

Pima County Transportation Advisory Committee

Regional Local Road Repair Program

September 12, 2017

Initial Methodology Discussion

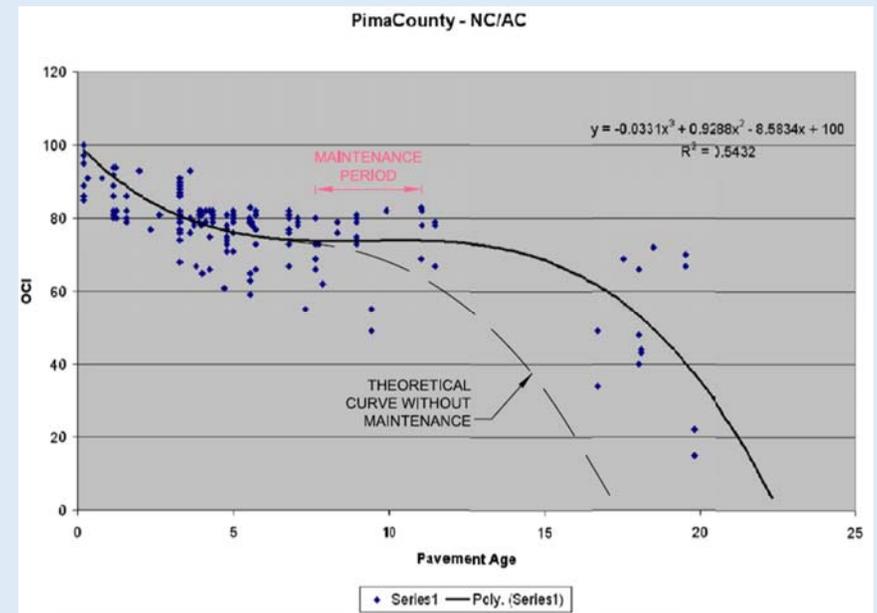
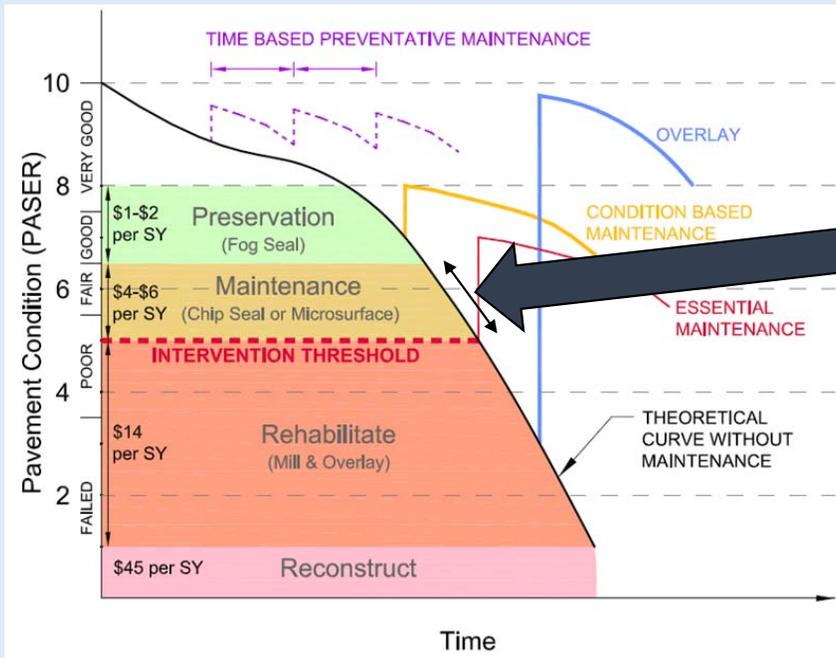


1. To keep roads from moving to failure, methodology reviews/includes PASER 5 roads only.
2. ADT was determined by using Census data which included both the number of parcels and the number of Building Units. ITE Trip Generation Manual shows that Single Family homes average 10 trips per day. With this information, a factor of 10 was given to the number of building units. We acknowledge that this over counts higher density housing units, Low-Rise Apartments and Condominiums-Townhomes which utilize an average of 6 trips per day.
3. While ADT was a good determinant for a single road, it overinflated larger subdivisions with mixed density housing.
4. Determined that ADT/Length could provide a more level criteria. Both were used to show differences.
5. Initially only Subdivisions were reviewed as the data could be aggregated more easily due to their contained nature (all roads within a subdivision, number of lots, number of building units, etc.).
6. Initially Average PASER was used, but discarded as it does not provide an accurate determinant. It also introduces fractions, which complicates the methodology.
7. The mode of the PASER for a subdivision more accurately describes what we need. The mode of a series of numbers is the number that repeats the most.

