

Overview of PANYNJ Enterprise Maximo Platform Implementation Journey (2016 - 2027)

NEMUG Fall 2023 Meeting

Robert K Kumapley, PE, LEED AP

October 11 & 12, 2023

Presentation Overview

1. The PANYNJ Mission
2. Enterprise Maximo Platform Business Objective
3. The Vision and End Product
4. EAM Conceptual Integration Framework
5. Governance Importance & Design Standard Process
6. Enterprise Maximo Minimum Viable Product & Progress Update
7. EAM Program Milestones (2016 - 2027)
8. New Initiatives (Asset specific PCR and Integrated safety/job plans)
9. Concluding Remarks & Lessons Learned

The PANYNJ Mission

Our Priorities: What we focus on to achieve this mission



Safety & Security

Provide peace of mind through world-class protection



Capital Plan

Revitalize our infrastructure



Customer Experience

Ensure a 21st century customer experience



Operational Excellence

Deliver first-class operations
Maintain financial self-sufficiency



Sustainability

Reduce our environmental impact



Employer of Choice

Retain, grow and attract top talent

Our Standards: How we meet these priorities



Integrity



Diversity, Equity & Inclusion



Global Best Practices



21st Century Technology



Collaboration



Speed

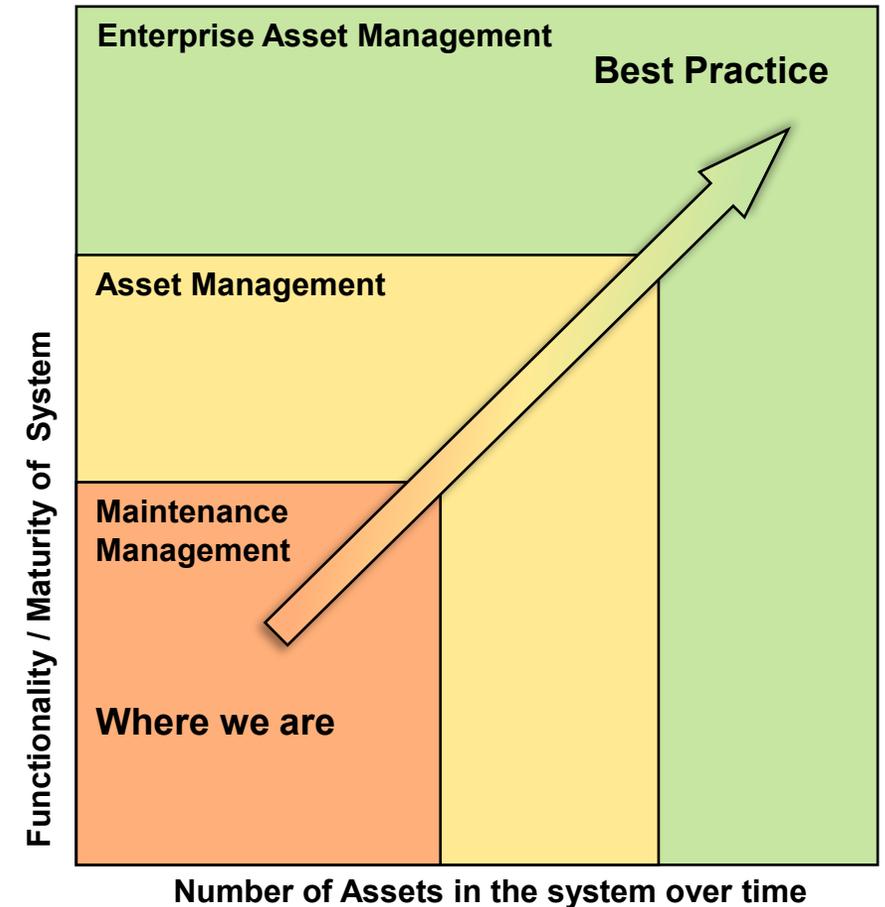
**Keep
the
Region
Moving**

Business Objective (2016 ~ 2027)

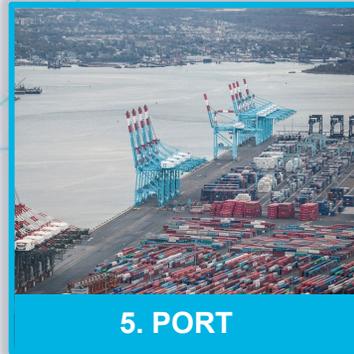
- Eliminate obsolete and one-off systems
- Establish a uniform Enterprise Asset Management System
- Complete an asset inventory database, and knowledge of **condition of assets** which are critical to performance

- Establish consistency in reporting across the Agency
- Standardize maintenance routines across the Agency
- Maintenance analysis and **failure prevention**
- Establish short and long-term capital and maintenance investment forecasting (asset and workforce)

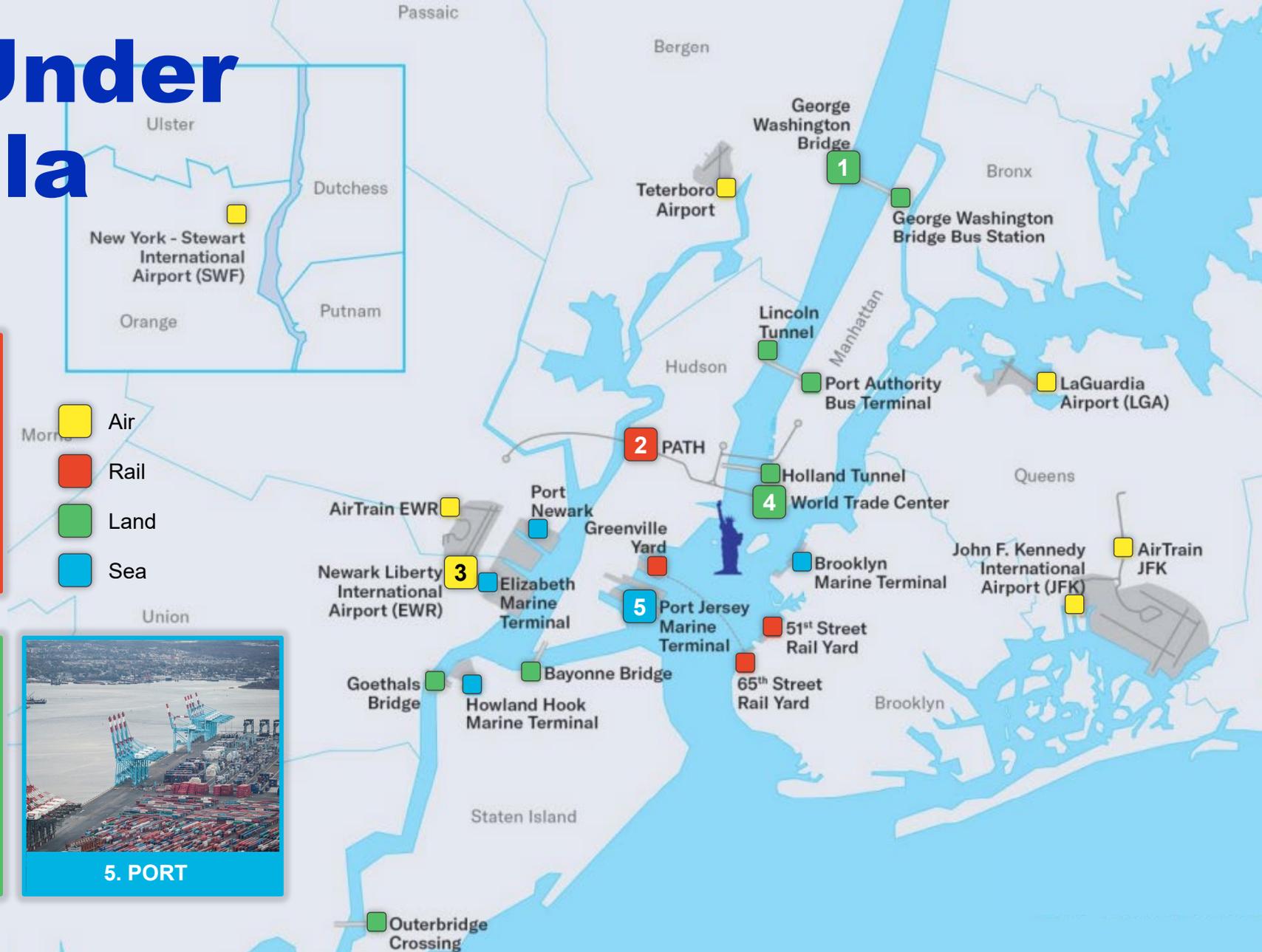
- Establish a Strategic Asset Management Plan and Asset Management Plans integrated into Business and Capital Planning and Line Department Business Planning processes
- Achieve maintenance and capital productivity gains



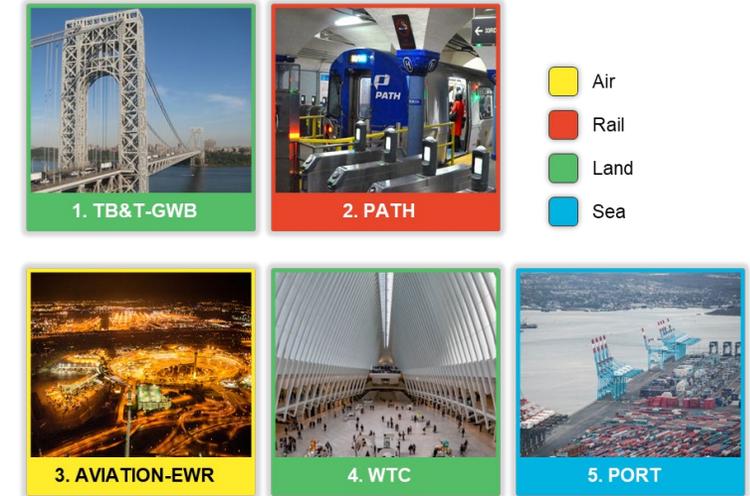
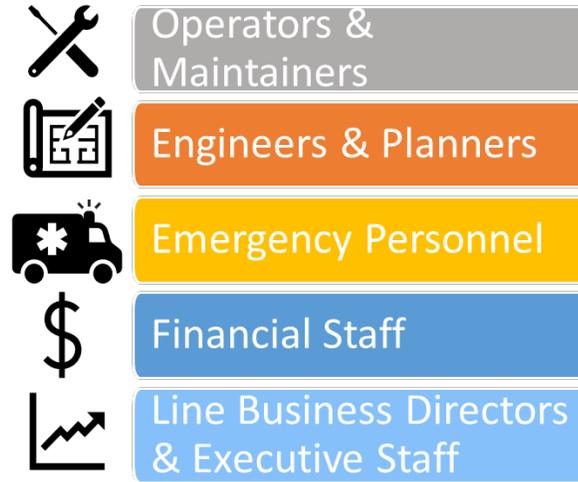
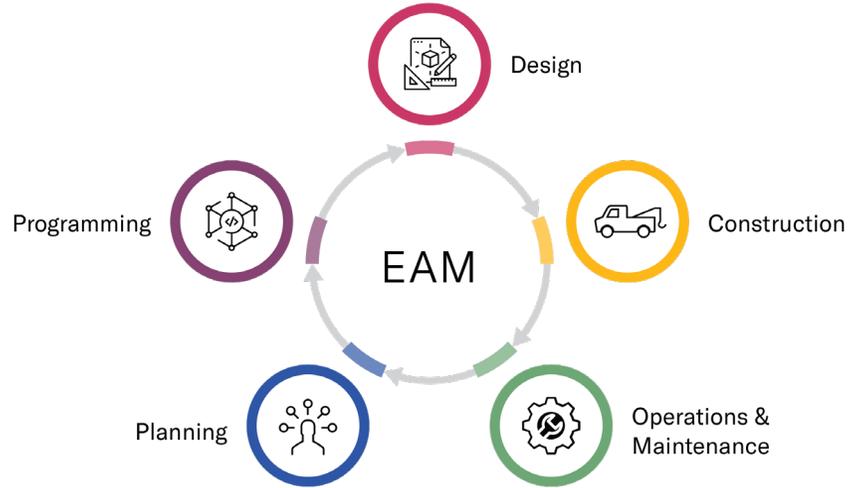
All Assets Under One Umbrella



