TAM Virtual Roundtable

Data and Operationalizing

July 30, 2020

TRANSIT
ASSET
MANAGEMENT

FTA
FEDERAL TRANSIT ADMINISTRATION

Welcome and Introduction

- Reflections from Day 2
- Teams Logistics

Alexi Miller and Alberto Aviles, Houston Metro
Jeri Bernstein, Washington State Ferries
Michael Quant, Los Angeles Metro

DATA AND OPERATIONALIZING

Using data to tell a story.

METRO

Houston METRO

Population 2.3M

61 Transit Centers / Park & Rides / Operating Facilities

Service Area 1,303 Sq. Miles

114 Bus Routes

1,250 Buses

116 Million Rides Yearly

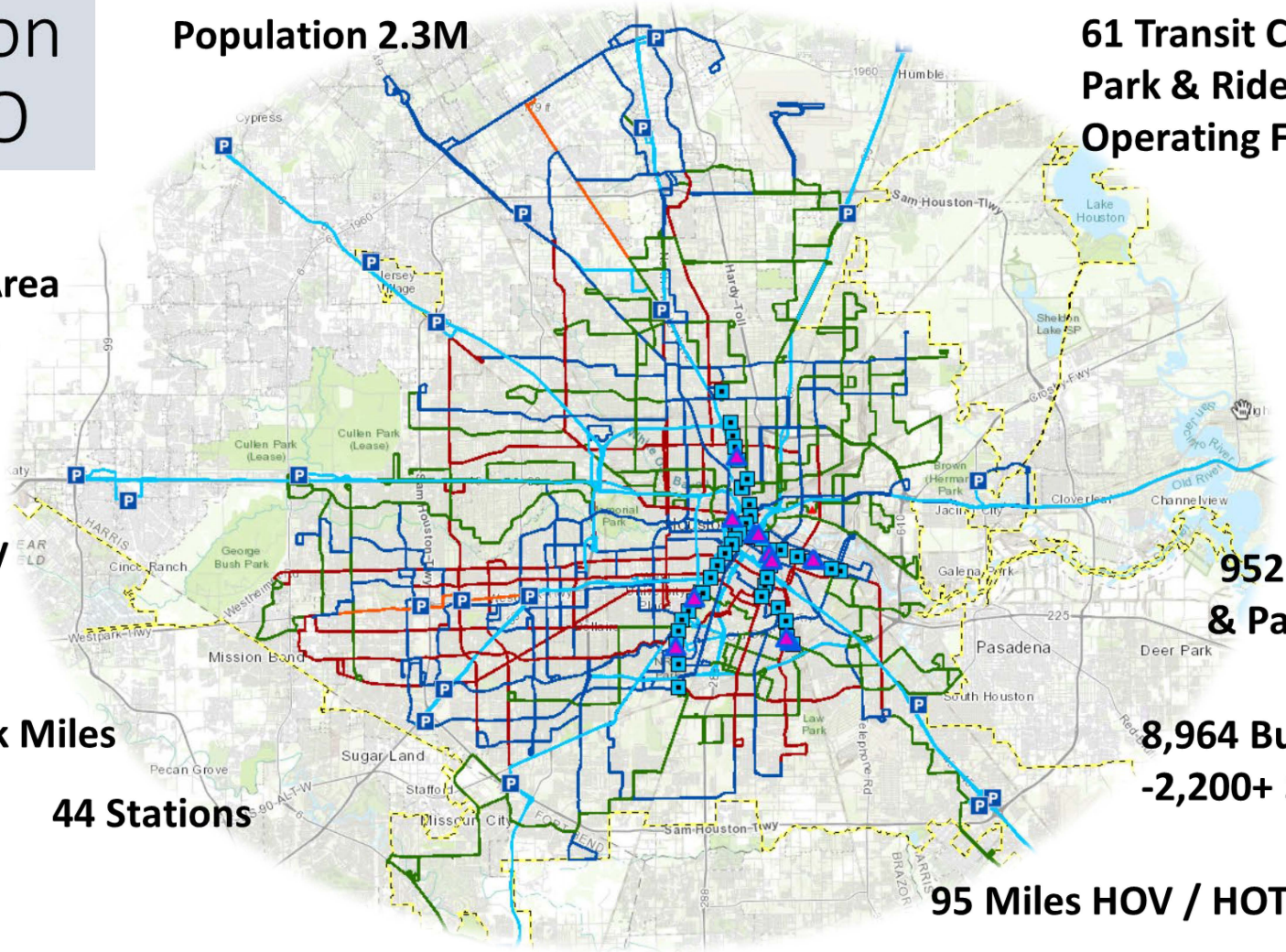
952 Vanpool & Paratransit

76 LRVs

22.7 Track Miles

8,964 Bus Stops -2,200+ Shelters

44 Stations



95 Miles HOV / HOT Lanes

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Our Top Rules for Data Reporting

The Who

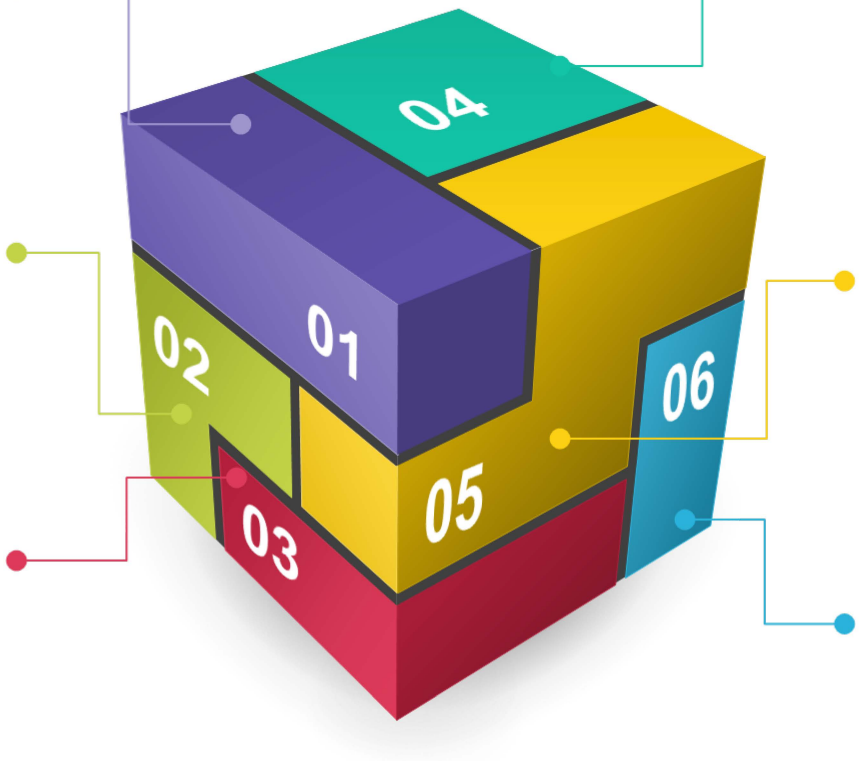
Know your audience and understand their needs.

The What & The Why

Executive Dashboard – What
Analytical Dashboard - Why

KISS

Visualizations are meant to SIMPLY & AMPLIFY.



The Goal

MEASURE what you are trying to MANAGE.

The Data

Good data. Do NOT underestimate this effort!

Continuous Improvement

Define
Measure
Analyze
Improve
Control

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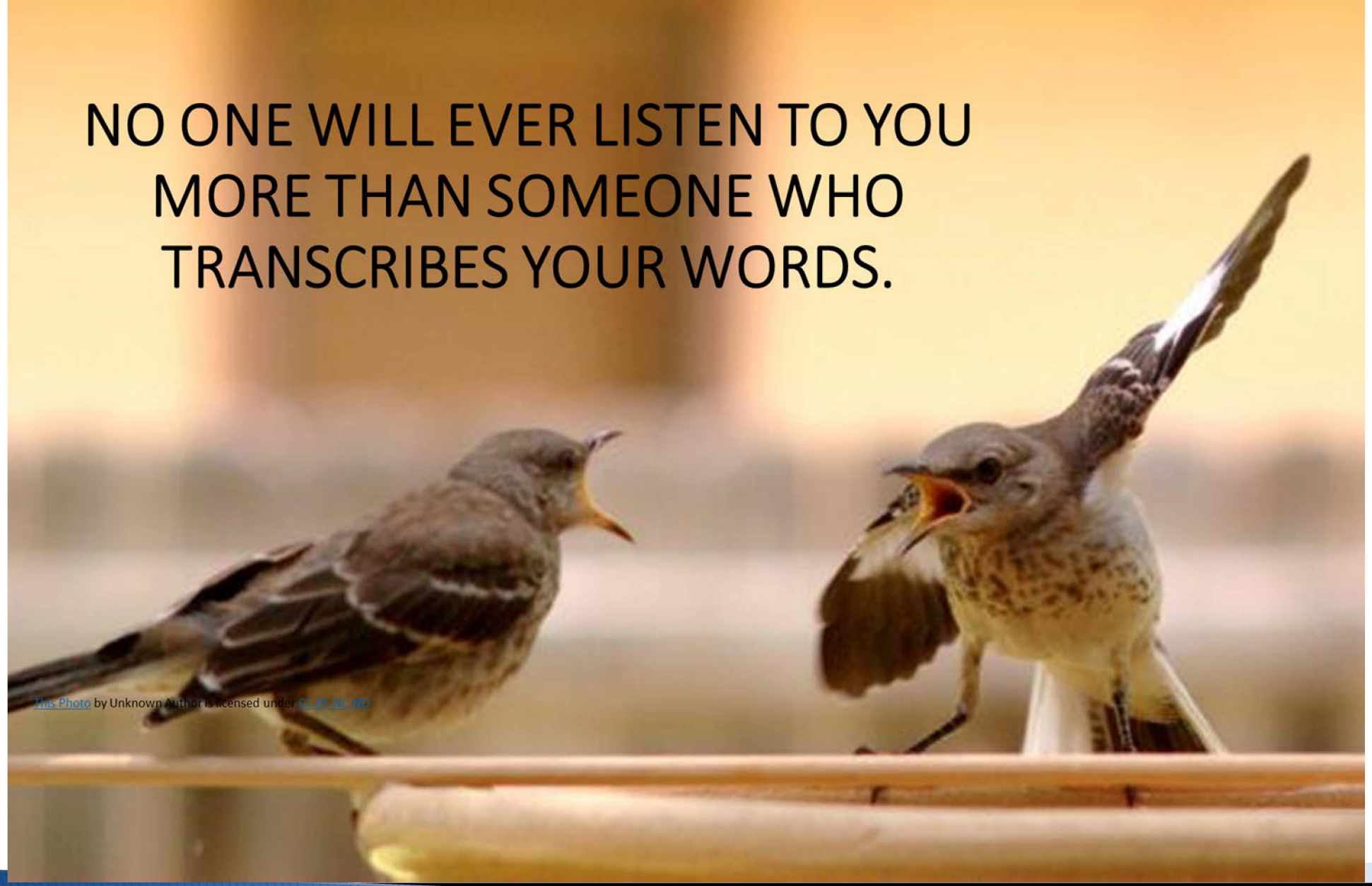


Are we failing our assets?

- One source of truth: a system of record
- Consolidate EAM system(s)
- Policy for standardization
- Audit reports for data gaps

SAP

- Asset Inventory
- Condition Score

CIP

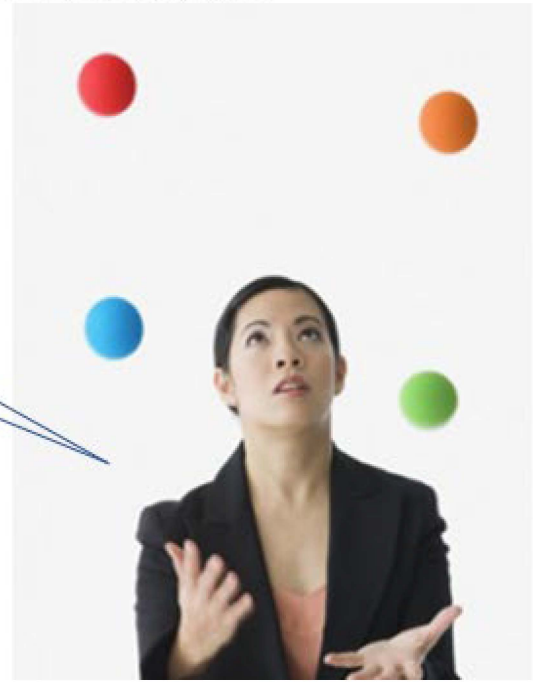
- Capital Needs
- SOGR Score

OMB

- Budget Planning
- Project Prioritization

I want it all now.

Pay now or pay later!



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Define "State of Good Repair" Goals

"The probability of hitting a target you haven't specified or aren't aiming at is low."

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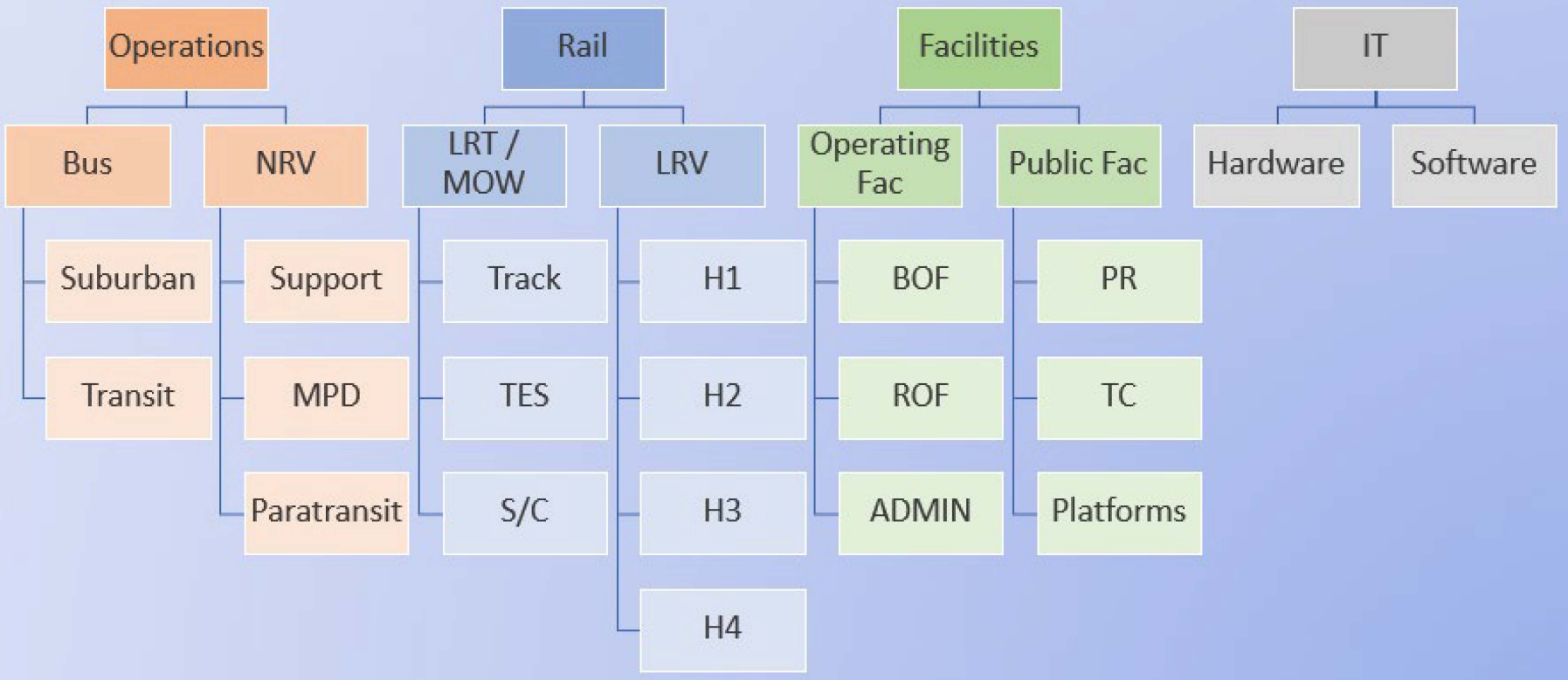
Standardize Data

What is the condition score?