8. Some subdivisions did not have a mode due to segment number/condition. The solution was to then compare the length of roadway at a specific PASER in a subdivision and assign the mode to the longest length at a specific PASER. This introduces an error in cost estimating because not all roads in a subdivision will be treated at that cost. This will be addressed.
9. A list of subdivisions with a mode of PASER 5 was determined.
10. The list was separated out by District and then sorted by highest ADT or highest ADT/Length.
11. The Base funding allocation was distributed per Table 1 from the Whitepaper.
12. To use up all Base funding, a portion of Accelerated was applied to the running total below the Base allocation. The table showing Base and Accelerated for the ADT and ADT/Length list are provided.
13. The Accelerated used was then removed from the whole in each case.
14. A review of the overall PASER 5 roads compared to the PASER 5 of subdivisions was performed to establish a methodology of allocating the remaining Accelerated funding.
15. Accelerated funding was allocated to subdivisions then roadways (if needed), all rated PASER 5. Remaining funding was tallied in both the ADT and ADT/FT lists.

Step 1: To keep roads from moving to failure, methodology reviews/includes PASER 5 roads only.

Goal: Keep non-failed roads from failing, extend the service life of the road for less money than to replace it.



If all our local roads were Fair or better, the yearly maintenance cost would be roughly \$11.2 million dollars.

Step 2: Established ADT as initial criteria to prioritize:

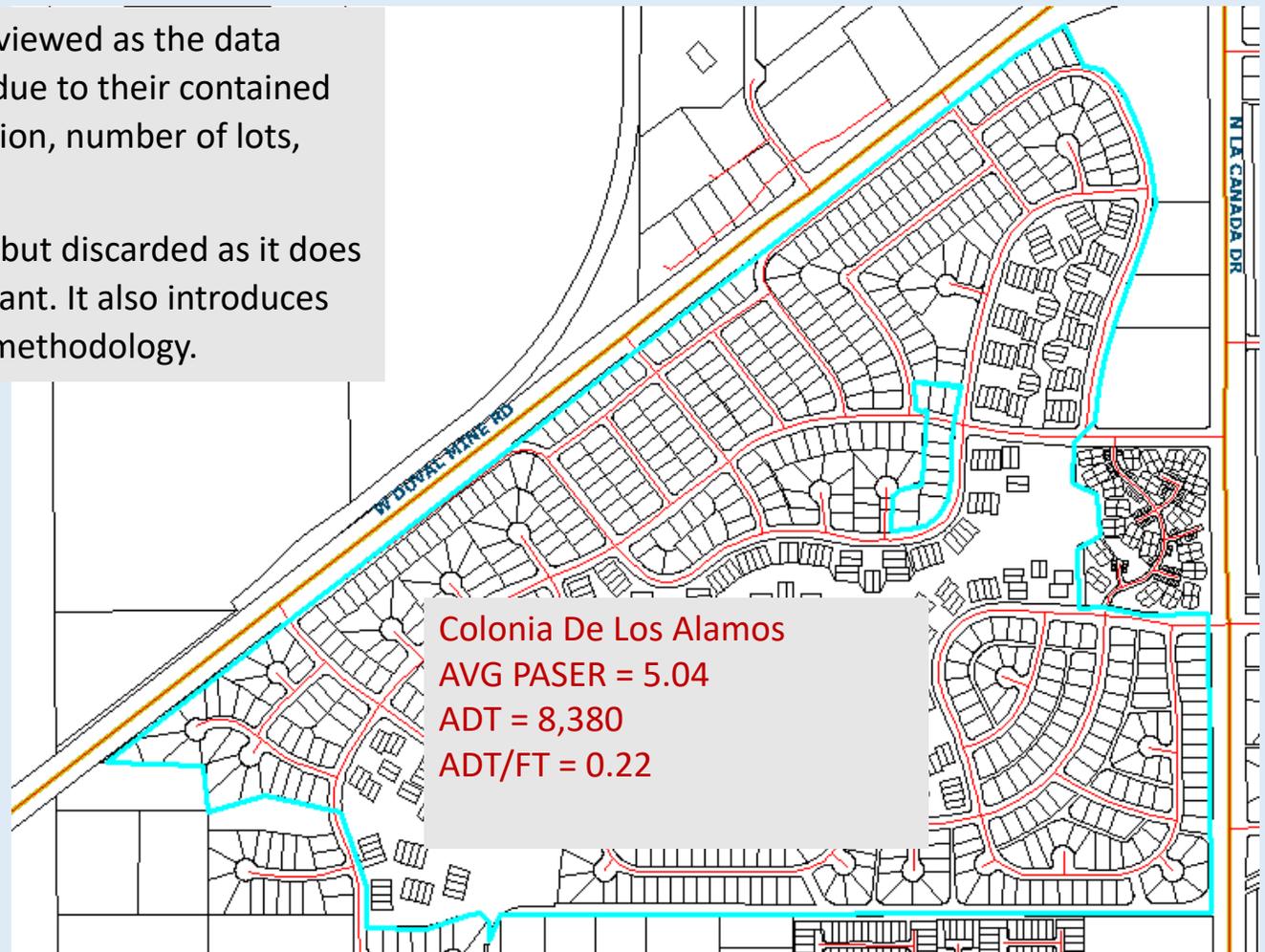
- ADT was determined by using Census data which included both the number of parcels and the number of Building Units.
- ITE Trip Generation Manual shows that Single Family homes average 10 trips per day. With this information, a factor of 10 was given to the number of building units.
- We acknowledge that this over counts higher density housing units, Low-Rise Apartments and Condominiums-Townhomes which utilize an average of 6 trips per day.

