Establishing Transportation Asset Management as a Core Business Process: Indiana DOT's Experience

by

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for

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Topics

1. Makeup of Indiana DOT
2. Timeline to a structured business process
3. Databases and management systems
4. Annual work flow of systems assessment & project programming
5. Project scoring & grading
6. Program performance measures & standards
7. Lessons learned

Indiana

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Indiana

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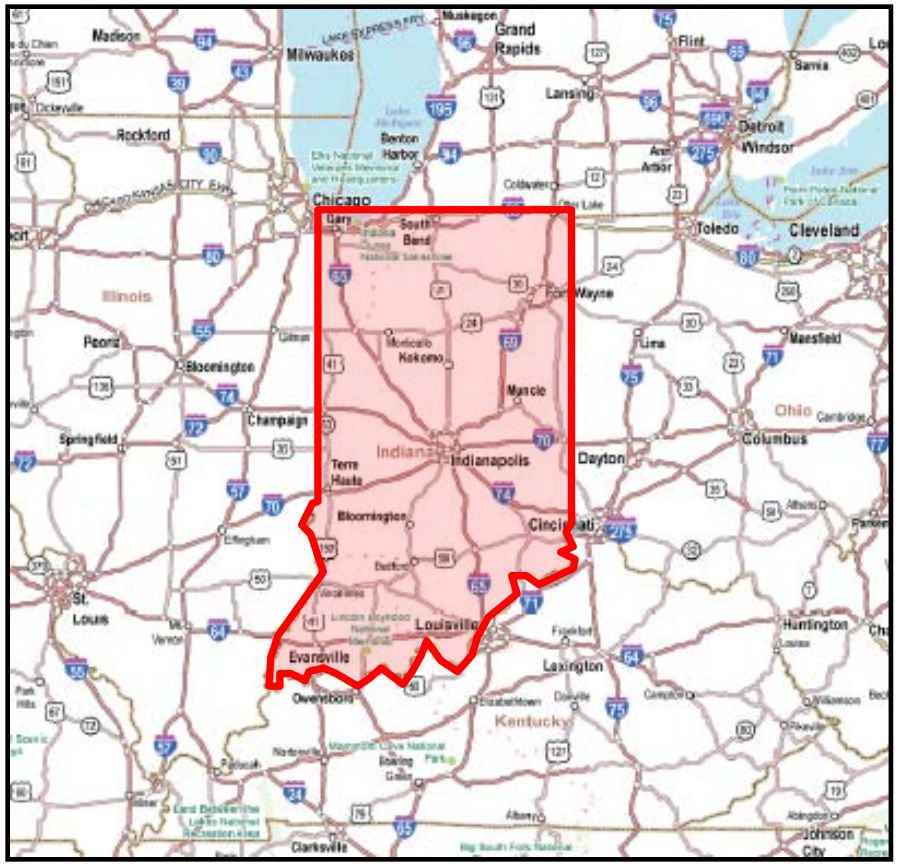
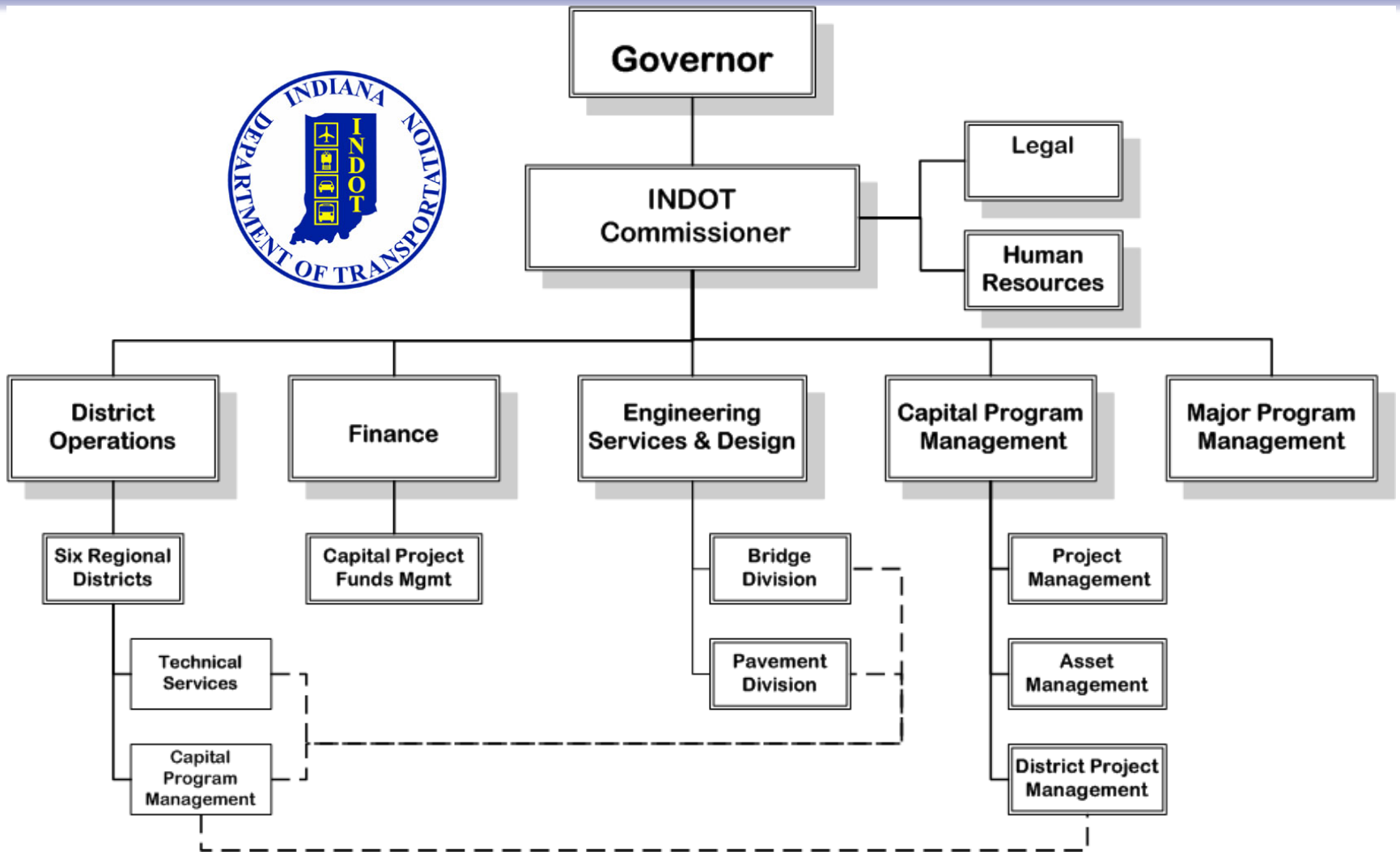
Indiana

- Crossroads of America
- ≈97,000 Public road miles
  - ≈11,150 total miles: INDOT manages (11.5%)
- ≈1,170 Interstate miles
- ≈19,000 Bridges
  - 5,430: INDOT manages



