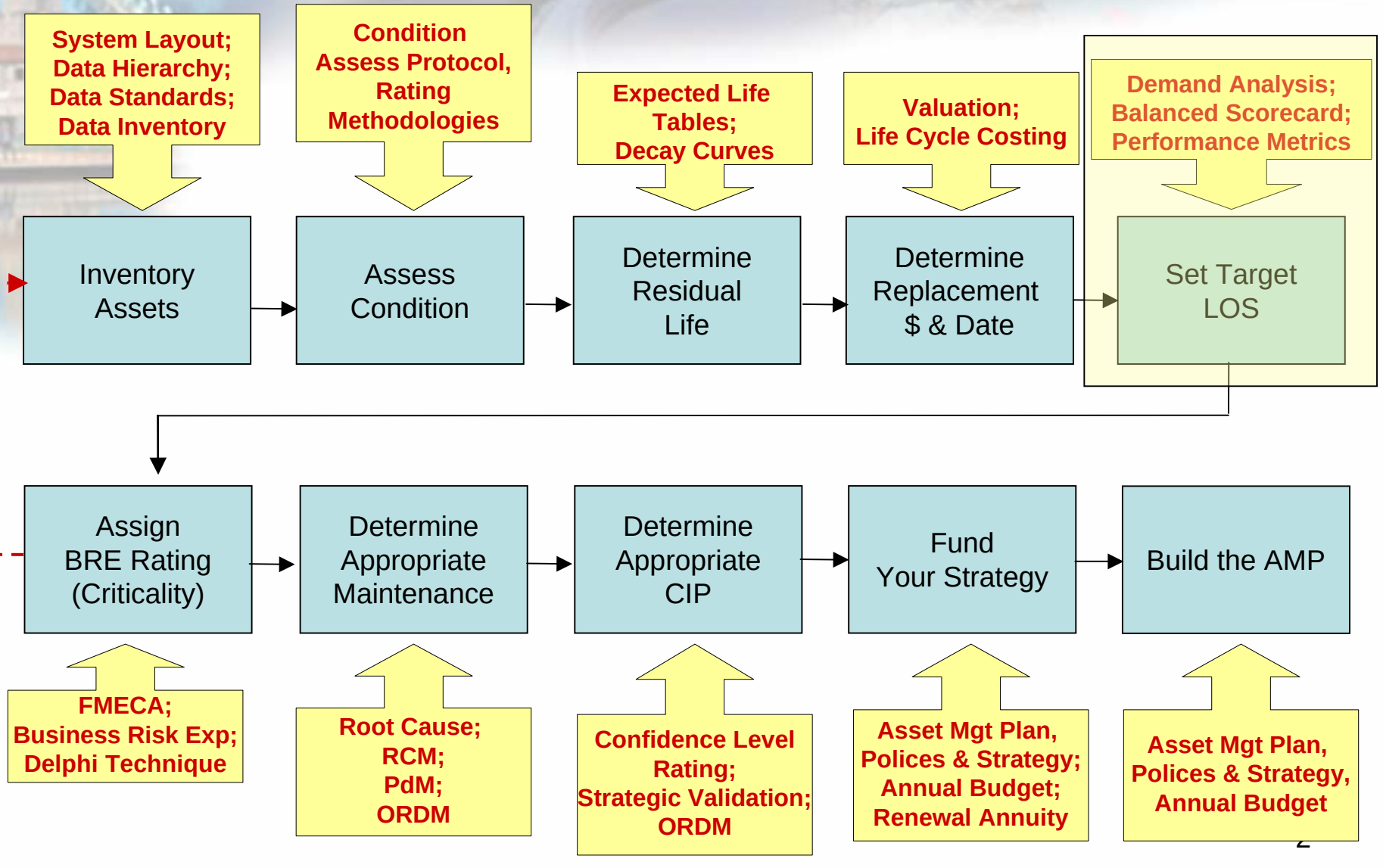
Q2. What Is My Required Sustainable LOS?