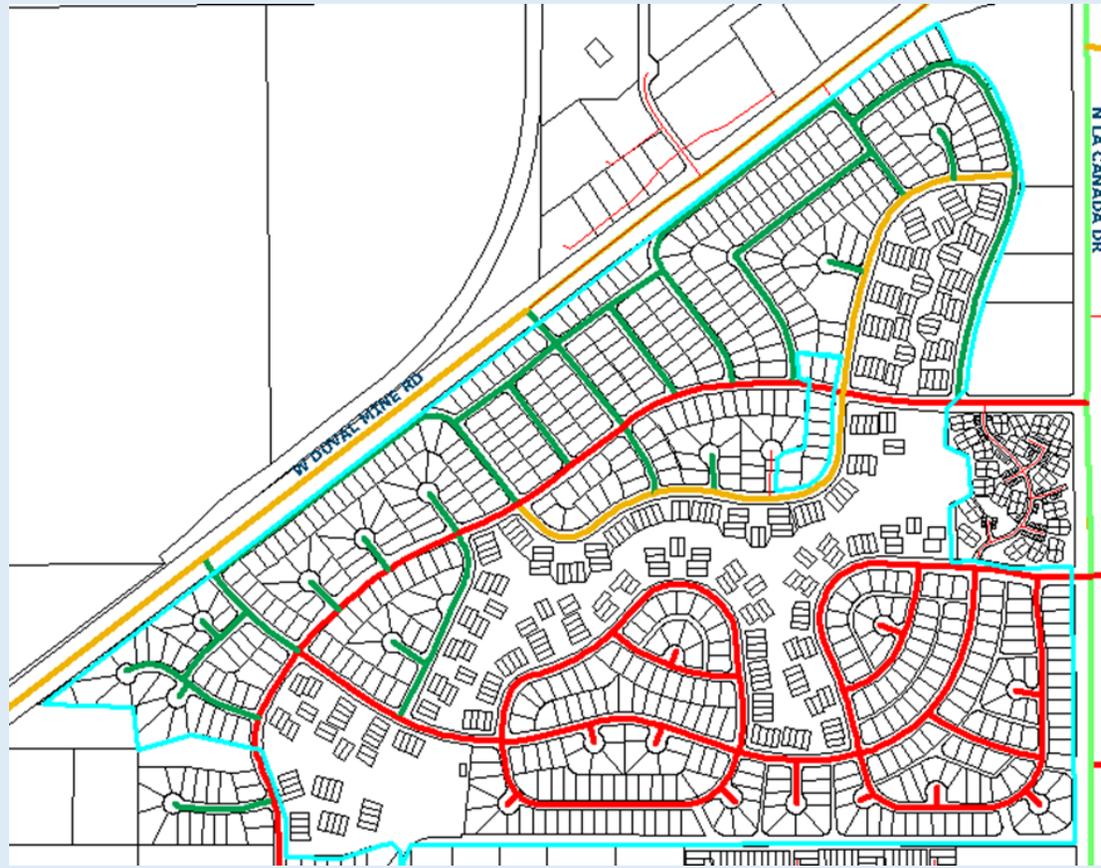
Step 3: While ADT was a good determinant for a single road, it tended to overinflate larger subdivisions with mixed density housing.