- Air
- Rail
- Land
- Sea



The Challenge – One Data Umbrella



Varied Process/Work Processes

- Varied data needs
- Varied data acquisition
- Data redundancies

Varied Stakeholders

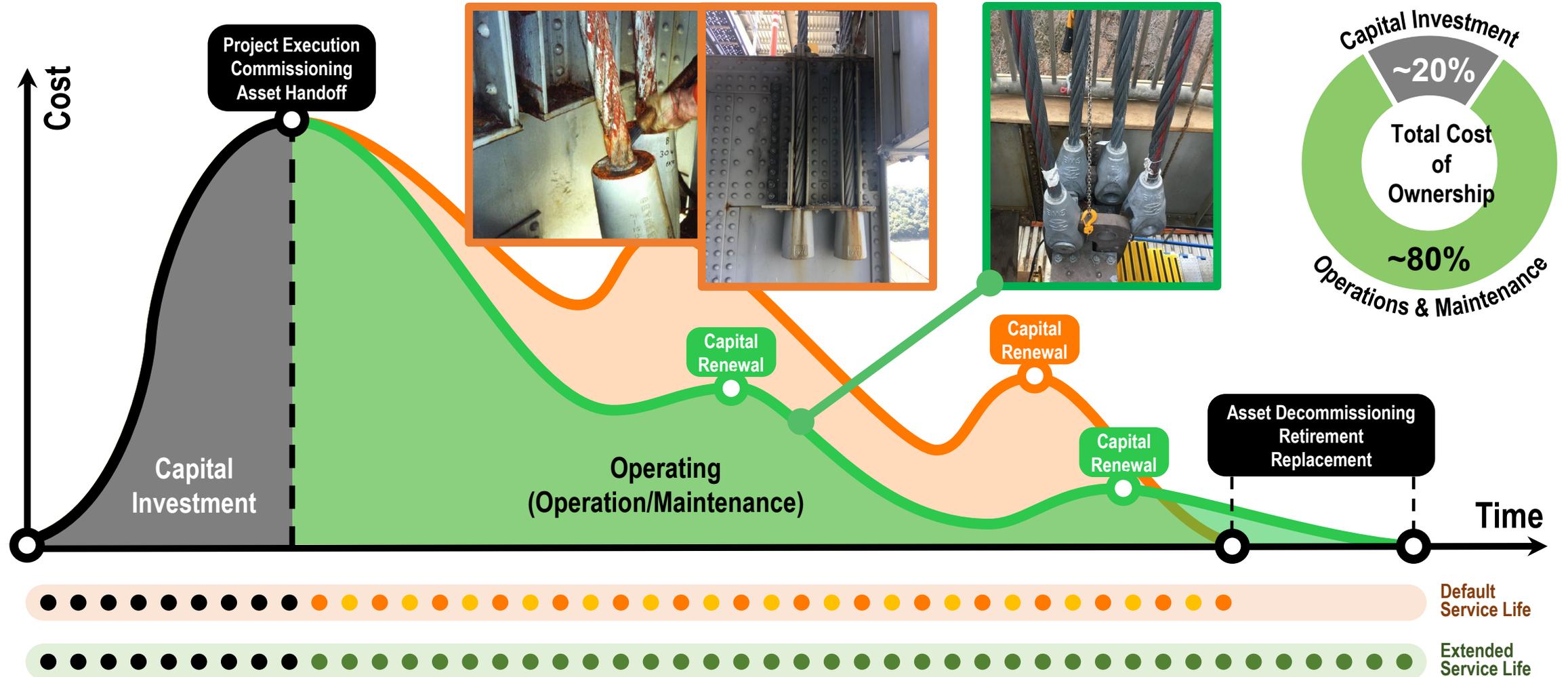
- Data needs
- Data acquisition
- Data redundancies

Varied Line of Business

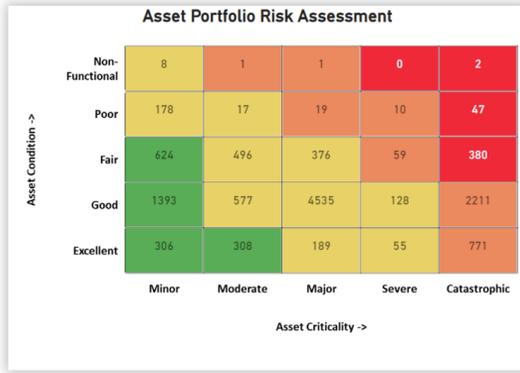
- Regulatory compliance
- Varied data need
- Reporting requirements

Asset Lifecycle Management Goal

Total Cost of Ownership (TCO)



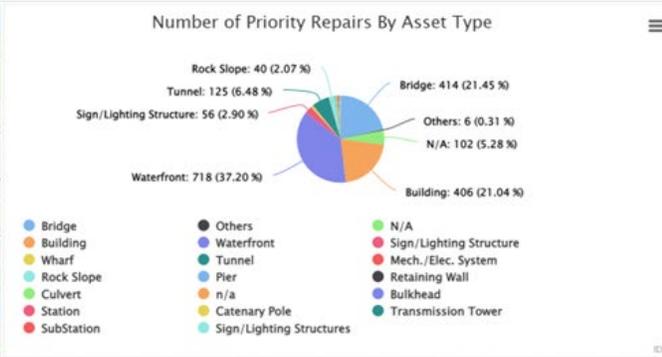
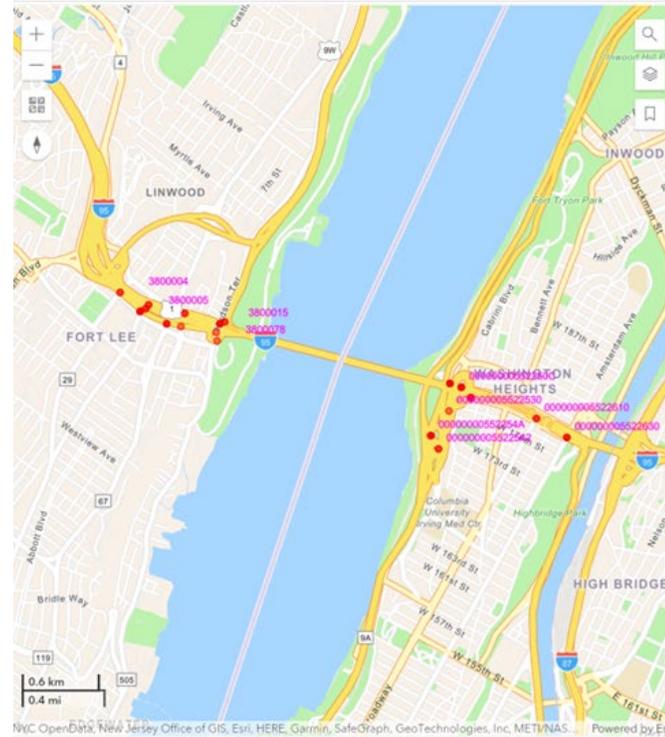
The Vision and End Product



Asset #	Description	Site	Dept/Srv	Condition	Criticality
10002784	INTERCOM & DOOR SECURITY	SIB	T&T	5	5
10006361	FIRE ALARM RELAY MODULE	SIB	T&T	5	5

When you click on the quadrant, it shows the list of assets on the right. In this case, these 2 assets:

- Condition: 5 (non-functional)
- Criticality: 5 (catastrophic)

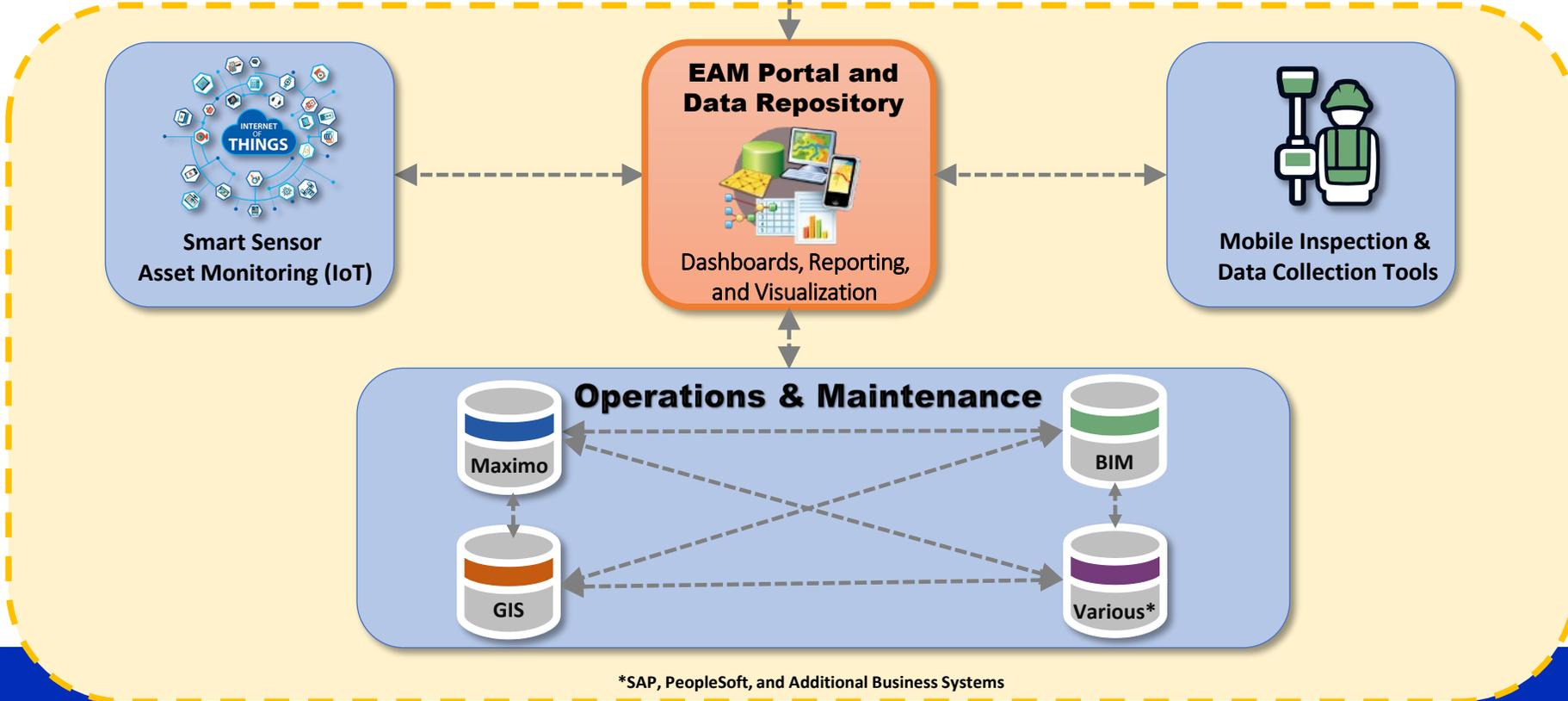
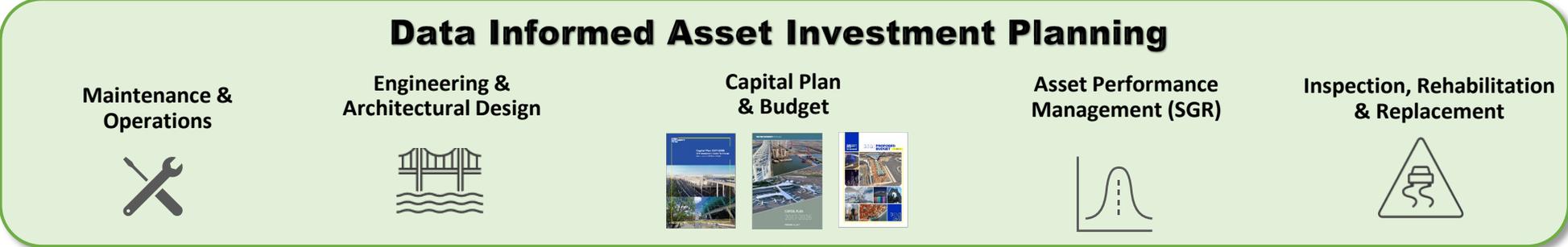