Indiana Department of Transportation



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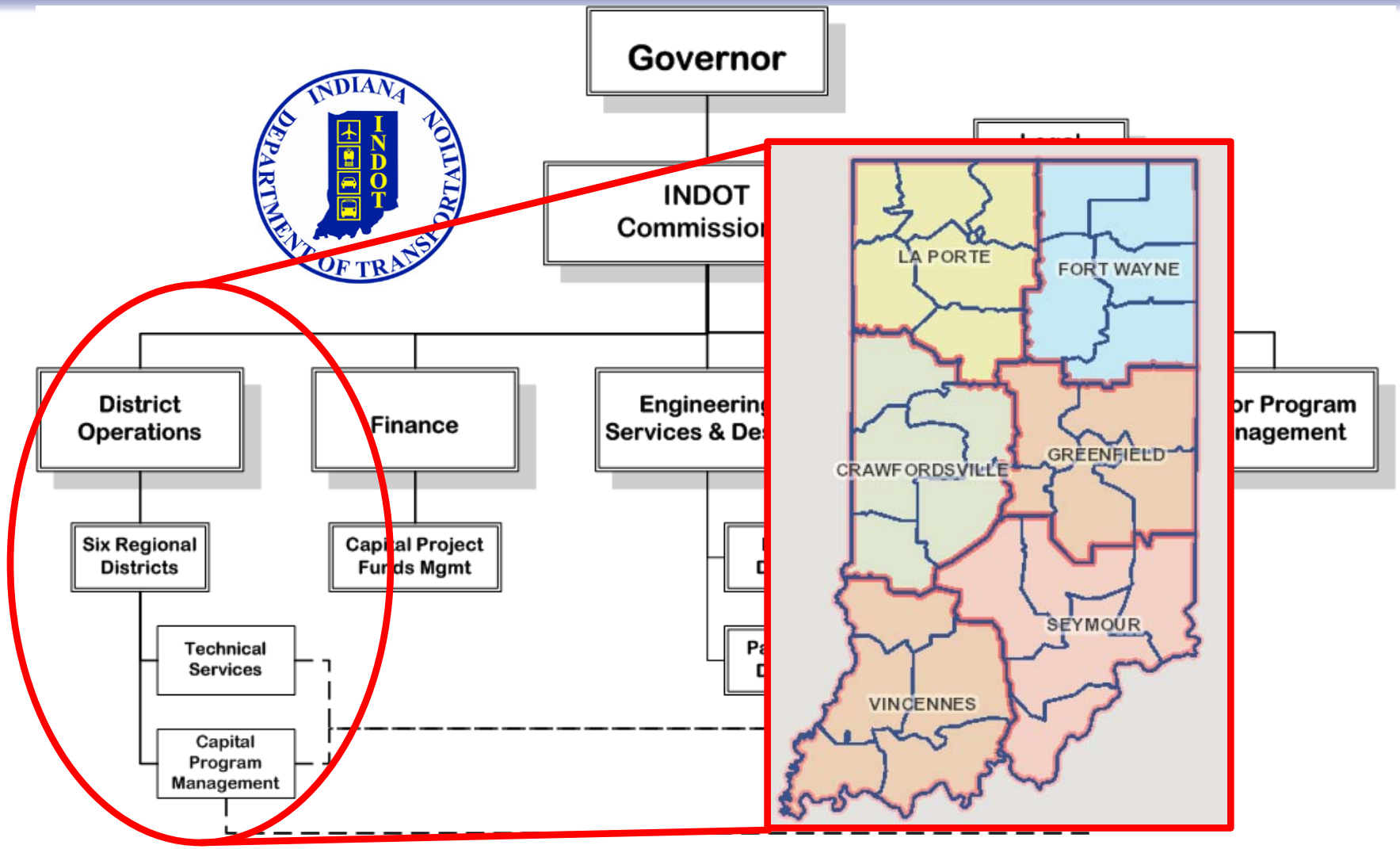


Timeline: INDOT's Evolution into TAM

'09

- June: INDOT / FHWA TAM Self Assessment
- November: Commissioner Reed recognizes INDOT's business need towards TAM.

Timeline: INDOT's Evolution into TAM

'09 ⇨ '10

- January ⇨ March: Process & Structure Development
- March: Asset Team 1st Meeting, 1st Workshop
- June: Asset Teams prioritize FY 11-15 Program
- August: 2016 Call for Projects

Timeline: INDOT's Evolution into TAM

'09 ⇨ '10 ⇨ '11

- June ⇨ November : Process Improvements
- July: 2nd Asset Management Workshop
- August: FY 12-16 Program Review
- December: FY 17 Call for Projects

Timeline: INDOT's Evolution into TAM

'09 ⇨ '10 ⇨ '11 ⇨ '12

- January ⇨ February: Development of agency's performance goals and measures.
- April: Executive review of performance goals and measures

Inventory Systems

- **Primary road inventory**
- **Bridge & small structure inventory & inspection**
- **Pavement inventory & condition**
- **Traffic crash records**
- **“Maintenance” inventory**

