

Arizona DOT: Needs-Based Maintenance Budget Allocation Model

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Background

The Arizona Department of Transportation (ADOT) is charged with delivering critical services to the general public, as revenues and budgets decrease and costs and public expectations increase. To aid ADOT in meeting its strategic goals for system health and sustainability, Dye Management Group, Inc. (DMG) developed a needs-based, performance-driven, budgeting model and implementation plan, which included an approach for communicating the resulting budget to decision makers.

Prior to the model, ADOT allocated funds to districts according to historical allocations. A 2007 audit conducted by the Arizona Office of the Auditor General recommended developing a needs-based, systematic approach for allocating maintenance funds at a district level. To meet that recommendation, DMG developed a budget model that compares current condition assessments to level of service (LOS) performance targets and calculates the level of effort required to achieve that target.

Goals

- Develop systematic way to allocate funds at district level based upon needs and priorities
- Address gap between available resources and needs
- Develop guidelines for maintenance activities
- Identify and prioritize the maintenance work backlog

Project Benefits

Implementing this budget model enables ADOT to realize several benefits.

- Promotes accountability and transparency across the agency as information from internal ADOT systems are employed to reach budget decisions that optimize resource usage
- Helps ADOT prepare for *Moving Ahead for Progress in the 21st Century* (MAP-21) compliance by establishing an accurate inventory, defining current asset conditions, and stating asset-based performance goals
- Enables the maintenance directors to translate performance data into actionable information and communicate more effectively with decision makers

LOS Performance Measures and Data Collection

- Maintenance work is performed and accomplishment data is tracked within the MMS
- Condition assessments are completed for ADOT-maintained assets

Annual Work Plan and Implementation

- Data is analyzed and scorecards are developed to show the current asset LOS
- DMG assisted in the revision of ADOT's LOS ranges and worked with executives determine targets LOS for each asset

Statewide LOS Scorecard						
Asset	A	B	C	D	E	F
Fence		B+				B+
Guardrail		B				A
Impact Attenuators	A+					A
Length Requiring Sweeping			C+			A
Length Requiring Litter Patrol		B+				A
Shoulders		B				B+
Drainage			C+			B+
Gravel			C+			B+
Pipes & Culverts		B+				B
Alligator Cracks		B				C
Bleeding		B+				B+
Paved Surfaces			C			C-
Cracks > 1/4"				D+		C-
Cracks < 1/4"		B+				A+
Potholes		B				B
Raveling		B				B
Sign Face		B				B
Delineators	A+					B+
Striping			C+			B
Markings	A+					A
Trees/Bush				D+		D+
ROW			C-			F
Recovery Zone		B				C
Sign & Hazard Marker Visibility			C			B
Encroachment			C+			D+
Groundcover			C+			F
Noxious Weeds				D+		D-
Irrigation		B				B
Dead Plants			C-			C
Plant Replacement					F	C
Pruning			C			C
Plant Health			C-			C
Sign Lines		B				A
Sign Clearance		B				A
Weeds					F	C
Litter (Landscape)			C-			C
Granite Mulch			C-			C
Sidewalk		B+				B+

Current Asset Evaluation and Target Setting

- Budget model compares current condition assessments to LOS targets and calculates the LOE required to achieve that target
- MS Excel-based spreadsheets help increase utilization and replicability

Level of Effort (LOE) Calculations and Budget Estimation

- Annual budget for maintenance activities is delivered and districts develop annual work plans to achieve targets
- Model promotes accountability and transparency

Results

- Complies with 2007 audit recommendations.
- Aligns with MAP-21 performance-based requirements
- Leverages detailed ADOT Maintenance Management System (MMS) cost and accomplishment data
- Asset LOS performance results are collected annually and expressed both as numeric values for budget calculation purposes and in easy-to-understand color-coded report-card formats.
- Can compare multi-year trends in performance.
- Comparison of current and target LOS allows specific adjustments to annual work accomplishments and budgets to meet objectives.
- Model calculates cost to achieve targets in 1-5 years.
- Helps prioritize maintenance backlog and optimizes use of resources
- Provides guidance to internal maintenance managers and provides accountability to decision makers and the public.

LOS-BASED WORK PROGRAM AND BUDGET											
Annual Budget (For LOS-Rated Assets Only)											
Year	Asset	Current LOS	Target LOS	Target FY	Yrs to Target	Activity	Labor	Equipment	Materials	Expenditure	Total
2015	Sign Face	B	B+	2020	5	406	\$ 144,527	\$ 61,715	\$ 114,517	\$ -	\$ 320,759
						450	\$ -	\$ -	\$ -	\$ -	\$ -
						452	\$ -	\$ -	\$ -	\$ -	\$ -
						454	\$ -	\$ -	\$ -	\$ -	\$ -
						456	\$ -	\$ -	\$ -	\$ -	\$ -
2016	Delineators	A+	A+	2020	5	401	\$ 3,452	\$ 1,135	\$ 3,263	\$ -	\$ 7,850
						403	\$ 121,396	\$ 22,884	\$ 65,078	\$ -	\$ 209,458
	Markings	A	A	2020	5	402	\$ 121,396	\$ 22,884	\$ 65,078	\$ -	\$ 209,458
						404	\$ -	\$ -	\$ -	\$ -	\$ -
						405	\$ -	\$ -	\$ -	\$ -	\$ -
2017	Striping	B	B+	2020	5	402	\$ 68,253	\$ 12,182	\$ -	\$ -	\$ 80,435
						422	\$ -	\$ -	\$ -	\$ -	\$ -
						423	\$ -	\$ -	\$ -	\$ -	\$ -
						424	\$ -	\$ -	\$ -	\$ -	\$ -
						425	\$ -	\$ -	\$ -	\$ -	\$ -
2018	High mast Lighting	B	B+	2020	5	5111	\$ 68,253	\$ 12,182	\$ -	\$ 1,303,192	\$ 1,383,627
						5112	\$ -	\$ -	\$ -	\$ -	\$ -
						5113	\$ -	\$ -	\$ -	\$ -	\$ -
						5114	\$ -	\$ -	\$ -	\$ -	\$ -
						5115	\$ -	\$ -	\$ -	\$ -	\$ -

DMG documented this approach in NCHRP Report 677 and has implemented it in more than a dozen state transportation agencies.