Step 4: Determined that ADT/Length could provide a more level criteria. Both were used to show differences.

Step 5: Initially only Subdivisions were reviewed as the data could be aggregated more easily due to their contained nature (all roads within a subdivision, number of lots, number of building units, etc.).

Step 6: Initially Average PASER was used, but discarded as it does not provide an accurate determinant. It also introduces fractions, which complicates the methodology.





LEFTSUB	PASER	Data			
		Average of PASER	Sum of LENGTH	Sum of COST PER LENGTH	
COLONIA DE LOS ALAMOS BLOCKS 1 THRU 45		3	3	18,975.10	\$885,504.49
		4	4	3,632.35	\$145,293.87
		8	8	15,800.62	\$0.00
		9	9	120.76	\$0.00
Grand Total		5.048543689		38,528.82	\$1,030,798.37

Step 7: The mode of the PASER for a subdivision more accurately describes what we need. The mode of a series of numbers is the number that repeats the most.

Step 8: Some subdivisions did not have a mode due to segment number/condition. The solution was to then compare the length of roadway at a specific PASER in a subdivision and assign the mode to the longest length at a specific PASER. This introduces an error in cost estimating because not all roads in a subdivision will be treated at that cost. This will be addressed.

LEFTSUB	STREET	PASER
AGUA CALIENTE ESTATES (1-82)	E FIREWEED LN	2
	E HEMLOCK LN	2
	N BUTTERCUP DR	3
	N JIMSONWEED DR	5
	N LARKSPUR RD	2
SAGUARO SPRINGS BLKS 1-10, A-D (1-9, A-D)	N SILVERBELL RD	8
	W LAMBERT LN	4