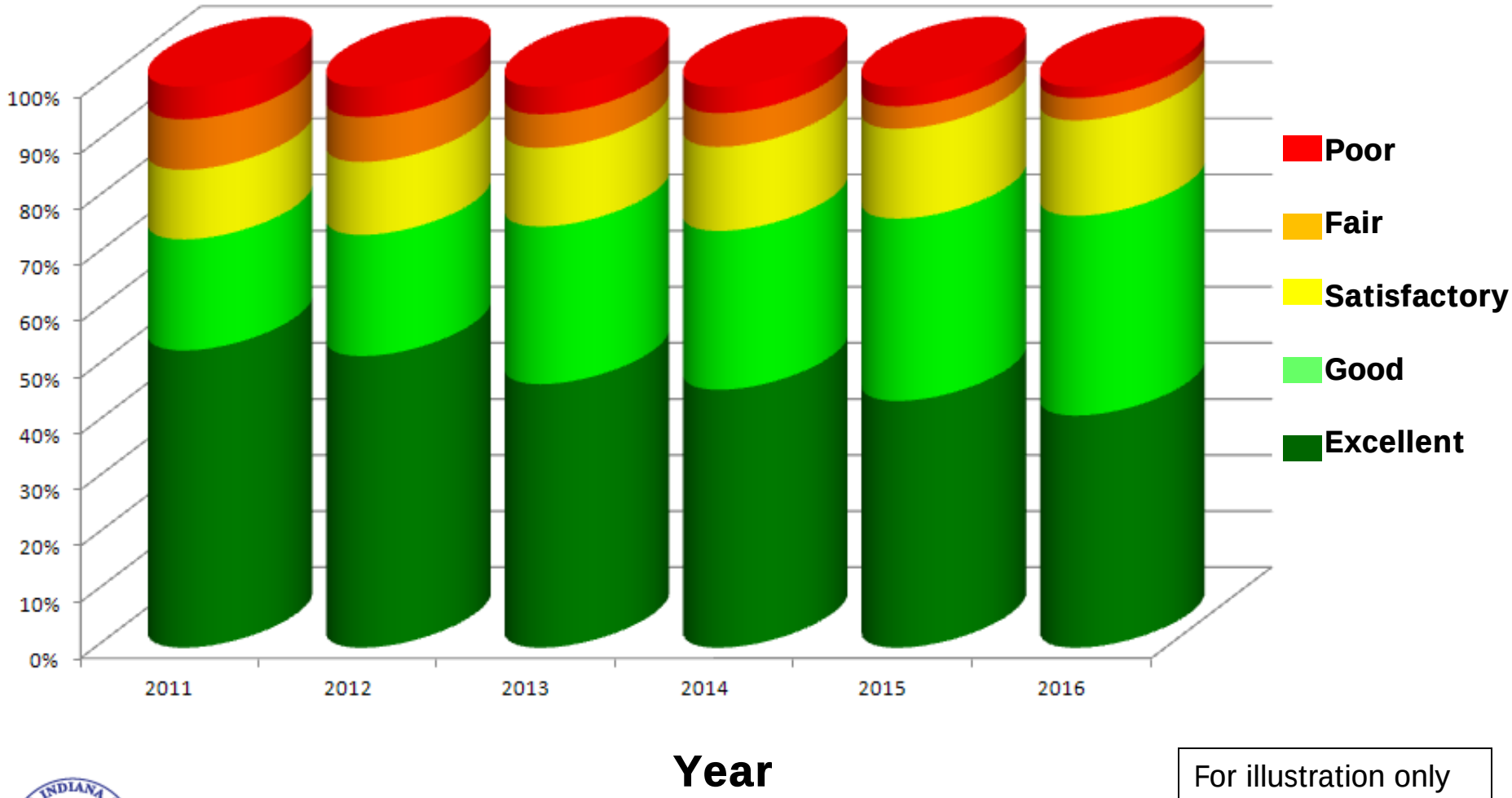
Management Systems: Model Components

- **Asset inventory & status**
- **Deterioration or growth equations**
- **Treatment logic**
- **Cost of various treatments**
- **Effects of various treatments (resets)**
- **Benefit-cost & optimization modules**

Management Systems: Uses

- **Forecasting system performance of selected projects**
- **Testing sensitivity of system performance to various budget scenarios over time**
- **Estimating investment levels to achieve a certain performance target**
- **Identifying candidate projects**

Management Systems: Uses



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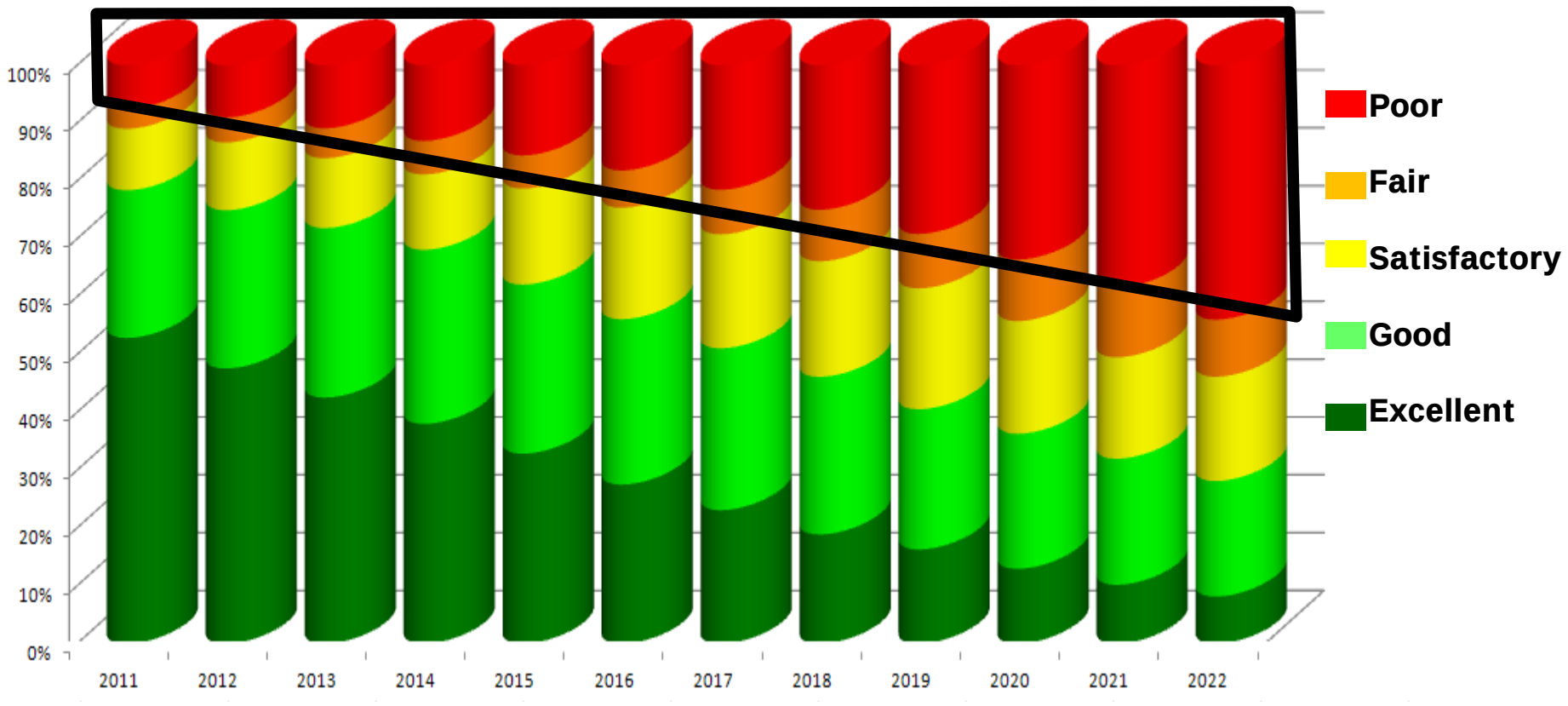
Management Systems: Uses



