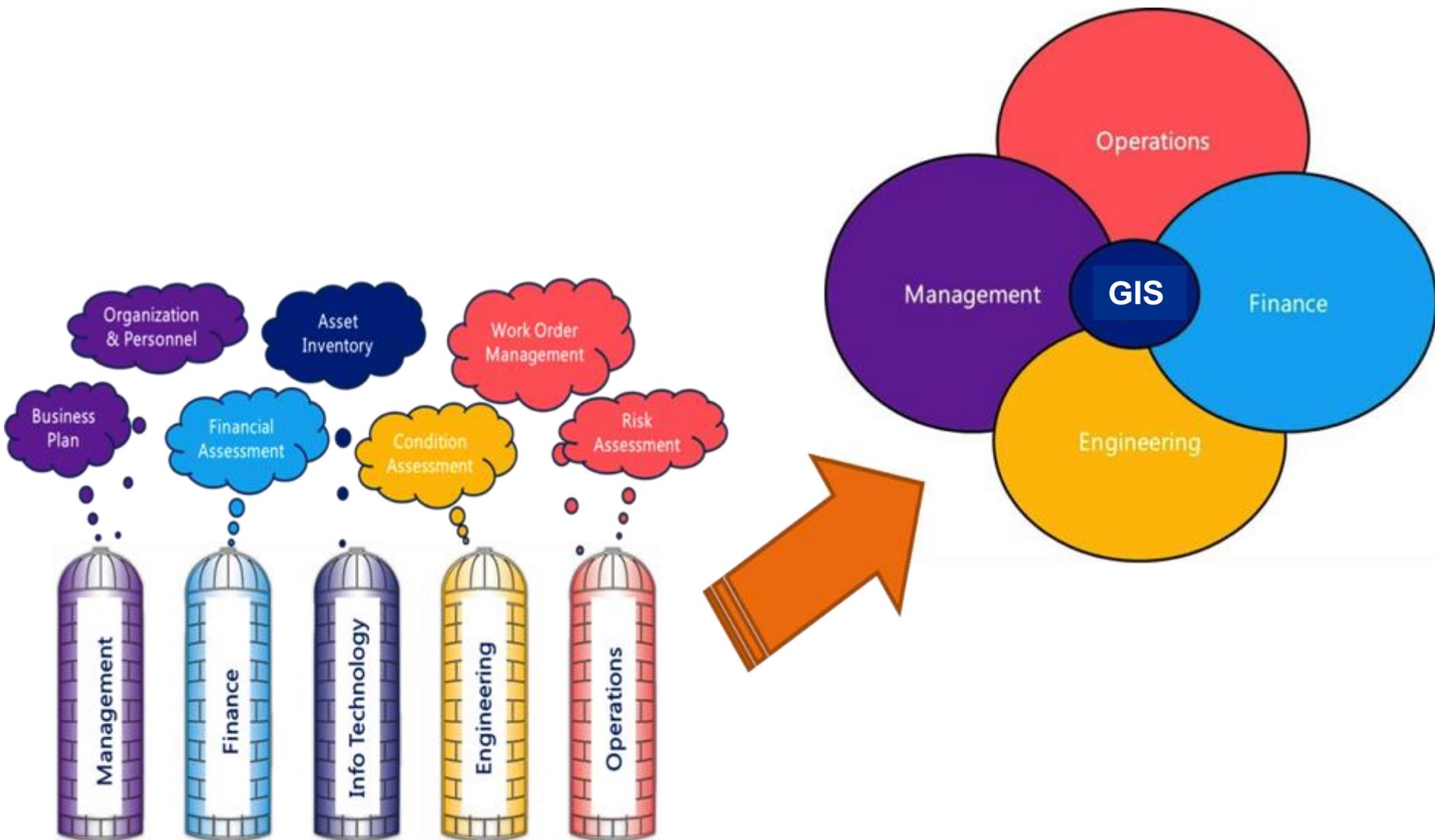
***(MAP-21 § 1103)***

**Perform the *right* treatment at  
the *right* time on the *right*  
bridge or roadway segment.  
Prioritize and track  
Operations and Maintenance**

# Asset Management is a Process for Managing the Entire Asset Lifecycle with Minimum Resources



# Asset Management Requires the Organization To Work Together For a Common Goal



# MAP-21 Asset Management Plan

- **MAP-21 requires that an asset management plan include:**
  - 1. A summary listing of the pavement and bridge assets on the NHS in the State, including a description of the condition of those assets
  - 2. Asset management objectives and measures
  - 3. Performance gap identification
  - 4. Lifecycle cost and risk management analysis
  - 5. A financial plan
  - 6. Investment strategies

# Risk Management

- **A risk-based asset management plan includes strategies that lead to a program of projects that would make progress toward achievement of the targets for asset condition and performance and support progress toward the achievement of the national goals.**
- **Entities must address pavements and bridges but are encouraged to include all infrastructure assets within the highway right-of-way in their risk-based asset management plan.**

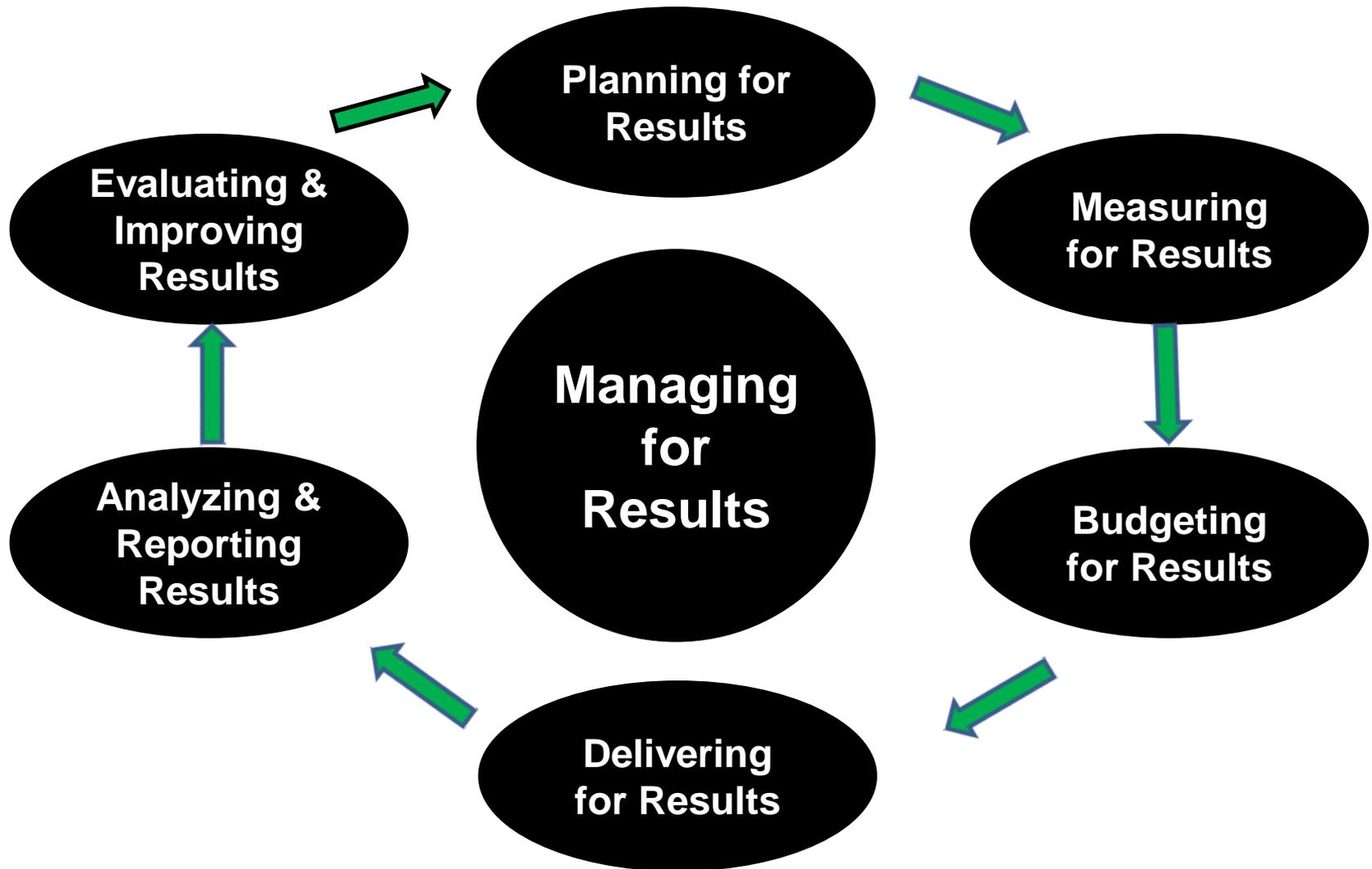
# Risk Management Decision Matrix

<b>Likelihood of Failure</b>	High	Repair/Replace on Failure	Programmed Rehab/Replace	Immediate Rehab/Replace
	Moderate	Monitor and Forecast	Proactive Assessment	Programmed Rehab/Replace
	Low	Monitor and Forecast	Opportunistic Assessment / Forecasting	Proactive Assessment
		Low	Moderate	High
<b>Consequence of Failure</b>				

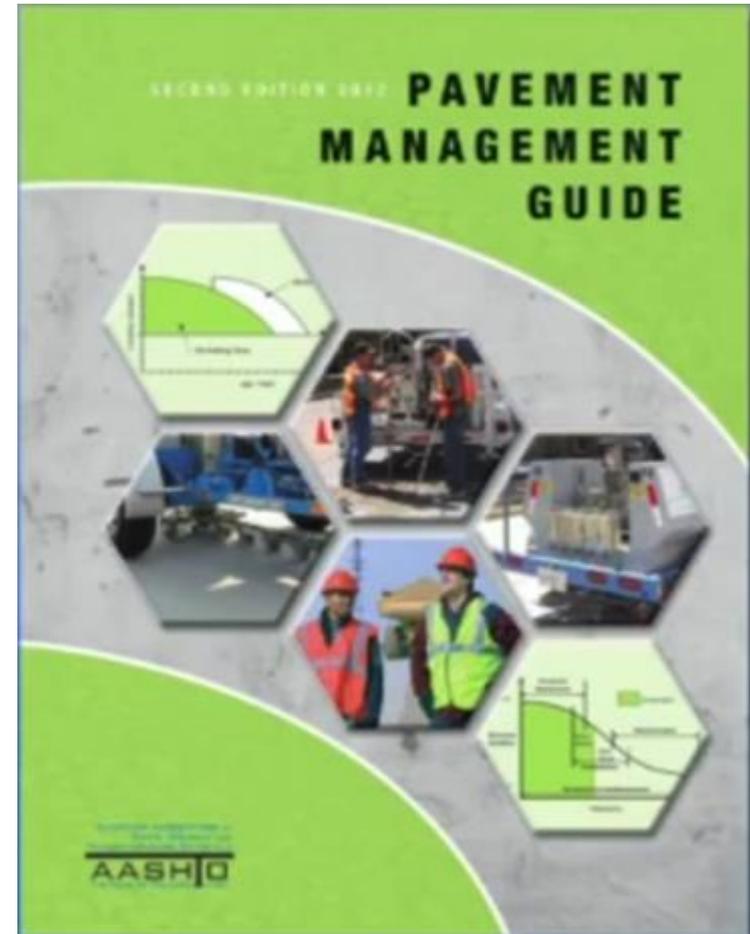
# How Do You Do Business?