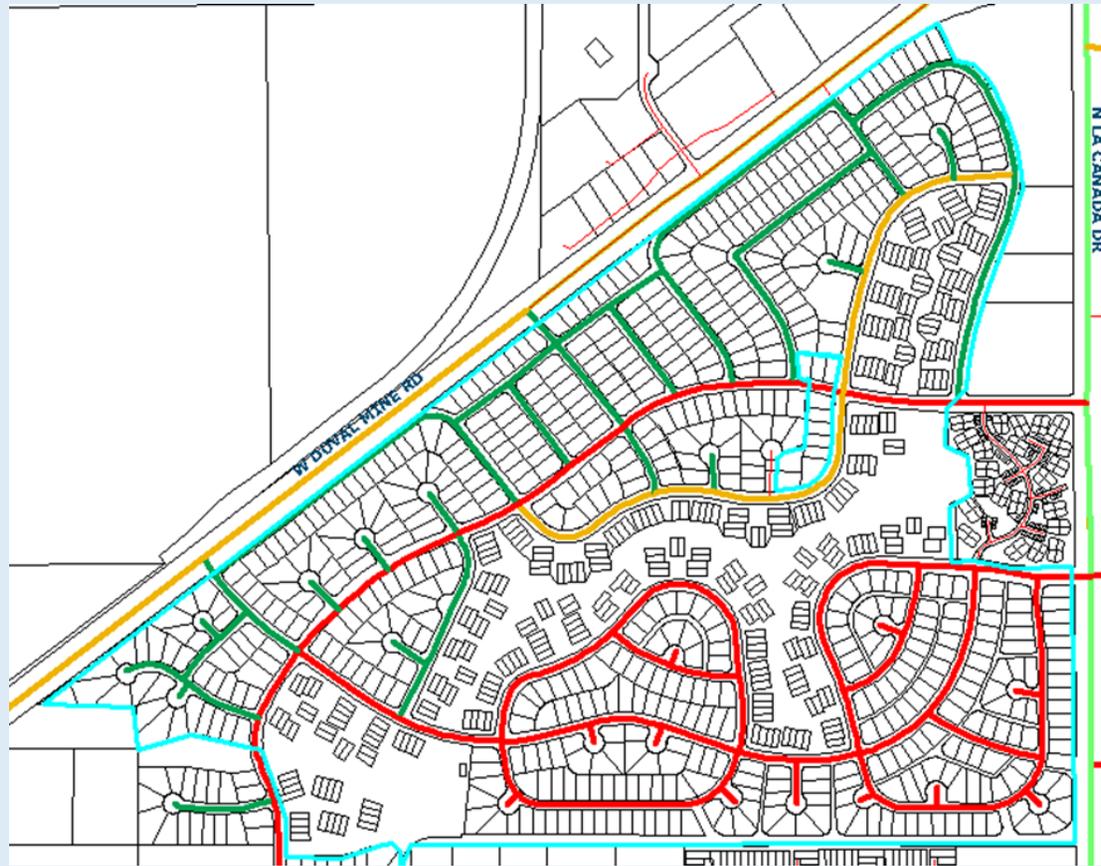
Mode is 2 (pointing to PASER 2 for Agua Caliente)

No Mode (pointing to PASER 8 and 4 for Saguaro Springs)

LEFTSUB	PASER	Sum of LENGTH
AGUA CALIENTE ESTATES (1-82)	2	2,145.46
	3	339.97
	5	335.38
SAGUARO SPRINGS BLKS 1-10, A-D (1-9, A-D)	4	40.14
	8	128.66

Mode is 2 (pointing to PASER 2 for Agua Caliente)

Mode is 8 (pointing to PASER 8 for Saguaro Springs)



LEFTSUB	PASER	Data			
		Average of PASER	Sum of LENGTH	Sum of COST PER LENGTH	
COLONIA DE LOS ALAMOS BLOCKS 1 THRU 45		3	3	18,975.10	\$885,504.49
		4	4	3,632.35	\$145,293.87
		8	8	15,800.62	\$0.00
		9	9	120.76	\$0.00
Grand Total		5.048543689		38,528.82	\$1,030,798.37

Step 9: A list of subdivisions with a Modal PASER 5 was determined.

Step 10: The list was separated out by District and then sorted by highest ADT or highest ADT/Length.

Step 11: The Base funding allocation is distributed per Table 1 from the Whitepaper.

Step 12: To use up all Base funding, a portion of Accelerated was applied to the running total below the Base allocation. The tables showing Base ADT and ADT/Length list are provided below.

Two Years Base Funding as Published

BASE			
District	1-YEAR	2-YEARS	% of BOS Miles
1	\$1,290,121	\$2,580,242	35.8%
2	201,806	\$403,612	5.6%
3	911,734	\$1,823,468	25.3%
4	886,508	\$1,773,016	24.6%
5	313,522	\$627,044	8.7%
Total	\$3,603,691	\$7,207,382	100.0%

BASE - ADT Only								
DISTRICT	# SUBD	# BU	# Miles	BASE \$	% of Total	ACLRD \$	Total \$	% of Total
BOS01	15	3,715	33.03	\$2,580,242	35.8%	\$35,784	\$2,616,026	35.3%
BOS02	2	1,458	5.42	\$403,612	5.6%	\$26,029	\$429,641	5.8%
BOS03	17	1,480	23.47	\$1,823,468	25.3%	\$35,418	\$1,858,886	25.1%
BOS04	14	1,114	22.95	\$1,773,016	24.6%	\$44,701	\$1,817,717	24.5%
BOS05	6	918	8.80	\$627,044	8.7%	\$70,241	\$697,285	9.4%
Total	54	8,685	93.68	\$7,207,382	100.0%	\$212,173	\$7,419,555	100.0%