Low Moderate High Extreme

Asset Portfolio Risk Assessment by Line Department/Facility

Asset Investment Plan Dashboard By Line Department/Facilities

EAM Conceptual Integration Framework



**Governed by
PANYNJ EAM
Asset Data Standards**



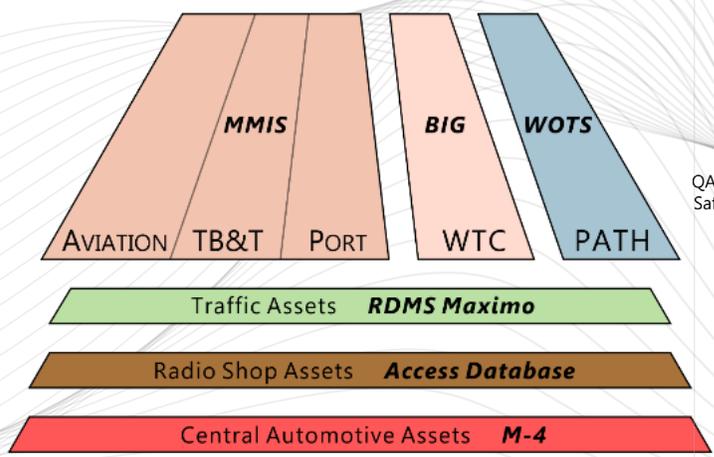
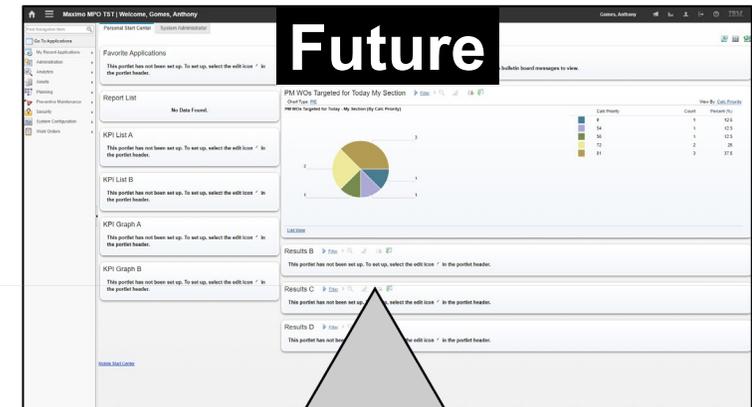
*SAP, PeopleSoft, and Additional Business Systems

Program Focus – Enterprise Maximo

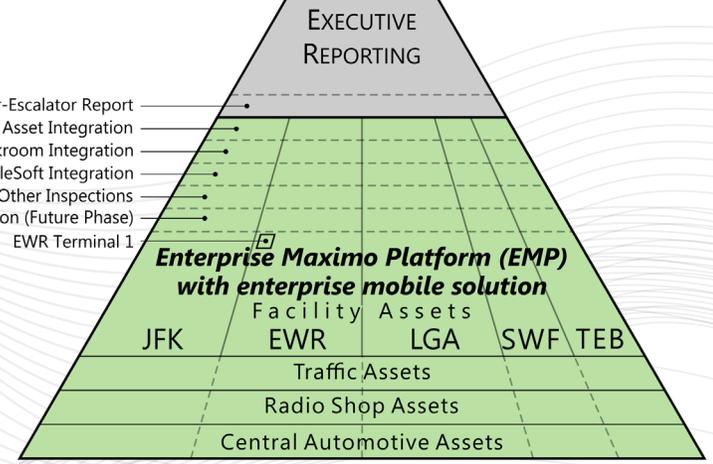
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COMMAND INPUT ***>
WORK ORDER NUMBER: 0425276
ORG / SEC/SUB-SEC: 244 0601
PLANNED BY: 037034
WORK ORDER DESC: MAXIMO REQUEST-5715-REPLACE PEDESTRIAN SIGNAL HEAD
EQUIPMENT ID: TSC RD19 0002 00
EQUIP DESCRIPTION: TRAFFIC SIGNAL-CORBIN/MARSH
TASK LOCATION: CORBIN & MARSH ST.
TASK NUMBER: 1
STDS/PROCEDURES:
SCHEDULE DATE: 04/09/2019
SHIFT: C
TASK STATUS / DATE: READY 04/09/2019
DWG. UPDATE REQD: N
SAFETY PERMIT REQD: N
SUPERVISOR: SACCENTE
PARTS REQUESTOR:
TASK DESCRIPTION: MAXIMO REQUEST-5715-REPLACE PEDESTRIAN SIGNAL HEAD
DESCRIPTION OF: THIS REQUEST IS FROM RDMX MAXIMO, AND IS TO REPLACE A
WORK/ SUPERVISOR: PEDESTRIAN SIGNAL HEAD#1 AT CORBIN/MARSH XING.
COMMENTS: USE ALL NORMAL SAFETEV WORK PRECAUTIONS, AND NOTIFY MAXIMO
TEAM WHEN COMPLETE FOR WORK ORDER CLOSE OUT.
MESSAGE: YOU MAY SCROLL/ TOP / BOTTOM /REQUEST A TASK NBR/ PF4 BACK TO HEADER.
    
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2016



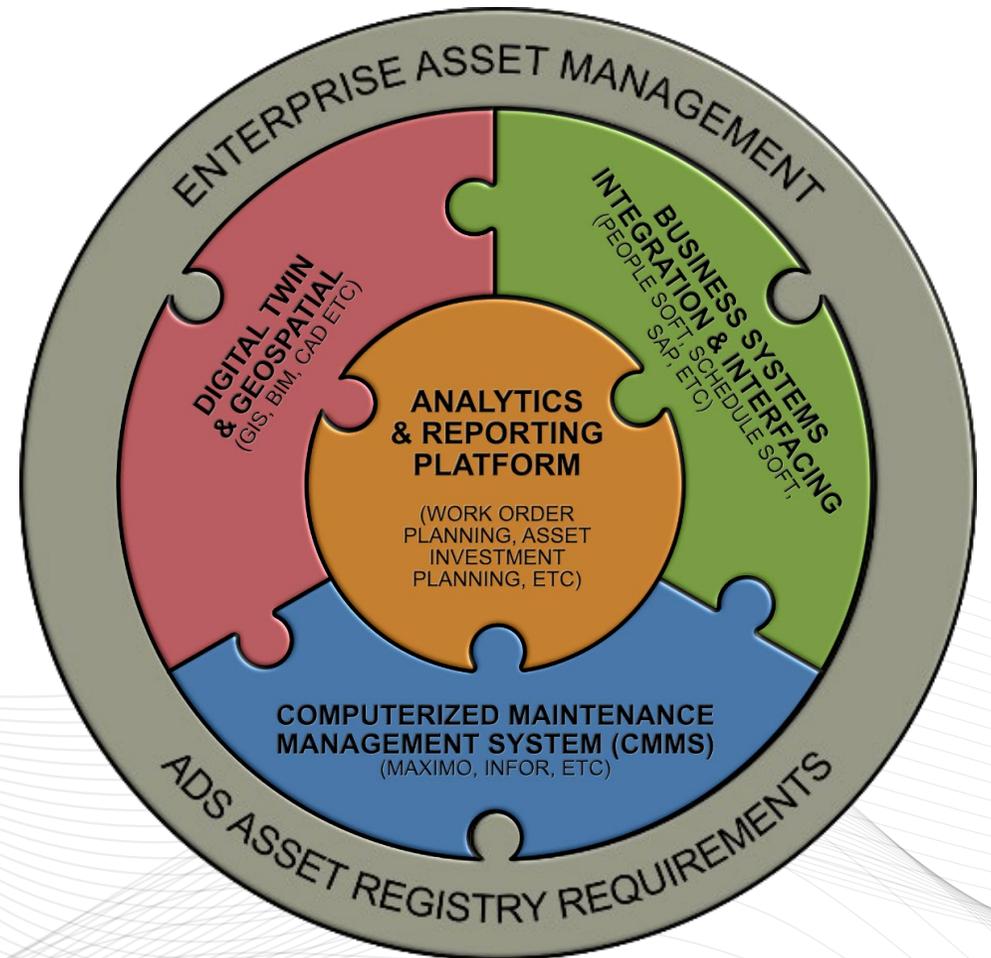
- Executive Elevator-Escalator Report
- ICMS/PMO/Fixed Asset Integration
- SAP-Stockroom Integration
- ScheduleSoft Integration
- QAD Structural Integrity and Other Inspections
- Safety/Industry Safe Integration (Future Phase)
- EWR Terminal 1



Governance Importance

Governance Importance to EAM Program

- Standards Based Governance Model
- CMMS (Maximo, Asset Works)
- Geospatial/Digital Twin (BIM)
- Business Systems (SAP, PeopleSoft)
- Asset Investment Planning (Next Phase)