- **Preserve your assets and minimize their whole life costs.**
- **Operate in a financially sustainable manner.**
- **Provide a framework to improve performance on a long-term basis.**

# Managing for Results

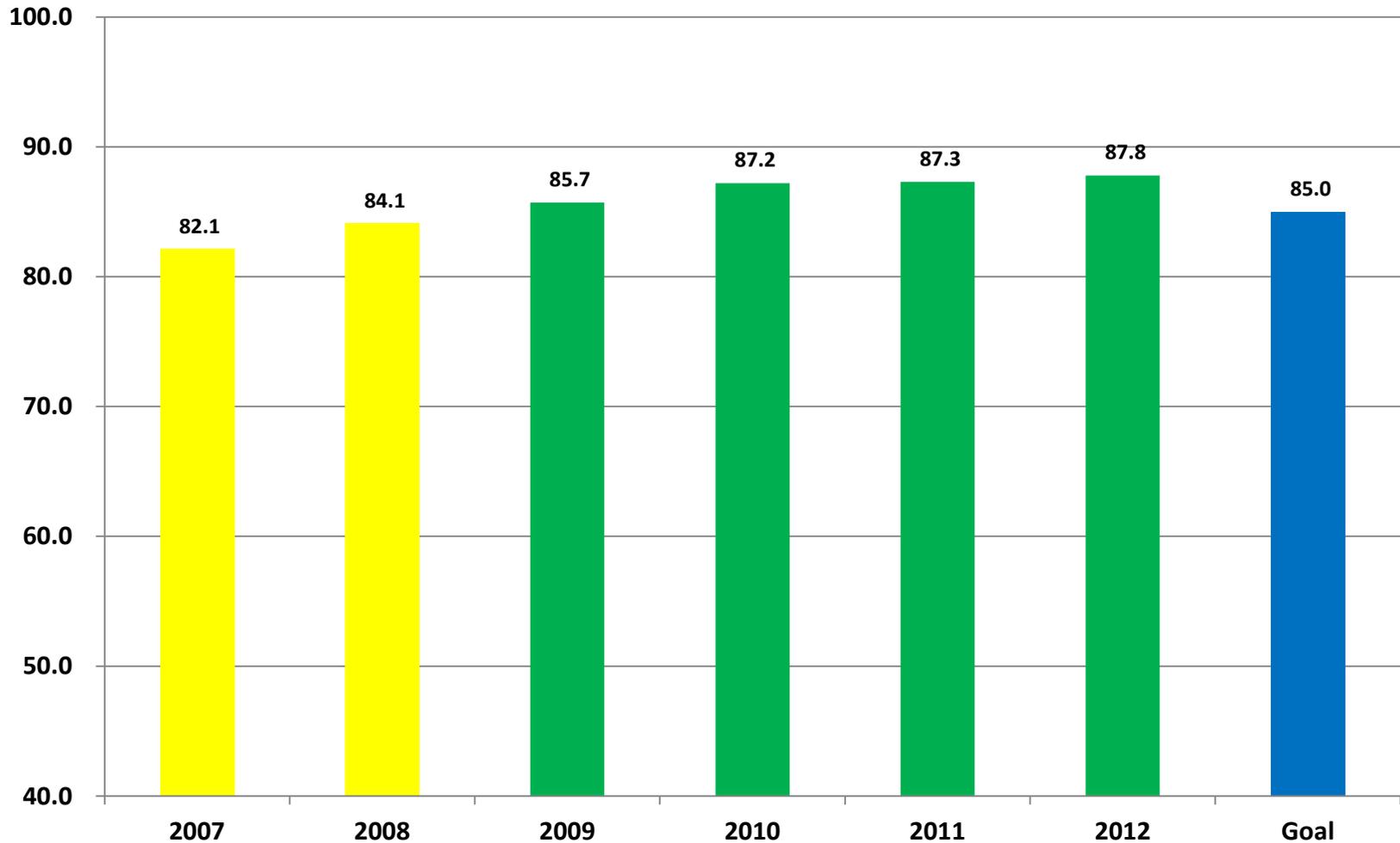


# AASHTO Management Systems



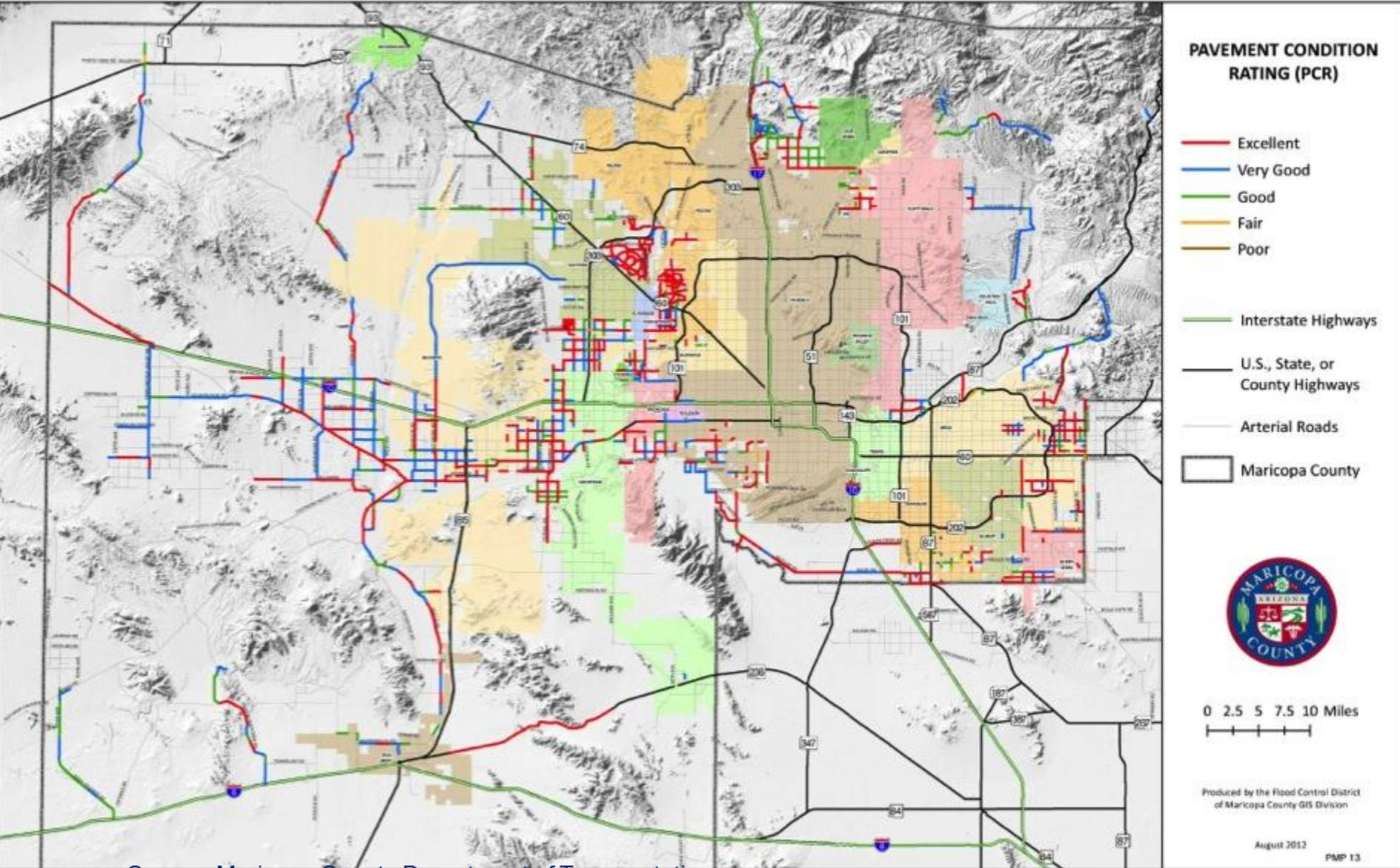
# Pavement Condition Reflects the Quality of the Roads in Maricopa County

Maricopa County - % of Roadways with a Pavement Condition Rating (PCR) Greater Than 70



