



City of Los Angeles

Proposed Tier of New Benefits for New Employees in the Los Angeles City Employees' Retirement System

2% @ 65 with Actuarial Equivalent Early Benefits

Actuarial Analysis

September 13, 2012

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Introduction

Bartel Associates has prepared this estimate of the costs a proposed new tier of benefits for future new hires in the Los Angeles City Employees' Retirement System. These cost estimates were prepared by using the group of current plan participants hired in the three years ending June 30, 2011 as a proxy for future new hires. This is the same methodology and the same group of participants used by The Segal Company, Inc. in their previous analysis of the cost of two different proposed new tiers: 2% @65 and 2% @67. The costs for the current program are included here for comparison purposes. Except as noted, we have used the same actuarial methods and assumptions in developing the costs for the proposed new tier as in previous actuarial studies, so that the results will be directly comparable.

The purpose of this study is to provide the City with information about the relative costs of this proposed future plan design, as summarized in this report. The actual future costs will differ from those presented in this report due to differences in the demographics of actual covered employees as well as the actuarial methods and assumptions used at that time.

Finally, note that this report considers only funding costs for the pension and OPEB plans and therefore does not address accounting requirements under the new GASB Statements 67 and 68. Our report also does not consider any funding or plan design requirements that may be implemented in 2012 or later for California public pension plans.

Comments

<u>Pay Basis.</u> This report shows results on two bases: Base Pay Only and Base Plus Bonuses specified as pensionable in MOUs. The Base Plus Bonus results assume that benefits are calculated using base pay plus bonuses specified as pensionable in MOUs. We have used the same assumption as the Segal Company in their studies: that these bonuses are on average 2% of base pay. The costs for these benefits are shown as a percentage of base pay plus the specified bonuses. The Base Pay Only results assume that benefits are calculated using base pay only, and show the resulting costs and contributions as a percentage of base pay.

<u>Retirement Rates.</u> As discussed in Section 7, we have used Retirement Rates that we believe will best estimate retirement behavior of new tier employees until such time as an experience study can be made.

<u>Contribution Rates.</u> The employee contribution rates contemplated by all of the benefit design in this study, including the current plan, are significantly higher than they have historically been. This is even more so if the plan develops a large Unfunded Actuarial Accrued Liability and employees are required to fund a portion of the amortization payments. This will lead to employees accumulating larger contribution account balances, while at the same time, their expected retirement benefits will be lower than in the past. We expect this will likely lead to changes in employee termination rates and contributions withdrawal experience. However, we have not anticipated this change in our analysis.

<u>Social Security.</u> We believe the proposed 2% @65 formula will qualify under the Defined Benefit Retirement System Safe Harbor rules, and not require participants to join Social Security. However, we made this determination as actuaries and the City's legal counsel should review our findings.



SECTION 1 COMMENTS

<u>Projected Unit Credit Funding Method</u>. The projected unit credit (PUC) funding method which has been used in the LACERS actuarial valuations attributes the cost of benefits to the time when they accrue. Under the current plan, a portion of the disability benefit (1/3 of pay) is accrued by employees immediately upon hire, even though they cannot receive the benefit until they satisfy the 5 year eligibility requirement. This immediately-accrued benefit results in newly entered employees having a relatively substantial accrued liability relating to the disability benefit. In the annual valuation, this liability would be amortized as a loss and is not and will not be part of the Normal Cost. Thus, to evaluate the full cost of all current plan benefits under the PUC funding method we have added the amortization of the initial liability to the normal cost.

The proposed new tier benefit eliminates this 1/3 of pay minimum disability benefit.

It should be noted that the PUC and Entry Age Normal (EAN) funding methods produce different cost patterns over time, with EAN's cost generally starting higher but increasing more slowly over time. For this reason we have shown the costs for the all of the current and proposed benefits under both funding methods, for comparison purposes. Please see the Tier II Savings Projection section for more detail.

To the best of our knowledge, this report is complete and accurate and has been conducted using generally accepted actuarial principals and practices. This study was prepared by the undersigned, who are members of the American Academy of Actuaries meeting the Academy Qualification Standards.