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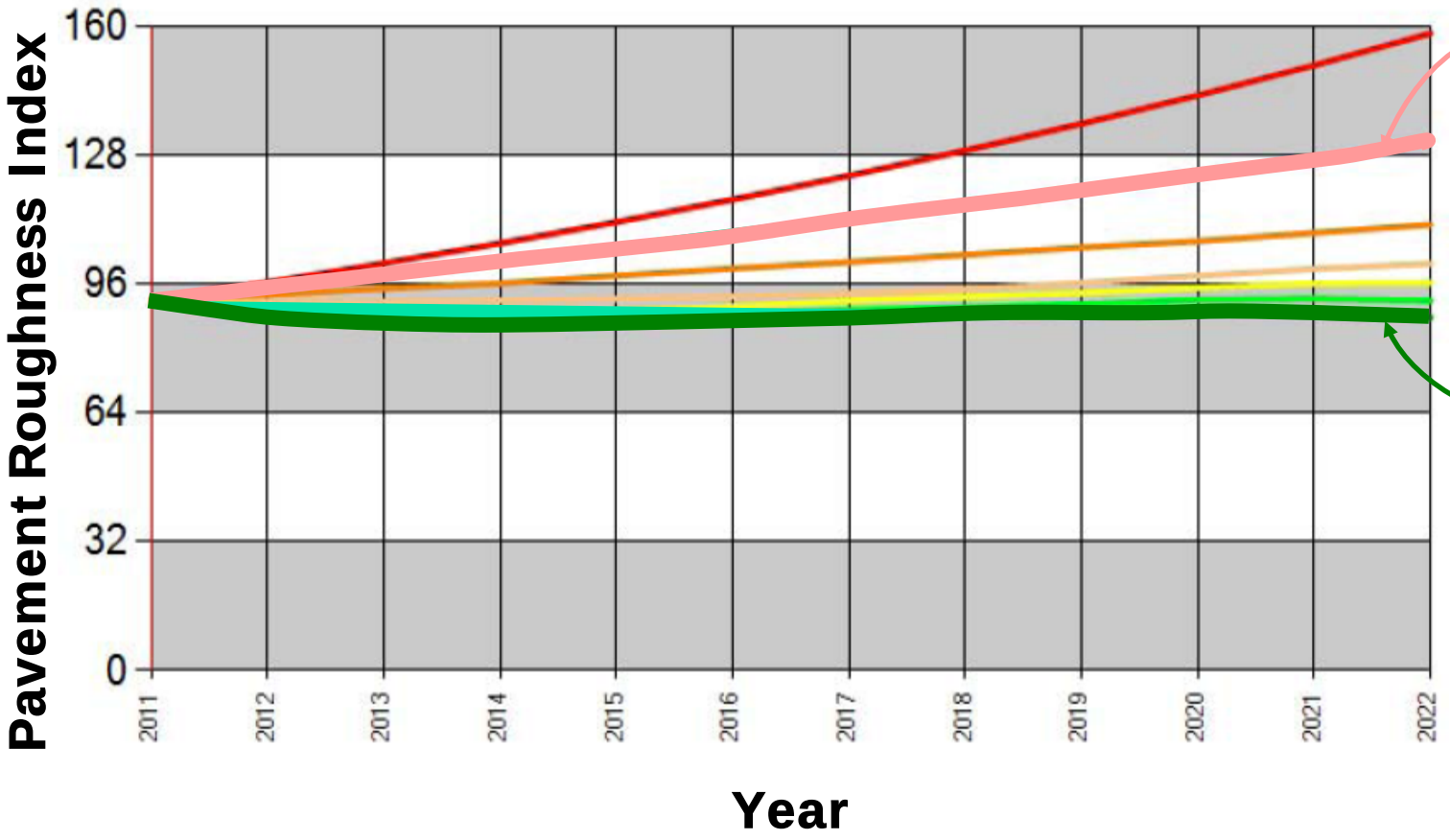

$100M Performance Curve

$300M Performance Curve

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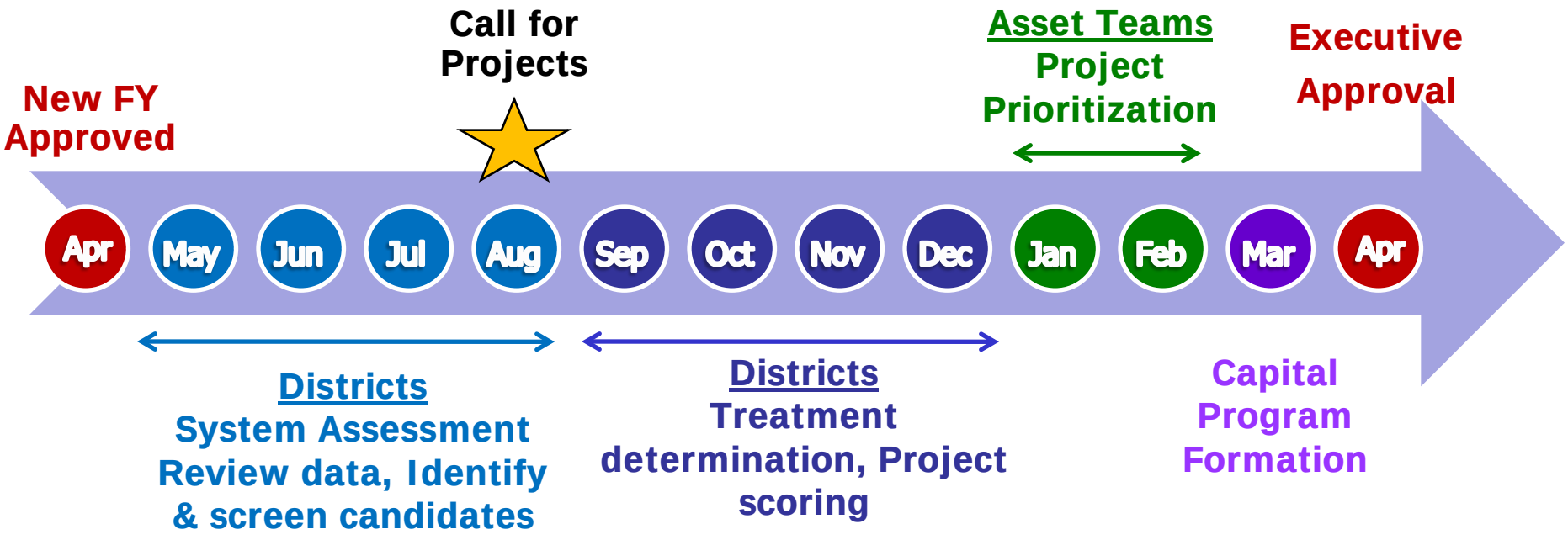
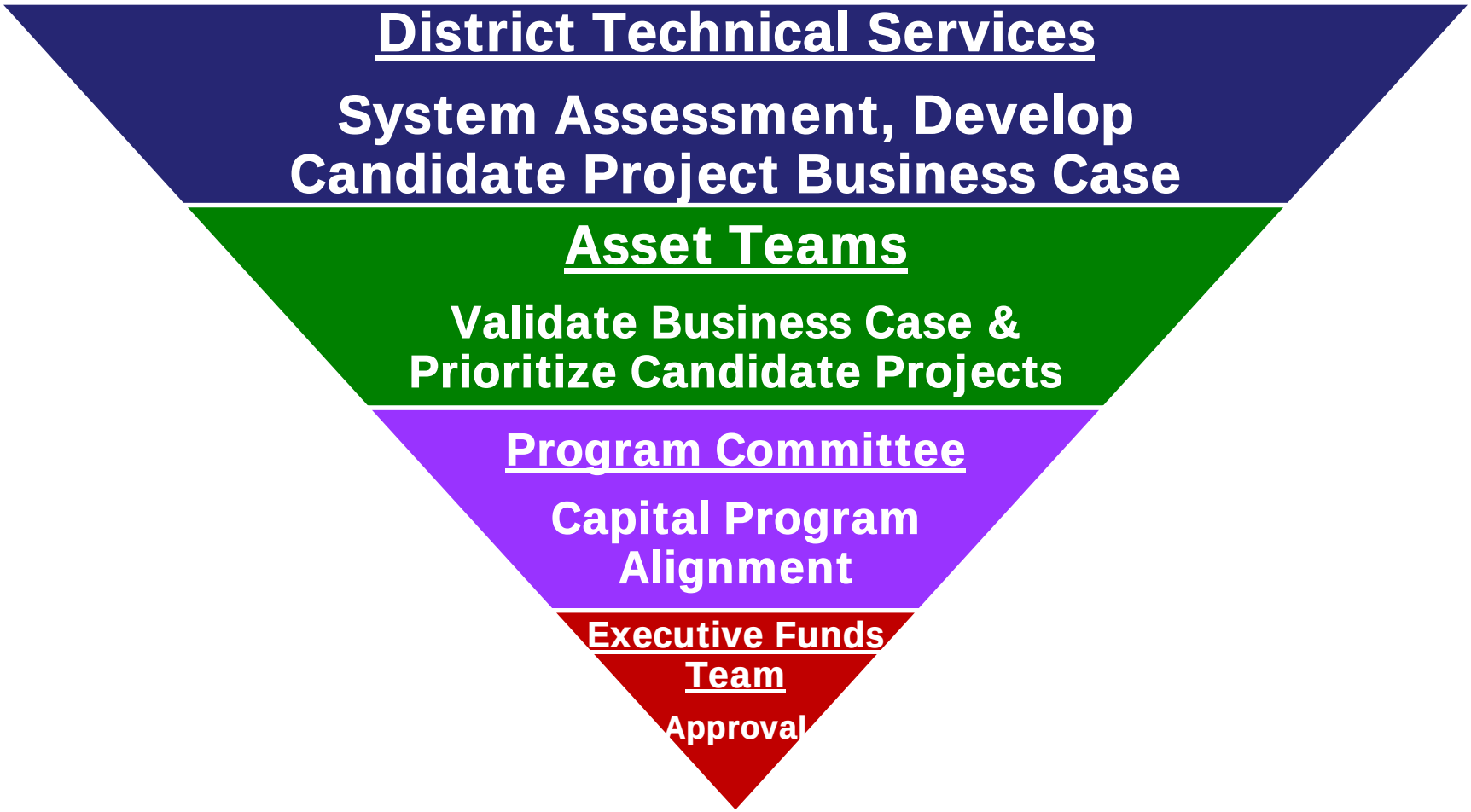
Annual Cycle