Source: Maricopa County Department of Transportation

# System Pavement Condition Rating (PCR)

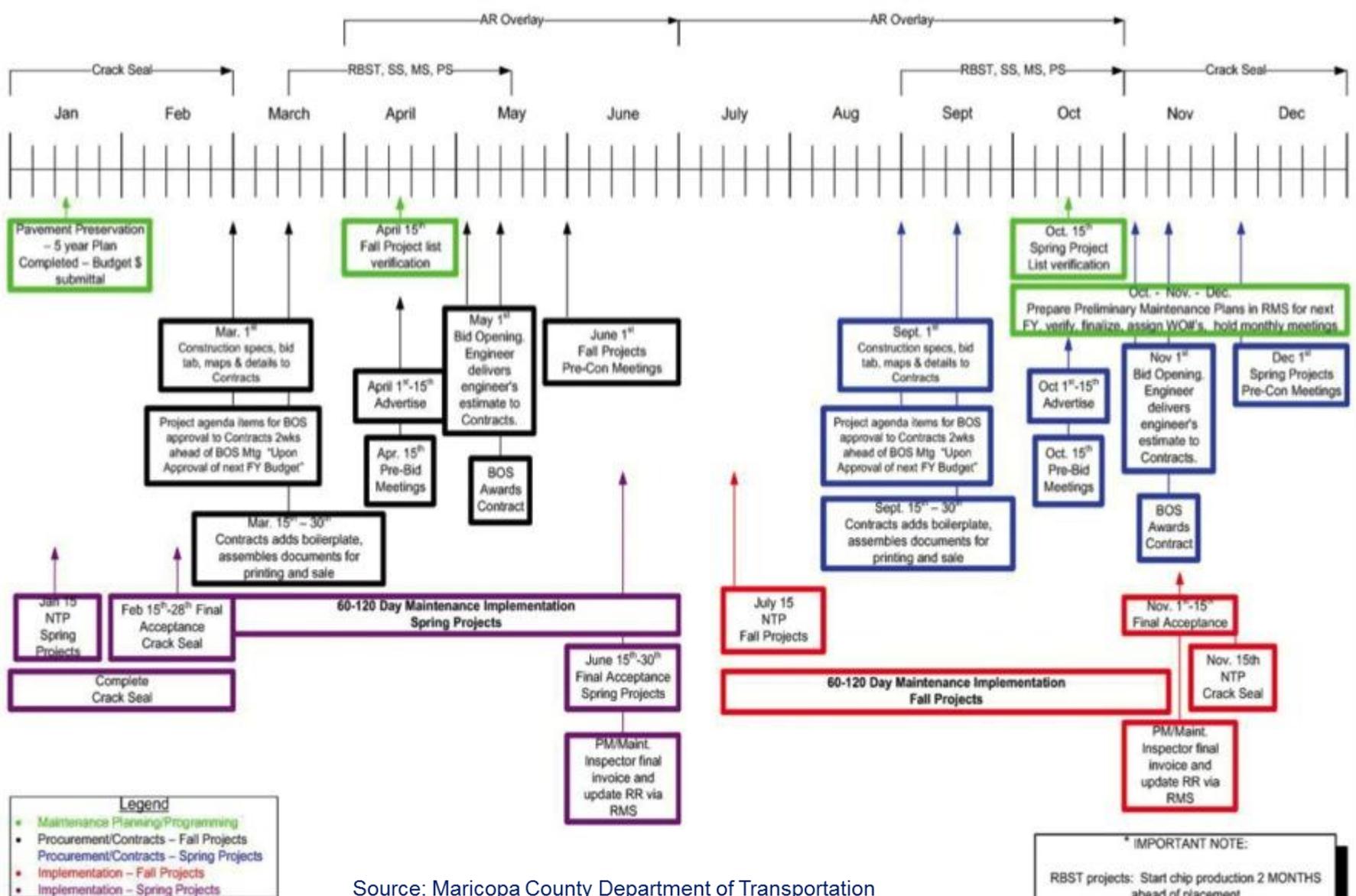


Source: Maricopa County Department of Transportation

# Typical Surface Treatment Programs

Road Condition Rating	Pavement Condition Index	International Roughness Index	Fog Seal	Preservative Seal	Crack Seal	Scrub Seal	Slurry Seal	Chip Seal	Microsurface	AR Overlay 1 1/2"	Mill & Replace 1 1/2" AR	Over Lay 2"	Cold In-Place with Chip Seal	Hot In-Place Recycle with 1 1/2" New AR	Reconstruct
EXCELLENT	100	0	Blue												
	95	50	Blue	Blue											
	90	80	Blue	Blue					Blue						
GOOD	85			Blue	Blue				Blue	Blue		Blue			
	80			Blue	Blue		Blue	Blue	Blue	Blue		Blue			
	75			Blue	Blue		Blue	Blue	Blue	Blue		Blue			
FAIR	70	120		Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue	
	65			Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue	
	60			Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue	
POOR	55			Blue	Blue	Blue		Blue	Blue	Blue	Blue	Blue		Blue	
	50	220		Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue	
	45			Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue	
FAILED	40			Blue	Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		
	35			Blue	Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		
	30			Blue	Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue
	25			Blue	Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue
	20			Blue	Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue
	15			Blue	Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue
10			Blue	Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue	
5			Blue	Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue	
0			Blue	Blue	Blue		Blue	Blue	Blue	Blue	Blue	Blue		Blue	
Costs Per Syd			\$0.25	\$0.45	\$0.50	\$2.00	\$2.10	\$2.50	\$3.25	\$8.50	\$9.50	\$9.75	\$9.80	\$10.00	\$25.35

# Timeline for Annual Pavement Management Program



Source: Maricopa County Department of Transportation

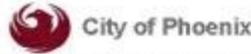


# Asphalt Pavement Surface Distress Rating System

Extent Spacing	Severity/Width				Extent	Severity/Width									
	< 3/8"		> 3/8"			< 3/8"		> 3/8"							
> 50 ft	1	(3)	4	(6)	Centerline Single	1	(3)	4	(6)						
12 ft to 50 ft	2	(5)	5	(8)	Wheel Path Single	2	(5)	5	(8)						
< 12 ft	3	(7)	6	(10)T	Multiples	3	(7)	6	(10)T						
D-76					D-70										
Fatigue Cracking					Block Cracks										
Extent	Severity/Width				Extent Block Size	Severity/Width									
	< 1/8"		> 1/8"			< 3/8"		> 3/8"							
One or two < 50 sf	1	(4)	5	(5)	9	(9)	> 50 sf	1	(3)	4	(6)				
Three or more < 50 sf	2	(6)	6	(7)	10	(11)	50 to 6 sf	2	(5)	5	(8)				
One of two > 50 sf	3	(8)	7	(12)	11	(14)	< 6 sf	3	(7)	6	(10)T				
Three or more > 50 sf	4	(10)	8	(13)	12	(15)T	D-50								
D-40					D-40										
Rutting					Raveling										
Extent		Severity			Extent		Severity/Width								
Laser Average 0.00-0.12		0			(0)			Wheel Paths < 50% length		1	(2)	5	(3)		
Laser Average 0.13-0.25		1			(4)			Wheel Paths > 50% length		2	(4)	6	(5)		
Laser Average 0.26-0.38		2			(8)			Entire Width < 50% length		3	(6)	7	(9)		
Laser Average 0.39-0.50		3			(12)			Entire Width > 50% length		4	(8)	8	(10)		
Laser Average > 0.50		4			(15)T			D-60							
D-60					D-60										
Shoving/Pushing/Corr.					Patching										
Extent		Severity			Extent/Number		Severity/Quality of Repair								
Laser Avg. IRI 0-59		0			(0)			< 5 Repairs		1	(01)	4	(04)	7	(07)
Laser Avg. IRI 60-94		1			(3)			5 to 15 Repairs		2	(02)	5	(05)	8	(08)
Laser Avg. IRI 95-170		2			(5)			> 15 Repairs		3	(03)	6	(06)	9	(10)T
Laser Avg. IRI 171-220		3			(8)			D-60							
Laser Avg. IRI > 220		4			(10)T			D-60							
D-60					D-60										
Excess Asphalt					Notes: 1. All numbers in parentheses are deduction points. 2. D = Default. 3. Trigger is activated when the rating is applied if the "T" value results in a lower Pavement Condition Rating (PCR) than the sum total of the deductions.										
Extent	Severity/Film														
	Thin		Thick												
Wheel Paths < 50% length	1	(3)	5	(4)											
Wheel Paths > 50% length	2	(5)	6	(6)											
Entire Width < 50% length	3	(7)	7	(8)											
Entire Width > 50% length	4	(9)	8	(10)T											
D-60					D-60										

Raveling				
Extent	Severity/Width			
	Minor		Major	
Wheel Paths < 50% length	1	(2)	5	(3)
Wheel Paths > 50% length	2	(4)	6	(5)
Entire Width < 50% length	3	(6)	7	(9)
Entire Width > 50% length	4	(8)	8	(10)
D-60				
Patching				
Severity/Quality of Repair				
Good		Fair		

# Bridge Inspection Summary Report



STREET TRANSPORTATION DEPARTMENT  
Bridge & Dam Safety

## Bridge Inspection Report 09599

Print Time 4/15/2013 8:37:23AM

Page 1 of 10

Inspector: Wbjocechowski

Inspection Date: 03/05/2013

Structure Name: Indian Bend Wash Br Facility: Tatum Boulevard Feature Crossed: INDIAN BEND WASH

Location: Tatum N Of Cholla St

Inspection Group : Cycle B

Road Name : Tatum Boulevard

Sub Group :

Agency : Phoenix

Political Unit (A250) : District 3

Maintenance District : NSC

Last Inspection Date : 03/03/2011

Insp No (A208) : 16

Next Inspection Date : March 2015

Inspection By : MBJ-ws, BW-cop

Inspection Crew (A224) : 9

Second Inspection By :

### Structure Evaluation

Deck Rating (58) : **7 Good**  
Super Rating (59) : **7 Good**  
Sub Rating (60) : **7 Good**  
Culvert Rating (62) : **N N/A (NBI)**

### Roadway Evaluation

Appr Roadway (72) : **8 Equal Desirable Crit**  
Bridge Rail (36A) : **1 Meets Standards**  
Transition Rail (36B) : **1 Meets Standards**  
Roadway Rail (36C) : **1 Meets Standards**  
End Section (36D) : **N N/A or not required**

### Waterway Evaluation

Channel Protection (61) : **8 Protected**  
Waterway Adequacy (71) : **8 Equal Desirable**  
Scour Critical (113) : **3 SC - Unstable**

### Structure Appraisal (Computed)

Structure Eval (67) : **7 Above Min Criteria**  
Deck Geom (68) : **2 Intolerable - Replace**  
Under Clearance (69) : **N Not applicable (NBI)**