BASE - ADT/Length								
DISTRICT	# SUBD	#BU	# Miles	BASE \$	% of Total	ACLRD \$	Total \$	% of Total
BOS01	58	5,454	33.53	\$2,580,242	35.8%	\$75,234	\$2,655,476	34.5%
BOS02	4	1,773	6.54	\$403,612	5.6%	\$114,286	\$517,898	6.7%
BOS03	26	1,649	24.27	\$1,823,468	25.3%	\$98,814	\$1,922,282	25.0%
BOS04	33	1,477	23.76	\$1,773,016	24.6%	\$108,627	\$1,881,643	24.5%
BOS05	9	1,005	8.95	\$627,044	8.7%	\$81,930	\$708,974	9.2%
TOTAL	130	11,358	97.05	\$7,207,382	100.0%	\$478,891	\$7,686,273	100.0%

Step 13: The Accelerated used was then removed from the published number for both ADT and ADT/FT.

Step 14: A review of the overall PASER 5 roads compared to the PASER 5 of subdivisions was performed to establish a methodology of allocating the remaining Accelerated funding

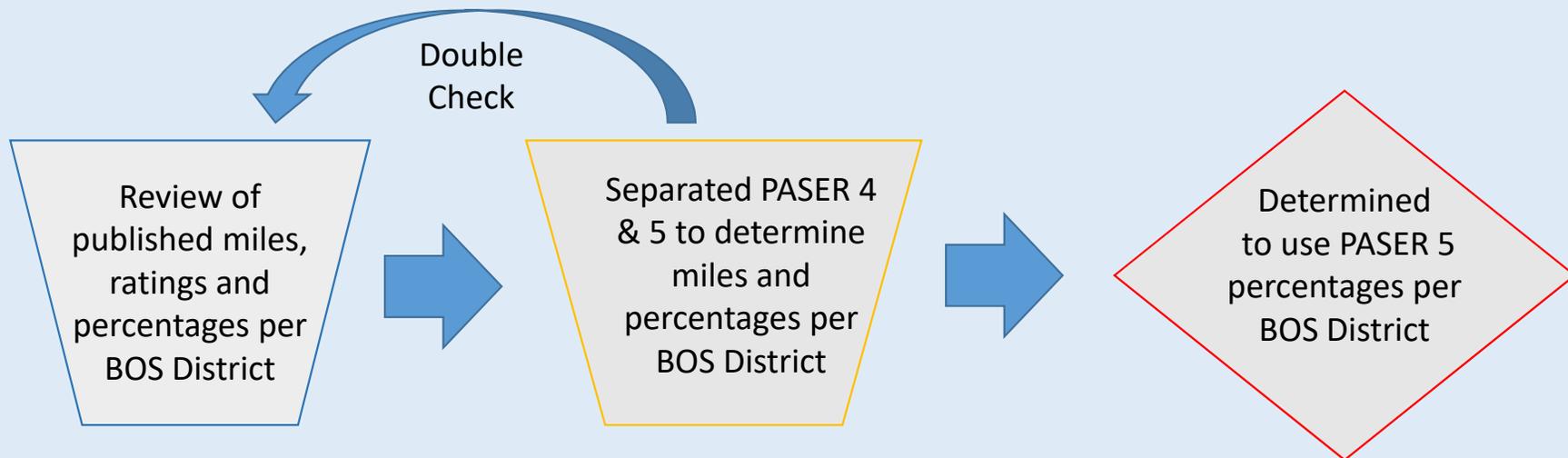


Table of Miles and Percentages of each BOS District as published

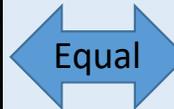
DISTRICT	Very Good		Good		Fair		Poor		Failed		Unrated		Total Miles
	# Miles	% Miles	# Miles	% Miles	# Miles	% Miles	# Miles	% Miles	# Miles	% Miles	# Miles	% Miles	
BOS1	25	15.7%	24	23.5%	50	42.4%	264	45.4%	77	36.3%	10	15.9%	450
BOS2	13	8.2%	12	11.8%	3	2.5%	25	4.3%	11	5.2%	3	4.8%	67
BOS3	52	32.7%	18	17.6%	23	19.5%	138	23.7%	45	21.2%	32	50.8%	308
BOS4	62	39.0%	34	33.3%	29	24.6%	103	17.7%	59	27.8%	17	27.0%	304
BOS5	7	4.4%	14	13.7%	13	11.0%	52	8.9%	20	9.4%	1	1.6%	107
TOTAL	159	100.0%	102	100.0%	118	100.0%	582	100.0%	212	100.0%	63	100.0%	1236