Decision Making Model



Decision Making Model

District Technical Services

System Assessment, Develop Candidate Project Business Case

- PROJECT SPONSOR
  - System assessment & data collection
  - Needs identification & verification
  - Analysis of treatment options
  - Project scoring
  - Submission of project candidates

Decision Making Model

- Committee of technical experts
- Scoring business rules
- Statewide need verification
- Project prioritization (A thru D, F)

Bridge Asset Team

- **Bridge Asset Team**
  - Bridge Replacements
  - Bridge Rehabilitations
  - Bridge Maintenance
  - Small Structures

Roadway Asset Team

- **Roadway Asset Team**
  - Pavement Preservation
  - Pavement Resurfacing
  - Pavement Reconstructions
  - Roadway Modernizations

Mobility Asset Team

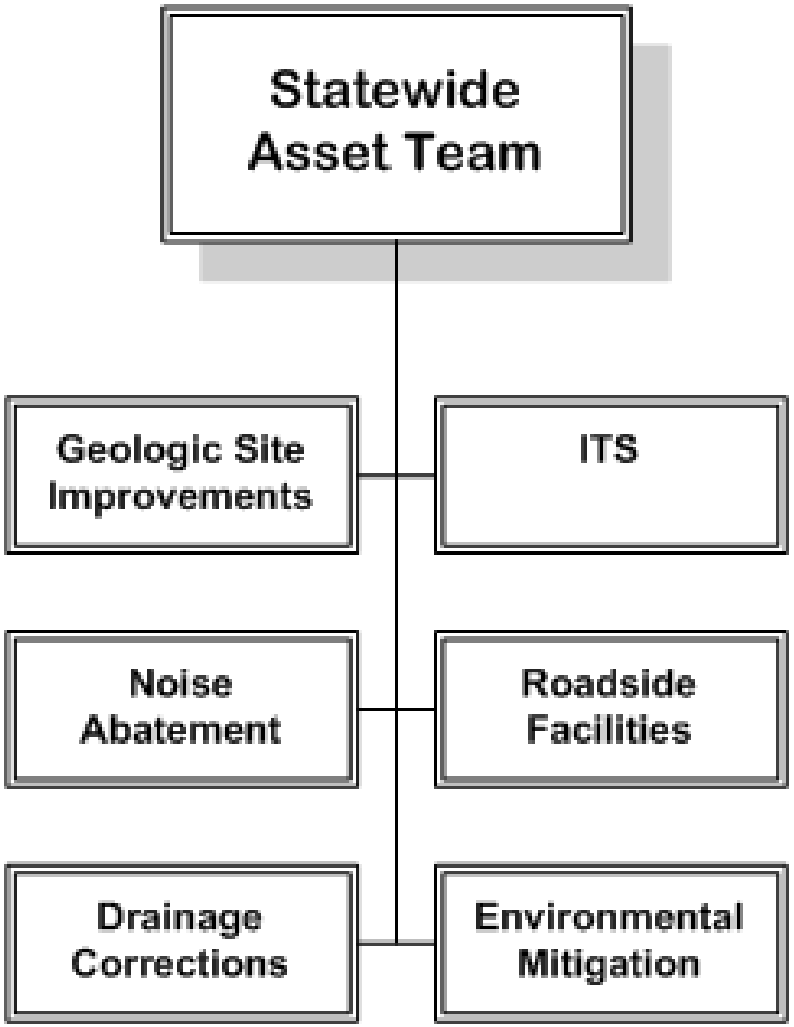
- Mobility Asset Team
  - New Road Construction
  - Added Capacity
  - Spot Congestion Relief