### Element Evaluation

Element	Rating
38 Concrete Slab	2 Low
800 AC Wear Sort	
210 R/C Pier Wall	2 Low
215 R/C Abutment	2 Low
321 R/Conc Approach Slab	2 Low
800 AC Wear Sort	
333 Other Bridge Railing	2 Low
830 R/Conc Wing Wall	2 Low
840 Metal Trans Railing	2 Low
835 Galv Coat	
850 Metal Apr Railing	2 Low
835 Galv Coat	
851 Conc Appr Railing	

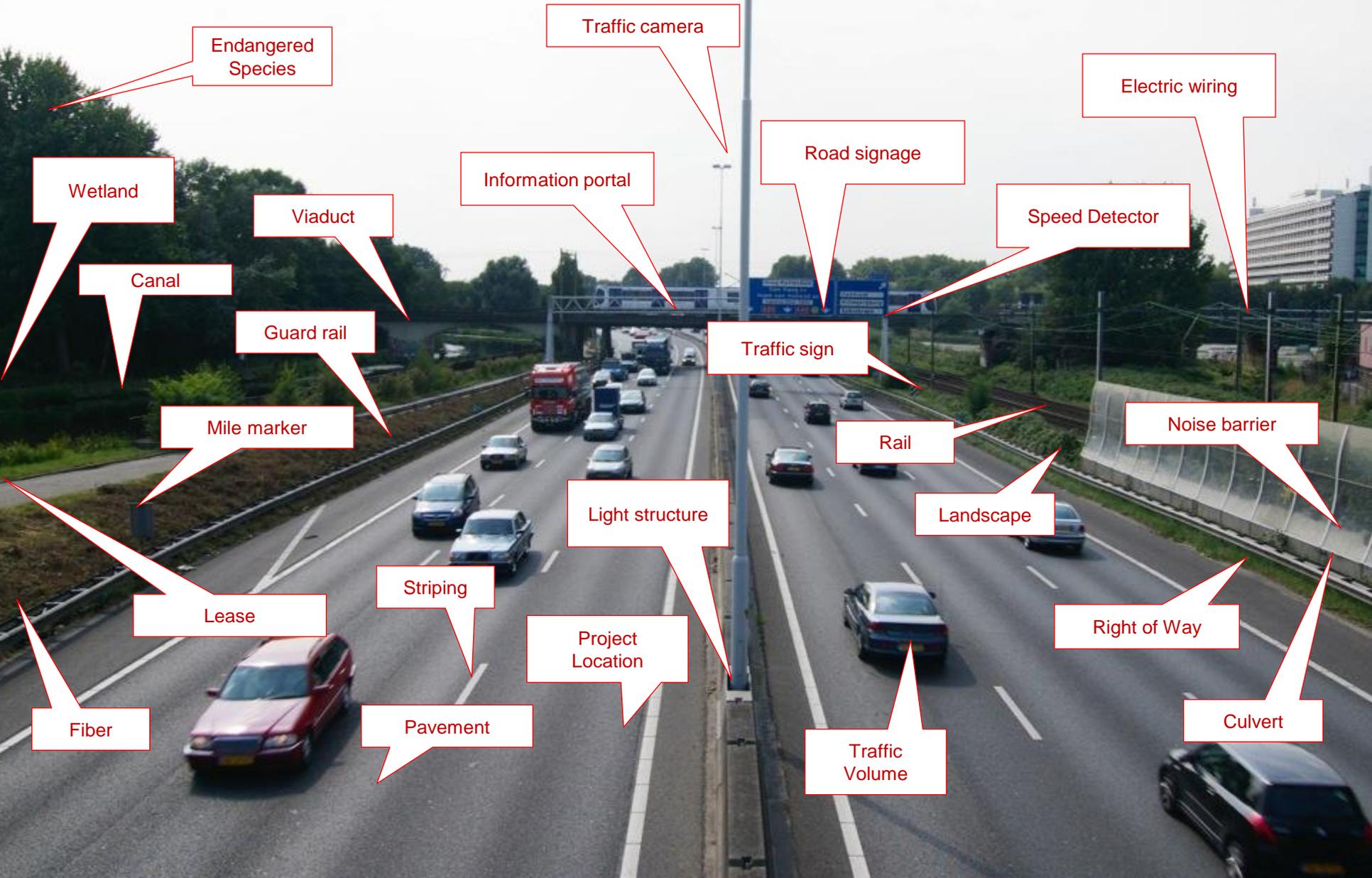
### Element Evaluation

Element	Env	Span Unit	Total	Quantity			
				State 1	State 2	State 3	State 4
38 Concrete Slab	2 Low	M Main	18944 sq.ft	18944	0	0	0
800 AC Wear Sort	Protect System	M Main	13022 sq.ft	0	0	13022	0
210 R/C Pier Wall	2 Low	M Main	600 ft	577	15	8	0
215 R/C Abutment	2 Low	M Main	240 ft	214	26	0	0
321 R/Conc Approach Slab	2 Low	M Main	2958 sq.ft	2958	0	0	0
800 AC Wear Sort	Protect System	M Main	2958 sq.ft	0	0	2958	0
333 Other Bridge Railing	2 Low	M Main	361 ft	360	0	1	0
830 R/Conc Wing Wall	2 Low	M Main	144 ft	143	0	1	0
840 Metal Trans Railing	2 Low	M Main	78 ft	72	0	6	0
835 Galv Coat	Protect System	M Main	351 sq.ft	0	193	160	0
850 Metal Apr Railing	2 Low	M Main	435 ft	433	0	2	0
835 Galv Coat	Protect System	M Main	1305 sq.ft	0	1095	210	0
851 Conc Appr Railing	2 Low	M Main	28 ft	28	0	0	0

### Inspection Notes

Mike Johnson and Bobby Wbjocechowski inspected on 3-5-2013

# DOT, County, City Responsibilities are Diverse



Endangered Species

Traffic camera

Electric wiring

Wetland

Road signage

Speed Detector

Canal

Information portal

Viaduct

Guard rail

Traffic sign

Mile marker

Rail

Noise barrier

Light structure

Landscape

Striping

Lease

Project Location

Right of Way

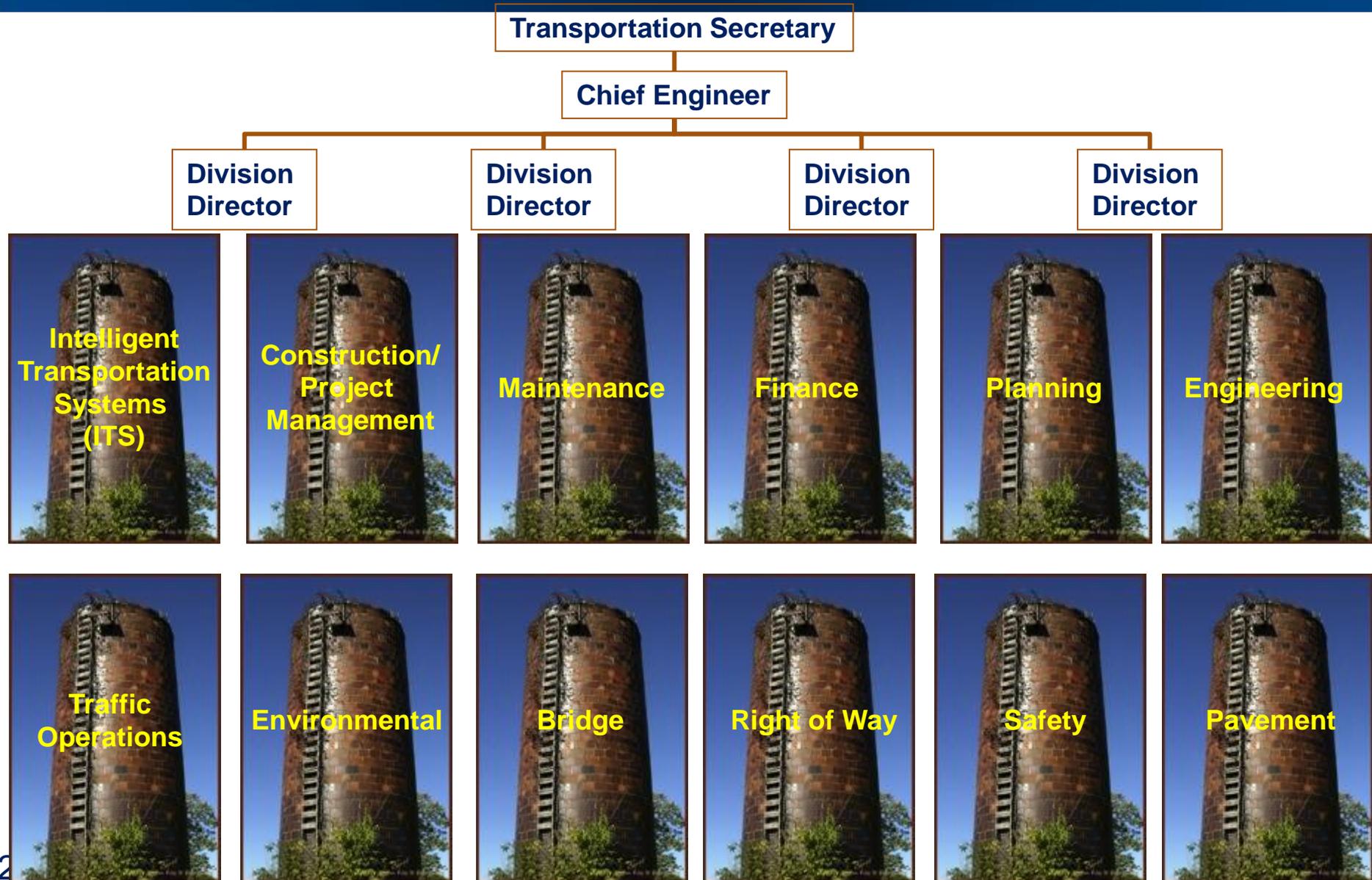
Fiber

Pavement

Traffic Volume

Culvert

# Typical Organizational Structure



# Technologies in Today's Agencies Cover a Wide Assortment

*What is the best way to bring all of this information together?*



*Accident data:  
GPS, Electronic Forms*

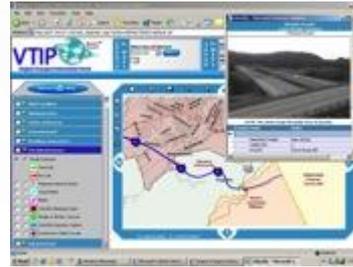


*Winter Operations:  
AVL, Blade & Spreader Monitoring*



*Asset Inventory:  
GPS, Electronic Forms,  
LIDAR, Video Log, Laser*

*Intelligent Transportation Systems:  
Road Sensors, Cameras, Fiber  
Variable Message Signs,  
Vehicle/Device Communication, Visualization*