AMPLE

Asset Management Program
Learning Environment

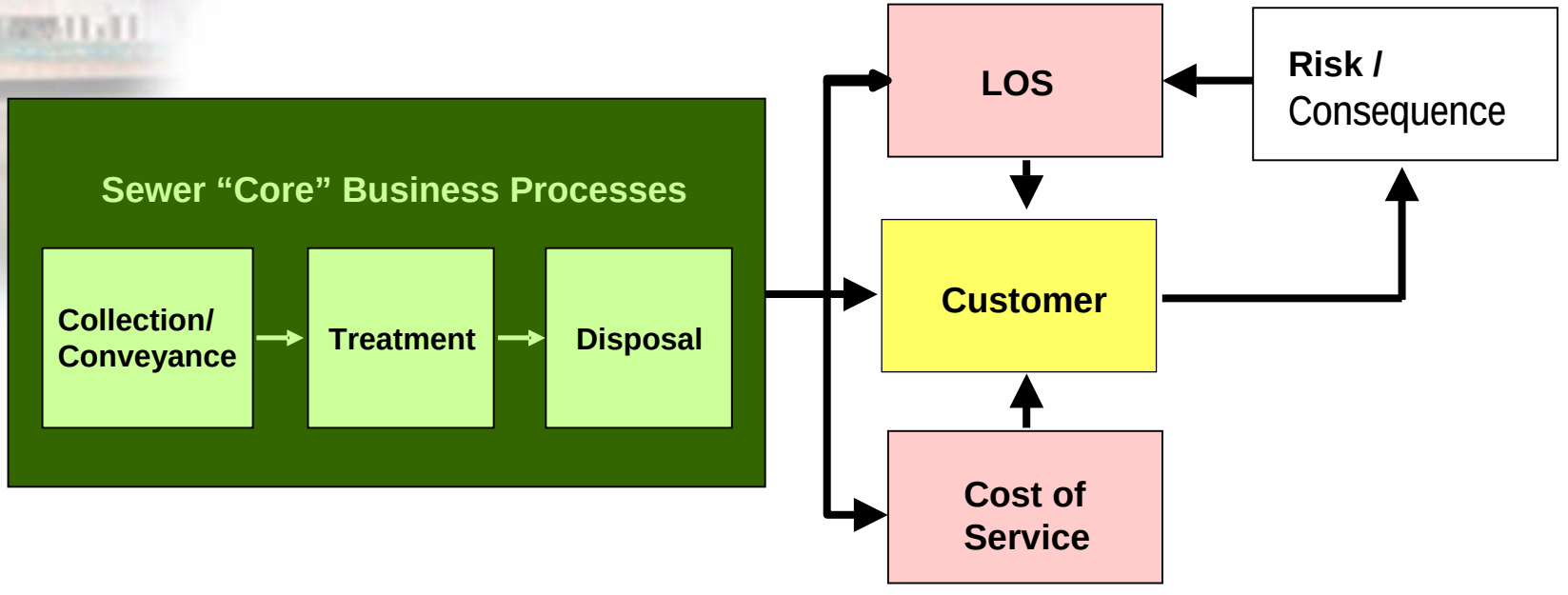
Core AAM Program Process Tools



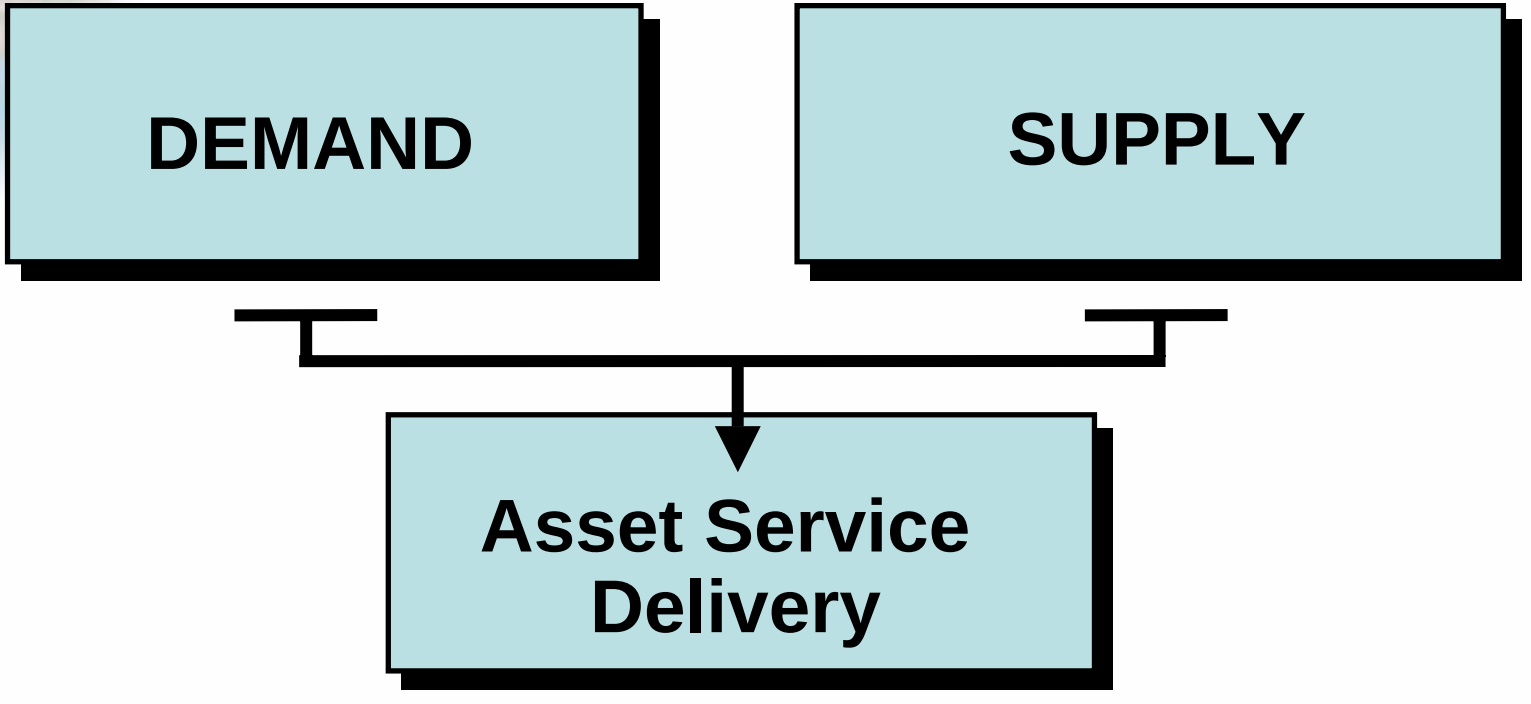
“Levels of Service”

- Good output-oriented management is driven by a defined standard or level of service.
- Where that LOS is:
  - Driven by customers/user demand
  - As determined by the appropriate legislative body in a political arena
- LOS can be defined as:
  - Characteristics or attributes of a service that describe its required level of performance;
  - These characteristics typically describe “how much”, “of what nature” and “how frequently” about the service.

LOS's Strategic Position



Project Planning and Formulation Phase: The Supply and Demand Elements



Supply and Demand Quality Elements

DEMAND
Understand

SUPPLY

- Demand for service and LOS
- Understand system capacity
- Understand rate of decay
- Understand the accurate probability of failure (the timing)
- Understand the consequence (cost) to the business

Supply and Demand Quality Elements