TERM Rating		Condition	Description
Excellent	◇	4.8–5.0	No visible defects, near-new condition.
Good	△	4.0–4.7	Some slightly defective or deteriorated components.
Adequate	○	3.0–3.9	Moderately defective or deteriorated components.
Marginal	▽	2.0–2.9	Defective or deteriorated components in need of replacement.
Poor	□	1.0–1.9	Seriously damaged components in need of immediate repair.

Break it Down



What you are trying to answer = level of data granularity.

Measure “State of Good Repair”

Average Facility TERM Score

Meas Position	Location																	
	GRIGGS STORAGE		POLK BOF		FALLBROOK BOF		HIRAM CLARKE BOF		KASHMERE BOF		WEST BOF		NORTHWEST BOF		FIELD SVC CTR		1900 MAIN	
CONVEYANCE			▽	1.667	▽	2.000	▽	2.000	▽	2.000	▽	2.000	▽	2.500	○	3.000	△	4.000
ELECTRICAL	○	3.875	○	3.000	▽	2.633	▽	2.441	▽	2.763	▽	2.533	▽	2.962	▽	2.048	○	3.250
EQUIPMENT			▽	2.000	▽	2.000	▽	2.154	▽	2.231	□	1.846	▽	2.357	▽	2.000	△	4.000
FIRE PROTECTION	◇	5.000	○	3.556	▽	2.813	▽	2.947	▽	2.923	○	3.000	○	3.000	▽	2.875	○	3.667
HVAC	△	4.000	○	3.233	○	3.240	▽	2.267	▽	2.441	▽	2.680	○	3.000	△	4.333	○	3.000
INTERIORS	△	4.800	▽	2.733	▽	2.167	▽	2.200	▽	2.421	▽	2.250	▽	2.200	▽	2.286	△	4.000
PLUMBING	◇	5.000	▽	2.933	▽	2.786	▽	2.545	▽	2.800	○	3.000	○	3.083	▽	2.250	○	3.000
SHELL	○	3.615	▽	2.487	▽	2.094	▽	2.810	▽	2.866	▽	2.292	▽	2.076	□	1.286	▽	2.227
SITE	○	3.000	▽	2.333	□	1.967	▽	2.000	□	1.967	▽	2.000	□	1.958	▽	2.000	▽	2.393
SUBSTRUCTURE	◇	5.000	○	3.778	▽	2.875	▽	2.875	▽	2.800	○	3.000	○	3.143	▽	2.750	△	4.000
Grand Total	○	3.841	▽	2.781	▽	2.407	▽	2.518	▽	2.639	▽	2.408	▽	2.469	□	1.962	▽	2.689

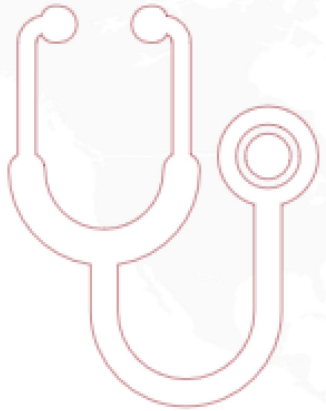
Facility KPI

Excellent	5.00	◇
Good	4.00 - 4.99	△
Adequate	3.00 - 3.99	○
Marginal	2.00 - 2.99	▽
Poor	1.00 - 1.99	□

Elements of a SOGR Composite Score

TERM SCORE

Condition Assessment



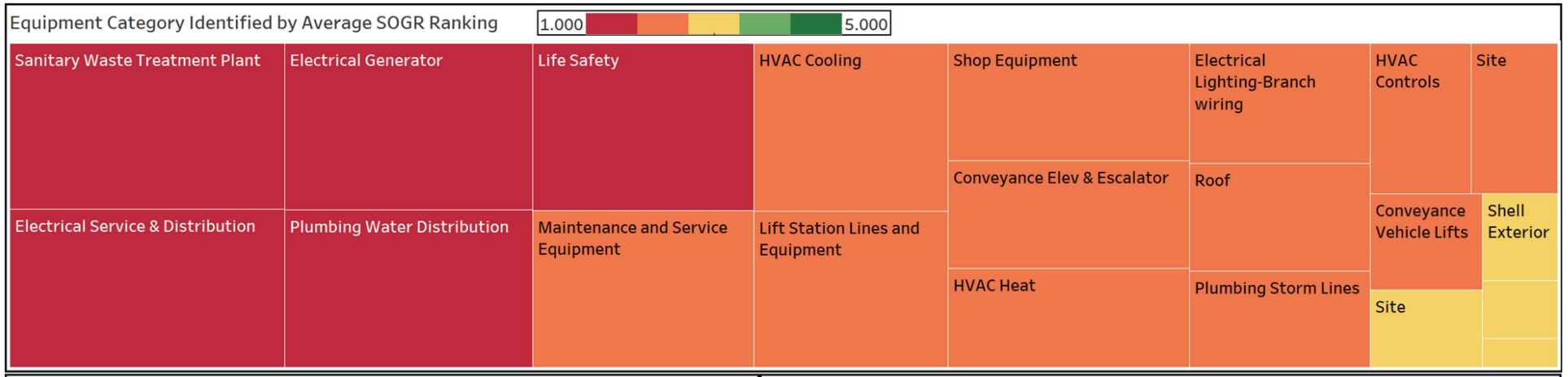
REMAINING LIFE

AGE - ULB

CRITICALITY INDEX

Asset's impact on mission delivery.

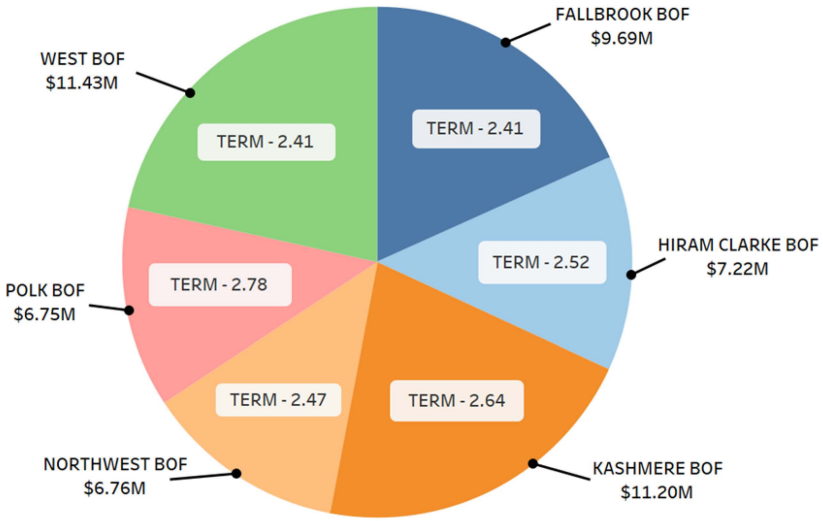
SOGR Dashboard



Equipment Category Identified by Average SOGR Ranking Per Facility

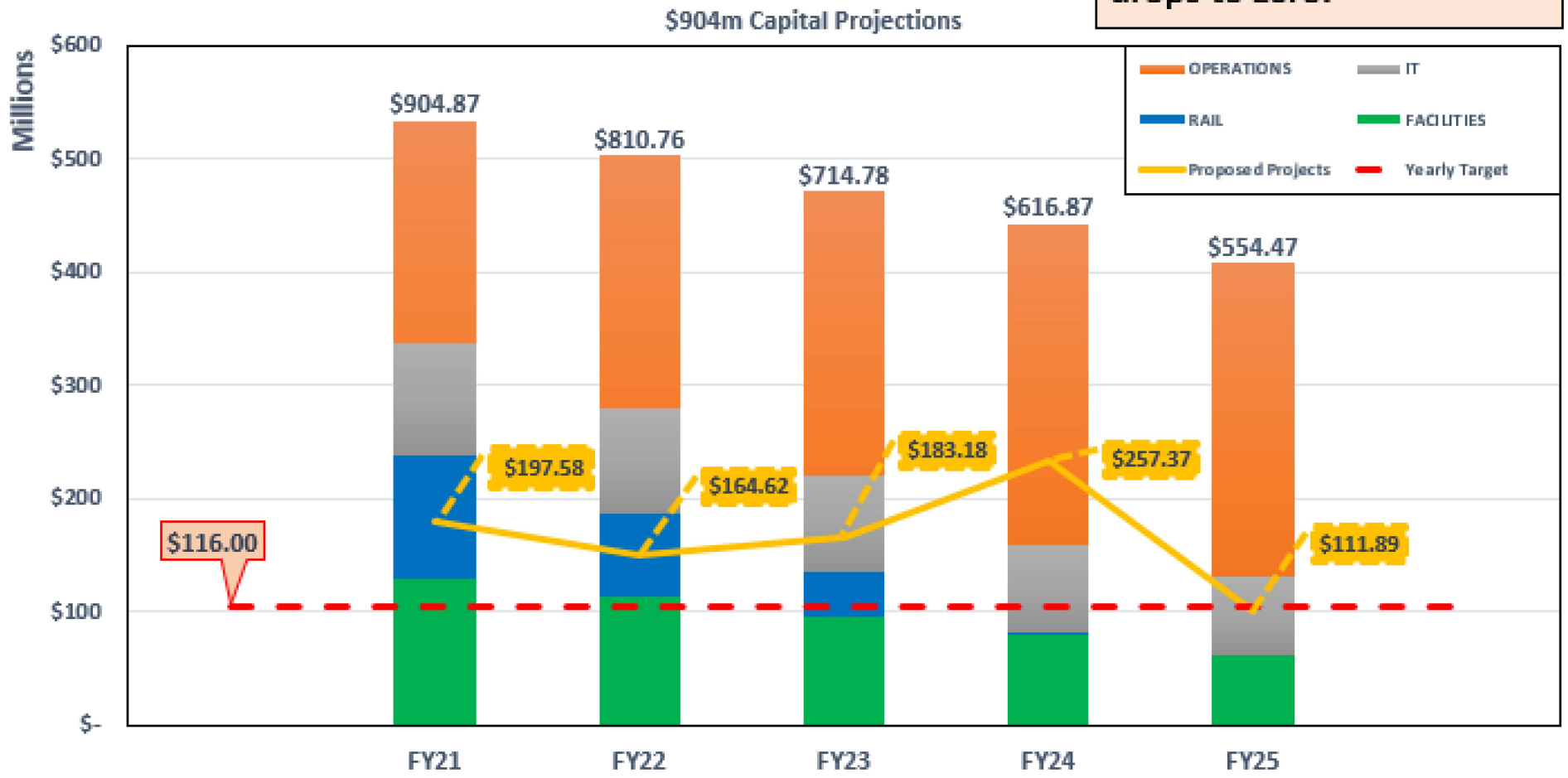
Equipment Category	Location: FALLBROOK BOF	HIRAM CLARKE BOF	KASHMERE BOF	NORTHWEST BOF	POLK BOF	WEST BOF
Conveyance Elev & Escalator	2.25		2.06	2.50	2.13	2.10
Conveyance Vehicle Lifts	2.37	2.60	2.43	2.80	2.68	2.79
Electrical Generator		1.40			1.49	1.50
Electrical Lighting-Branch wiring	2.50	1.10	2.90			2.90
Electrical Service & Distribution			1.40			
HVAC Controls	2.60		2.60	2.40		2.50
HVAC Cooling	1.95	1.74	2.02	2.70	1.91	1.77
HVAC Heat	2.38	2.40	2.29	2.40	2.40	2.25
Interior Spaces			3.13			
Interiors Finishes	2.90	2.80	2.85	2.90	2.80	2.95
Life Safety			1.67			
Lift Station Lines and Equipment		2.30	2.00	1.30	2.30	2.00
Maintenance and Service Equip..						1.90
Plumbing Storm Lines				2.50		
Plumbing Water Distribution						1.60
Roof	2.60				2.10	2.50
Sanitary Waste Treatment Plant	1.60	1.40	1.10	1.40	1.40	1.20
Shell Exterior		2.80	2.80		2.80	2.80
Shop Equipment	2.20	2.16	1.68	1.95	1.78	2.15
Site Development	2.95	2.40	2.45	2.40	2.40	2.55
Site Roadways-Driveways	2.90	2.90	2.50	2.50		2.47

Total Project Backlog Per Facility and Facility TERM Score

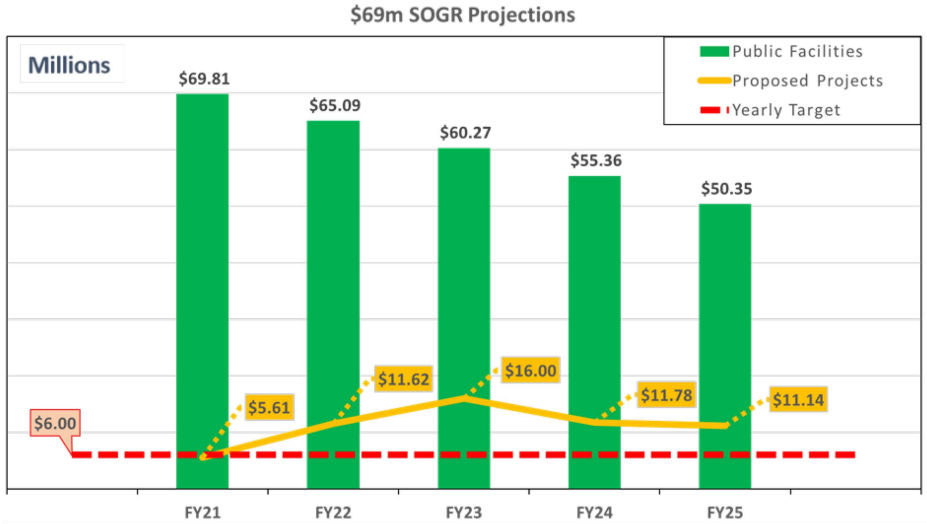


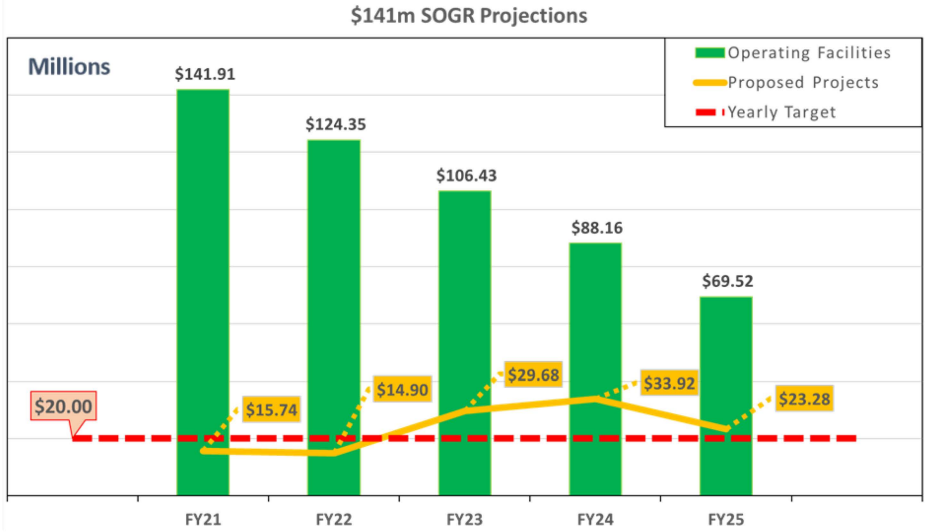
Capital Projects Projections

On a long enough timeline, the usefulness for assets drops to zero.