*Communication & Reporting:  
511 Telephones, Traveler Info Web  
Sites, HPMS Report, Databases,  
Radio Network, Computer  
Networks*

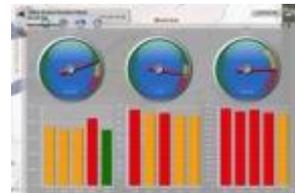
*Maintenance Activities:  
Automated Scheduling &  
Prioritization, Work  
Records*



*Construction Activities:  
Survey, CADD, Project  
Management Software*



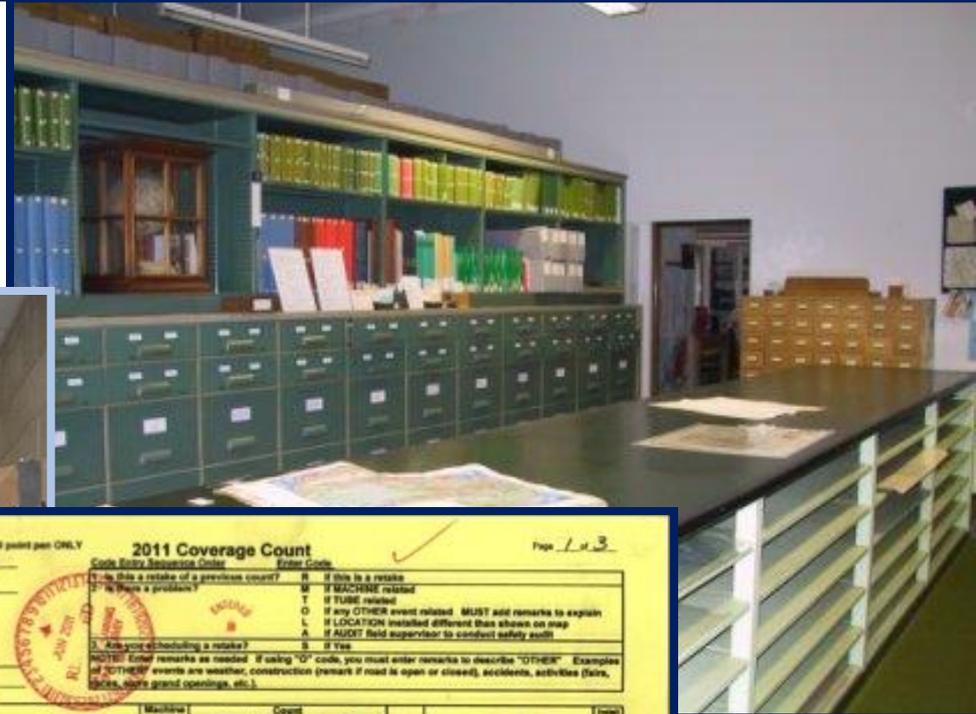
*Resource Management:  
Time sheets, Financial  
Systems*



# And then there is paper...

How do you make use of these data?

How do you make use of this data?



Complete using BLACK or BLUE ball point pen ONLY

### 2011 Coverage Count

Code Book, Appendix Code Page Code

Date Collected Tim Anderson  **RECEIVED** **NOV 20 11** **INSURANCE**

Date Installed 5.9.11  Is this a remake of a previous count?  If this is a remake

Day of Week:  TU  W  TH  F  Is there a problem?  M If MACHINE related

County Name Forsyth  T If TUBE related

Special Project #  O If any OTHER event related. MUST add remarks to explain

Start Time 2004  L If LOCATION installed different than shown on map

Always encircling a stake?  A If AUDIT field supervisor to conduct safety audit

NOTE: Enter remarks as needed. If using "O" code, you must enter remarks to describe "OTHER". Examples of "OTHER" events are weather, construction (remark if road is open or closed), accidents, activities (fairs, fairs, note grand openings, etc.).

Station No.	Route ID	Location	Machine No.	One	Count	Three	Codes	Remarks	Inval. Yes
447	US 158	N = Beverly Rd	44804	8981	9086		S	other site up	no
447	US 158	N = Beverly Rd	40852	1995	0		TS		no
451	SR 2377	E = US 158	32051	6714	6842				no
449	SR 2357	N = SR 2433	32608	4622	4718				no
498	SR 2367	S = SR 2423	32606	4827	4932				no
722	Water Works Rd	N = SR 2357	45832	4169	4357				no
445	SR 2367	S = Water Works Rd	45824	3537	3622				no
464	SR 2377	W = Myers Dr	40852	7270	7471				no
597	SR 2377	S = SR 2574	40800	10408	10490				no
1570	SR 2385	N = SR 2377	43866	4026	4054				no
591	SR 2385	N = SR 2559	4302	3678	3682				no
593	SR 2377	N = SR 2385	44888	10544	10731				no
595	SR 2467	S = SR 2377	40049	5779	6082				no
3469	SR 2467	S = SR 2781	32039	5182	5274				no
2648	SR 2309	N = SR 2447	40824	165	140		R		no

# Detailed Integration

File Edit View Favorites Tools Help

★ Favorites BPA Test District 4

Project Suite

FM#:  Advanced Search

**Project Tree**

421662.1

- Video Log
- Project Impacts (GIS)
- Scope
  - Schedule Changes
  - Scheduling
- EVT
  - Drainage
  - Final Plans
  - Contracts
  - Environmental Tracking System
  - Commitment
  - Status
  - Contacts
  - File Uploads

**Project Specific Options**

Item Segment	Project Manager	Goes With	Lead Job	Related Projects
421662.1	Fausto Gomez	--	--	

Location	
County	City
BROWARD	COCONUT CREEK CORAL SPRINGS MARGATE PARKLAND

Roadway ID	Side	MP From/To	Section Work Length
86100000	Composite	20.941 / 23.359	2.418
86100102	Composite	0.000 / 0.226	0.226

[Show All Locations...](#)

SR/Local Name	Limits
SR-7/US-441	FM SAMPLE RD N. APPROACH TO N OF SAWGRASS/TPK

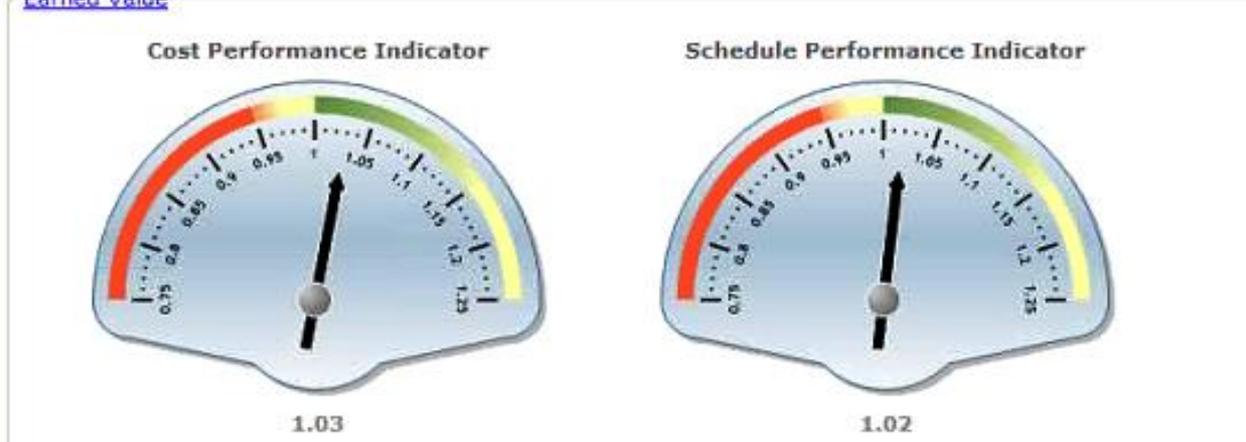
Description	Status	Cont.Class	Federal Oversight
Work Mix			
RESURFACING	CONTRACT EXECUTED	TO BE LET	NO