Traffic Safety Asset Team

Traffic Safety Asset Team

- Systematic Improvements
- Serious Crash Locations

Statewide Asset Team



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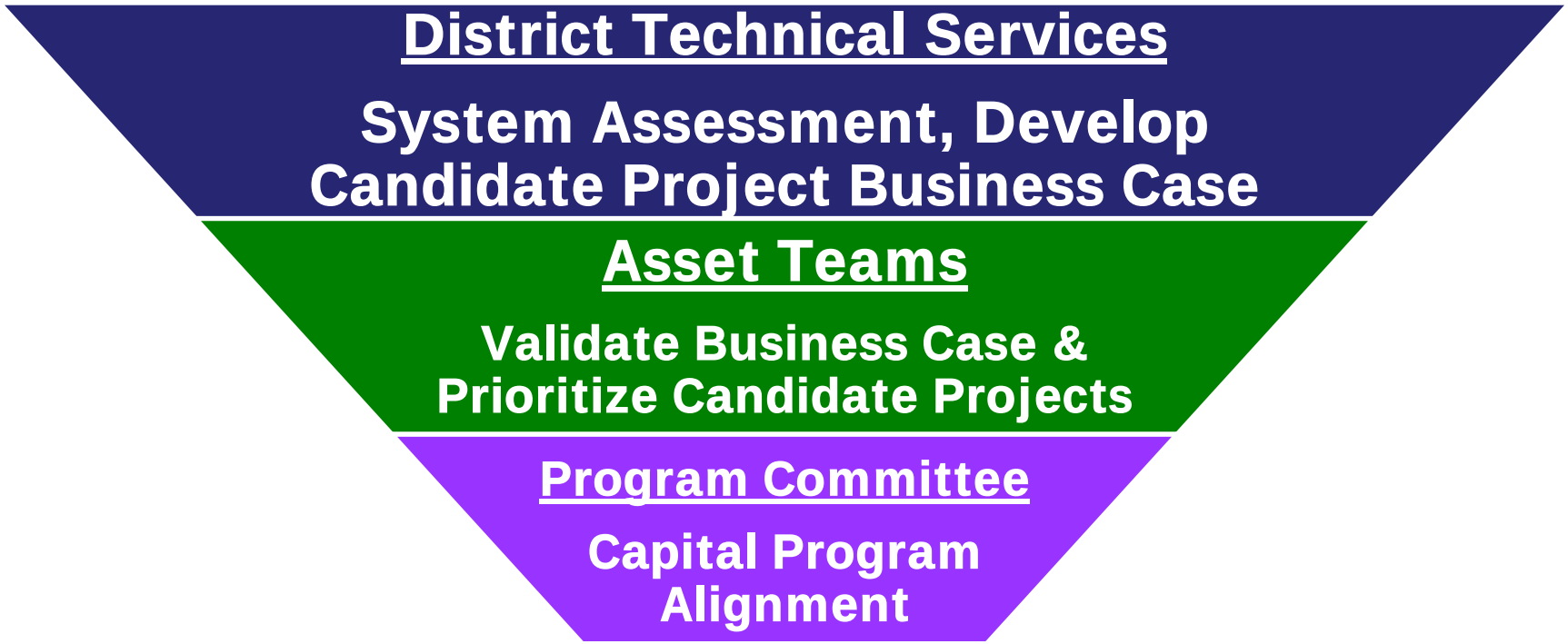
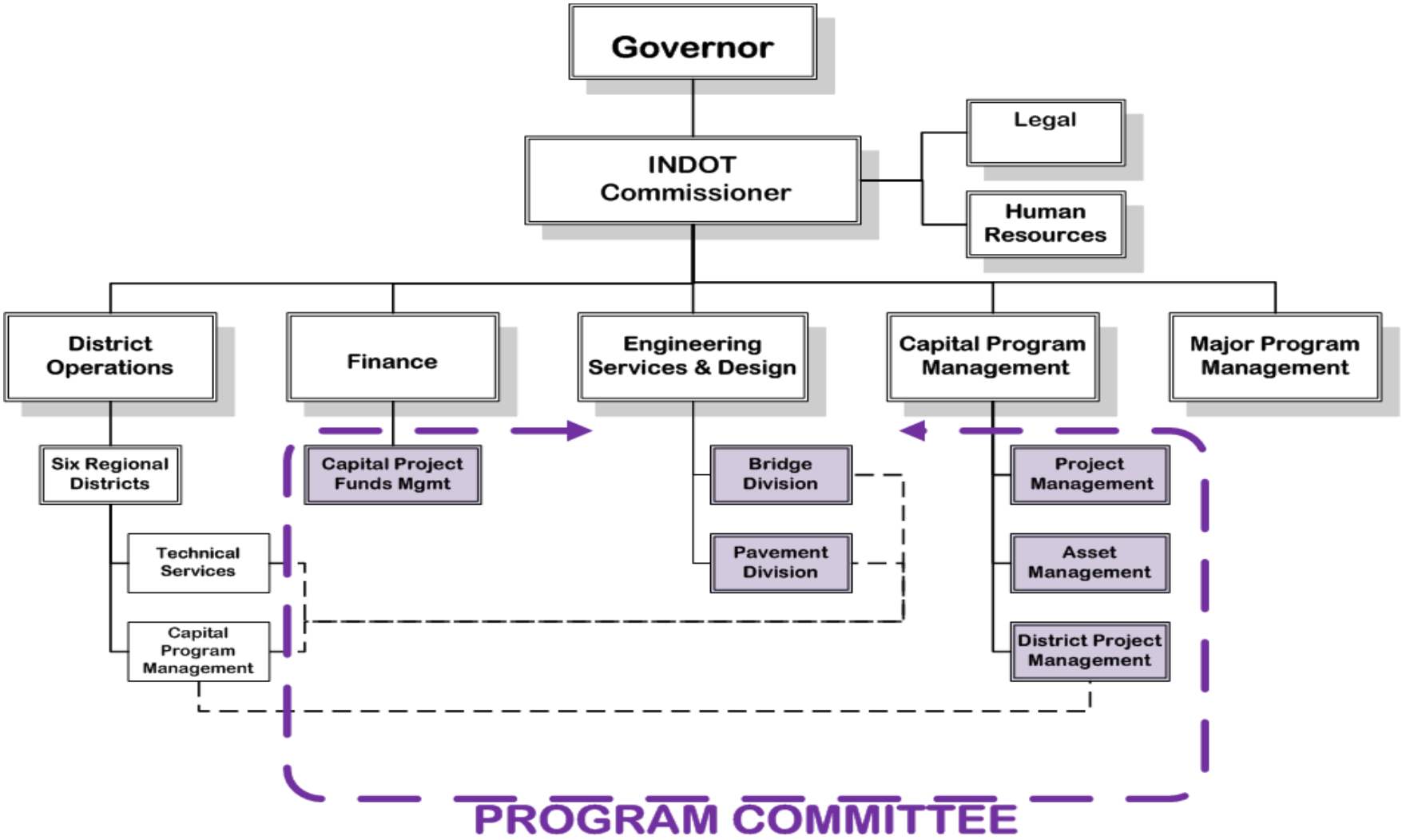
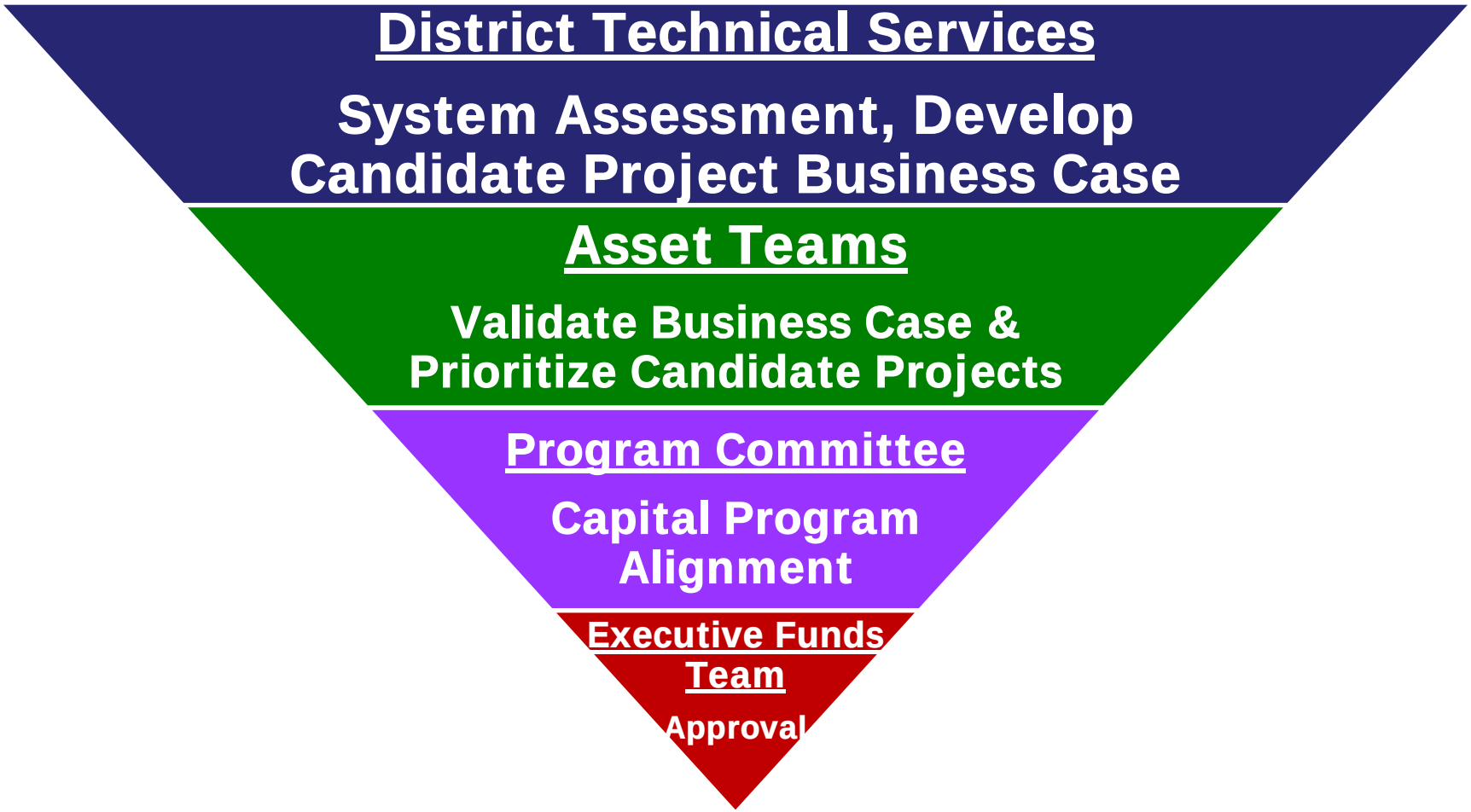