Facility Comparison





Challenges, Solutions, & Goals

Data Sharing and Real Time Data.	Collaboration is Key.
Don't Data Puke!	K.I.S.S.
Identifying the Goal or Problem.	Ask the right questions.
Analytics Brings Change.	Understand and use the data.

- Staff for **EFFICIENCY**, Resource for **OPTIMIZATION**
- Thing **BIG**, Act **SMALL**
- Design for **FAILURE**, Deliver for **SUCCESS**
- Learn the **TAKE OFF**, Study the **LANDING**

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Where do we go from here?

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Washington State Ferries

FTA ROUNDTABLE PRESENTATION

JULY 30, 2020

DECISION SUPPORT TOOLS FOR PASSENGER AND MAINTENANCE FACILITIES ASSETS

Jeri Bernstein, SE

PRESENTATION OUTLINE

- About Washington State Ferries (WSF)
- Asset Inventory
- Asset Condition
- Decision Support Tools
  - Economic Life/Service Life
  - Example Fauntleroy Facility
- Lessons Learned

Washington State Ferries

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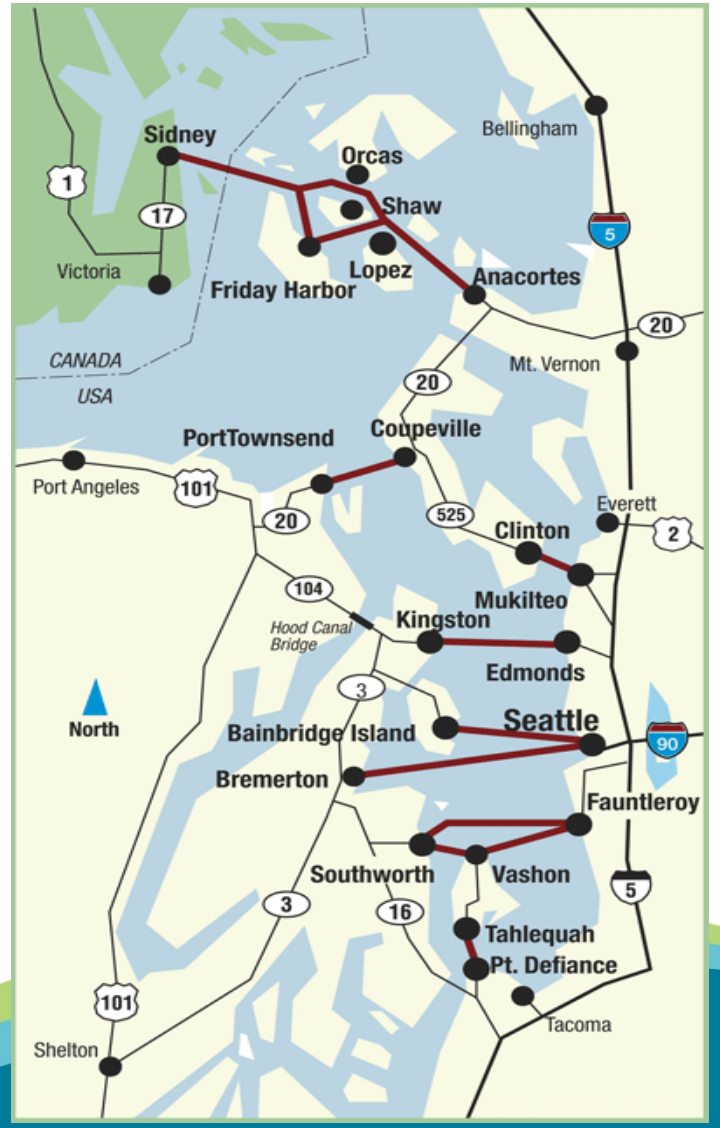
WASHINGTON STATE FERRIES

- FTA Region 10-Puget Sound Region of WA State
- Largest fleet of vessels in the United States. (21 Vessels)

- 2019: 24 Million Riders
  11 Million Vehicles
  Busiest Terminal - Seattle with 7000 ADT

- Operates 19 Passenger Facilities on 10 routes.
- Vessels are serviced at 1 Maintenance Facility.
- Part of WSDOT (State Highway Network) - Serving 8 counties and Canada



Washington State Ferries

WASHINGTON STATE FERRIES

Tier 2 Agency-21 Ferry Vessels < 101 Revenue Vehicles

FTA TAMP Plan Focus is 4 Elements

WSF-Division of WSDOT

State Transportation Asset Management Plan (STAMP) -meets requirements of FTA, FHWA, & WA State Legislature

STAMP Contains all 9 elements of FTA TAMP Plan

Element	Brief Description
I. An inventory of asset	A register of capital assets and information about those assets.
2. A condition assessment of inventoried assets	A rating of the assets' physical state; to be completed for assets an agency has direct capital responsibility for; should be at a level of detail sufficient to monitor and predict performance of inventoried assets
3. Description of a decision support tool	An analytic process or tool that (1) assists in capital asset investment prioritization and/or (2) estimates capital needs over time *does not necessarily mean software*
4. A prioritized list of investments	A prioritized list of projects or programs to manage or improve the SGR of capital assets

Presentation Focus 3 Elements

Asset Inventory & Condition-19 Passenger Facilities & 1 Maintenance Facility

Decision Support Tools

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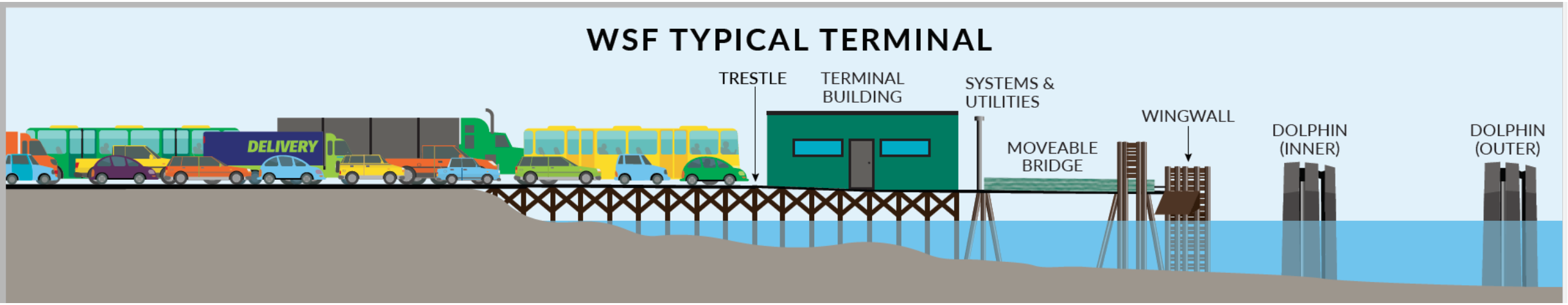
ASSET INVENTORY-PASSENGER FACILITY ASSETS



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Facility Condition Reporting

- Condition value is weighted based on the replacement costs of individual assets
- New Assets under construction are not included in the condition report
- Does not include security systems, Generators and lighting, IT Systems, HVAC

SHAW FACILITY

Sub-Asset Description	Replacement Cost	Weight	Condition Score	Weighted Score
Dolphin, Right Intermediate, 12 Steel Pile Frame, Slip 1	$2,316,000	0.109	5	0.54
Dolphin, Right Outer, 18 Steel Pile Frame, Slip 1	$2,316,000	0.109	5	0.54
Wingwalls (L & R), 14L/13R Steel Pile Frame, Slip 1	$3,721,000	0.174	4	0.70
Transfer Span (M-Span), Vehicle, Steel Open Girder, Slip 1	$2,097,000	0.098	4	0.39
Apron (Hydraulic), Vehicle, Steel, Slip 1	$463,000	0.022	4	0.09
Towers (L & R), Pipe Pile w/Rock anchors, Slip 1	$2,401,000	0.113	4	0.45
Bridge Seat, Pipe Pile, Slip 1	$1,108,000	0.052	3	0.16
Transfer Span Electrical Systems, Type 4, Slip 1	$739,000	0.035	5	0.17
Transfer Span Mechanical Systems, Type 4, Slip 1	$3,073,000	0.144	3	0.43
Trestle, Treated Timber (Creosote), Small	$1,941,000	0.091	2	0.18
Bulkhead (Abutment), Concrete	$720,000	0.034	3	0.10
Timber Trestle Overlay, MMA	$161,000	0.008	2	0.02
Holding Lanes, Paved, BST, Upland	$81,000	0.004	3	0.01
Parking Lot (Restrooms), Paved, BST, Upland	$27,000	0.001	3	0.00
Agent / Attendant's Booth	$24,000	0.001	3	0.00
Rest Room Building	$100,000	0.005	4	0.02
Passenger Waiting Shelter	$50,000	0.002	4	0.01
Total Score for Shaw Island				**4**

Facility Condition Reporting

Inspection Rating Comparisons by Governing Authority					
WSF	**Description**	**FTA**	**Description**	**WSDOT /FHWA**	**Description**
		5.0	Excellent		
90-100	Good	**4.0**	Good	**90-100**	Good
70-89	Fair	**3.0**	Adequate	**70-89**	Fair
50-69	Poor	**2.0**	Marginal	**50-69**	Poor
0-49	Substandard	**1.0**	Poor	**0-49**	Poor

FTA Facility Condition Rating Detail			
Maintenance Facilities - Annual Performance			
Terminal	**2019 Target: - Condition Rating Beginning of CY 2019**	**2019 Performance: - Condition Rating End of CY 2019**	**2020 Target: - Condition Target Rating**
Eagle Harbor	3	3	3
Passenger Facilities - Annual Performance			
Terminal	**2019 Target: - Condition Rating Beginning of CY 2019**	**2019 Performance: - Condition Rating End of CY 2019**	**2020 Target: - Condition Target Rating**
Anacortes	3	3	3
Bainbridge Island	3	4	4
Bremerton	3	3	3
Clinton	4	4	4
Coupeville	3	3	3
Edmonds	3	3	3
Fauntleroy	3	3	3
Friday Harbor	3	3	3
Kington	3	3	3
Lopez Island	3	3	3
Mukilteo	3	3	3
Orcas island	3	3	3
Point Defiance	4	4	4
Port Townsend	3	3	3
Seattle	3	3	3
Shaw Island	4	4	4
Southworth	3	3	3
Tahlequah	3	3	3
Vashon Island	3	3	3

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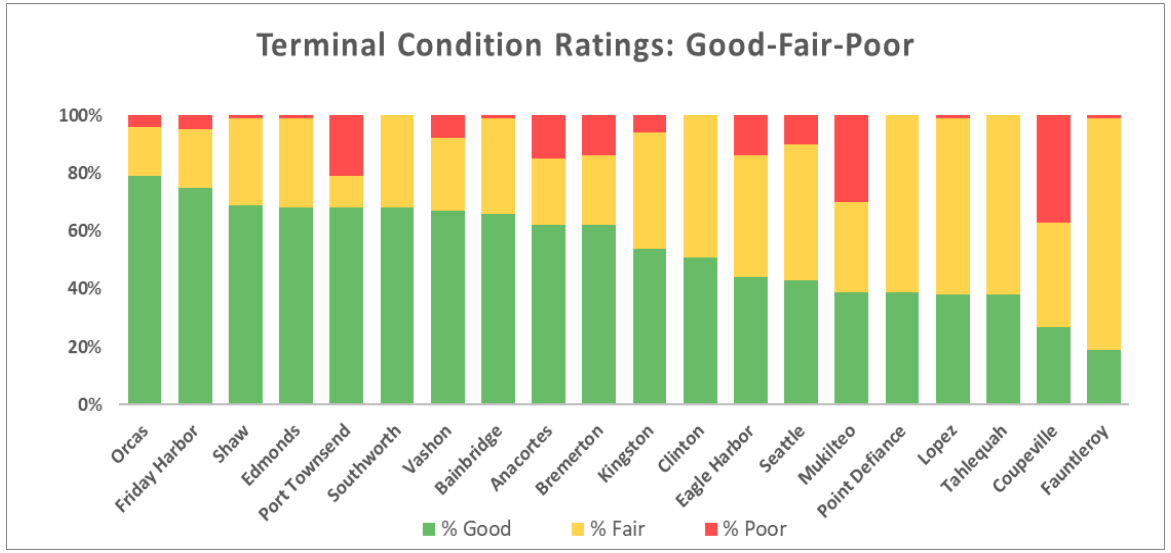
Facility Condition Rankings

FTA Ratings
4 Good- 3 Adequate/Fair- 2 Marginal/Poor
Green-Yellow-Red



Fauntleroy-Marginal Condition
Movable Bridge Mechanical Systems;
Capital Project-Replace entire terminal in 15 years

Coupeville-Marginal Condition
Capital Project 2029-Timber Dolphins
Monitor/Maintenance-Movable bridge foundation scour
Maintenance-Movable bridge Mechanical system.