Double Check

Table of Miles and Percentages of each BOS District with PASER 4 & 5 Separated

DISTRICT	PASER 7		PASER 6		PASER 5		PASER 4		PASER 3-1	
	# Miles	% of Total	# Miles	% of Total						
BOS01	24	23.2%	50	42.5%	140	47.9%	124	42.7%	78	36.6%
BOS02	12	12.0%	3	2.6%	18	6.1%	7	2.4%	11	5.2%
BOS03	18	17.8%	23	19.0%	61	20.7%	78	26.8%	45	21.0%
BOS04	34	33.1%	29	24.7%	48	16.5%	55	18.9%	59	27.8%
BOS05	14	13.8%	13	11.2%	26	8.7%	27	9.2%	20	9.4%
TOTAL	102	100.0%	119	100.0%	292	100.0%	290	100.0%	213	100.0%



Equal

PASER 4 & 5

District	PASER 4 & 5	
	# Miles	% of Total
BOS01	264	45.3%
BOS02	25	4.3%
BOS03	138	23.8%
BOS04	103	17.7%
BOS05	52	9.0%
TOTAL	582	100.0%

Two Years Accelerated Funding as Published with proposed Distribution based on miles of PASER 5

District	ACCELERATED			ADT	ADT-FT
	1-YEAR	2-YEARS	% of PASER 5		
1	\$1,551,908	\$3,103,817	47.9%	\$4,050,403	\$3,922,672
2	\$242,756	\$485,512	6.1%	\$518,447	\$502,098
3	\$1,096,740	\$2,193,481	20.7%	\$1,754,422	\$1,699,096
4	\$1,066,396	\$2,132,791	16.5%	\$1,394,846	\$1,350,858
5	\$377,141	\$754,282	8.7%	\$739,591	\$716,268
Total	\$4,334,941	\$8,669,882	100.0%	8,457,709	\$8,190,991

Step 13



Step 15: Accelerated funding was allocated to subdivisions and then roadways (if needed), all rated PASER 5. Remaining funding was tallied in both the ADT and ADT/FT lists.

ACCELERATED - ADT								
DISTRICT	# SUBD	# BU	# Miles	ACLRD \$	% of Total	Total \$	% of Total	Difference
BOS01	40	3,762	50.93	\$4,050,403	47.9%	\$4,033,358	48.2%	\$17,045
BOS02	4	510	5.95	\$518,447	6.1%	\$471,206	5.6%	\$47,242
BOS03	18	389	22.03	\$1,754,422	20.7%	\$1,744,853	20.9%	\$9,569
BOS04	30	608	17.57	\$1,394,846	16.5%	\$1,391,757	16.6%	\$3,088
BOS05	4	967	9.11	\$739,591	8.7%	\$721,688	8.6%	\$17,903
TOTAL	96	6,236	105.59	\$8,457,709	100.0%	\$8,362,863	100.0%	\$94,846

ACCELERATED - ADT/FT								
DISTRICT	# SUBD	# BU	# Miles	ACLRD \$	% of Total	Total \$	% of Total	Difference
BOS01	42	2,890	48.25	\$3,922,672	47.9%	\$3,821,580	47.4%	\$101,092
BOS02	2	195	6.35	\$502,098	6.1%	\$502,794	6.2%	-\$697
BOS03	9	220	21.23	\$1,699,096	20.7%	\$1,681,458	20.9%	\$17,638
BOS04	11	245	16.91	\$1,350,858	16.5%	\$1,339,614	16.6%	\$11,244
BOS05	13	375	8.96	\$716,268	8.7%	\$709,891	8.8%	\$6,377
TOTAL	77	3,925	101.71	\$8,190,991	100.0%	\$8,055,337	100.0%	\$135,654

Questions?