- Six core business directors
- Business recommendations and decision making
- Fiscal constraint & performance based
- Program alignment based on asset team prioritizations

Program Committee



Decision Making Model



- Approving authority

Project Scoring & Grading

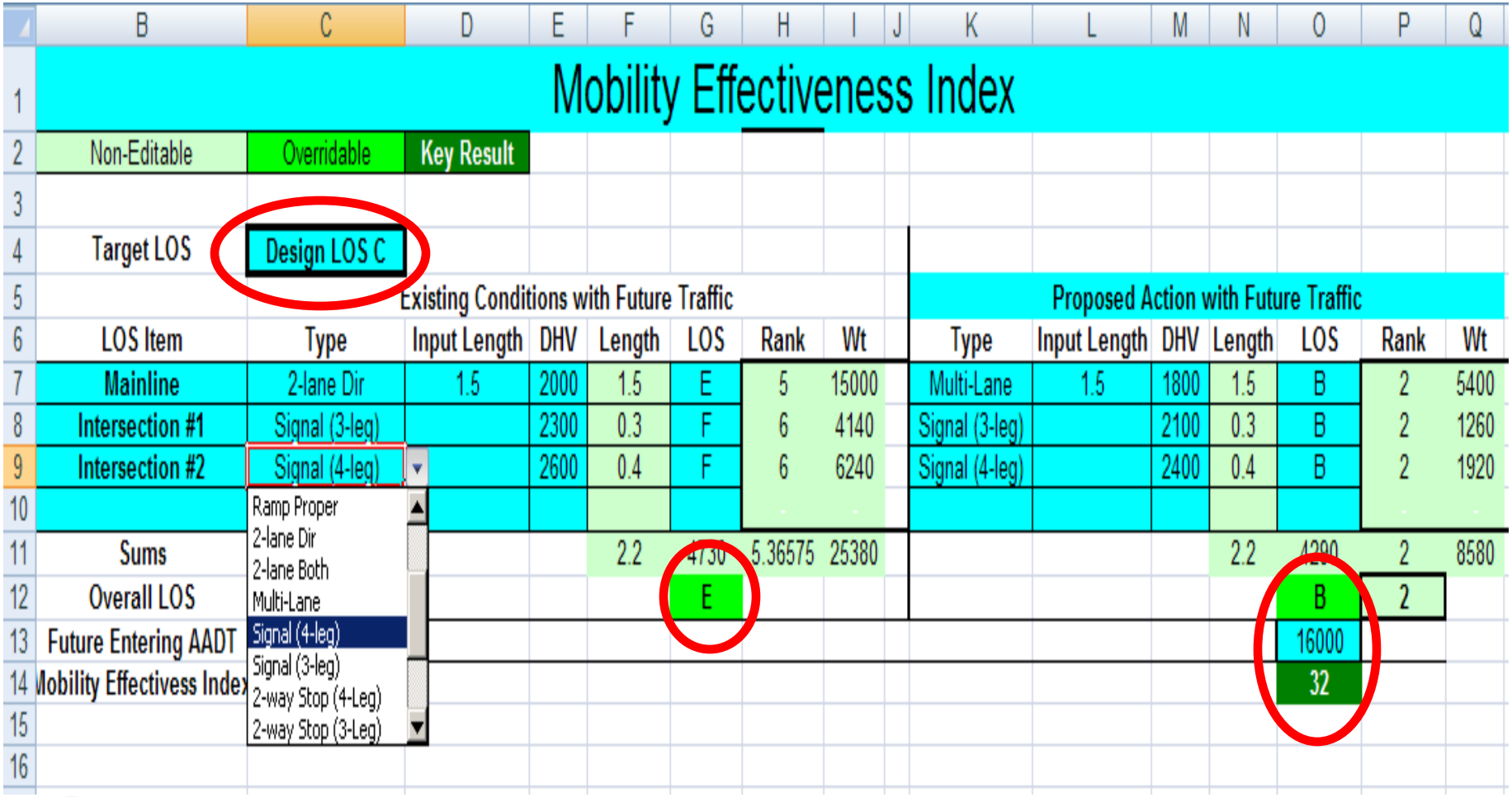
- **Unique procedure established for each of 5 functional / program areas**
- **Multiple scoring factors**
- **Defined scoring method for each factor**
- **Scaled 0 to 5 points for each factor**
- **0-5 points then weighted**
- **Common score range 0-100**
- **Supplementary factors/points**