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Decision Support Process

2 METHODS – COMBINED to ESTABLISH CAPITAL/MAINTENANCE PROJECT PRIORITY

- **Adjusted Service Year Due (Without Risk): Service Life adjusted for Condition BASED ON INSPECTIONS**

- **Economic Year Due (With Risk): BASED ON ASSET MANAGEMENT MODEL**
  - **Includes the following parameters**
    - **Ridership Impact Cost**
    - **Maintenance Cost**
    - **Probability & Consequence of Failure**
      - **Seismic Failure…Toggle Off/On**
      - **Operator Error**
      - **Weather / Climate Change /Scour**
      - **Structural/Electrical/Mechanical Failure**

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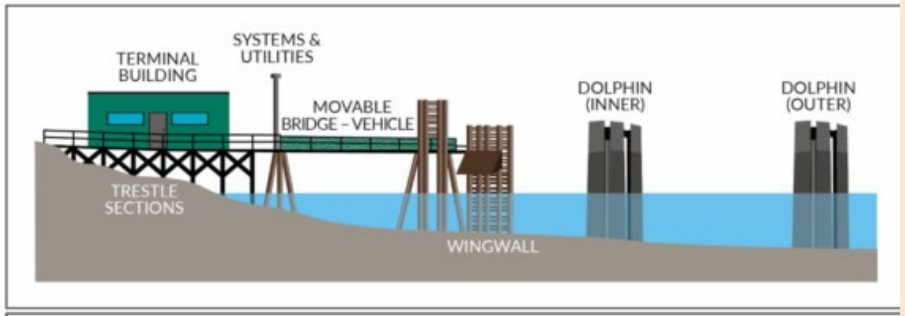
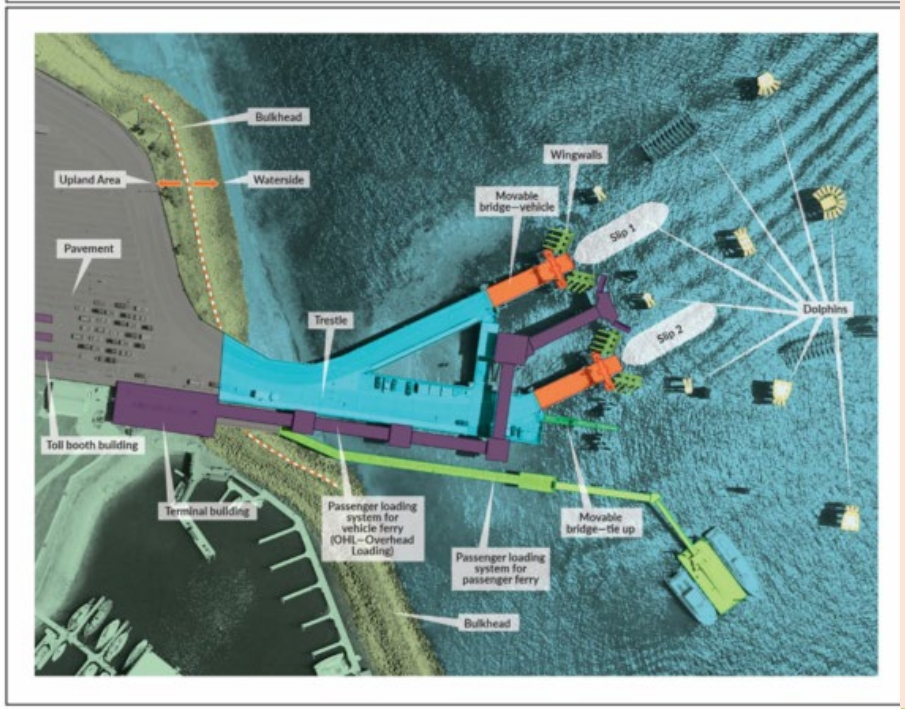
SERVICE LIFE-ECONOMIC LIFE





SERVICE LIFE ASSETS	ECONOMIC LIFE ASSETS
Passenger Only Facilities	Dolphins
Pavement	Wingwalls
Buildings	Vehicle Movable Bridges
Systems & Utilities	
IT Assets	Passenger OHL

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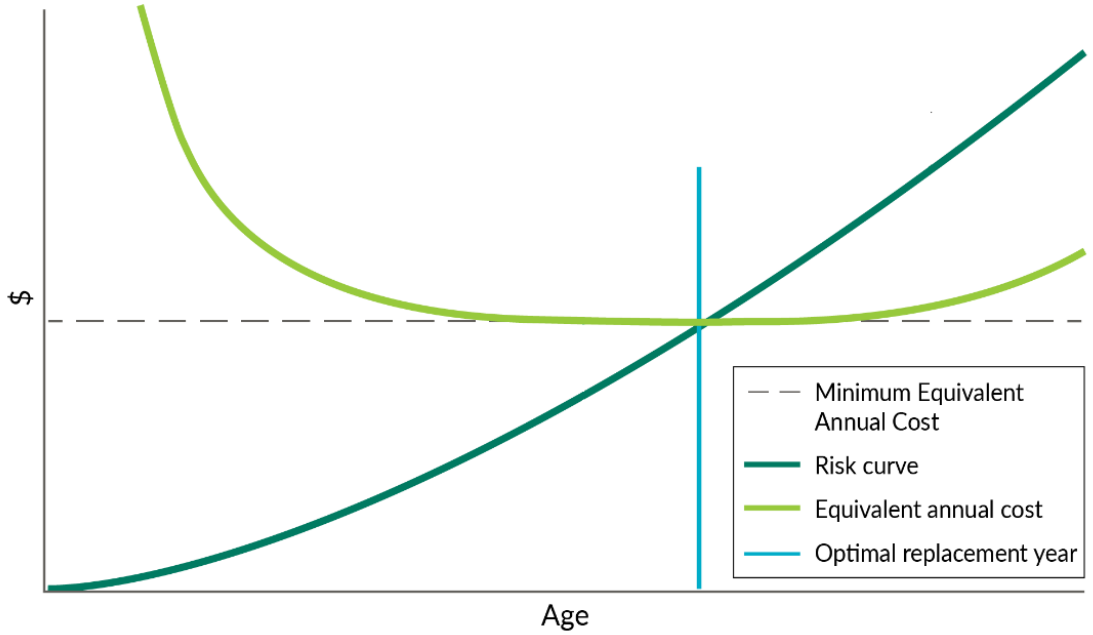
ASSET MANAGEMENT MODEL

- Purpose-Prioritize Assets
- Uses Economical Cost Analysis

- Risk Cost Curve
  Terminal Ridership
  Physical Condition Ratings
  Planned Maintenance
  Unplanned Event & Consequence
  Elect., Mech., Structural Failure; Operator Error
  Scour Ratings from inspections; Weather



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ASSET MANAGEMENT MODEL

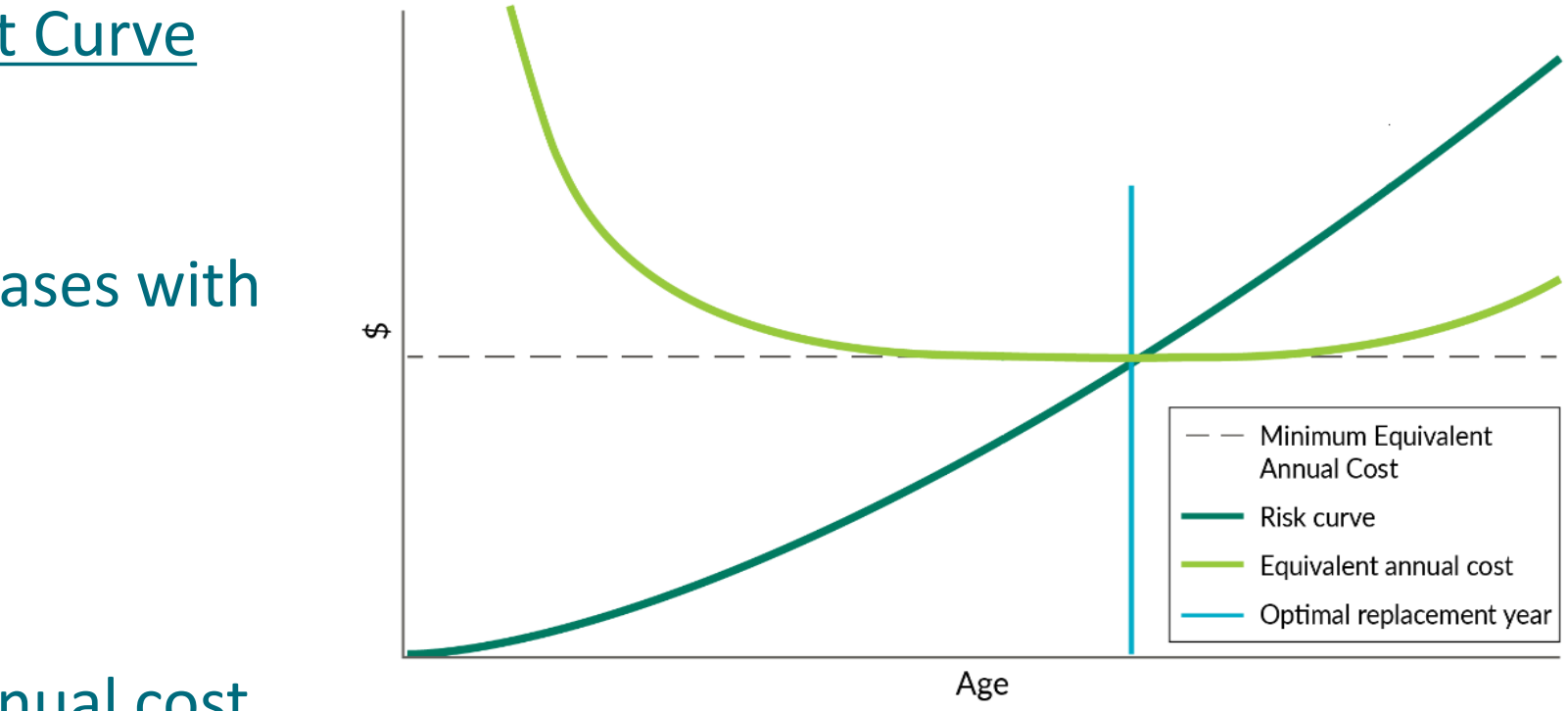
Equivalent Annual Cost (EAC)

Replacement Cost + Risk Cost Curve

Age of Asset

Equivalent annual cost decreases with age only initially.
Dashed Line-Min EAC

Optimal Replacement Year is intersection of Equivalent annual cost and risk cost curve.



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EXAMPLE-FAUNTLEROY FERRY FACILITY

- Year Constructed
  - Timber Trestle: 1957
  - Steel Girder Movable Bridge: ~1989
  - Terminal Building: 1957
- Busy Terminal
  - Number of Riders/trip 4th highest in WSF system.
  - 40 daily trips leave the facility
  - Over 1 Million Vehicles/year

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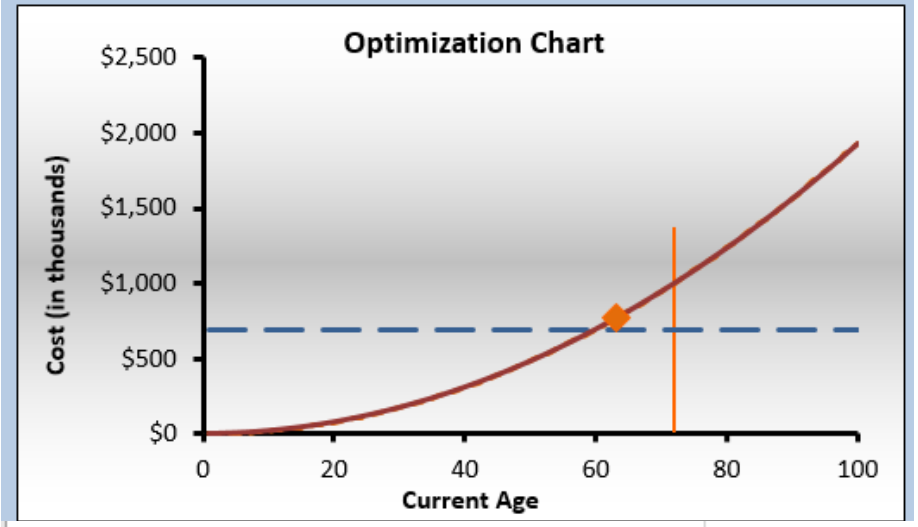
EXAMPLE – FAUNTLEROY TRESTLE

ASSET MANAGEMENT MODEL RESULTS

- Year Constructed: 1957; Age=63 years
- Material: Timber Trestle with timber piles
- Optimal Replacement Year with all risks except for Seismic: 2016
- Fauntleroy trestle is exposed to high tides and storms. The Trestle carries a significant chance of damage due to a high tide combined with an extreme storm. Unplanned maintenance is highly likely at this terminal compared to other terminals.



RESULTS	
Minimum EAC of new asset	$686,715
Optimal lifecycle, new asset	59
Optimal year of replacement	2016
Age at planned replacement (2029)	72
Benefit/cost ratio	1.19
NPV of immediate replacement	$13,733,514
NPV of optimal replacement	$13,629,865
NPV of forced replacement	$14,877,709

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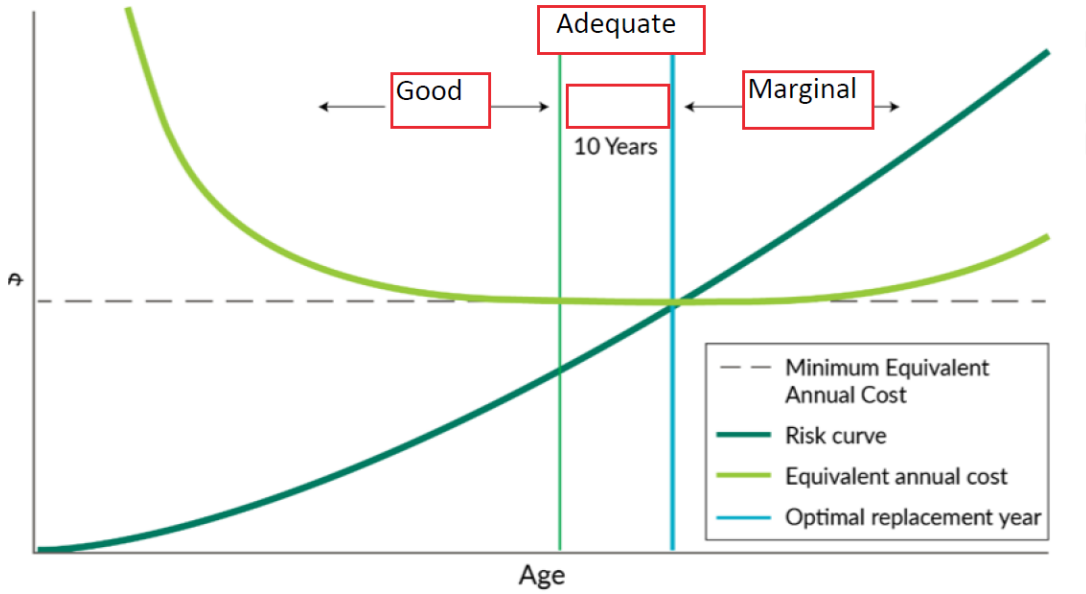
FAUNTLEROY FACILITY ASSETS