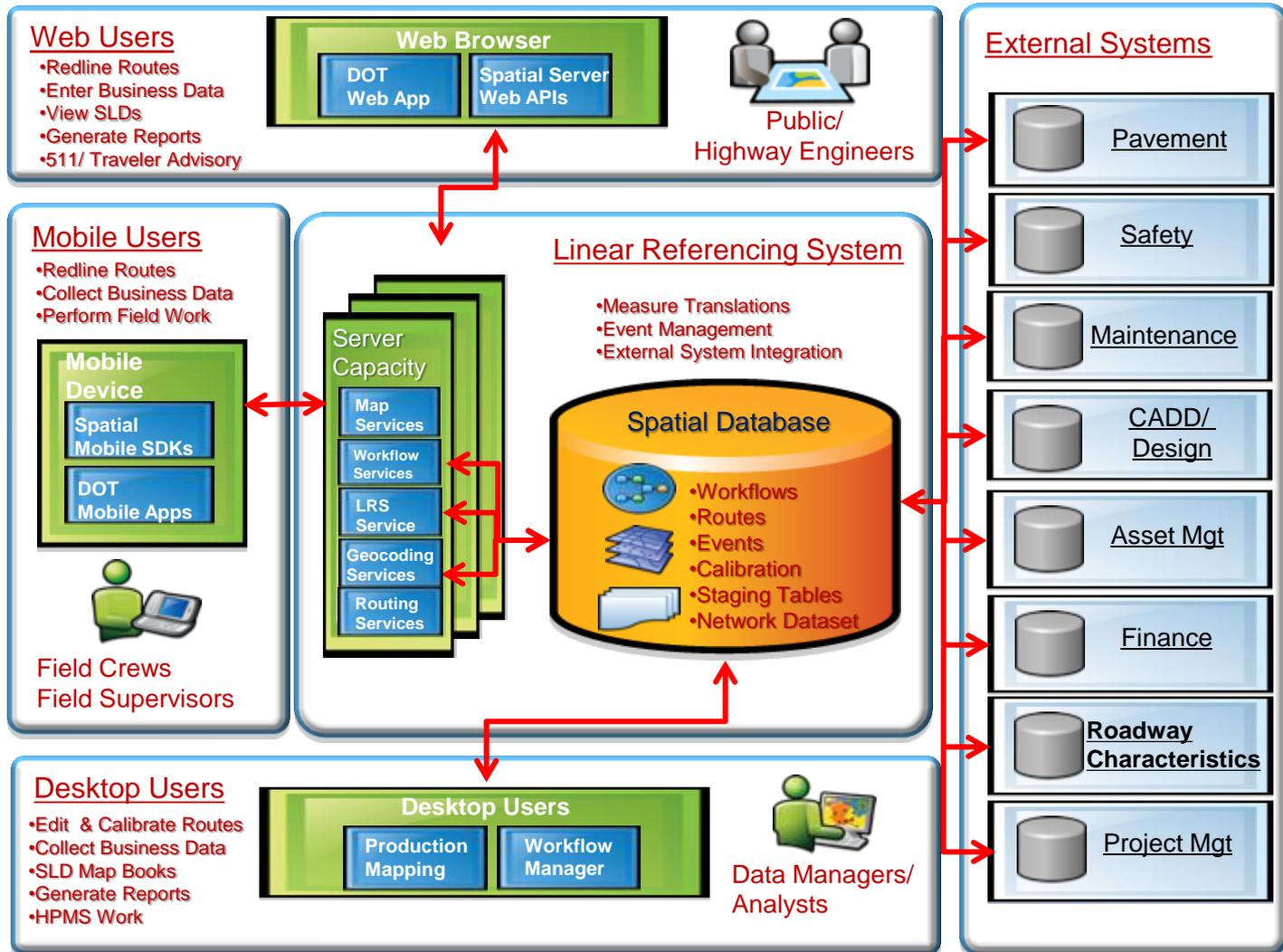
**Item Segment Comments/Extra Description**

INCLUDES 2 NORTHERN RAMPS UNDER SECTION 86100102 & 103/ SCOPE INCLUDES SAFETY WORK PH52 SPLIT FUNDED DDR/HSP APPROVED BY SAFETY COMMITTEE 4/19/07

Financial	Phase	(PDC) Funded	FY(1st)	UnFunded	Fed Aid #
<a href="#">Preliminary Engineering (3X)</a>		\$857,841.00	2008	\$0.00	--
<a href="#">Construction (5X)</a>		\$3,358,663.00	2011	\$0.00	4751-128-P
<a href="#">Consultants/Contractors (52)</a>		\$3,358,663.00	2011	\$0.00	4751-128-P
<a href="#">Construction Support (6X)</a>		\$783,138.00	2011	\$0.00	--



# Fundamentals For a Highly Integrated Engineering Environment



# GIS

- **Does my LRS support a stable multiple linear referencing system, dual carriageways, and event data over time for local, state and federal roads?**
- **Is my roadway information management system efficient enough to collect and manage changes for local, state, and federal roads?**
- **Can I quickly and accurately comply with HPMS and other federal reporting?**
- **Does my performance management system provide accurate reports and analytics for external and internal communications?**

# GIS Support to MAP-21

- **Linear Referencing**
  - Multiple linear referencing methods
  - Multiple geometric representation
- **Roadway Inventory Management**
  - Event data management of roadway assets and HPMS section data
- **Highway Safety Planning**
  - Locate crash data
  - Identify hot spots
  - Monitor effect of counter-measures
- **HPMS Report**
  - Manage, view, report
  - Pull in data from different sources
  - Validate
  - Submit
  - HPMS 2014 requires dual carriageway
- **Performance Monitoring and Management**

# Transportation Infrastructure Management

- **Locate**
  - Infrastructure
  - Hazardous Locations
  - Crashes
- **Inspect (e.g. bridges and tunnels)**
- **Monitor**
- **Report**
  - Prioritize Capital Improvement
  - Effects of Safety Planning Overtime
  - Streamline Reporting
    - Internal
    - Share with public
    - Thematic maps

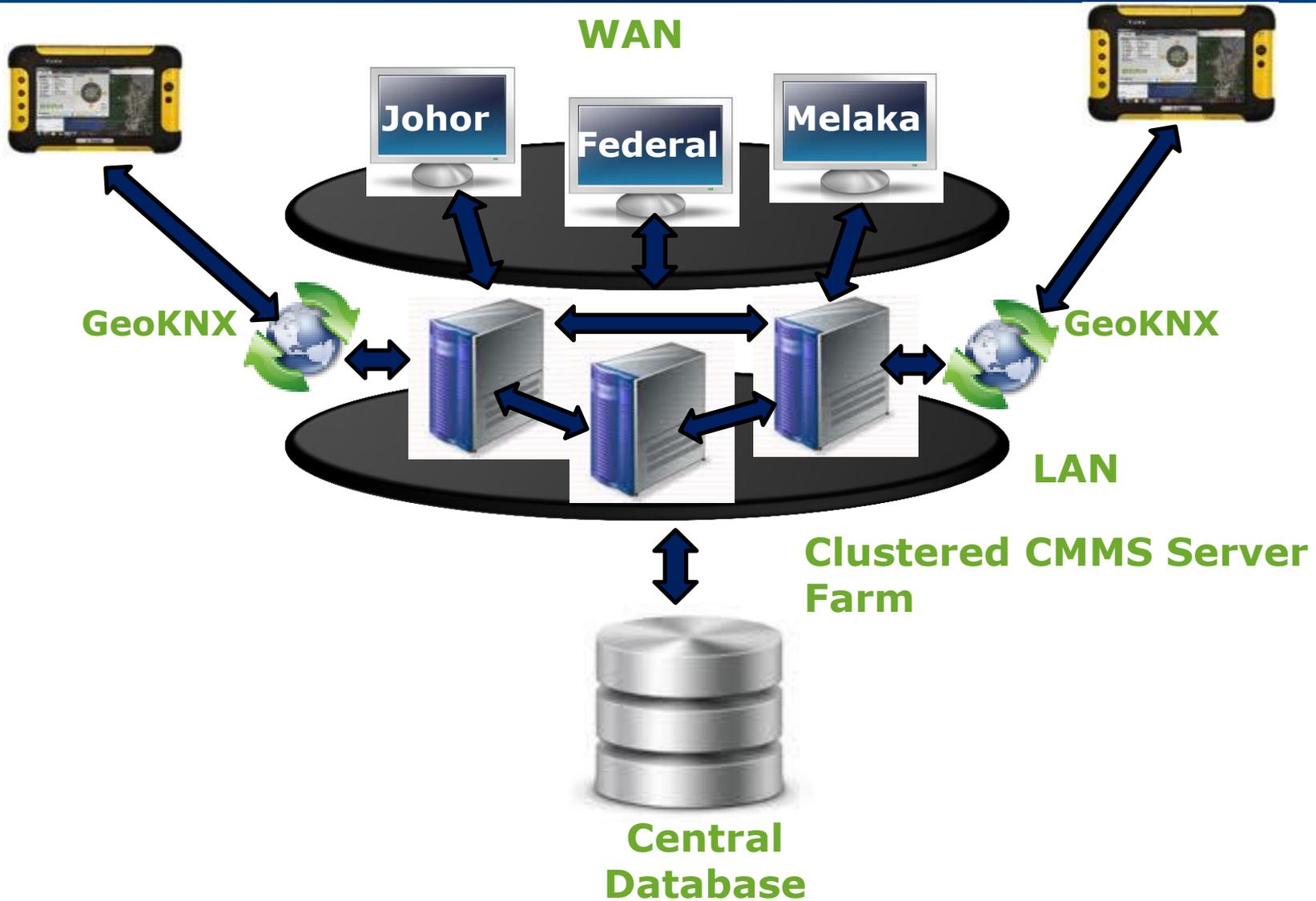
## Background Information

- **Tunnel Operations, Maintenance, Inspection and Evaluation (TOMIE) Manual:**
  - **Objective:** provide guidance to tunnel owners and to use Best Practices to operate, maintain, inspect, evaluate their tunnels