Project Scoring & Grading: Scoring Factors

- **State of physical infrastructure or level of service**
- **Cost-effectiveness**
- **System priority and sheer traffic**
- **Route continuity**
- **Interest**
- **Economic impact / opportunity**
- **Others specific to program**

Project Scoring & Grading: An Example (Factor #3)

Calculate Mobility Effectiveness Index (MEI)



Mobility Effectiveness Index

Non-Editable | Overridable | Key Result

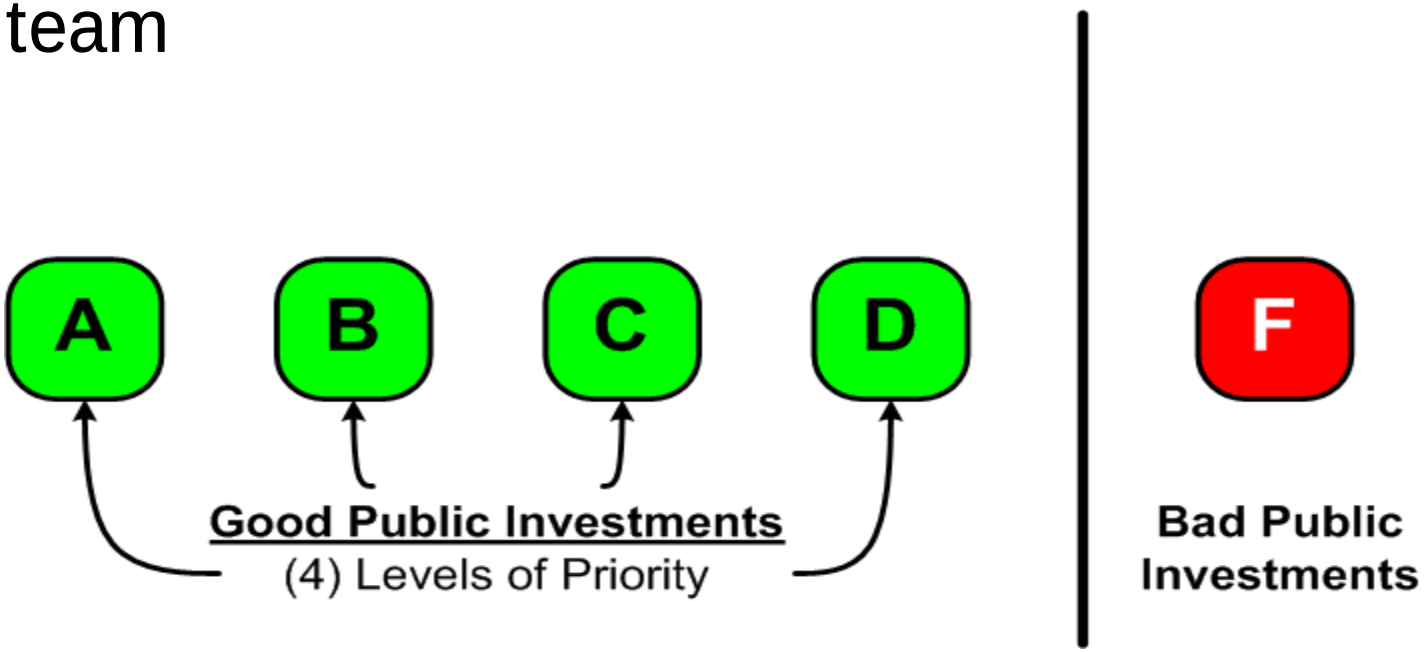
Target LOS: Design LOS C

	Existing Conditions with Future Traffic							Proposed Action with Future Traffic						
LOS Item	Type	Input Length	DHV	Length	LOS	Rank	Wt	Type	Input Length	DHV	Length	LOS	Rank	Wt
Mainline	2-lane Dir	1.5	2000	1.5	E	5	15000	Multi-Lane	1.5	1800	1.5	B	2	5400
Intersection #1	Signal (3-leg)		2300	0.3	F	6	4140	Signal (3-leg)		2100	0.3	B	2	1260
Intersection #2	Signal (4-leg)		2600	0.4	F	6	6240	Signal (4-leg)		2400	0.4	B	2	1920
Sums				2.2	4730	5.36575	25380				2.2	4200	2	8580
Overall LOS					E							B	2	
Future Entering AADT												16000		
Mobility Effectivess Index												32		

Type dropdown: Ramp Proper, 2-lane Dir, 2-lane Both, Multi-Lane, Signal (4-leg), Signal (3-leg), 2-way Stop (4-Leg), 2-way Stop (3-Leg)

Project Scoring & Grading: Numeric Score → Letter Grade

- Project Prioritization
  - Based strictly on score, projects initially placed in one of four quartiles
  - Project grade confirmed or reset by asset team



Performance Measures

- **Measures in four core functional areas (and others) established by INDOT:**
  - **Traffic Mobility**
  - **Road / Pavement**
  - **Bridge**
  - **Traffic Safety**
- **Continually monitored, re-assessed, and amended**
- **Relevant, integrated with everyday decisions on capital project selection and investment levels across various programs areas**
- **Identified for each measure, select standards/goals focus on long-run performance vision**

Performance Measures: Qualities

1. **Simple, straightforward**
2. **Data available, reliable, and stable**
3. **Data available back in time & capable of being projected**
4. **Captures individual project effects**
5. **Each has corresponding standard or goal**

Lessons Learned

- Evolutionary: Expect Change
- Don’t expect perfection
- Keep it simple
- Decision making: Right staff / skillset
- View recommendations / communication from layperson perspective

Lessons Learned

- Inclusive of entire agency will produce better buy-in and results.
- Understanding current state prior to developing meaningful performance goals.
- Executive leadership/support

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