ECONOMIC & SERVICE YEAR DUE

GOOD	ADEQUATE	MARGINAL
2030 or Greater	2020-2030	2020 or less



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FAUNTLEROY FACILITY ASSETS

SERVICE YEAR DUE

Terminal	Slip	Sub-category	Condition Rating	Replacement Cost	Service Life Year Due	BC Ratio	
Fauntleroy	1	9A Main Terminal Building	87	$1,125,000	2022	0.00	
Fauntleroy	1	9C Storage Buildings	80	$9,000	2022	0.00	
Fauntleroy	2	9C Storage Buildings	87	$28,000	2029	0.00	
Fauntleroy	2	9D Toll Booths	83	$569,000	2030	0.00	
Fauntleroy	1	9D Toll Booths	87	$332,000	2030	0.00	Adequate
Fauntleroy	1	7A Pavement	97	$632,000	2034	0.00	
Fauntleroy	1	7B Traffic Lanes	100	$163,000	2047	0.00	Good

ECONOMIC YEAR DUE

Terminal	Slip	Sub-category	Condition Rating	Replacement Cost	Economic Year Due	BC Ratio	
Fauntleroy	1	4A Trestle	76	$10,643,000	2020	1.19	
Fauntleroy	1	4B Bulkhead	85	$296,000	2020	1.45	
Fauntleroy	1	3E Transfer Span Electrical Systems	93	$1,069,000	2020	2.42	Marginal
Fauntleroy	1	4A Trestle	85	$1,636,000	2028	0.00	Adequate
Fauntleroy	2	4A Trestle	76	$10,096,000	2034	0.00	Good
Fauntleroy	1	3B Apron	95	$469,000	2034	0.00	
Fauntleroy	1	3C Towers	79	$1,020,000	2037	0.00	
Fauntleroy	1	3F Transfer Span Mechanical Systems	75	$3,413,000	2038	0.00	
Fauntleroy	1	3D Bridge Seat	76	$1,042,000	2038	0.00	
Fauntleroy	2	4B Bulkhead	85	$287,000	2043	0.00	
Fauntleroy	1	2 Wingwalls	96	$3,618,000	2045	0.00	
Fauntleroy	1	1 Dolphin	87	$968,000	2049	0.00	
Fauntleroy	1	1 Dolphin	91	$968,000	2049	0.00	
Fauntleroy	1	1 Dolphin	88	$1,140,000	2052	0.00	
Fauntleroy	1	1 Dolphin	90	$2,252,000	2070	0.00	
Fauntleroy	1	1 Dolphin	92	$2,252,000	2071	0.00	
Fauntleroy	1	3A Transfer Span	92	$3,787,000	2103	0.00	

LESSONS LEARNED

Model has been operating for 10 years
Understand-Results of Models is a Guide
Subject Matter and Entire Team input is used to produce final project list
Economic Life Model must be calibrated to make sure the results are reasonable.

There is no public ridership associated with the Vessel Maintenance Facility. The assets at the vessel maintenance facility rarely rise to a priority even though maintaining vessels is important to ferry system operations.

Island Facilities do not get as high of a priority

Failure risks and maintenance costs are based on historic expenditures, not all data is maintained at the asset level. Modeling risks are sometimes not accurate at the asset level.

LESSONS LEARNED

Will be competing with other WSDOT Assets for Preservation Dollars…WSF Priority should be comparable the rest of WSDOT

Focus on High Freight Routes, Island Routes, Largest Ridership Routes
Seismic vulnerability is not a preservation issue

Questions?

Contributors:

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Darin Johnson, **PE**-Bis Consulting LLC

Jeri Bernstein, SE
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Washington State Ferries

WSDOT

LESSONS LEARNED

Economic Life Model must be calibrated to make sure the results are reasonable.

Predicted maintenance needs at the asset level need to be developed beyond one Fiscal Year.

Electrical Components for Movable Bridge have 10 year economic & service life…always due even if replaced recently

- Most likely to have Unplanned Failures
- Components become obsolete

Question if Economic Life of Berthing Structures is reasonable….will compare to actual condition including steel pile corrosion and scour.

FTA Transit Asset Management Roundtable 2020

Transit Equipment Guides for Los Angeles Metro Rail Department

Michael Quant
Los Angeles Metro, Maintenance & Engineering
July 29-30, 2020

Metro

Topics

- Objective
- Background
- Los Angeles Metro service area
- Resources used to help locate equipment
- Factors that make it difficult to locate equipment
- Equipment guide case scenarios
- Review of equipment guide components
- Summary
- Questions & Discussion

Metro

Objective

Discuss various resources available to assist Transit Asset Management, Rail Operations, contractors, and emergency personnel to locate bus and rail equipment in a safe, efficient, and cost-effective manner.

Background

Various forms of bus and rail transit solutions are routinely implemented resulting in many interrelated pieces of equipment, all requiring maintenance.

Teams of Maintenance personnel are required to routinely inspect and repair equipment, as well as, support non-track personnel who perform contract services including FTA's Transit Asset Management, State-of-Good Repair (SGR) inspections.

These teams requesting access, particularly to the rail system Right-of-Way (ROW), are required to answer a fundamental question, "Where is the equipment located?"

"One of the major aims of education is to impart an appreciation of what and how much we do not know."

The Look of Maps (1951)
Arthur H. Robinson

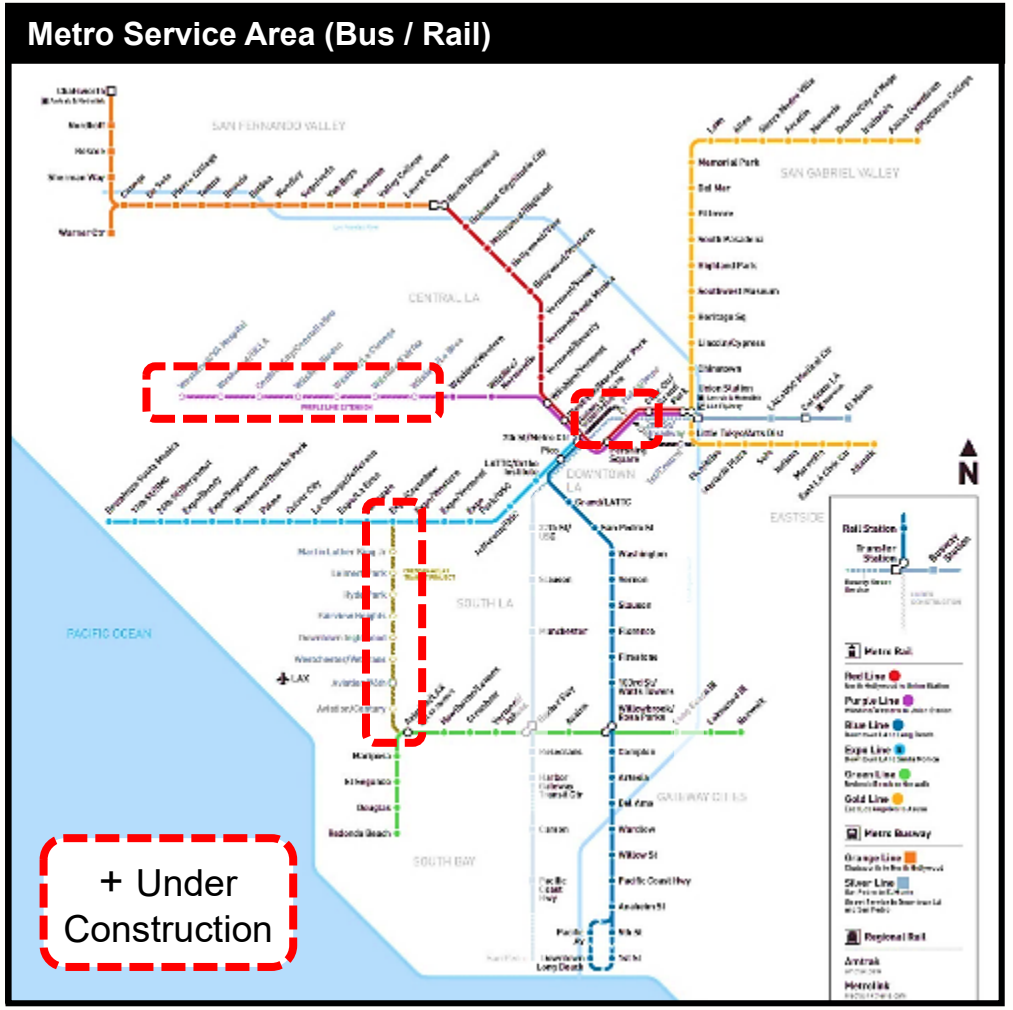
Metro

Los Angeles Metro service area

- Service area is approx. 1,500 sq. mi.
- Bus transit
- 4 Light Rail Lines (LRT)
- 2 Subway Lines (HR)
- 93 rail passenger stations
- 7 Rail Maint. Facilities

Under Construction

- 3 rail lines (2 LRT, 1 HR)
- 19 passenger stations



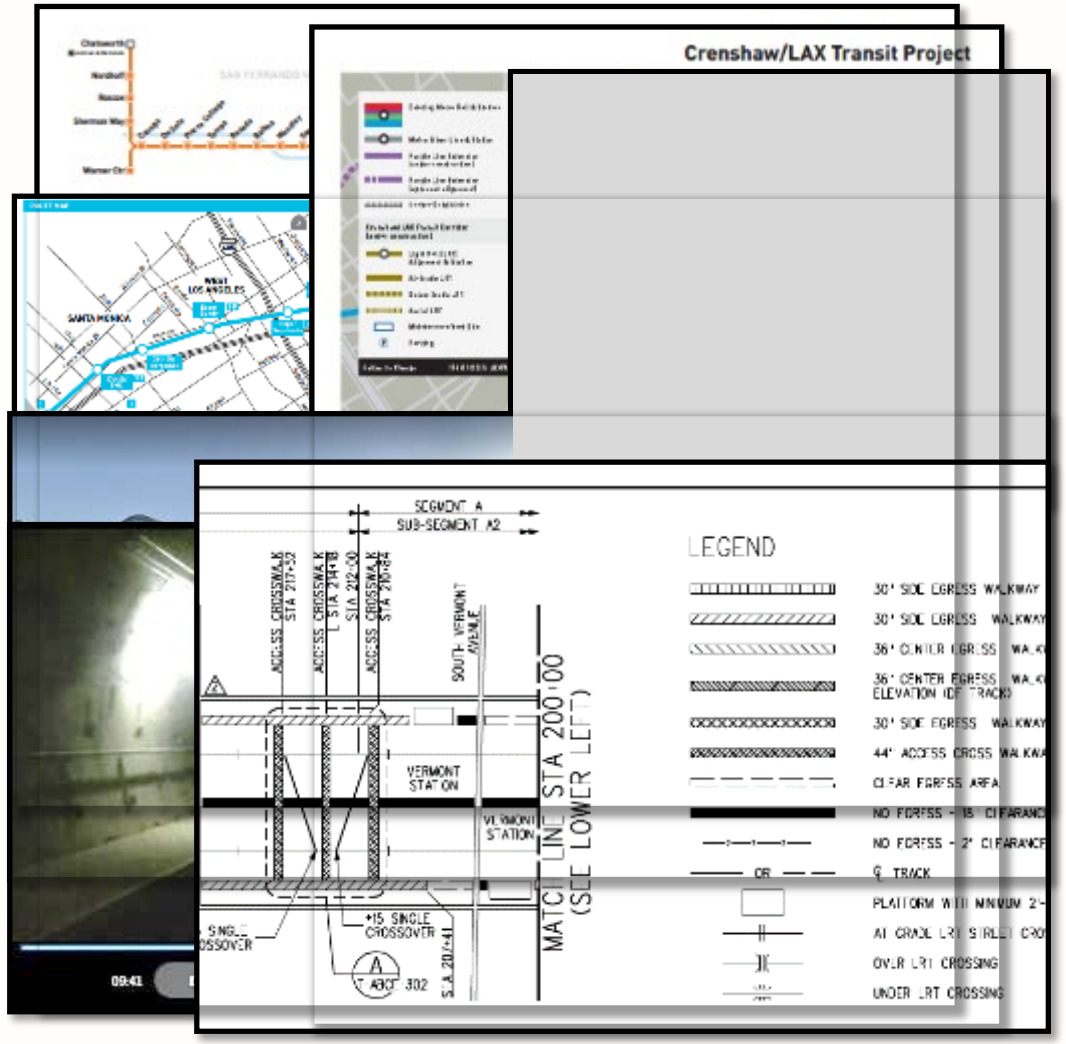
Source: https://www.metro.net

Resources used to help locate equipment

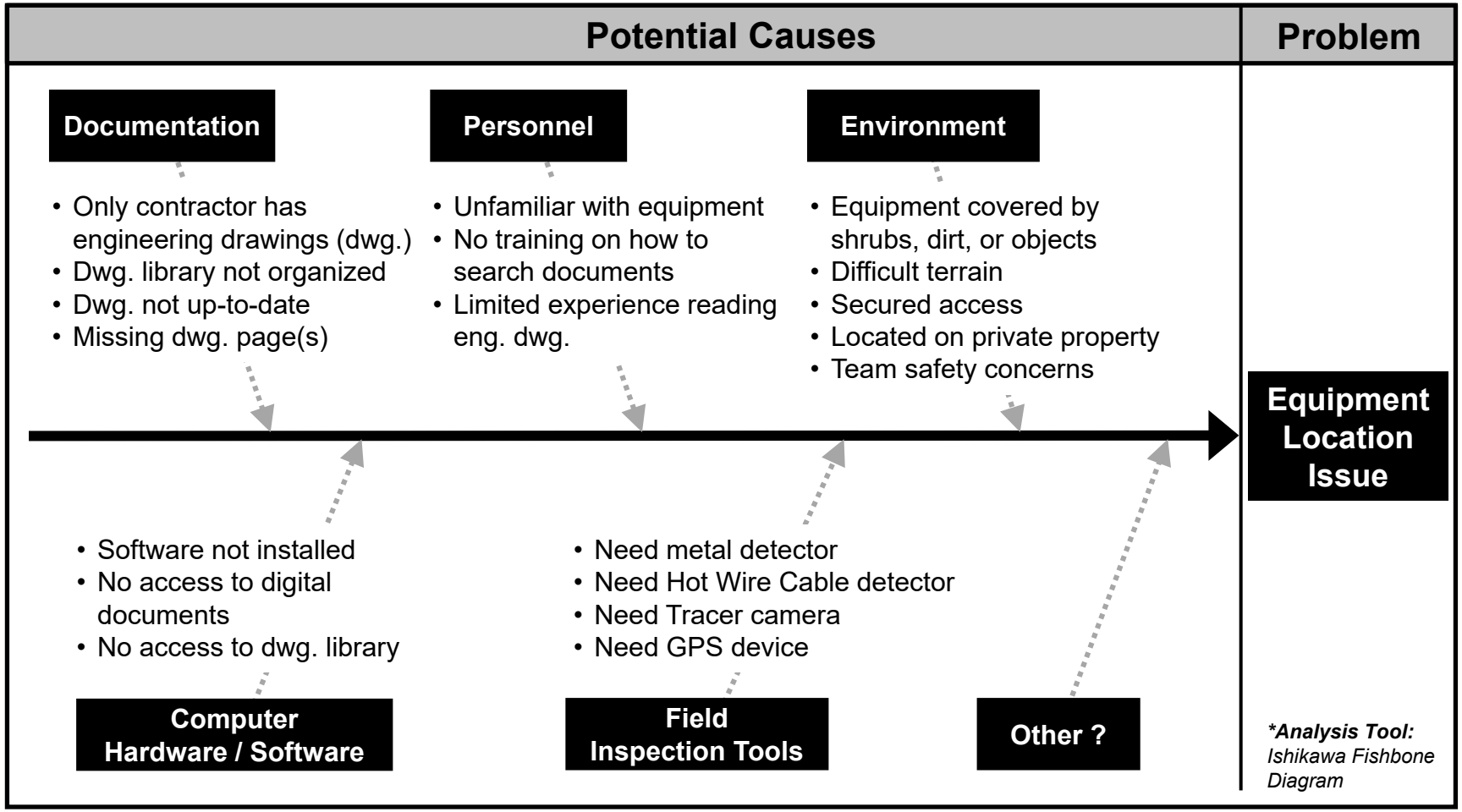
Public Internet
- Rail System Map
- Passenger Route Map
- New project documents
- Google / Bing Maps
- City / County maps

Dept. / Internal Intranet
- Track video
- Track restricted areas
- ITS equipment systems

Engineering Drawings
- Track Walking Schematic
- Track Charts
- Architectural, Civil ...