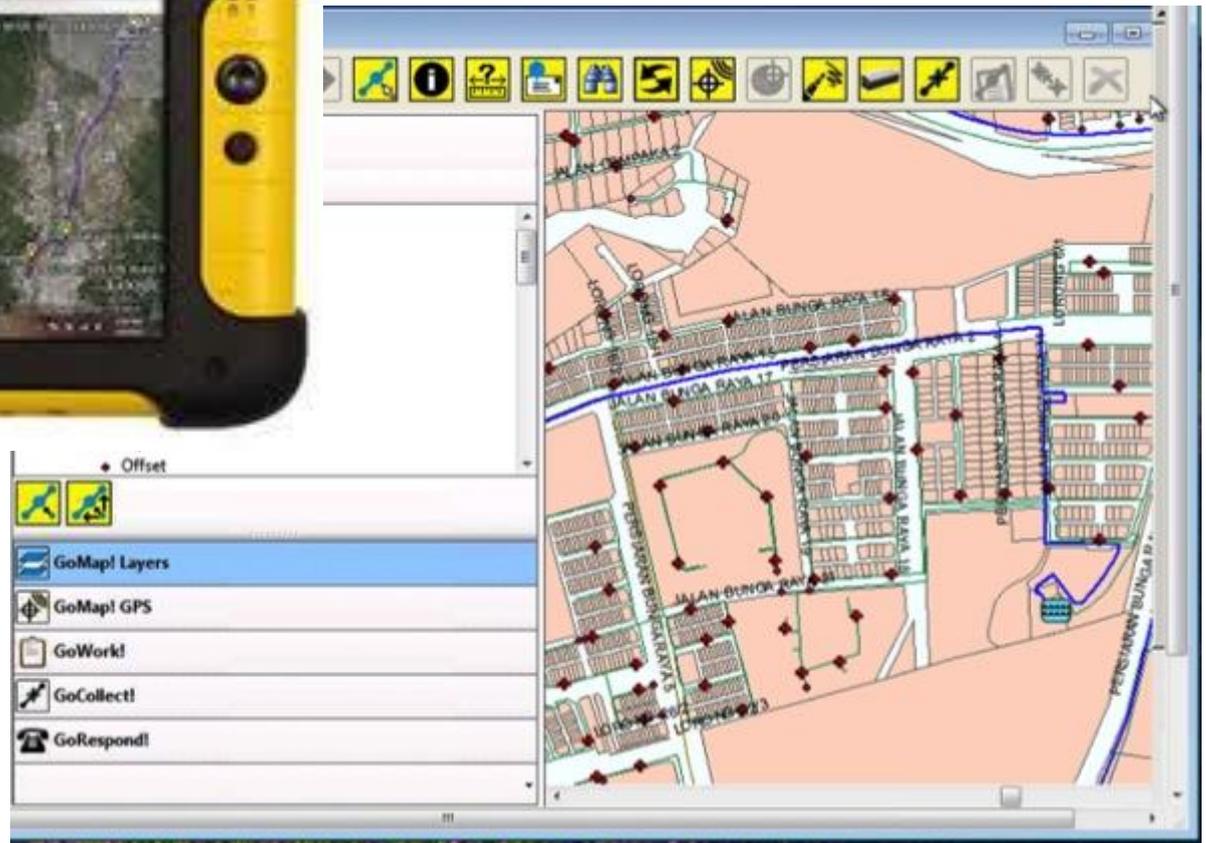


Tunnel Operations,  
Maintenance, Inspection &  
Evaluation

# So What Might This System Look Like?



# Mobile Data Collection Tool Syncs with Office Database



# And Includes Work Order Editor, Syncing Real Time

The screenshot displays the GeoKNX Mobile application interface. The main window is titled "Work Order Editor - Modify - WO# 1005: Hydrant Repair". The interface is divided into several sections:

- Top Bar:** Contains various navigation and tool icons such as zoom in/out, pan, and search.
- Map:** Shows a street map with a blue line indicating a hydrant repair path. Labels include "JALAN BUNGA BAYA 18/4" and "PERSTAWAN BUNGA RAYA 1".
- Form Fields:** A table-like structure for entering work order details.

Work Order Information	
Reported By	rhaman
Work Order	1005
Priority	
Reported Date	12/6/2012 7:27 PM
Work Order Description	Hydrant Repair
Scheduled Start	
Scheduled Finish	
Supervisor	
Lead	rhaman
Classification	
Site	N-Negeri Sembilan
Work Type	
Problem Code	
Status	APPR
Status Date	12/6/2012 3:26 AM

Below the form fields is a section for "Asset Information". At the bottom of the window are "OK" and "Cancel" buttons.

# Customizable User Interface – “Dashboard”

Welcome to Pengurusan / x  
 paab.geodecisions.com

Google Apps Welcome to Pengur... IRRIS Login Loudin Water Hydra... LOCATE/IM Google ArcGIS Viewer for Flex CityEngine Web Vie... Risk Management Fleet RAG Report Other bookmarks

Pengurusan Aset Air Berhad

User: admin1 / Role: Administrator / State(s): Global [ Language: English ] / [ User Profile ] [ Help ] [ Log Off ]

Dashboard Map Assets Work Orders Inventory Reports Charts Alerts Feeds MCDM SCADA Analysis Users Notifications SMTP Log

Scheduled tasks

### Map Overview

### Chart - Total Asset by Type (Total: 1705)

Asset Type	Count
Reservoirs	1241
Water Intakes	87
Dams	16
Pump House	(unlabeled)

### Chart - Total asset by Status (Total: 1434)

Status	Count
Active	1222
Inactive	184
Abandoned	26

### Reports

- List of assets with condition rating 1
- Group Water Structure Condition
- Reservoir Condition
- Pump House Condition
- All Open Service Cases
- Water consumed
- Amount of money received

### Chart - Material (Total: 175598)

Material	Count
vinyl Chloride	38081
Mild Steel	39361
Poly Chloride	146
Poly Steel	187
Other	281
Abestos Cemen	(unlabeled)
Acrylonitrile-Bu	(unlabeled)
Anti-Bacteria 3 L	(unlabeled)
Cast Iron	1487
Ductile Iron	6833
Galvanized Iron	138
High Density Polythylene	13857

### Feed - PAAB and Industry News 2012

- Langat 2 will end Selangor water woes, says PAAB  
9/17/2012 11:29:23 PM -04:00 | PAAB & Industry News 2012
- Tawaran tender Langat 2 pastikan projek siap  
9/12/2012 11:00:00 AM -04:00 | PAAB & Industry News 2012
- Lembah Klang berdepan krisis air tempoh setahun  
9/12/2012 11:00:00 AM -04:00 | PAAB & Industry News 2012

### Feed - Events

- PAAB Signed MOA for Consultancy Services for Langat 2  
10/20/2008 4:19:54 AM -04:00 | Events

### Feed - Alerts

# And Multiple Criteria Decision Model – Asset Rankings

Browser: http://paab.geodecisions.com/ | Pending Invitations | GoRPM | Marcellus Shale | Welcome to Peng...

File Edit View Favorites Tools Help

Navigation: All files and folders - Box | Centurion Research Soluti... | MiX Telematics Hardware... | Welcome to Pengurusan ... | Suggested Sites | Web Slice Gallery | Suggested Sites | Bing Traffic

## Pengurusan Aset Air Berhad

[ Profile ] [ Help ] [ Log Off ]  
User: admin / Role: Administrator / State(s): Global

Dashboard | Map | Assets | Work Orders | Reports | Charts | News | MCDM | Users | Notifications | SMTP | JW10000004 \*

File Edit | Test

Template | Mapping Fields | Ranking | Details x

View Ranking

Show active only (uncheck to show all) | View Ranking

Risk Calculation

Calculate Risk

Capacity Effect

Get Capacity Effect

View Detail

View Children Component

Current Ranking: intake\_11012012 (Water Intake)

Rank	Asset Tag	Asset Name	Poff	Coff	Risk	Capacity [MLD]
1	PAAB/N/006/IN/03	PASIR BESAR BARU	2.201	2.166	3	22.73
2	PAAB/N/001/IN/02	TITI	2.188	2.166	3	11.35
3	PAAB/N/005/IN/05	SUNGGAI BATANG PENAR	2.188	2.166	3	181.84
4	PAAB/N/007/IN/03	KUALA JELAI	2.18	2.166	3	68.2
5	PAAB/N/005/IN/04	SUNGGAI TERIP	2.168	2.166	3	191
6	PAAB/N/001/IN/03	LAKAI	2.166	2.166	3	8.2
7	PAAB/N/002/IN/06	BUKIT	2.159	2.166	3	2.32
8	PAAB/N/005/IN/06	PANTAI	2.155	2.166	3	18.2
9	PAAB/N/001/IN/04	DURIAN TAWAR	2.155	2.166	3	1
10	PAAB/N/004/IN/04	SAWAH RAJA	2.148	2.166	3	45.46
11	PAAB/N/005/IN/07	SUNGGAI LINGGI	2.145	2.166	3	136
12	PAAB/N/007/IN/01	JAMBU LAPAN	2.145	2.166	3	40.05
13	PAAB/N/006/IN/01	GEMAS BARU	2.145	2.166	3	36.37
14	PAAB/N/007/IN/02	DANGI	2.145	2.166	3	13.64
15	PAAB/N/004/IN/03	PEDAS LAMA	2.145	2.166	3	9.1
16	PAAB/N/002/IN/02	KUALA PILAH	2.145	2.166	3	9

**PoF x CoF**

Successfully get all menu data | intake\_11012012 (Water Intake)

Pengurusan Aset Air Berhad (732544-D), 24th Floor, Menara Multi-Purpose, Capital Square, 8, Jalan Munshi Abdullah, 50100, Kuala Lumpur

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# Searchable Maps Enhance Access and Understanding

The screenshot displays a web browser window with the URL <http://paab.geodecisions.com/>. The browser's address bar shows several tabs: "Pending Invitations | ...", "GoRPM", "Marcellus Shale", and "Welcome to Peng...". The browser's menu bar includes "File", "Edit", "View", "Favorites", "Tools", and "Help". The browser's status bar shows "All files and folders - Box", "Centurion Research Soluti...", "MIX Telematics Hardware...", "Welcome to Pengurusan ...", "Suggested Sites", "Web Slice Gallery", "Suggested Sites", and "Bing Traffic".

The main content area is titled "Pengurusan Aset Air Berhad" and includes navigation links: "[ Profile ]", "[ Help ]", and "[ Log Off ]". Below these links, the user information is displayed: "User: admin / Role: Administrator / State(s): Global".