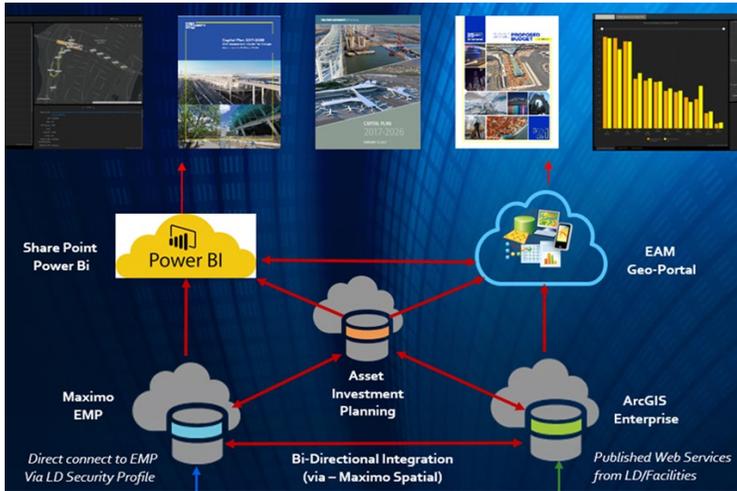
The PANYNJ EAM “As” vs “To-be”

	PAST (As-Is)	FUTURE (industry standard/steady state)
People	<ul style="list-style-type: none"> • Siloed departmental approaches to achieve PA objectives • Emphasis on skillset development within bus. Function • More qualitative approaches to problem solving 	<ul style="list-style-type: none"> • Holistic approach to asset life cycle management • Personnel with cross-functional skillsets • Staff empowerment via data-driven work environment
Process	<ul style="list-style-type: none"> • Non-governed asset management processes, data standards, and technology platforms (e.g., MMIS, GIS) • Manual capital investment planning process • Corrective maintenance 	<ul style="list-style-type: none"> • Governance around processes, standards, & technology • Data-driven capital investment process based on asset condition and criticality • Asset Management Plans and predictive maintenance
Data	<ul style="list-style-type: none"> • No universal data standards • Limited cross-departmental analytic capabilities • Limited quality assurance procedures • Burdensome data cleansing and reporting procedures 	<ul style="list-style-type: none"> • Enterprise Standards - Asset Data Specification (ADS) • Cross-departmental analytic capabilities • Coordinated enterprise quality assurance procedures • Automated & Integrated AIP process
Technology	<ul style="list-style-type: none"> • Spreadsheets and MMIS • Limited business system integration • Siloed instances of Maximo 	<ul style="list-style-type: none"> • Integrated Enterprise Maintenance Management System • Integrated Systems (CMMS, GIS, SAP, etc.) • Enhanced/Agile Agency-wide reporting

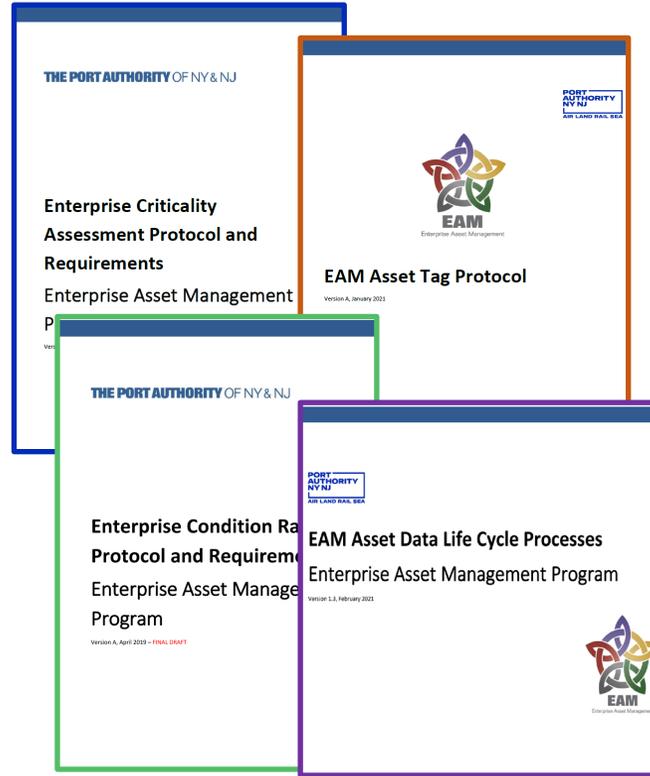
Data Standards Goals & Objectives

- **Make Data Visible** – Users can easily locate needed data
- **Make Data Accessible & Interoperable** – Foster common data platform for all business analytics agencywide. Ensure common representation and comprehension of data. Proper exchange of data between systems is critical for successful decision-making.
- **Make Data Understandable** – Users have access to standard taxonomies/dictionary
- **Make Data Linked** – Data-driven decision-making requires data to be linked
- **Make Data Trustworthy** – Users can be confident in all aspects of data for decision-making.
- **Make Data Structures Flexible and Scalable** – Ensure data hierarchies are systems agnostic, flexible and easily updated structures to accommodate new assets, technology etc.
- **Make Data Governance Priority** - Ensure global Governance, people, process, technology data.

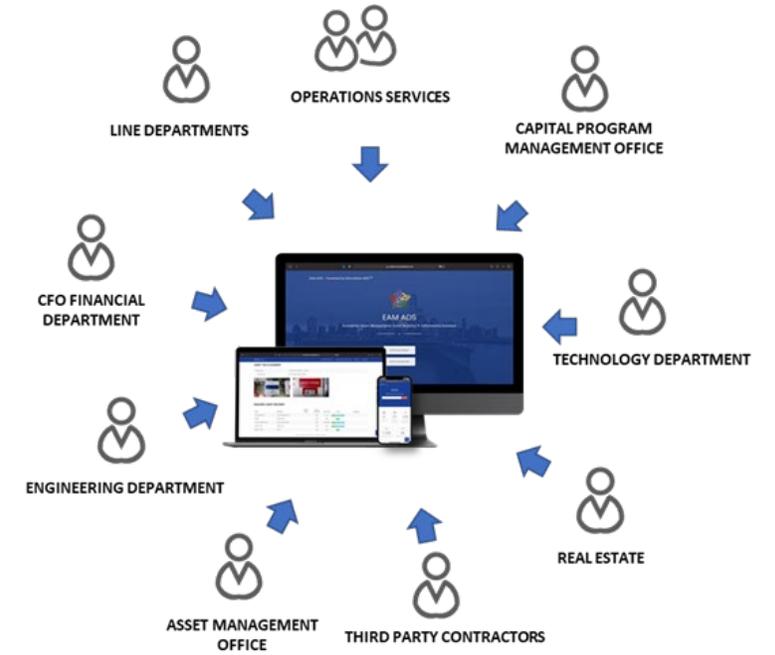
Essential Areas for Success



Systems Integration Architecture - Enterprise cloud and other technologies



Standards - family of standards that enable data exchange



Governance & Culture – Oversight to effectively manage data from cradle to grave. Encourages adoption

Asset Data Specification – Key to Success

Record of Agreement – Primary source of asset registry data requirements

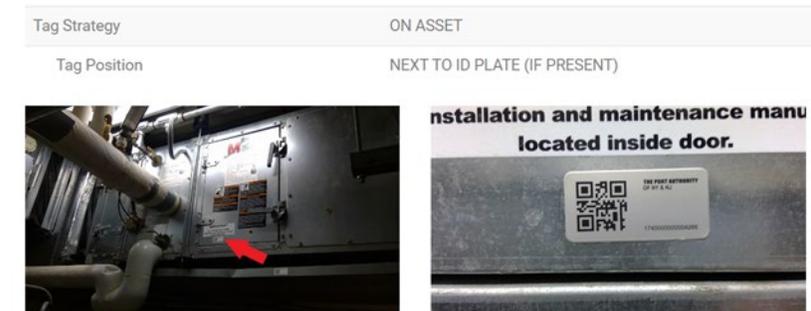


500 Asset classes / 3,000 asset types

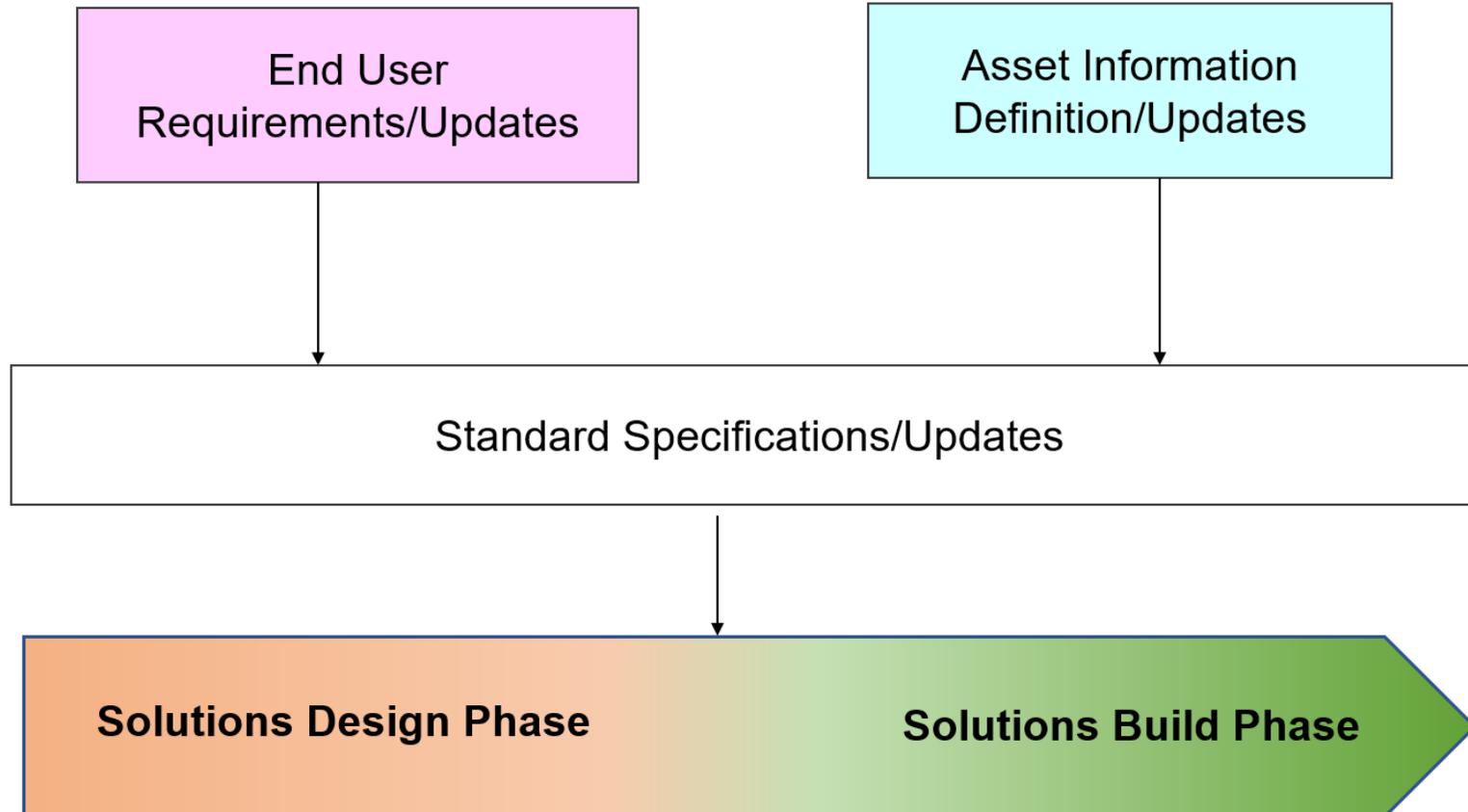
- ✓ Problem-cause-remedy,
- ✓ Default useful life,
- ✓ Equipment & asset attributes,
- ✓ Protocols for asset condition, criticality, asset tags, photos & more