DEMAND

SUPPLY
Analyze Options

- Construct new assets
- Refurbish / augment existing assets
- Operate differently
- Maintain differently
- Non asset options

Performance-based Asset Management

Performance = Adequacy / Reliability / Efficiency

Service = customer *perception* of performance

Nature of LOS

- LOS occurs at multiple levels
  - Agency-wide
  - Groups or systems of assets (collection system, treatment plants)
  - Assets (individual pump stations, digesters, clarifiers)
  - Key asset components (pumps, motors, etc.)
- LOS targets are established to “roll up” to meet higher level targets
- There are internal and external LOS targets
  - External LOS targets are typically strategic or “KPI” outcomes:
    - Driven by customers/user demand
    - Confirmed or determined by the appropriate legislative body in a political arena
  - Internal LOS targets are typically tactical in nature and are set at the asset level

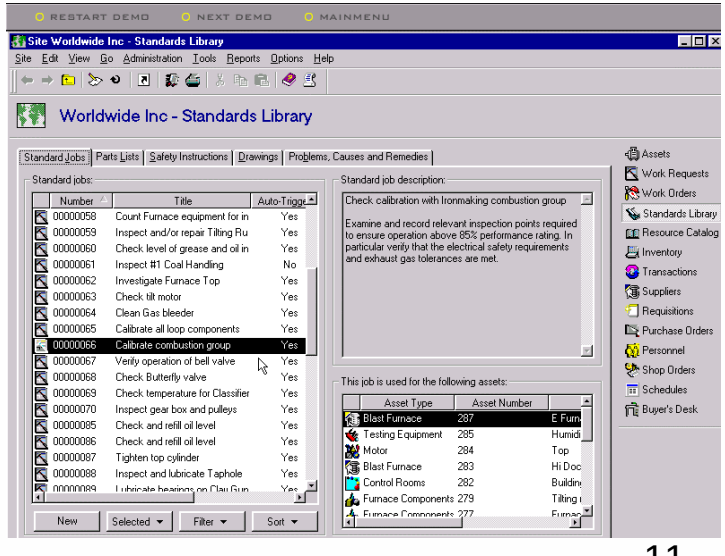
Alignment of O&M and Capital Tactics with Organizational Strategies