John E. Bartel, ASA, MAAA, FCA President

Mary Elizabeth Redding, FSA, MAAA, EA Assistant Vice President



SECTION 2 SUMMARY OF RESULTS

Comparison of Estimated Contribution Rates: Current & Proposed (2% @ 65, Actuarial Early, Base + Bonus) Formulas All Amounts are Average Per New Employee

	Blue Italics amounts developed from Segal's reports								
		Pension:							
	Dongion	Proposed	ODED.	ODED.	Total	Total			
	Current	2% @ 05 Base+	OPED; Current	OPED: Proposed	Total: Current	10tal: Proposed			
	Plan	Bonus	Plan	Plan	Plan	Plan			
Base Pay	\$64,030	\$64,030	\$64,030	\$64,030	\$64,030	\$64,030			
Base Pay + Included Bonus	65,337	65,337	65,337	65,337	65,337	65,337			
]	Entry Age Normal								
Employer Normal Cost	\$ 7,337	\$ 1,825	\$(620)	\$ 351	\$6,717	\$ 2,175			
Employee Normal Cost	4,574	5,467	2,613	1,052	7,187	6,519			
Total Normal Cost	11,911	7,291	1,993	1,403	13,904	8,694			
Cost as % of Base + Bonus									
Employer Cost % of Pay	11.23%	2.79%	(0.95%)	0.54%	10.28%	3.33%			
• Employee Normal Cost % of Pay	7 00%	8 37%	4 00%	1 61%	11.00%	9 98%			
Total Cost % of Pay	18.23%	11.16%	<u>3.05%</u>	2.15%	21.28%	13.31%			
Employer Cost Portion	61.6%	25.0%	(31.1%)	25.0%	48.3%	25.0%			
Employee Cost Portion	38.4%	75.0%	131.1%	75.0%	51.7%	75.0%			
			Projected V	Unit Credit					
Employer Normal Cost	\$3,691	\$ 1,324	\$(1,228)	\$ 241	\$2,463	\$ 1,565			
Employee Normal Cost	<u>4,574</u>	<u>3,969</u>	2,613	722	<u>7,187</u>	4,691			
Total Normal Cost	8,265	5,293	1,385	963	9,650	6,256			
Accrued Liability	14,000	-	-	-	14,000	-			
15-Year Amortization of AL	1,168	<u>-</u>		<u>-</u>	<u>1,168</u>	-			
Total Cost	9,433	5,293	1,385	963	10,818	6,256			
Cost as % of Base + Bonus									
• Employer Cost % of Pay	7.44%	2.03%	(1.88%)	0.37%	5.56%	2.40%			
• Employee Normal Cost %									
of Pay	<u>7.00%</u>	<u>6.07</u> %	<u>4.00%</u>	<u>1.11%</u>	<u>11.00%</u>	<u>7.18%</u>			
• Total Cost % of Pay	14.44%	8.10%	2.12%	1.47%	16.56%	9.57%			
Employer Cost Portion	51.5%	25.0%	(88.7%)	25.0%	33.6%	25.0%			
Employee Cost Portion Employee contributions payable bi-weekly	48.5%	75.0%	188.7%	75.0%	66.4%	75.0%			

Employee contributions payable July 15th Employee contributions allocated to OPEB paid to Retirement Trust.





SECTION 2 SUMMARY OF RESULTS

Comparison of Estimated Contribution Rates: Current & Proposed (2% @ 65, Actuarial Early, Base Pay Only) Formulas All Amounts are Average Per New Employee