ASSET TAG PLACEMENT



Design Standard Process



THE PORT AUTHORITY OF NY & NJ

Agency-Wide System Design Standard

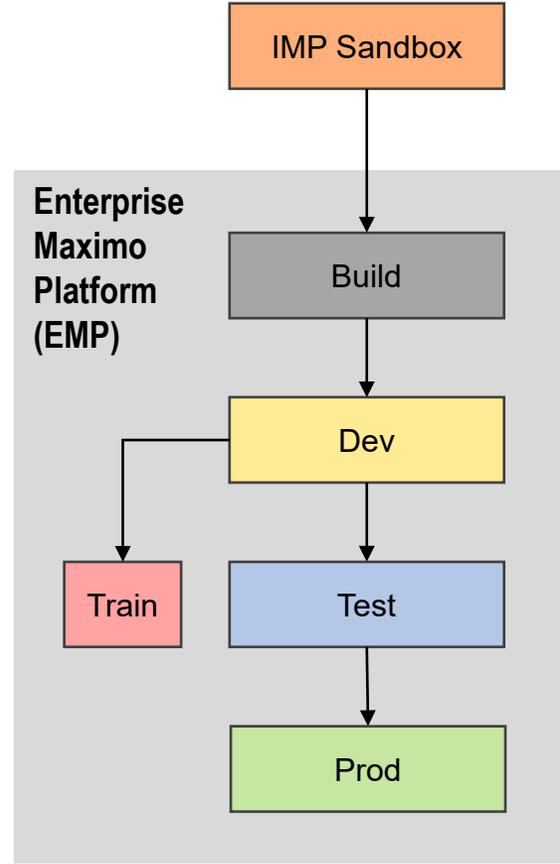
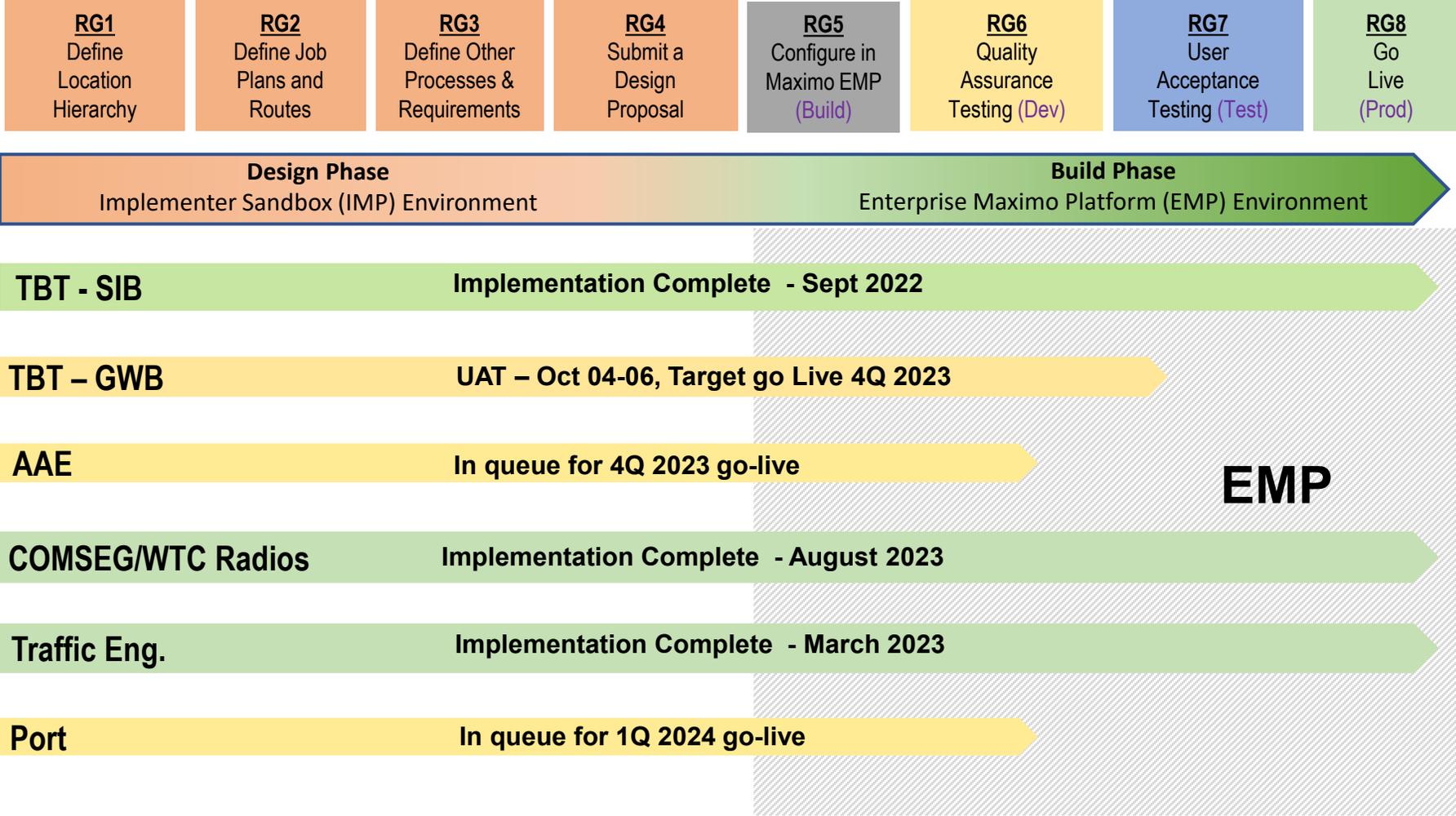
**Enterprise System Design Standard
to Define and Support
EAM Systems Implementation**

Enterprise Asset Management Program

Version 5.0

September 1, 2023

EMP & Governance Progress Update



EMP Minimum Viable Product

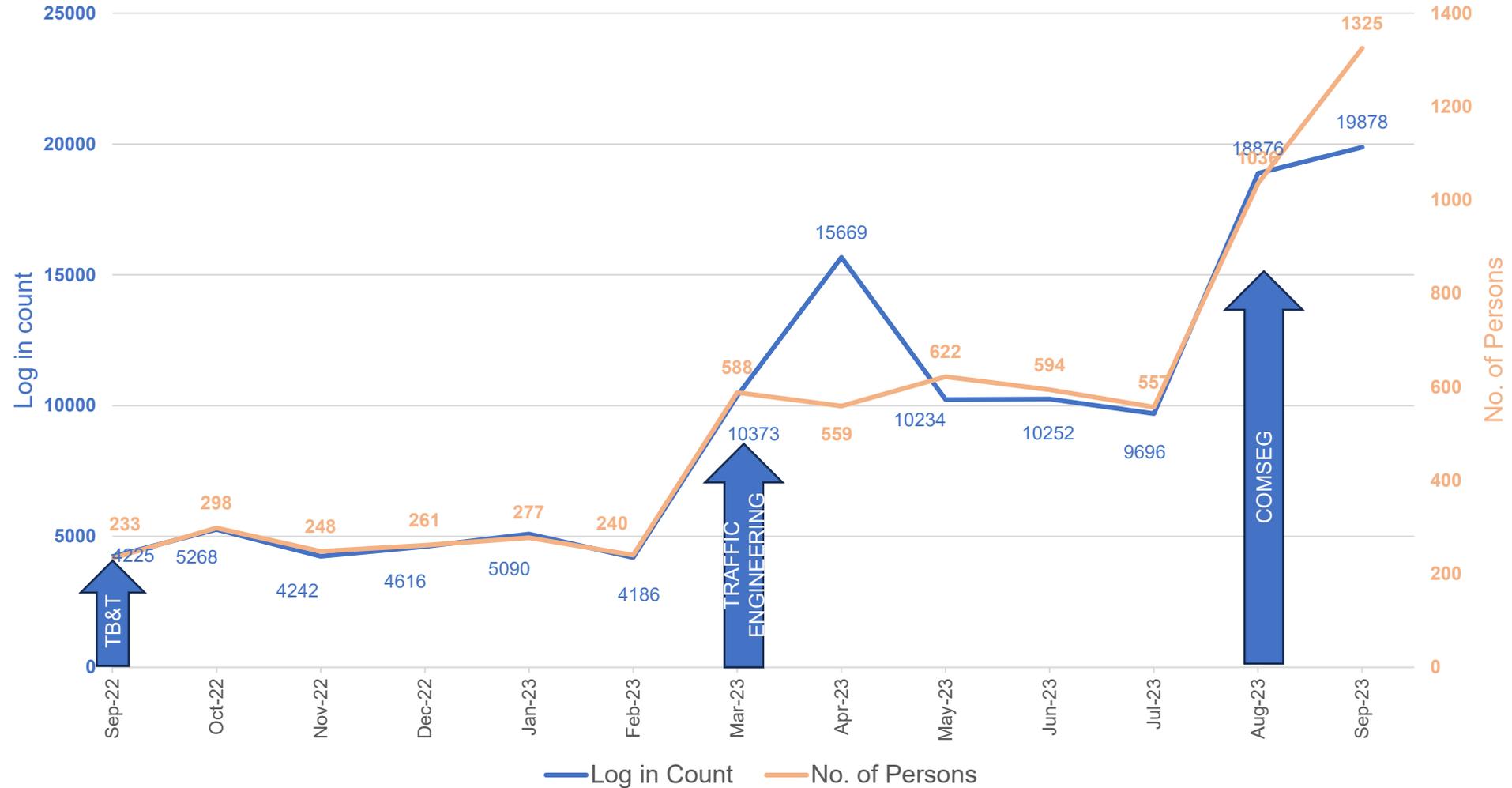
Enterprise Minimum Viable Product – Phase 1

Minimal Viable Product (MVP) for Phase 1A	Go Live Status
System hierarchies	✓
Maintenance Objects (SCBD/SCDT)	✓
Standardized asset ID's/classifications, etc.	✓
Business Process (as-is/to-be)	✓
Defined Roles – Peoplesoft	✓
Identified facility system lead	✓
Standardized work-flows (Gate 4)	✓
Preventive maintenance routines (Gate 2)	✓