SUGGESTED LOS/PERFORMANCE MEASUREMENT STRUCTURE	
KEY DELIVERY CRITERIA	PERFORMANCE MEASURES
The criteria or indicator against which the asset manager and customer will judge the level of service	The specific measures used to determine actual performance of the service delivered through the assets
Financial Performance	Total Proportion of Income from Charges (%) (Usage/Access/Other)
	Proportion of Income from Charges (%)(Usage/Access/Other/Trade Waste)
	Actual Total Capital Expenditure Over Time
	Actual Capital Expenditure by Type
	Renewals Expenditure as a Proportion of Current Replacement Cost of Assets
	Revenue per Property/Connection
	Revenue per Million Gallons per Day
	Economic Real Rate of Return
	Financial Ratios
	Asset-based Financial Ratios – Return on Assets, Return on Earnings
	Profit / Loss
	Written Down Current Cost of Fixed Assets
	Change in Revenue (% previous year)
Responsiveness	Time to Respond to Customer Contacts (Written & Verbal)
	Restoration of Service within X hours (unplanned (%))
Legislative Requirements	Water Quality Compliance (%) (Bacteriological/Physical/ Chemical/Standard)
	BOD – Compliance (%)
	Suspended Solids – Compliance (%)
	Nutrients – Compliance (%)
	Wastewater Treatment Plants Compliance with Permits at all Times
System Efficiency	Total Operating Costs Per Million Gallons Treated
	Energy Consumption As % of Operating Expenditures
	Wastewater System Infiltration per 1000 feet Pipeline (gallons/day/1000 ft)
Cost Effectiveness	Percentage Change In Customer Average Annual Bill
	Operating Cost per Property/Connection Served
Reliability	Interruption Frequency per 1000 Properties/Connections (unplanned)
	Average Duration of Interruptions (hours per interruption-unplanned)
	Average Outage Time (minutes/property –unplanned)
	Sewer Main Blockages and Collapses
	Sewer Main Blockages and Collapses Repaired < 5hours (%)
	Sanitary Sewer Overflows (SSO per 1000 ft of pipeline)
Customer Satisfaction	Odor Complaints per 1000 Connections
	Customer Interruption Frequency (%)
Quantity	Connected Populations and Connections
	Wastewater Collected (million gallons per day)
	Wastewater Collected per Property (gpd per connection)
	Volume of Infiltration Collected per Property (gpd per connection)
	Proportion of Wastewater Treatment Levels (Primary/Secondary/Tertiary)
	Peak Wet Weather Flow
	Average Dry Weather Flow
	Average Daily Flow
	Proportion Wastewater Reused
	Proportion of Wastewater Biosolids Reused
	Fixed Assets – Physical Quantities
Utilization	Utilization – Ratio of Peak Day to Average Day Flow
	Utilization – Ratio of Peak Day to Peak System Capacity
	Utilization – Ratio of Average Dry Weather to Average Dry Flow
Organizational Learning	Progress Toward Defined Objectives On Gap Chart

Content of LOS – What do we measure?