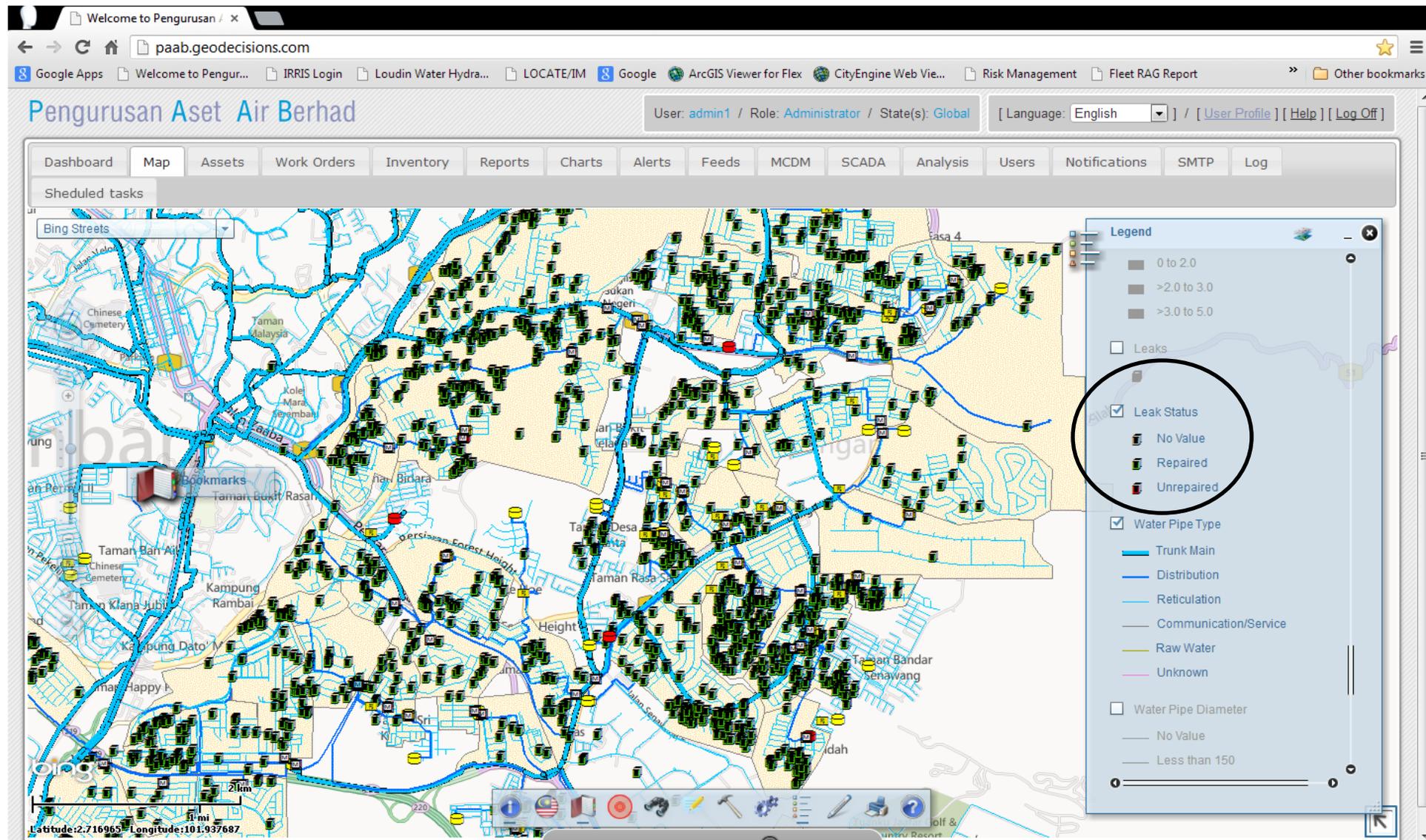
The application interface features a top navigation bar with tabs: "Dashboard", "Map", "Assets", "Work Orders", "Reports", "Charts", "News", "MCDM", "Users", "Notifications", and "SMTP". The "Map" tab is active, showing a Bing Streets map of a city area. A "Selection" dialog box is open over the map, with the "Target Layer" set to "Fire Hydrants". The "Fields" section lists "Hydrant Size", "Condition Rating", and "Material". The "Operators" section includes buttons for "=", "<", ">", "<=", ">=", "Like", "and", and "or". The "Values" section lists "1", "3", and "4". The dialog box also displays "Processing: 20000 of 56859 (Esc to Cancel)" and a SQL query: "SELECT \* FROM Fire Hydrants WHERE:". The "Clear" and "Select" buttons are at the bottom of the dialog box.

A "Legend" dialog box is also open, showing a list of map features and their corresponding colors and line styles. The legend includes "Type" (Trunk Main, Distribution, Reticulation) and "Diameter" (No Value, Less than 150, 150 to 300, 350 to 900, 1000 and Greater). The "Raw Water Pipes" section includes "No Value" and "Less than 150".

The map shows a network of water pipes and hydrants. The "Legend" dialog box is open, showing a list of map features and their corresponding colors and line styles. The legend includes "Type" (Trunk Main, Distribution, Reticulation) and "Diameter" (No Value, Less than 150, 150 to 300, 350 to 900, 1000 and Greater). The "Raw Water Pipes" section includes "No Value" and "Less than 150".

The bottom of the browser window shows the "Bing" logo and the coordinates "Latitude:1.496354 Longitude:103.793101".

# This "Theme" Example Shows System Leak History



# So You Can Use Network Tracing to Show Customers Affected...and Consequence of Failure

Welcome to Pengurusan / x

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Pengurusan Aset Air Berhad

User: admin1 / Role: Administrator / State(s): Global [ Language: English ] [ User Profile ] [ Help ] [ Log Off ]

Dashboard Map Assets Work Orders Inventory Reports Charts Alerts Feeds MCDM SCADA Analysis Users Notifications SMTP Log

Scheduled tasks

Bing Streets

### Interactive Network Trace Model

Affected Service Connections

ACCOUNTNO	ADD1	ADD2	ADD3	ANCILLARYROL	ASSETTAG	CHILDRE
0510000715086	KG GAGU ULU T	JELEBU	71600 KUALA KI	2		
0510001327088	KG GAGU ULU J		71600 KUALA KI	2		
0510001264129	KG GAGU ULU T	71600 KUALA KI	71600 KUALA KI	2		
0510074889010	NO 41 KG GAGU	71600 KUALA KI	71600 KUALA KI	2		
0510000285069	KG GAGU ULU T	NG	71600 KUALA KI	2		

Clear

### Legend

- Crossings
  - No Value
  - Above Gound
  - Under Ground
- Crossing Condition Rating
  - 0 to 2.0
  - >2.0 to 3.0
  - >3.0 to 5.0
- Fire Hydrants
  - No Value
  - Pillar
  - Underground

500 m 2000 ft

Latitude:2.938370 Longitude:102.005270

# You Can See Spatial Overlay of Work Orders with High Risk Assets

Dashboard Map Assets Inventory Work Orders Reports Charts Alerts Feeds MCDM SCADA Analysis Users Notifications SMTP Log

Scheduled tasks J1000000006

Bing Streets

Name	Asset Number	Operating Status	Asset Tag	Condition
Parit Kadir	J1000000014	Active	J/001/PH/02	2
Industri Parit Raj	J1000000018	Inactive	J/001/PH/06	3.836
Batang Height	J1000000017	Active	J/001/PH/05	2.078
Taman Soga	J1000000016	Active	J/001/PH/04	2
... (truncated) ...	...	...	...	...

Legend

- Features
- Dams
- Reservoirs
- Water Treatment Plants
- Water Pipe Type
- Trunk Main
- Distribution

Latitude: 1.736546 Longitude: 103.295845

# Work Order Detail

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paab.geodecisions.com

Google Apps Welcome to Pengur... IRRIS Login Loudin Water Hydra... LOCATE/IM Google ArcGIS Viewer for Flex CityEngine Web Vie... Risk Management Fleet RAG Report Other bookmarks

## Pengurusan Aset Air Berhad

User: admin1 / Role: Administrator / State(s): Global [ Language: English ] / [ User Profile ] [ Help ] [ Log Off ]

Dashboard Map Assets Work Orders Inventory Reports Charts Alerts Feeds MCDM SCADA Analysis Users Notifications SMTP Log

Scheduled tasks 1004 \*

▼ Work activity details

Work order number	Work order's location	Status of the work order	Identifies the site
<input type="text" value="1004"/>	<input type="text" value="WJ001"/>	<input type="text" value="WAPPR"/>	<input type="text" value="J"/>
Parent of the work order	Work order's class	Date the work order status was last changed	Description
<input type="text" value="WJ10000001"/>	<input type="text" value="ACTIVITY"/>	<input type="text" value="2012-10-16T09:23:15-04:00"/>	<input type="text" value="Kerja2 membuat Drain Hole pd Base Pump siap dilaksanakan"/>
Work order's type	Asset Number	Modified By	
<input type="text" value="CM"/>	<input type="text" value="J1000075541"/>	<input type="text" value="MAXADMIN"/>	
Organization Identifier	Failure class of the defined work asset	Date the work order was last modifiedD	
<input type="text"/>	<input type="text"/>	<input type="text" value="2012-10-16T09:23:15-04:00"/>	

▼ Actual costs and hours

The cost of internal labor for the task on the current work order	Actual Material Cost
<input type="text"/>	<input type="text"/>
The hours of internal labor that are required for the task on the current work order	The cost of external labor that are required for the task on the current work order
<input type="text"/>	<input type="text"/>
Actual Labor Cost	The hours of external labor that are required for the task on the current work order
<input type="text"/>	<input type="text"/>
Actual Labor Hours	Actual Tool Cost
<input type="text"/>	<input type="text"/>
Total actual service cost against this work order	Date and time the work was actually started
<input type="text"/>	<input type="text"/>

► Approved costs and hours

# Custom Charts Assist in Condition Monitoring

Browser: <http://paab.geodecisions.com/>

Navigation: [ Profile ] [ Help ] [ Log Off ]  
User: admin / Role: Administrator / State(s): Global

Dashboard | Map | Assets | Work Orders | Reports | **Charts** | News | MCDM | Users | Notifications | SMTP | JW1000004

Asset type: Water Structure  
Chart type: Total Asset Type by Condition  
States:  Johor,  Negeri Sembilan,  Melaka,  Breakdown by states

### Breakdown of Total Asset Type by Condition Rating

Condition Rating	Count
Very Good	98381
Good	85054
Moderate	81891
Poor	74270
Very Poor	96601

Legend:  
Very Good (Blue)  
Good (Red)  
Moderate (Green)  
Poor (Purple)  
Very Poor (Teal)

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# Where Do We Go From Here?

- **Visioning Workshop**
  - Gap analysis
  - Prioritize tasks
- **Data Integration Portal**
  - Inventory
  - Collaboration
  - Analysis
  - KPIs
- **Implementation and Training**

# Asset Management

*In developing an effective transportation asset management system that includes a strategic approach to obtaining information you will have the tools to help you readily share the data with others.*

*As a result, you're able to make meaningful decisions related to the development, operations, repair, rehabilitation, and preservation of transportation infrastructure while taking into account stakeholders, processes, policies, lifecycle, and costs.*

# Thank You!



- **For further information contact:**
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