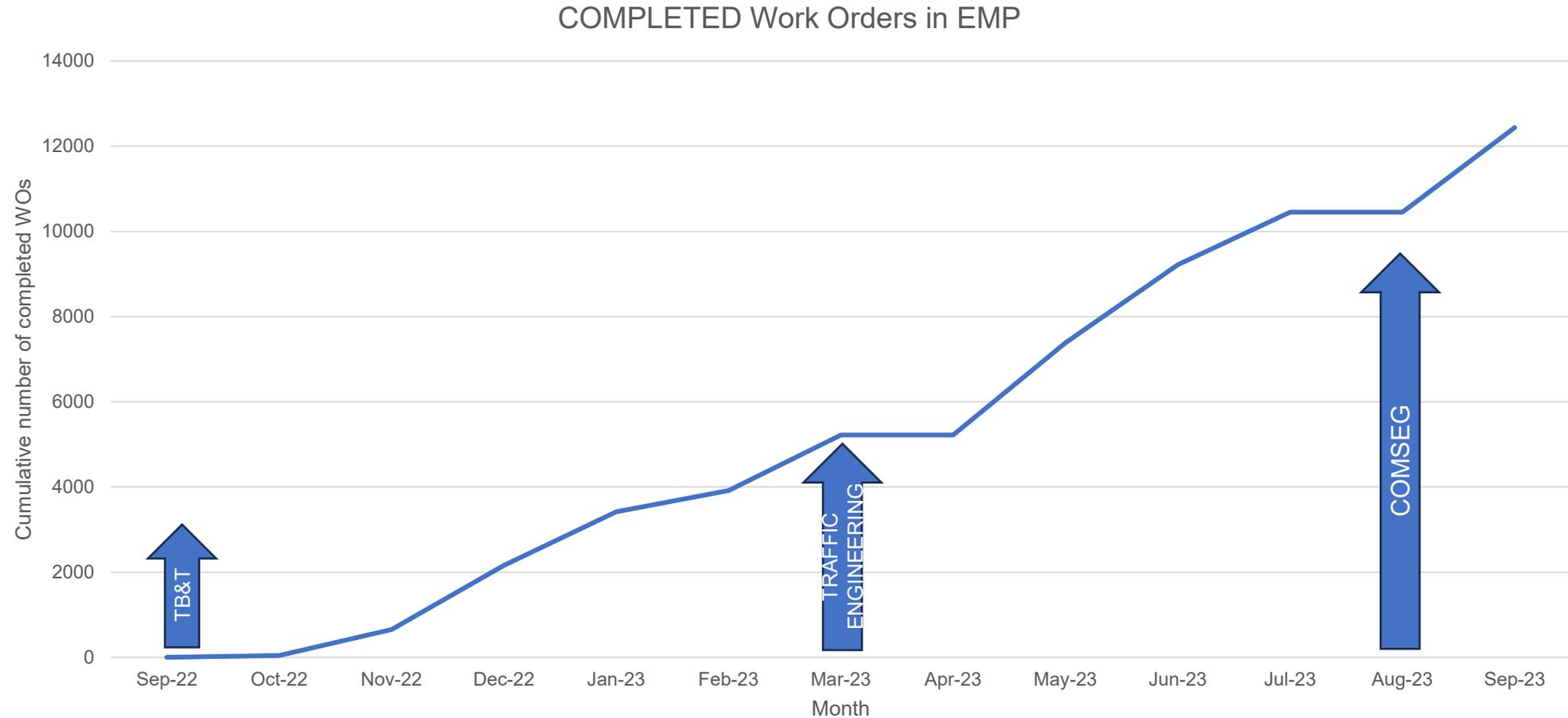
Minimal Viable Product (MVP) for Phase 1A	Go Live Status
Job Plans/Safety Plans/HSE	✓
Standardized KPI's and ad-hoc reporting	✓
Meters, PCR, Failure Coding	✓
Warranty Management	✓
Geospatial Integration	✓
Support for Budgeting, Capital Renewal, SGR & AIP	2022 - 2026
Mobility	2023 - 2026
Standardized bill of materials	2024 - 2026

Enterprise Maximo System Adoption

Log in count and No. of Persons



Enterprise Maximo System Adoption



EAM Program Milestones

● Completed ● In Progress ● In Queue

Maximo becomes Agency Standard

Maximo established as the standard system across the organization

2016

2017

2018

2019

2020

EAM Program Vision & 10-year Roadmap

Recruitment of EAM team and development of a 10-year program vision & execution plan.

EAM Support Call-in Awarded

EAM support call-in agreements successfully secured for TEC & EAMD.

Agency-wide Governance

Agency-wide governance protocols & requirements management.

Asset Data Collection & Validation

SIB and COMSEG data collection & validation in compliance with agency-wide data standards.

Retirement of Legacy CMMS

Legacy mainframe CMMS phased out, enhancing risk mitigation for Aviation, TBT, and PORT departments.

Agency Data

Standard protocols over 2,800. Used by A, JFK

EAM Program Milestones

● **Completed** ● **In Progress** ● **In Queue**

Agency-wide Governance

Agency-wide governance protocols & requirements management.

Asset Data Collection & Validation

SIB and COMSEG data collection & validation in compliance with agency-wide data standards.

POC: Asset Investment Planning

Introduction of AIP for SGR involving 44 GWB Approach Bridge Structures.

Go-Live Traffic Assets

Integration of 70,000 traffic assets into the Maximo system.

TEC Call-in Awarded EAM Pending

TEC call-in contract successfully awarded.

2019

2020

2021

2022

2023

Retirement of Legacy CMMS

Legacy mainframe CMMS phased out, enhancing risk mitigation for Aviation, TBT, and PORT departments.

Agency-wide Data Standards

Standardized data protocols developed for over 2,800 asset types. *Used by EWR Terminal A, JFK Redevelopment*

Go-Live TBT SIB

Maximo successfully integrated with over 8,000 TBT SIB assets.

Go-Live Geospatial Interface

Successful implementation of geospatial interface for Maximo.

Go-Live OSD COMSEG

~20,000 radio assets

Go-Live TBT-GWB

~20,000 GWB assets

Go-Live Aviation Elec.

~35,700 electrical assets

Go-Li
~80,000

Go-Li
~15,500

Go-Li
~10,000

Go-Li
~7,000

Roof System
~890 B

Peop
Data ca
manag
assets a

Go-Li
~25,000

Go-Li Mana
Materia
Integrat

POC: Asset Investment Planning

Introduction of AIP for SGR involving 44 GWB Approach Bridge Structures.

Go-Live Traffic Assets

Integration of 70,000 traffic assets into the Maximo system.

TEC Call-in Awarded EAM Pending

TEC call-in contract successfully awarded.

Go-Live Aviation M&P

~80,000 assets

Go-Live Ports

~15,500 assets

Go-Live TBT-LT

~10,000 assets

Go-Live TBT-HT

~7,000 assets

Roof Management System

~890 Buildings / 40 million sqft

Go-Live TBT-PABT

~8,500 assets

Go-Live Aviation Struct.

~60,000 assets

PATH Asset Management

Introduction of PANYNJ standards-compliant asset management solution for PATH, total assets to be determined.

● Completed ● In Progress ● In Queue

2022

2023

2024

2025

2026

Go-Live TBT SIB

Maximo successfully integrated with over 8,000 TBT SIB assets.

Go-Live Geospatial Interface

Successful implementation of geospatial interface for Maximo.

Go-Live OSD COMSEG

~20,000 radio assets

Go-Live TBT-GWB

~20,000 GWB assets

Go-Live Aviation Elec.

~35,700 electrical assets

People Movers System

Data capture & performance management system for ~1,700 assets agency-wide

Go-Live WTC

~25,000 assets

Go-Live Material Management

Material management Maximo Integration

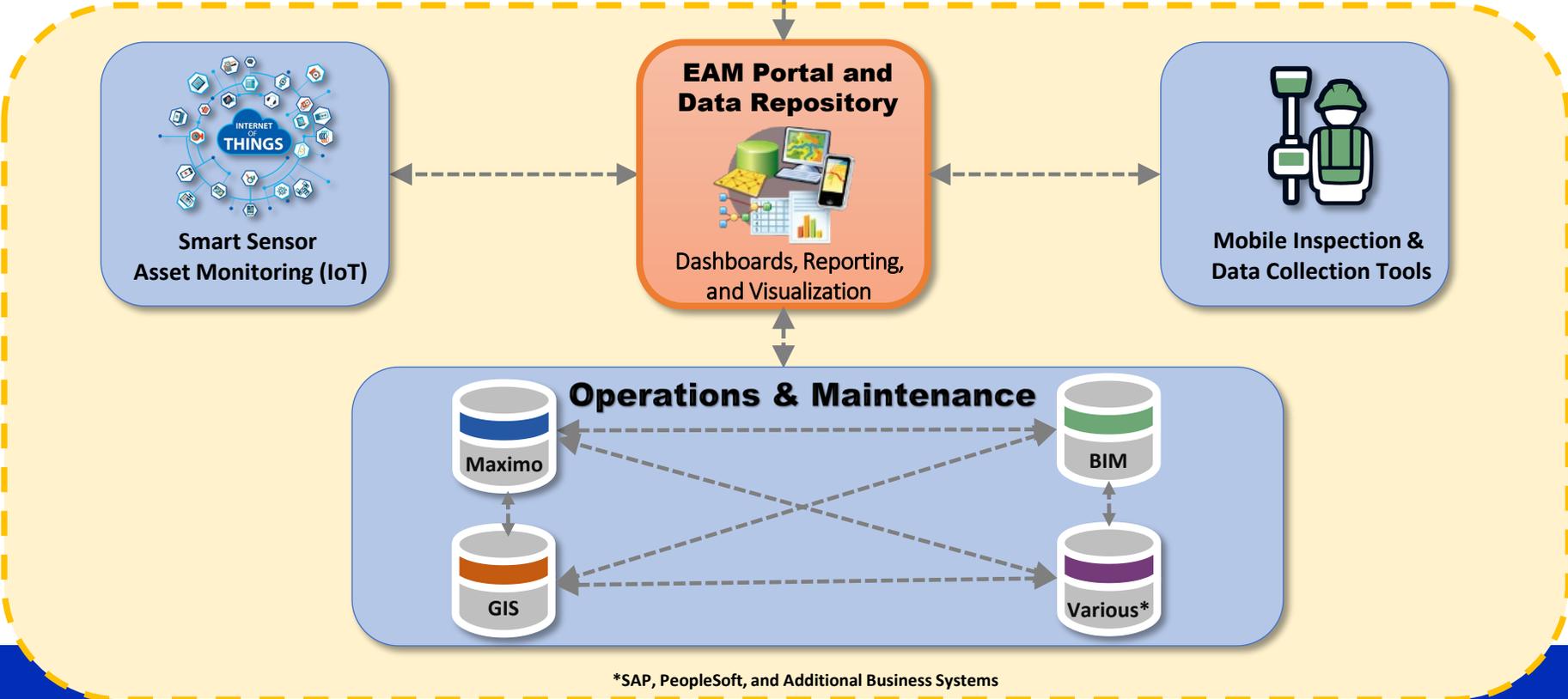
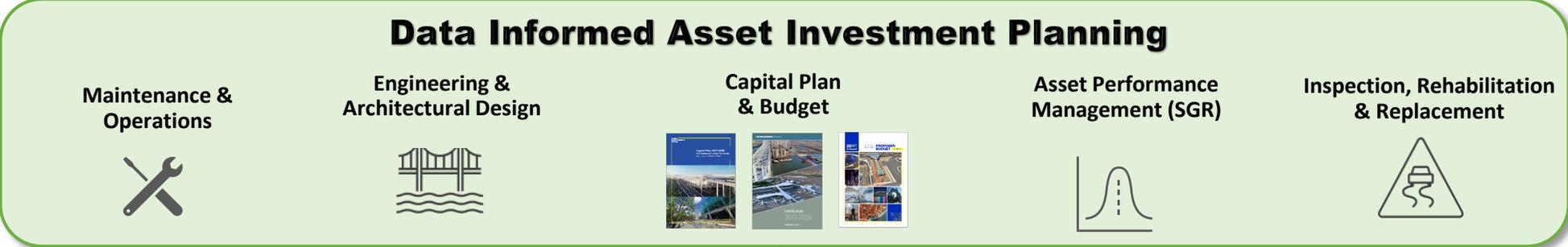
OSD CAD Asset Management

Introduction of PANYNJ standards-compliant asset management solution for OSD CAD, total assets to be determined.