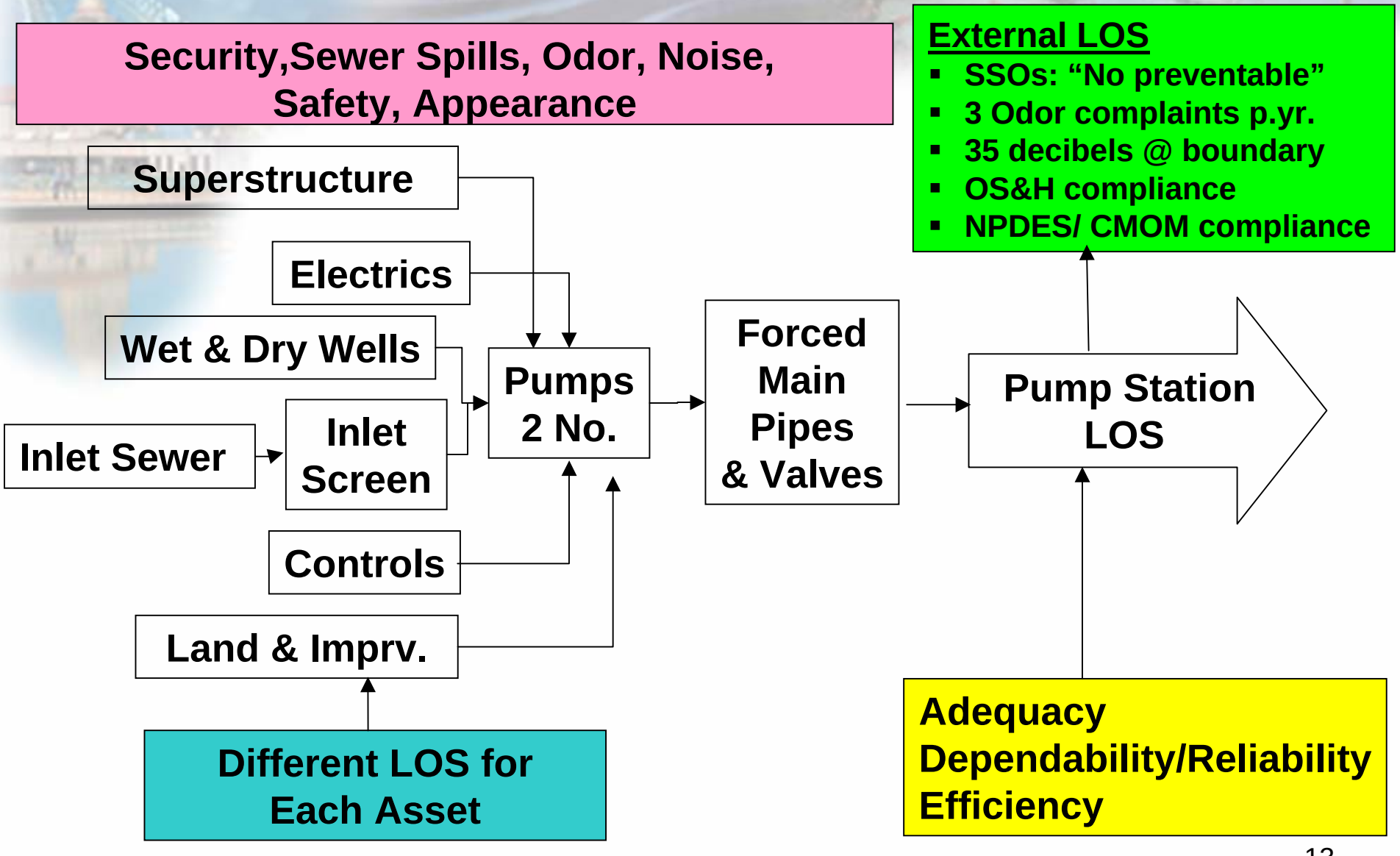
Develop content:

- Select starting framework
- Build metrics



Key Management Questions
The "Balanced Scorecard"

Pump Station LOS Requirements



System Performance Requirements

External LOS Targets

NPDES Permit

BOD	10 mg/l
SS	15 mg/l
TN	2 mg/l
P	1 mg/l

Sewer Spills, Odor, Noise, Safety, Water Quality

Network Collection Systems

Trunk Sewer Systems

Treatment Plant

Disposal System

Final Discharge

Different LOS for Each of these

Reliability
Availability
Performance

System Performance – Internal Levels of Service

Exercise 2 (LOS)

- *Help Tom develop LOS targets for his "problem" pump station:*
  - *4 measures at "whole-system" output level*
  - *2 customer service measures*
  - *4 measures at lift station asset level*