Factors that make it difficult to locate equipment

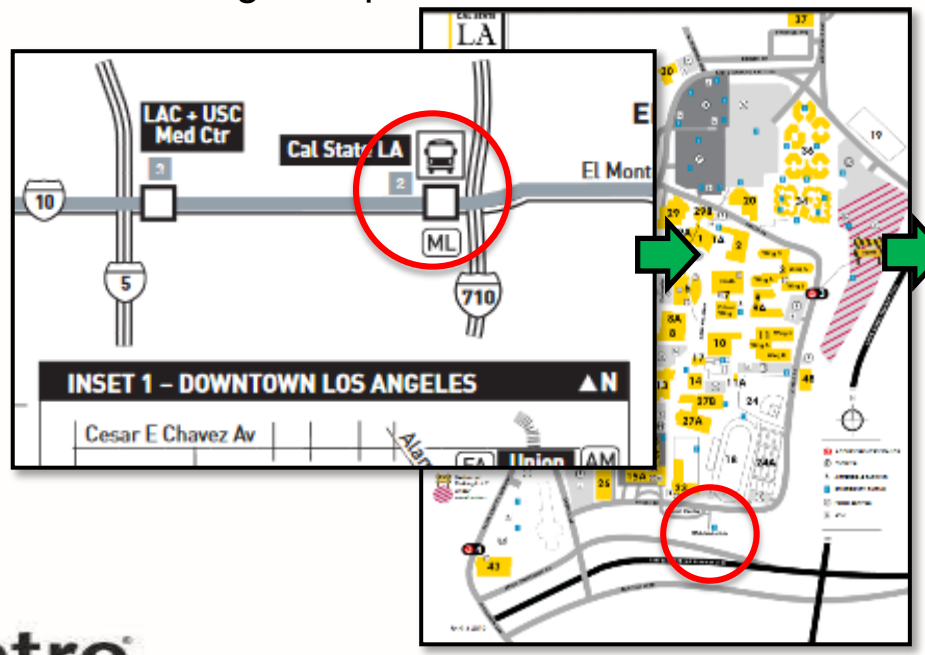


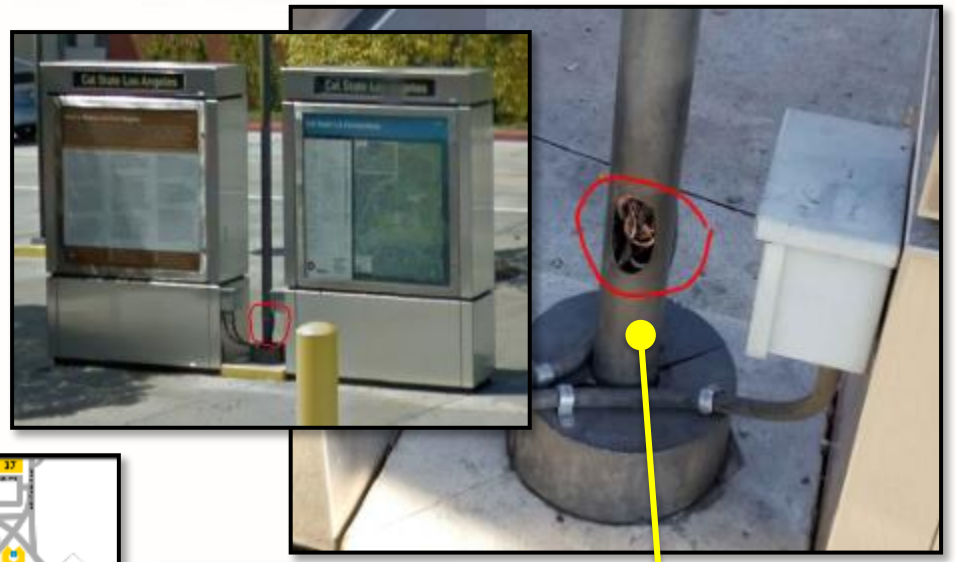
Case Scenario & Sample Formats

Equipment Guides - Single Sheet Map

Site Inspection: Map Case Exposed Electrical Wires

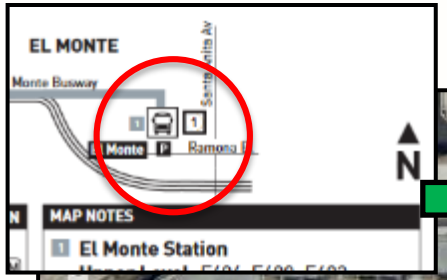
- **Issue:** Exposed electrical wires
- **Location:** College campus
- **Resources:**
  - Metro bus website
  - College campus website
  - Google Maps & Street View

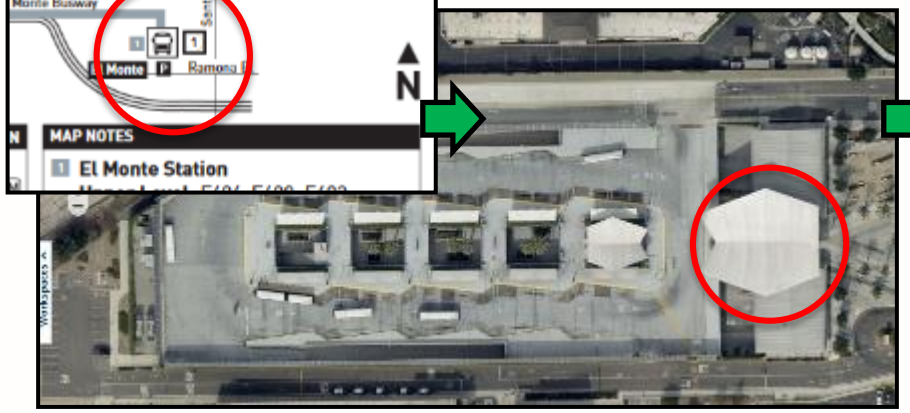




Site Inspection: Bus Station Fire Extinguisher Missing

- **Issue:** Missing Fire Extinguisher
- **Location:** Bus passenger station
- **Resources:**
  - Metro bus website
  - LA County aerial imagery
  - Map case station layout map

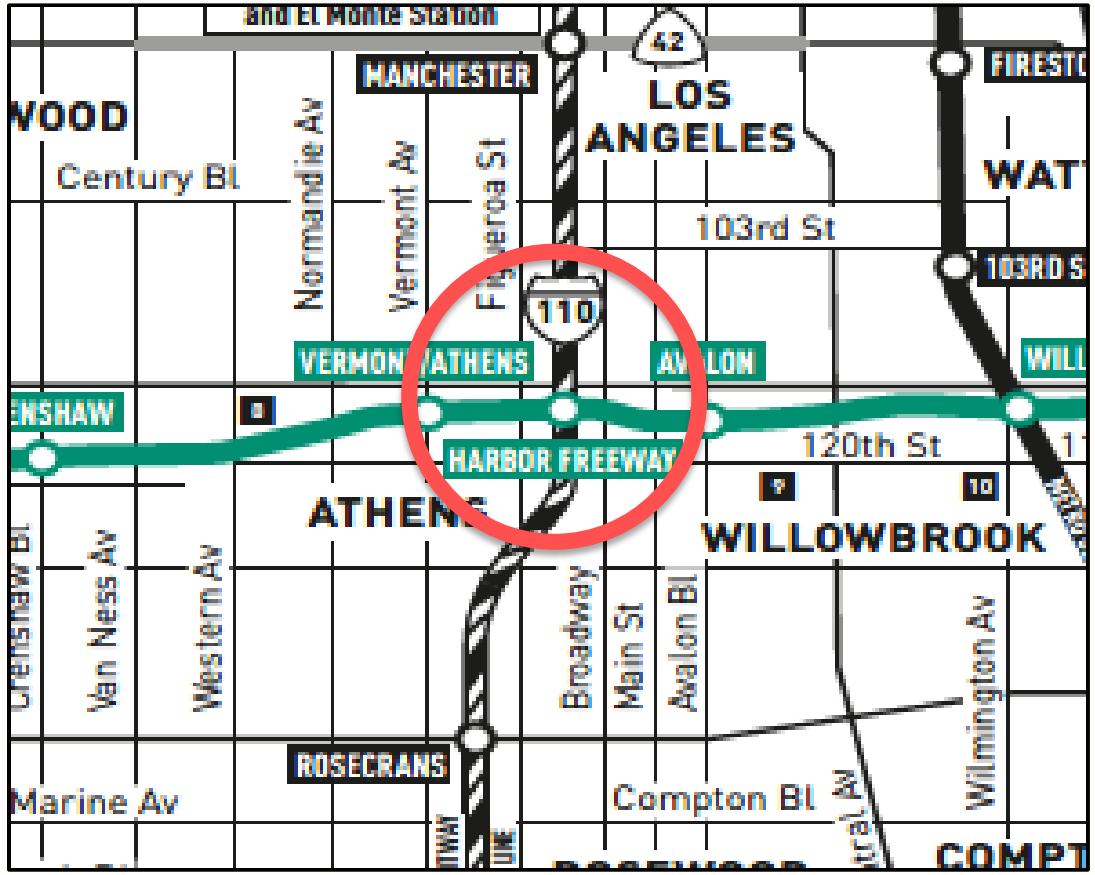




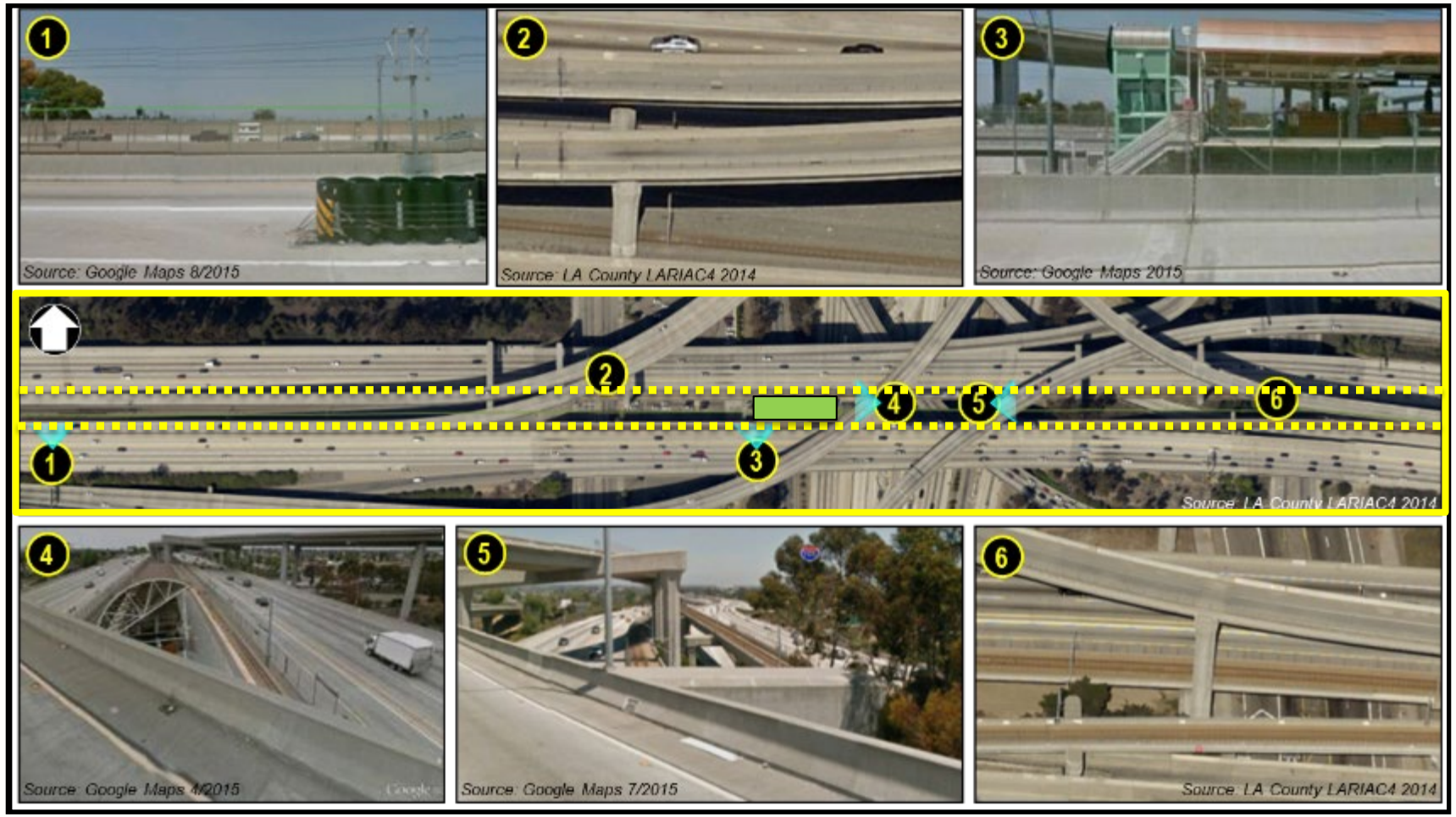
Metro

Site Study: Rail & Automobile Freeway Barrier Hazards

- **Issue:**
  Research freeway locations that cross over the train tracks and identify barrier height hazards
- **Location:**
  Light rail track
- **Resources:**
  - Rail route map
  - LA County aerial imagery
  - Google Street View