OSD-OSPPM/CHS-ASM Asset Management

Introduction of PANYNJ standards-compliant asset management solution for OSD-OSPPM/CHS-ASM, total assets to be determined.

PANYNJ EAM Integration Framework



Governed by PANYNJ EAM Asset Data Standards

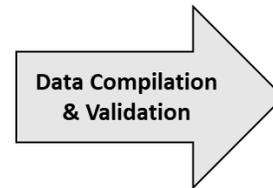
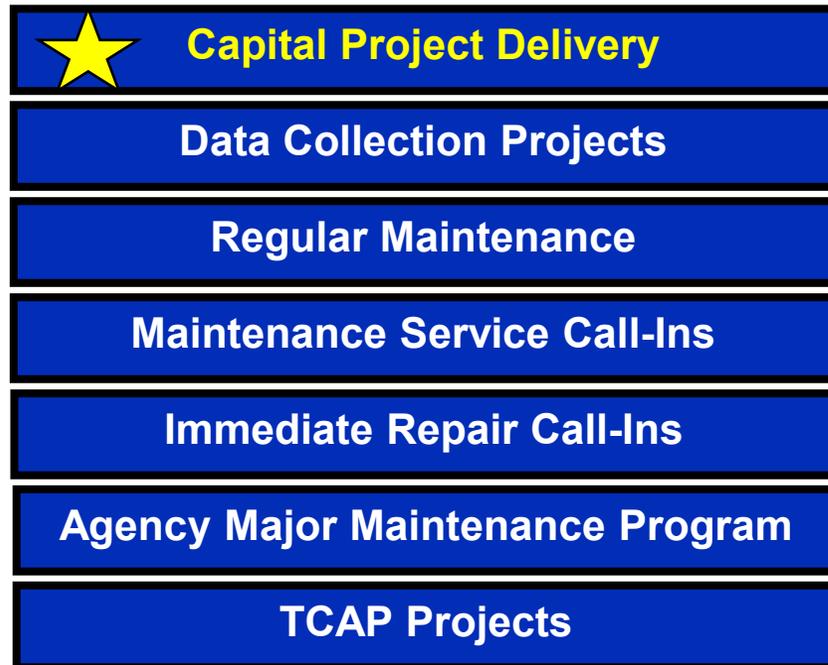


*SAP, PeopleSoft, and Additional Business Systems

Post Construction Asset Data Chain of Custody

ASSET ONBOARDING

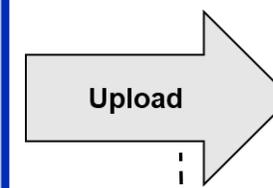
INFORMATION ACQUISITION



DB/DBOM or
ENG Call-in
Con^oltant



LD Data
Stewards & FMs

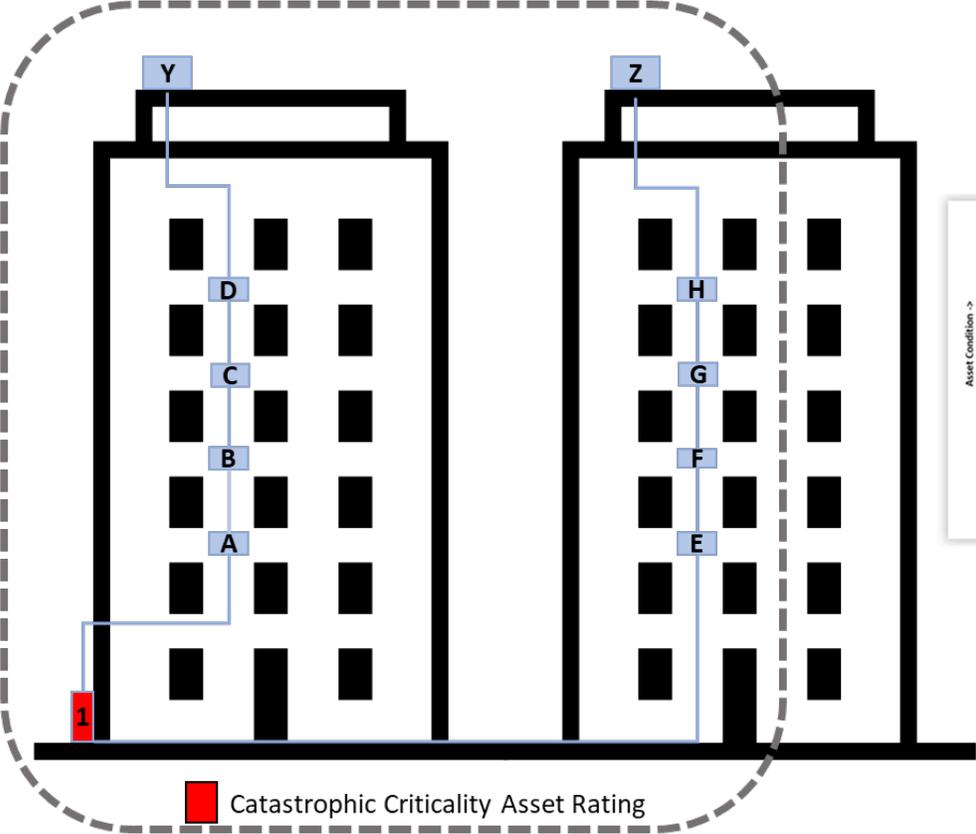


TEC
(AMSS)



Individual vs. System Risk Assessment

System (Instance) Based Risk

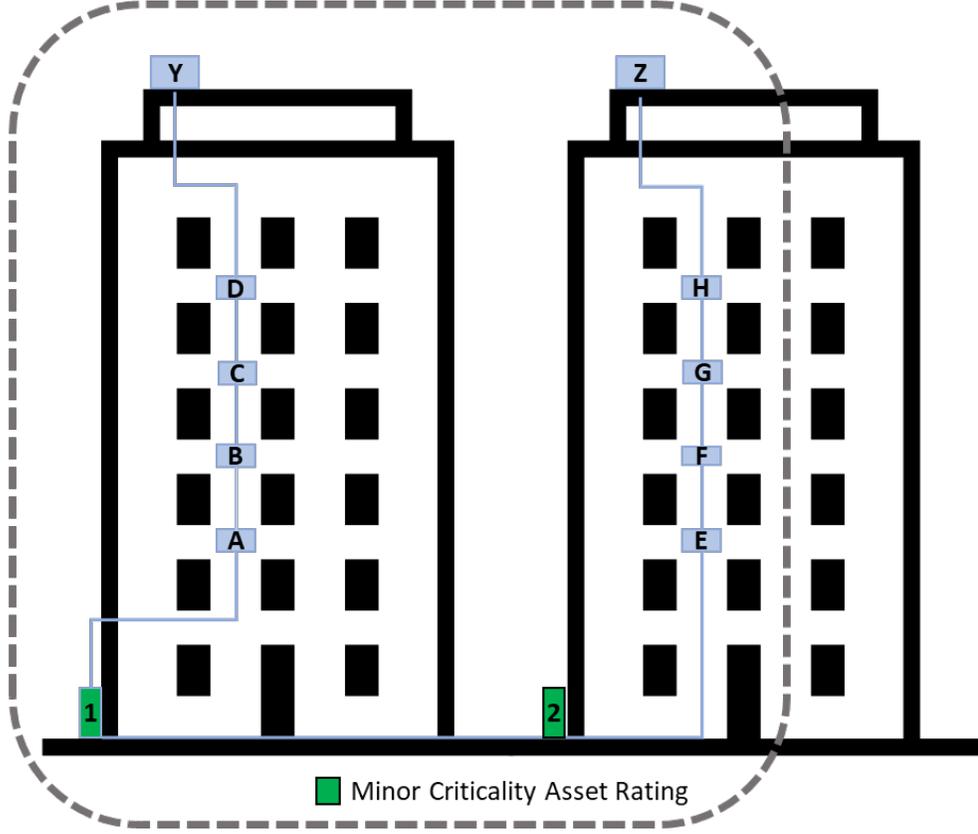


Instance with no Redundancy

Asset Portfolio Risk Assessment

Asset Condition ->	Minor	Moderate	Major	Severe	Catastrophic
Non-Functional	8	1	1	0	2
Poor	178	17	19	10	47
Fair	624	496	376	59	380
Good	1393	577	4535	128	2211
Excellent	304	308	189	55	771

Asset Criticality ->



Instance with Redundancy

■ Low
 ■ Moderate
 ■ High
 ■ Extreme

Condition, Criticality & Useful life

THE PORT AUTHORITY OF NY & NJ

Enterprise Condition Ratings Protocol and Requirements Enterprise Asset Management Program

Version A, April 2019 – FINAL DRAFT



THE PORT AUTHORITY OF NY & NJ

Enterprise Criticality Assessment Protocol and Requirements

Enterprise Asset Management Program

Version C, September 2021



Asset Class	Default/Average Service Life (years)	Default/Average Service Life (Equipment Utilization)
AEDS	10 years	5,000 hours
AIR CONDITIONER	15 years	60000 hours
AIR DRYER	10 years	30,000 hours
AIR_HANDLING_UNIT	15 years	60,000 hours
ANTENNA	15 years	50,000 hours
BARRIER	30 years	1,000,000 cycles
BATTERY	5 years	3000 charge cycles
BATTERY RACK	10 years	5,000 charge cycles
BOLLARD	20 years	50,000 retracts and extends
BULKHEAD	30 years	5,000 load cycles
CANOPY	15 years	N/A
CCTV	10 years	87,600 hours
DECK JOINT	30 years	10,000,000 cycles
DEHUMIDIFIER	10 years	50,000 hours
DEHYDRATOR	15 years	40,000 hours
DOOR	30 years	500,000 cycles
DOOR CLOSER	15 years	500,000 cycles
ELECTRIC VEHICLE CHARGING STATION	10 years	20,000 charging cycles
ELEVATOR CAR	25 years	500,000 cycles
ESCALATOR	20 years	50,000 hours
FAN	15 years	60,000 hours
MOTOR	15 years	50,000 hours
PUMP	20 years	50,000 hours
RAILROAD FLASHER	20 years	50,000 activations
RAILROAD_SIGNAL	30 years	3,000,000 cycles
RAMP	20 years	50,000 hours
ROOF	30 years	N/A
ROOF DECKING	40 years	N/A