Pump Station LOS

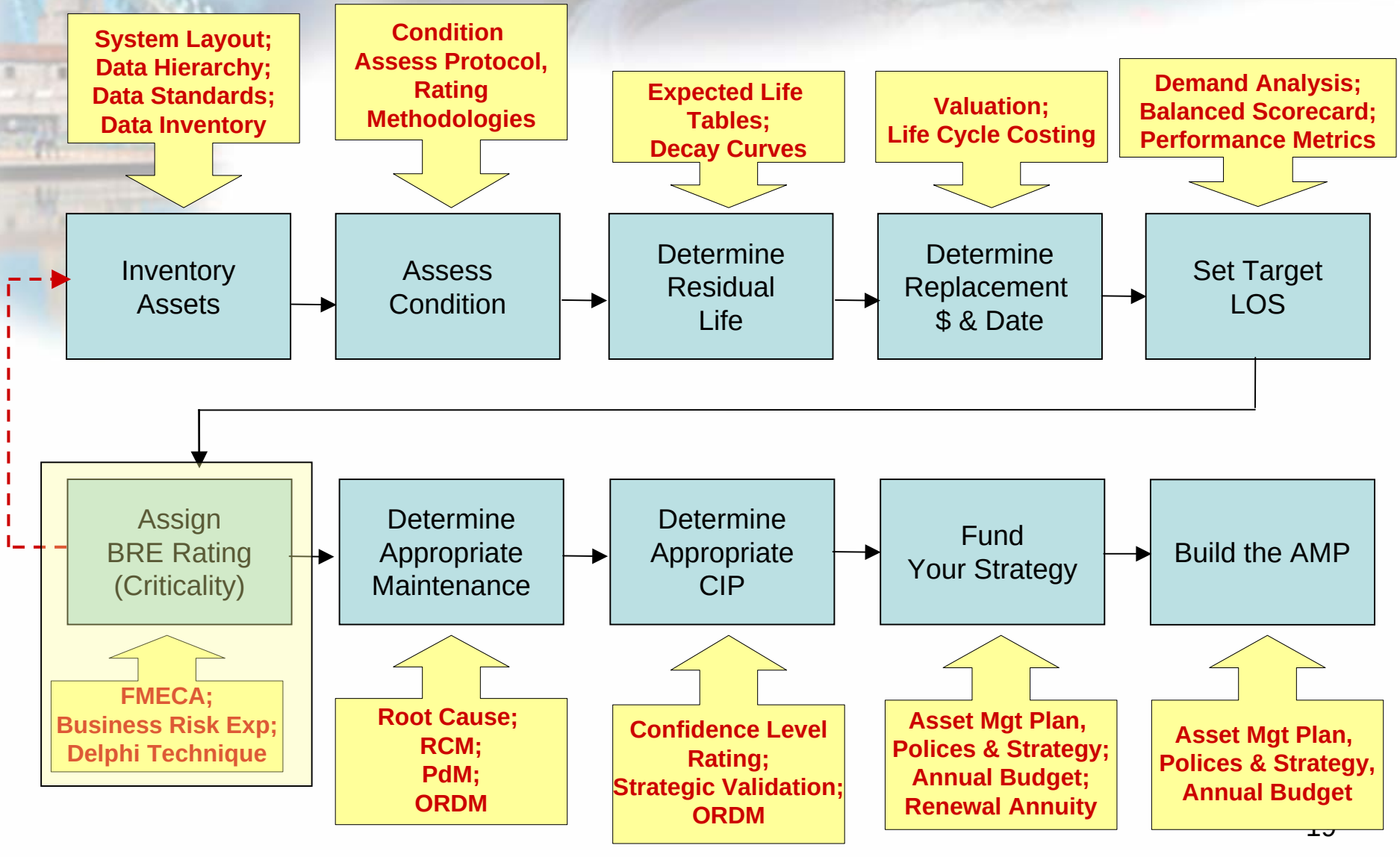
Performance	Measure	Current	Target
Odor	*Complaints/yr*	***0.5***	***1***
Spills	*#/yr*	***2***	***0***
	Gals/spill	***56,000***	***2,000***
Pumping	*% influent*	***99.68%***	***100%***
Reliability			
Scada	*Outages/yr*	***7***	***2***
	Duration, hrs	***72+***	***8***
Power	*Outages/yr*	***1***	***1***
	Duration, hrs	***7***	***2.5***

Pump Station LOS

Reliability	Measure	Current	Target
Pumps	*% reserve capacity, Peak Q*	*30%*	***30%***
	% redundancy @ peak Q	*0%*	***50%***
Power	*2nd source, hrs*	*7*	***2.5***
Regulatory			
Spill reporting	*verbal, hrs*	*N/A*	***24***
	Report, days	*21*	***10***
	Impact Notice, hrs	*N/A*	***8***
	Response plan trng, hrs/yr	*0*	***8***

AGENDA

Day 1

- *Welcome, Introductions & Housekeeping Details*
- *"Storyline" Introduction, Background And Context*
- *Overview Of Fundamental Concepts & Core Practices*
- *The Storyline: Tom's Really Bad Day*
- *Core Question 1: What Is The Current State Of My Assets?*
- *Core Question 2: What Is My Required "Sustainable" Level Of Service?*
- *Core Question 3: Which Assets Are Critical To Sustained Performance?*
- *Discussion /Q & A*

Core AAM Program Process Tools