Site Study: Rail & Automobile Freeway Barrier Hazards



Case Scenario & Sample Formats

Equipment Guides - Brochure Format

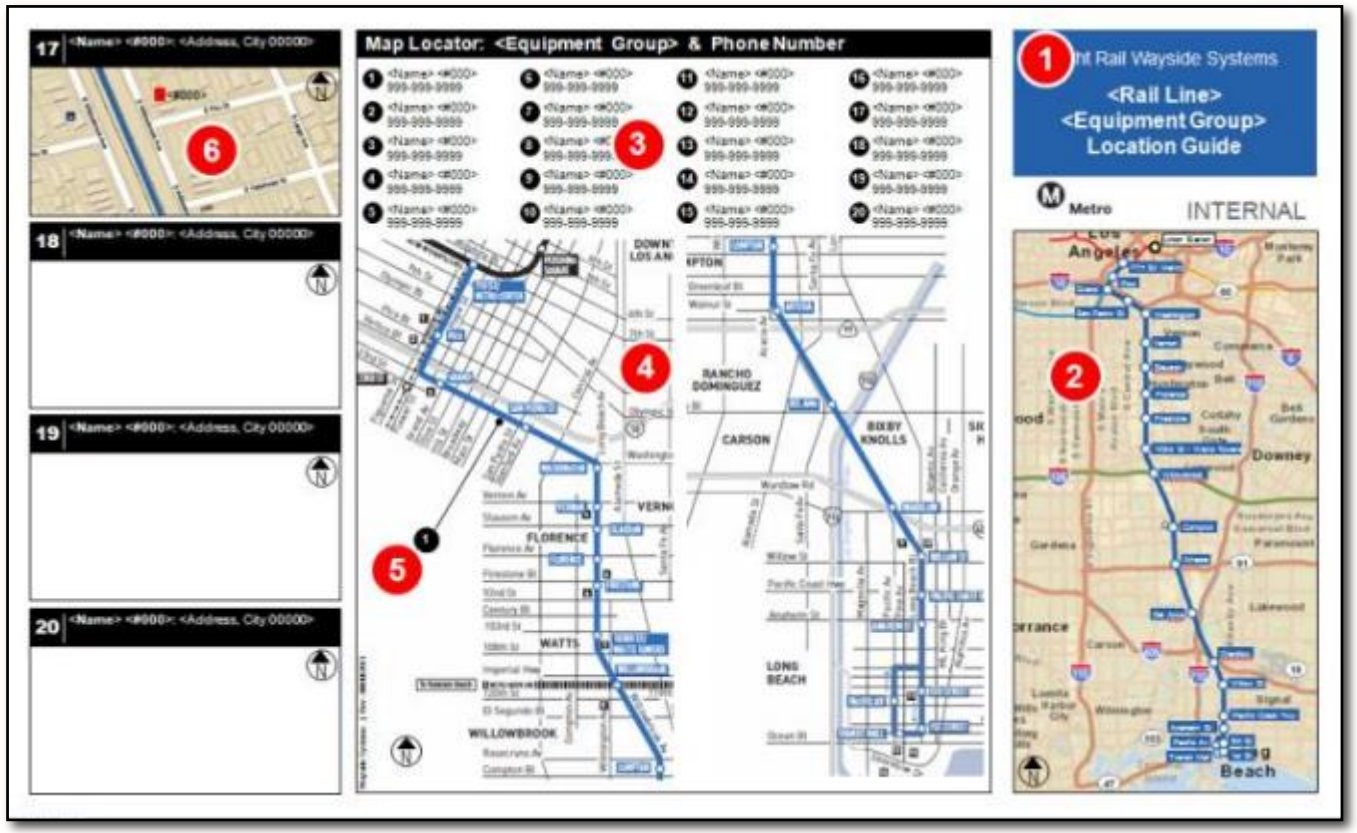
Brochure: Traction Power Substation Locator Maps

- **Issue:** New staff were unfamiliar with equipment locations
- Requested by Traction Power supervisor to help staff
- Identified user requirements
  - depict equipment location in relationship to freeway & local streets
  - street access path
  - equipment address & phone
  - small enough to fit into your pocket
  - standard paper sizes (letter, legal, tabloid)
  - provide PDF file for printing on department color copiers
- Post-production additions
  - vehicle fueling locations
  - rail station restrooms

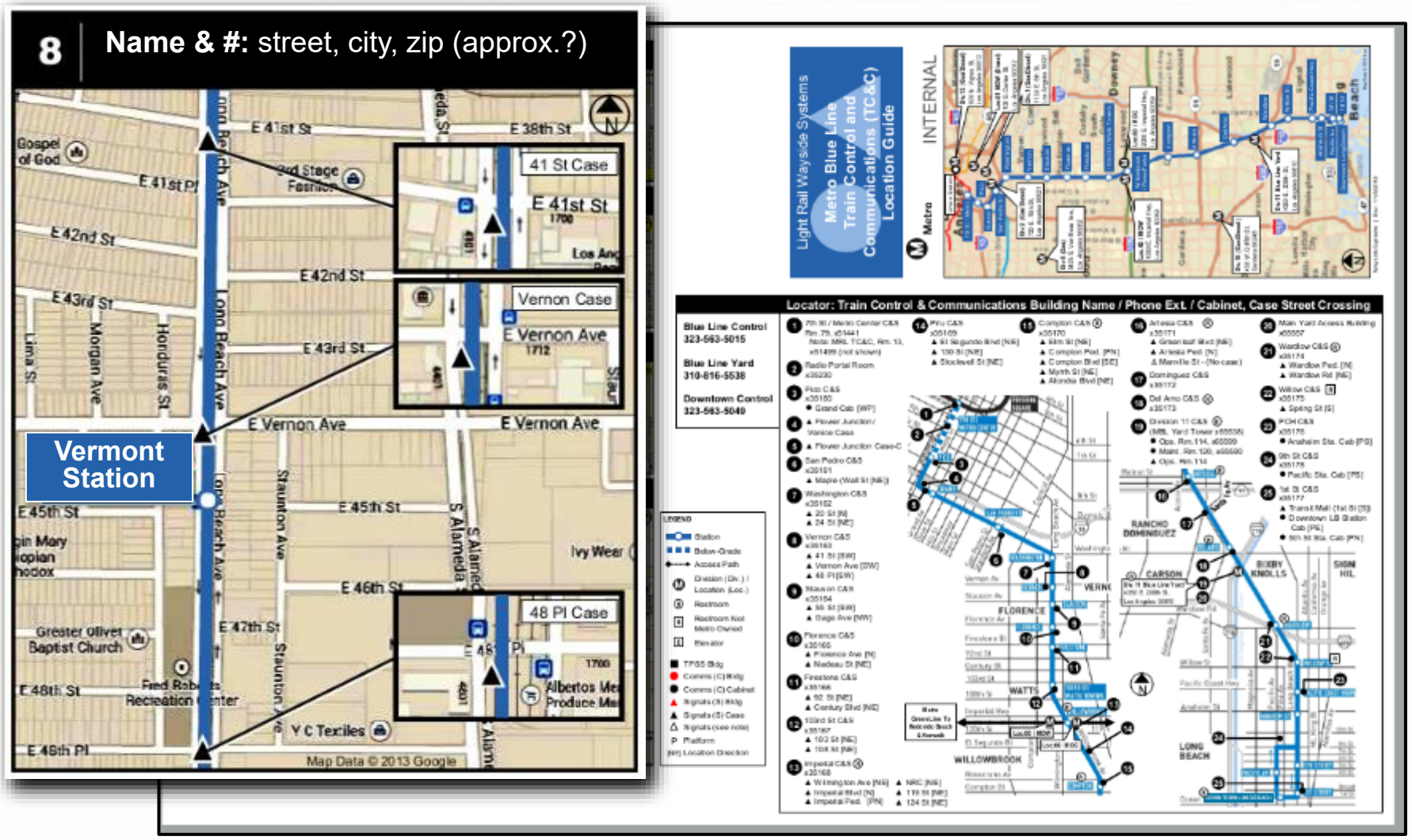
Traction Power Locator (continued)

- Publication design / format based on travel guides and venue maps
- Page layout produced with standard Microsoft Office PowerPoint
  - reduce software / production costs, utilize or train staff, high school or college interns

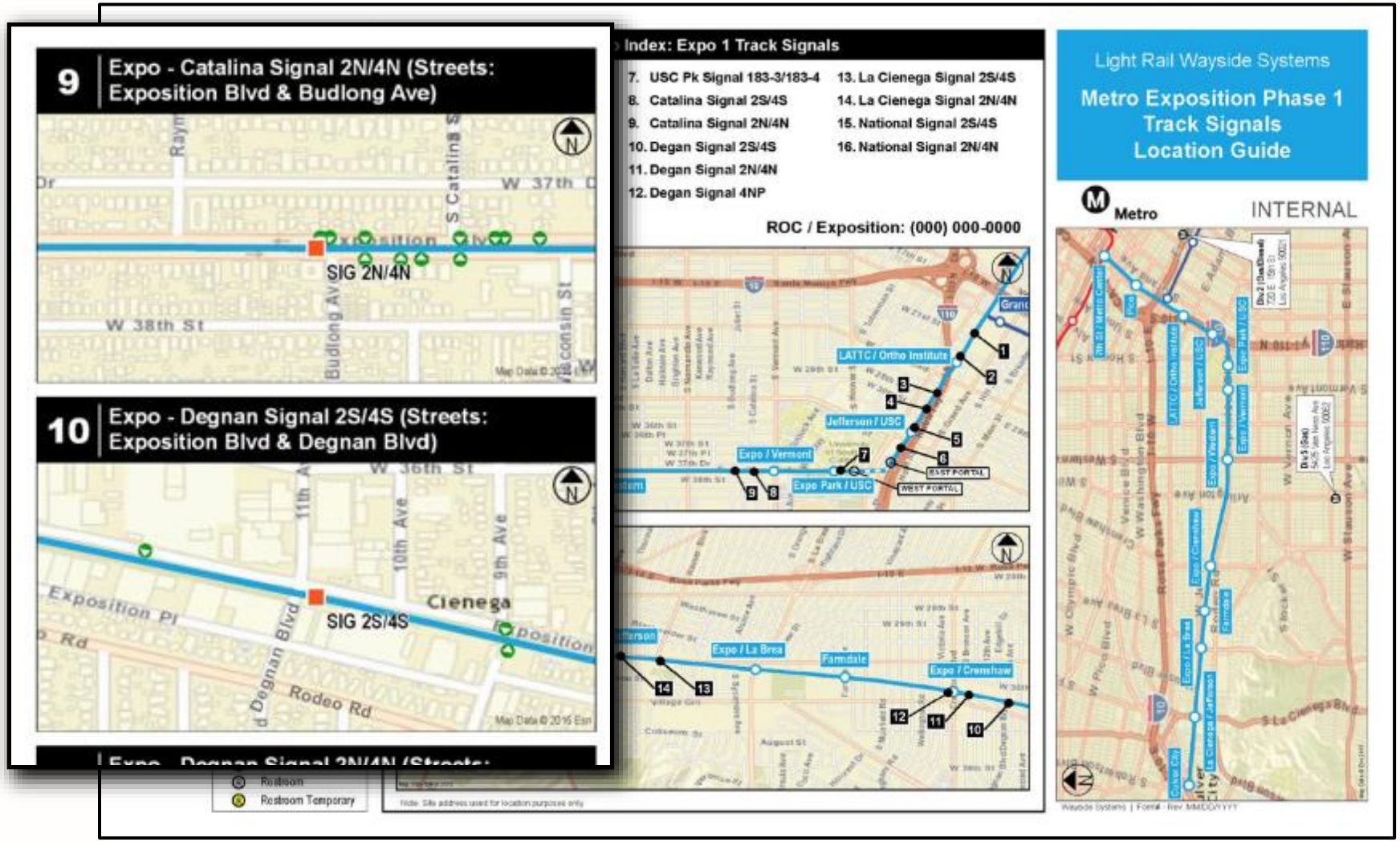
- Components
  1. Title block
  2. Hwy map (Google, Bing, Esri)
  3. Equipment index
  4. Index map (public route map)
  5. Equipment street location
  6. Detail street map (Google, Bing, Esri)



Template applied to Signal & Communication equipment



Template applied to prototype for Track Signal equipment



Template Printing & Folding Instructions Page

Locator Map Printing & Folding Instructions - Legal Paper (8.5" x 14")

Print Dialog:

1. Pages: 1-2
2. Actual size
3. Print on both sides of paper
4. Flip on short edge
5. Landscape

Printer Properties Dialog:

6. Properties Dialog
7. Paper Size: Legal (8.5x14)
8. Sides: 2-sided printing
9. Binding Location: Short Edge [Left]
10. Color Mode: Auto [Color/B&W]
11. Orientation: Landscape

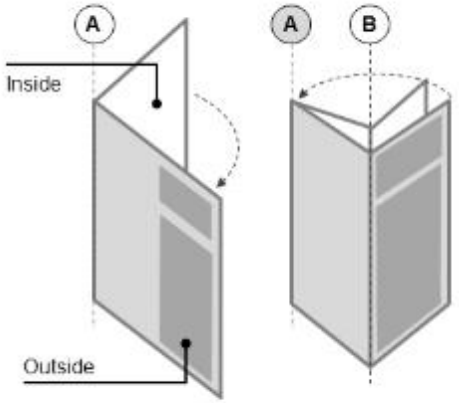
Notes:

1. Paper color: white
2. Paper size: Legal 8.5"x 14" (min. 20lb.)
3. Finishing: folded 4 panel vertical

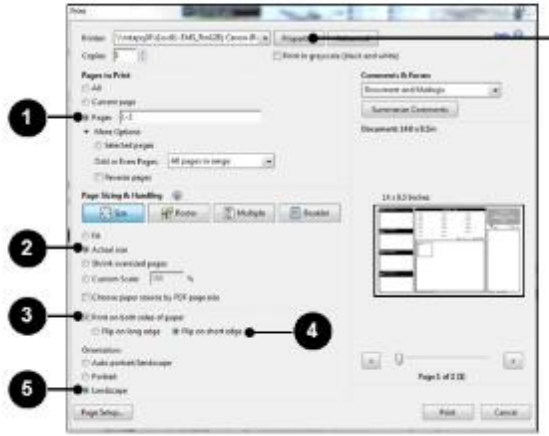
Outside *pg.1*

Inside *pg.2*

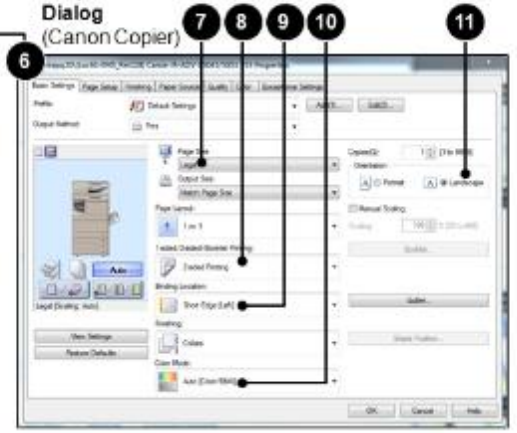
Legal Paper 4 Panel Folding

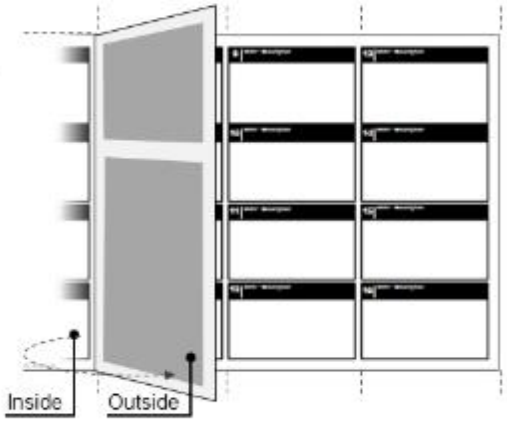


Print Dialog (Acrobat Reader)