Condition Rating Normalization Chart

EAM Color Code	EAM Color Rating	EAM Condition Score Rating	Description - FTA	Pavement Condition Index Rating (PCI-%)	Roof Condition Index Rating (RCI-%)	Description - QAD	Description - EAM	Definition - EAM	General Maintenance Strategy
#00b050 rgb(0,176,80)	Excellent	1	No visible defects, near new condition.	100 - 90	91-100	"As New" Condition.	New or Excellent Condition Requires only normal prescribed maintenance.	Asset in excellent condition 75% to 100% of useful life remaining (0-25% of useful life consumed).	Routine/preventative maintenance
#05A3DC rgb(5,163,220)	Good	2	Some Slightly defective or deteriorated components.	90 - 80	71 - 90	The structural system is sound and performing its function, although it shows signs of wear and may require some minor repairs, mostly routine maintenance repairs.	Minor Defects Only Requires only minor maintenance.	Asset in good condition signifying 50% to 75% useful life remaining (25%-50% of useful life consumed).	Preventative maintenance/ major rehabilitation
#FFFF00 rgb(255,255,0)	Fair	3	Moderately defective or deteriorated.	80 - 70	51-70	The structural system is still performing adequately currently but needs "priority" and/or "routine" repairs to prevent future deterioration and to restore it to good condition.	Moderate Deterioration Requires significant maintenance.	Asset in fair condition signifying 25% to 50% of useful life remaining (50%-75% of useful life consumed).	Major rehabilitation
#ED7D31 rgb(237,125,49)	Poor	4	Defective or deteriorated components in need of replacement.	70 - 55	31-50	The structural system cannot be relied upon to continue to perform its original function without "immediate" and/or "priority" repair.	Significant Deterioration Requires renewal or upgrade.	Asset in poor condition with no more than 25% useful life remaining (75% of useful life consumed).	Immediate repairs/ major rehabilitation reconstruction /replacement
#ff0000 rgb(255,0,0)	Non- Functional	5	Seriously damaged components in need of immediate repair.	55 - 0	0-30	Unserviceable requiring full or partial replacement to remain functional.	Unserviceable Requires full or partial replacement, or otherwise, unmaintainable due to unavailability of parts.	Asset in unseviceable condition signifying past useful life (100% of useful life consumed).	Reconstruction / replacement

Integrated Job/Safety Plans (In development)

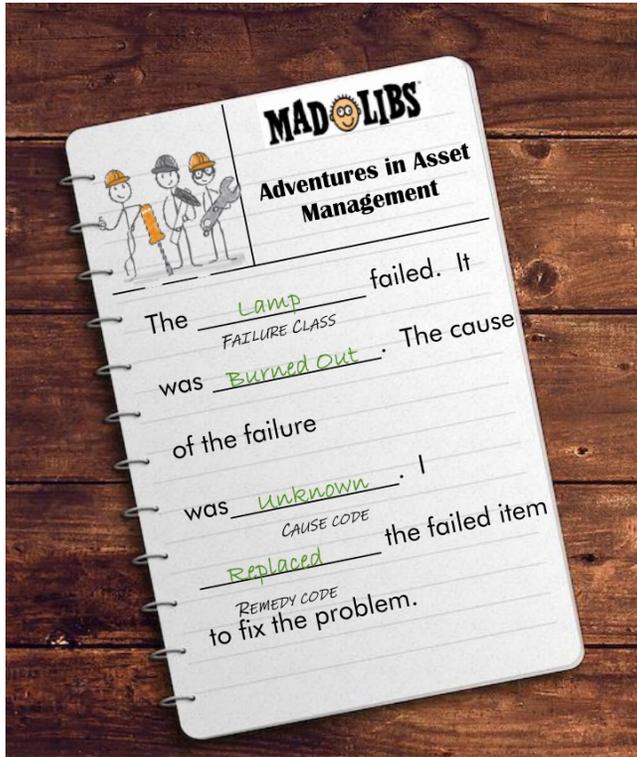


Standard integrated job/safety plans in development for 500 asset classes

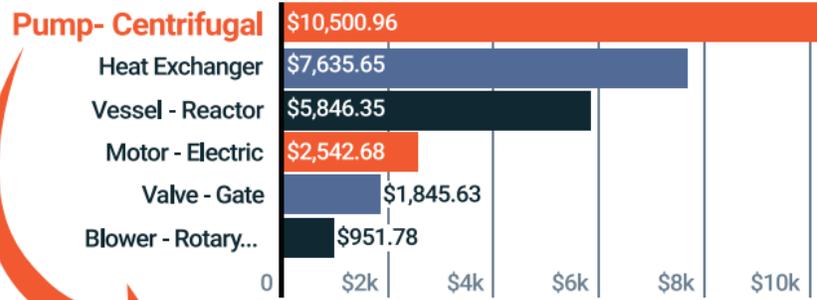
HYDRAULIC PUMP (FUNCT02A-MACHR-HDPP)			
JOBPLAN	STEP	JOB TASK	SAFETY TASK
FUNCT02A-MACHR-HDPP-JP001	Step 010	SAFETY	All personnel performing maintenance activities and tasks must possess the requisite certification and qualifications, as prescribed by the relevant regulations. If not, the supervisor must be contacted immediately.
FUNCT02A-MACHR-HDPP-JP001	Step 020	Inspect condition of water pump and review service log.	Always wear protective gear such as eye protection, gloves, and work boots when performing maintenance.
FUNCT02A-MACHR-HDPP-JP001	Step 030	Check water levels and replenish if necessary.	Ensure that water pump is shut off and cooled down before performing any maintenance.
FUNCT02A-MACHR-HDPP-JP001	Step 040	Check and replace impeller, if needed.	Make sure to disconnect all power sources from the water pump before performing any maintenance.
FUNCT02A-MACHR-HDPP-JP001	Step 050	Check motor bearings and lubricate if needed.	Dispose of old lubricants and filters in a designated container and in accordance with local laws.
FUNCT02A-MACHR-HDPP-JP001	Step 060	Check wiring and replace if necessary.	Be aware of any potential hazards such as moving parts, electrical components, and hazardous fluids.
FUNCT02A-MACHR-HDPP-JP001	Step 070	Change pump oil and filter.	Utilize appropriate tools and equipment during maintenance operations.
FUNCT02A-MACHR-HDPP-JP001	Step 080	Clean pump housing and cooling fins.	TASK
FUNCT02A-MACHR-HDPP-JP001	Step 090	Check pump wiring and connections.	TASK
FUNCT02A-MACHR-HDPP-JP001	Step 100	Test pump for proper operation.	TASK
FUNCT02A-MACHR-HDPP-JP001	Step 110	SAFETY	Maintain the site cleanliness by eliminating debris using appropriate materials and tools.
Notes		* Any other OEM and related safety requirements not encompassed herein should be adhered to.	
		* The Line Department should be contacted and, if necessary, the Original Equipment Manufacturer (OEM) should be referred to for any additional requirements that may be needed when preparing equipment-specific job plans, safety plans, and Preventative Maintenance (PMs).	

Benefits

Consistent Agency-wide Failure Analytics Reporting

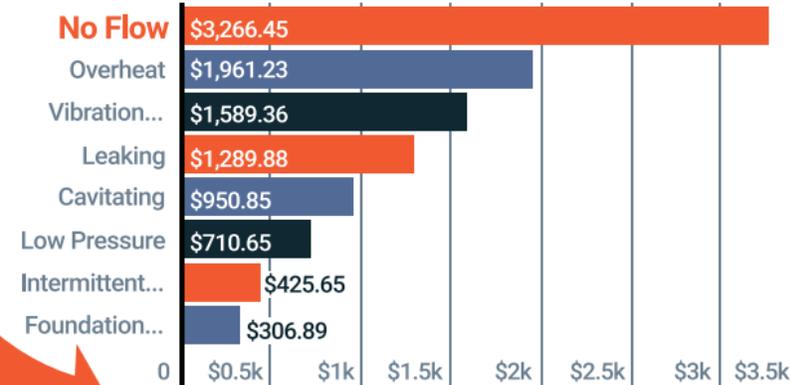


Equipment Class Failures



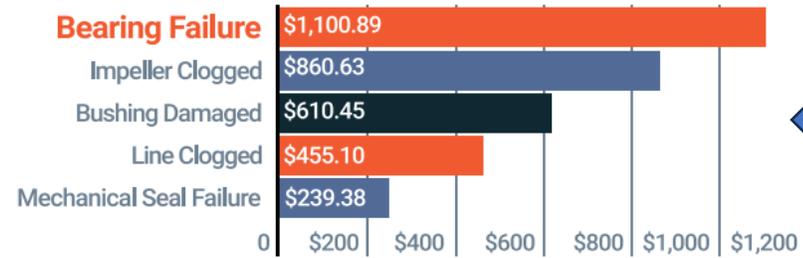
Asset Class

Pump - Centrifugal / Problem Reason



Problem

Pump - Centrifugal / No Flow / Failure Reasons



Cause

Lessons Learned

- **Ensure easy access** to program solutions and standards across agency
- Design specifications that **enable efficient data exchange and sharing**
- Implement effective **governance and maintenance** of standards etc. Critical to program success
- Encourage **enterprise compliance; collaboration & transparency**
- **Ensure consistent uniform hierarchy definition** including naming conventions
- Accommodate **varied regulatory requirements** (FAA, FTA, FRA, FHWA etc.)
- **Leverage in-house resources** – Existing data, staff experience; & technology
- Have **consistent data template, data quality and maintenance** in mind during program implementation. Feeding the beast can be a nightmare, especially as the beast grows to be a giant

Concluding Remarks

- Solutions must be **Scalable**. Don't boil the ocean
- Solutions must be **Relevant** to end-user business needs
- Solutions must be **Flexible** to meet changing business needs and new technology. Efficient data exchange, sharing and interoperable. Accommodate varied regulatory requirements
- Solutions must meet business needs in **Timely** manner
- Encourage **enterprise compliance; collaboration & transparency**

EAM Division Leadership Team



EAM

Enterprise Asset Management

THE PORT AUTHORITY OF NY & NJ



Robert Kumapley, PE, LEED, AP
Chief of Enterprise Asset
Management



Lavinia Galatis, PE, PMP
Deputy Chief EAM



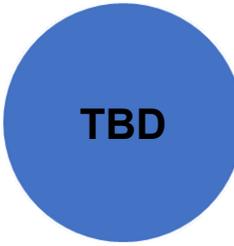
Julia Pasquale
Asset Information
& Data



Ali Toor
Governance



Michelle Mayer
Operations



TBD
Asset Investment
Planning

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