Printer Properties Dialog (Canon Copier)





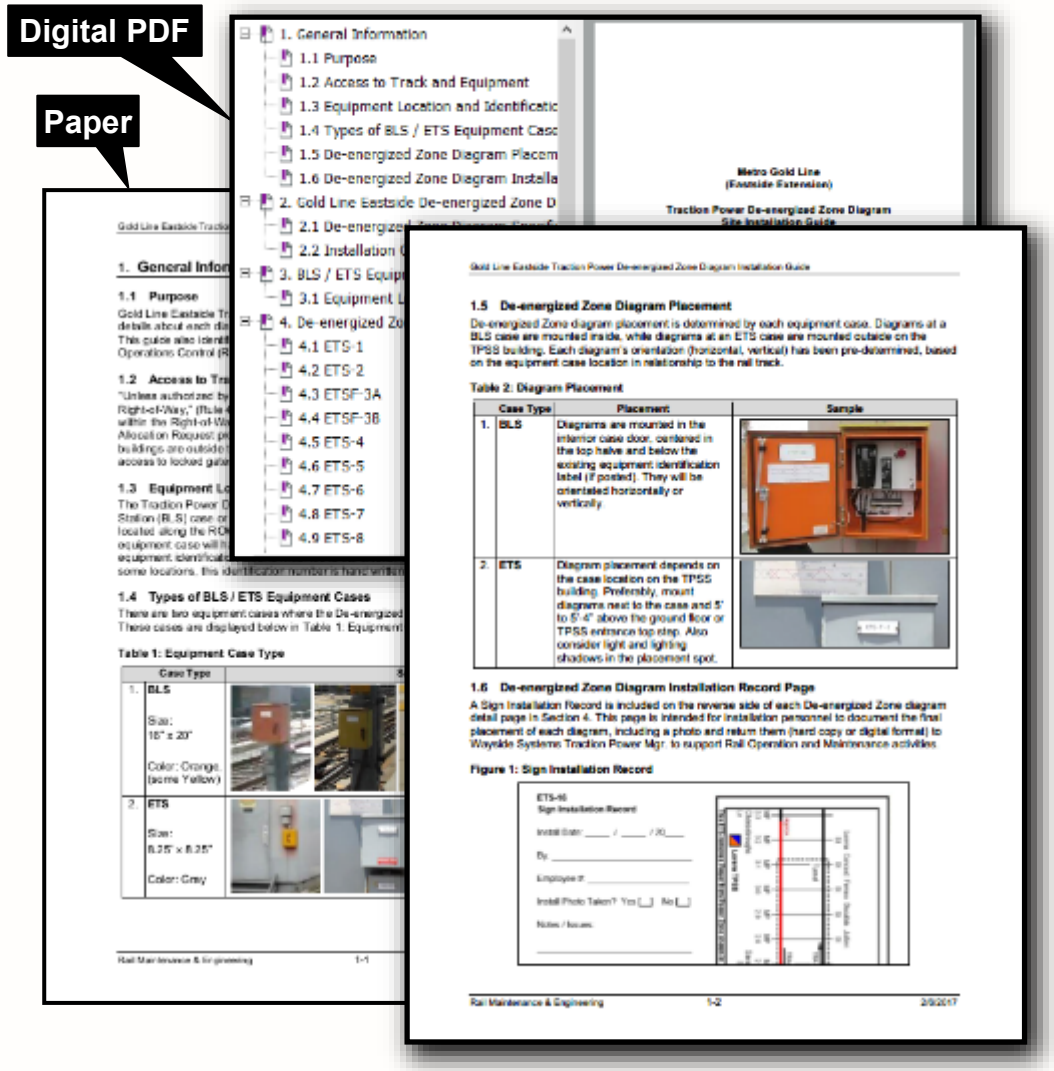
Metro

Case Scenario & Sample Formats

Equipment Guides - Report Format

Report: Equipment Installation Guide Package

- **Project:** De-energized Zone Diagram replacement
- **Location:**
  Inside & outside track
- **Risk:** Low & High
- **Resources:**
  - Passenger route map
  - Google Map / Street View
  - LA County aerial imagery
  - CPUC Grade Crossing list
  - GIS software
  - Rail Instruction track video
  - Engineering drawings



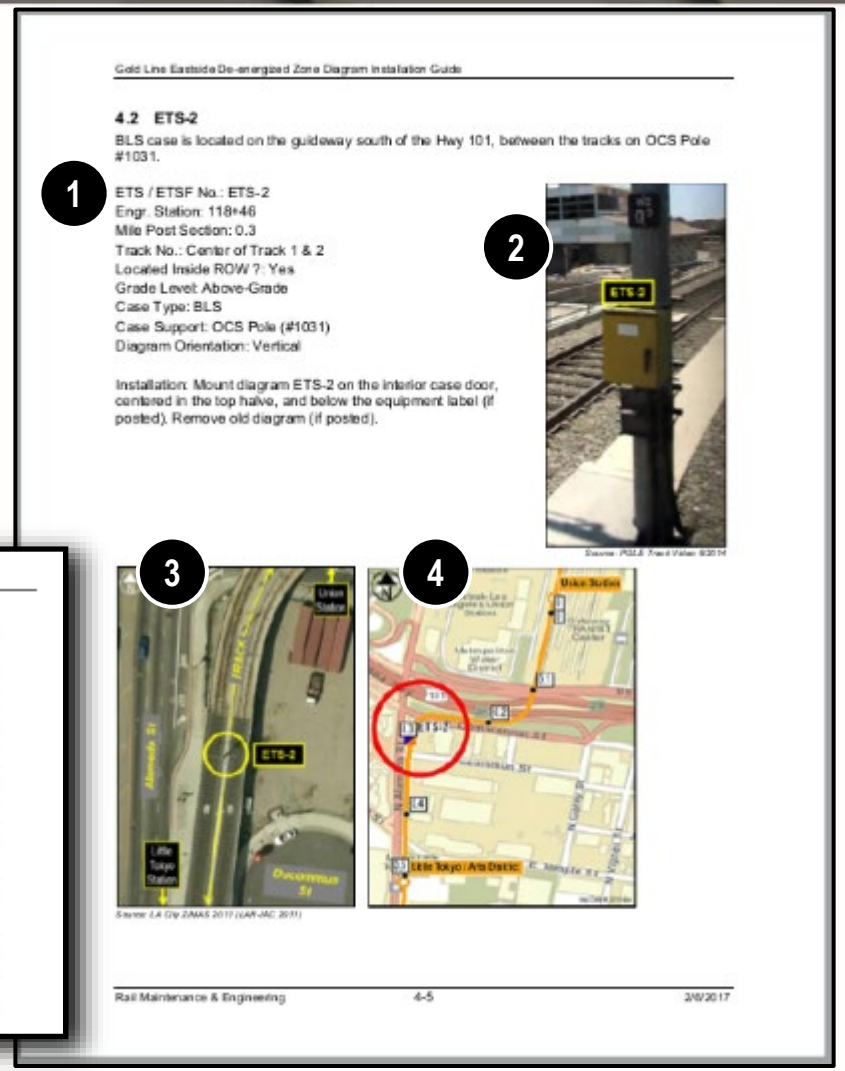
Equipment Installation Guide Package (continued)

Front Page:

1. Equipment information
2. Train video screen capture
3. Aerial imagery
4. GIS map

Back Page:

5. Installation check-off sheet



Gold Line Eastside De-energized Zone Diagram Installation Guide

4.2 ETS-2

BLS case is located on the guideway south of the Hwy 101, between the tracks on OCS Pole #1031.

1

ETS / ETSF No.: ETS-2
Engr. Station: 118+46
Mile Post Section: 0.3
Track No.: Center of Track 1 & 2
Located Inside ROW ?: Yes
Grade Level: Above-Grade
Case Type: BLS
Case Support: OCS Pole (#1031)
Diagram Orientation: Vertical

Installation: Mount diagram ETS-2 on the interior case door, centered in the top halve, and below the equipment label (if posted). Remove old diagram (if posted).

2

3

4

Rail Maintenance & Engineering 4-5 2/6/2017

5

Gold Line Eastside De-energized Zone Diagram Installation Guide

ETS-2
Sign Installation Record

Install Date: _____ / _____ / 20____

By: _____

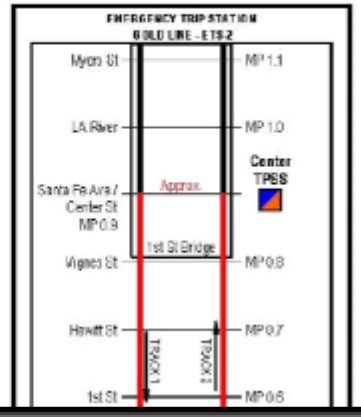
Employee #: _____

Install Photo Taken? Yes [__] No [__]

Notes / Issues:

_____

_____



Report: Equipment Location Guide Package

- **Project:** CCTV Camera upgrade
- **Location:**
  Inside & outside the track
- **Risk:** Low & High
- **Resources:**
  - Passenger route maps
  - Google traffic peak map
  - LA County aerial imagery
  - Rail Instruction track video
  - GIS software
  - Engineering drawings

Equipment Detail Page (one sheet, double-sided)

Front Page:

1. Transit Mode (Bus or Rail Line)
2. Equipment Type
3. Equipment Name/No.
4. Mile Post (approx.)
5. Track No.
6. Track Territory
7. Street Intersection
8. Address (approx.)
9. Engineering Stationing
10. Geographic Coordinates
11. Within ROW?
12. Grade Level (Above, At, Below-Grade)
13. Access Point
14. Location Web map
15. Engineering Drawing List (Eng. Dwg.)
16. Notes
17. Site Photo

Back Page:

18. Aerial View and Engineering Drawings details

4.1 MBL - OCS-1033

Rail Line:	Blue, Exposition
Equipment Type:	OCS Pole
Equip. Name/No.:	OCS-1033
Mile Post (approx.):	0.90
Track No.:	1
Track Territory:	Street Running
Street Intersection:	S Flower St & Venice Blvd
Address (approx.):	1370 S Flower St, Los Angeles, 90015
Eng. Stationing:	57+64
Geo. Coordinates:	34.038104, -118.267952
Within ROW:	Yes
Grade Level:	At-Grade
Access Point:	Sidewalk
Location Webmap:	Google Map
Eng. Dwg. List:	EXPO-1, 1-06, OC-E-390, 4/24/2012, Rev-3, As-Built EXPO-1, 1-06, Q-A-304A, 8/14/2013, Rev-3, As-Built
Notes:	Located on sidewalk. Distance from track = 7 ft.
Site Photo:	

7/11/2019, Wayside Systems

MOW Maintenance & Engineering 4-3 M. Quant

Metro

Review of Equipment Guide Components

Easy Access / Low Effort / Less Detail /

Difficult Access / High Effort / More Detail

Equipment Locator Products & Tools	General	Details
Websites: Agency, Local, State, Federal	■	■
• Bus & Rail System / Passenger Map	■	
• Station Map or Map Case map	■	
• Project Study Report (Map / Video)	■	■
• Google Map & Street View / Bing Maps / OpenStreet / Leaflet / QGIS / Esri ArcGIS / EagleView Aerial Imagery / ...	■	■
• City / County Planning & Eng. Dept.	■	■
• State Agency (Grade Crossing List)	■	■
• Federal (FRA, FTA, NTD)	■	■
Department Docs / Internal Intranet	■	■
• Track Video	■	■
• Equipment Manuals	■	■
Contractor / Internal Engineering Dwg.	■	■
• Alignment Plan & Profile		■
• Track Chart, Walkway Schematic		■
• Civil, Track, Signals, Traction Power, ...		■

Websites: Agency, Local, State

- System Map
- Passenger Maps
- Project Study Reports
- Project Map / Video
- Grade Crossing List
- ….

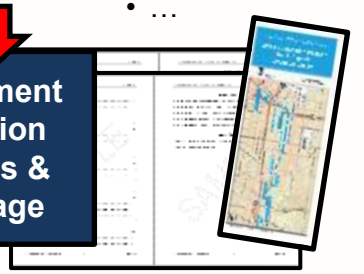
Internal Department Documents

- Track Video
- ITS equip. system
- Wayside Worker Protection Guide
- Equipment Manuals
- Inspection Procedures
- …

Engineering Drawings

- Track Chart
- Walkway Schematic
- Track, Signals, Communications, Traction Power
- …

Equipment Location Guides & Package



Metro

Summary

- Locating bus and rail equipment can be simple, difficult or dangerous
- Preparing location materials can be as easy as downloading a passenger route map from the agency website
- Factors that determine inspection team risk and hazards include equipment type, location, environmental conditions, and personnel experience or training
- Additional time spent collecting site inspection materials will enhance team awareness and safety, while reducing risk and cost

Metro

Questions & Discussion

Acknowledgements

- Maintenance & Engineering: Rail Communications, Signals, SCADA, Traction Power, Track, and Facilities departments
- Rail Operations Control (ROC)
- Rail Transportation Instruction
- Transit Asset Management
- Participating college interns involved in developing rail location materials (G. Valdivia, J. Wang, T. Watanabe)
- Staff and consultants who were surveyed and provided feedback for the report package content

Contact

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Maintenance & Engineering
quantm@metro.net

Please ask your questions in the chat pod and identify to whom they are directed. There will be an opportunity for open discussion later in the session.

PARTICIPANT QUESTION AND ANSWER

Please follow the link in your email from July 28 to report to your Microsoft Teams break-out room. If there are logistical issues, please put them in the chat pod. You will have 30 minutes in the breakout room.

BREAK-OUT DISCUSSION

Break-out Discussion Questions

- Do you have a dedicated resource or group that works to incorporate TAM data with internal reporting or business processes?
- How do you account for data that may be different from the FTA requirements or different from elsewhere in the agency?
  - Does your agency complement your TAM program with qualitative data and observations from field and maintenance staff?
  - Does your agency calculate anything differently than FTA's definition? For example, calculating the SGR backlog differently than how it is reported to NTD.
  - Are there cases where your TAM data is inconsistent with other data used within the agency?
- Can you share examples of how you have applied your TAM inventory and other data to support day to day operations? Do you have examples of how you have used it to locate assets in the field? Other examples? Has there been any feedback that has helped to advance your TAM program?

REPORT BACK AND OPEN DISCUSSION

THANK YOU FOR ATTENDING THE 2020 TAM ROUNDTABLE

Post-Event Evaluation

We value your feedback! Please complete a brief Post-Event Evaluation for today's Roundtable, using the website or QR code below. The link will also be posted in the chat pod.

https://www.surveymonkey.com/r/TAMinviteRT