	Blue Italics amounts developed from Segal's reports						
	Pension: Current Plan	Pension: Proposed 2% @ 65 Base Pay	OPEB: Current Plan	OPEB: Proposed Plan	Total: Current Plan	Total: Proposed Plan	
Base Pay	\$64,030	\$64,030	\$64,030	\$64,030	\$64,030	\$64,030	
Base Pay + Included Bonus	65,337	65,337	65,337	65,337	65,337	65,337	
			Entry Ag	e Normal			
Employer Normal Cost	\$ 7,337	\$ 1,789	\$(620)	\$ 351	\$6,717	\$ 2,139	
Employee Normal Cost	4,574	5,360	2,613	1,052	7,187	6,412	
Total Normal Cost	11,911	7,148	1,993	1,403	13,904	8,551	
 <u>Cost as % of Base Pay</u> Employer Cost % of Pay Employee Normal Cost % 	11.46%	2.79%	(0.97%)	0.55%	10.49%	3.34%	
of Pav	7.14%	8.37%	4.08%	1.64%	11.22%	10.01%	
• Total Cost % of Pay	18.60%	11.16%	3.11%	2.19%	21.71%	13.35%	
Employer Cost Portion Employee Cost Portion	61.6% 38.4%	25.0% 75.0%	(31.1%) 131.1%	25.0% 75.0%	48.3% 51.7%	25.0% 75.0%	
]			Projected	Unit Credit			
Employer Normal Cost	\$3,691	\$ 1,299	\$(1,228)	\$ 241	\$2,463	\$ 1,540	
Employee Normal Cost	4,574	3,893	2,613	722	7,187	4,615	
Total Normal Cost	8,265	5,192	1,385	963	9,650	6,155	
Accrued Liability	14,000	-	-	-	14,000	-	
15-Year Amortization of AL	<u>1,168</u>	-	<u>_</u>	<u>-</u>	<u>1,168</u>	<u>-</u>	
Total Cost	9,433	5,192	1,385	963	10,818	6,155	
Cost as % of Base Pay							
Employer Cost % of PayEmployee Normal Cost %	7.59%	2.03%	(1.92%)	0.38%	5.67%	2.41%	
of Pay	<u>7.14%</u>	<u>6.08%</u>	<u>4.08%</u>	<u>1.13%</u>	<u>11.22%</u>	7.21%	
• Total Cost % of Pay	14.73%	8.11%	2.16%	1.50%	16.89%	9.61%	
Employer Cost Portion	51.5%	25.0%	(88.7%)	25.0%	33.6%	25.0%	
Employee Cost Portion	48.5%	75.0%	188.7%	75.0%	66.4%	75.0%	

Employee contributions payable bi-weekly Employer contributions payable July 15th

Employee contributions allocated to OPEB paid to Retirement Trust.





SECTION 3 OUTLINE OF PROPOSED PLAN DESIGN

	Current Pension Plan	Proposed Pension:
Benefit	2.16% @ 60	2.0 % @ 65
Maximum benefit	100%	75%
	55/30	
	60/10	65/10
Normal (Unreduced) Retirement	70/0	70/0
Early Retirement Eligibility	55/10 or /30 yrs	55/10
Reduction for Early Retirement		
(see next page)	1.5% per year after 55	Actuarial (7.5%/yr)
		75% of Normal Cost
		8.37% pay for pension
Employee Contribution Rate	7% for pension	EAN, 6.07% PUC
		3 years
		Base Only OR Base +
		pensionable bonus
	1 year, Base + some bonus,	specified in MOU,
Final Average Compensation	IRS limits	IRS limits
	20/	2% (add 1 coverage
	<u>3%</u>	purchasable)
Disability Eligibility	5 years	10 years
	Greater of: $1/2$ of pay OP $1/70$	1/00 (1.110/) x pov x
	(1.43%) x pay x svc	1/90 (1.11%) x pay x
Dicability	No early ret_reduction	reduction
	- Early ret	- – Farly ret
	- Return of Contr @ 55 If	- Return of Contr @ 55 If
Vested Termination	<10 years	<10 years
	-Married: 50% L&S	
	- Else: Life Annuity	- Life annuity (add'l
	Return survivor contr	coverage purchasable)
Post-Retirement Death	- \$2.500 LS death benefit	- \$2.500 LS death benefit
		50% Employer. 50%
		Employee paid. Ee rate
		fixed for 3-year periods.
Payment for Unfunded Liabilities		Applies to UAL for Tier II
(Gains and Losses)	100% Employer paid	benefits only.



SECTION 3 OUTLINE OF PROPOSED PLAN DESIGN

		Proposed
Retirement	Current	Pension:
Age	Pension Plan	2% @ 65
Age 55	2.00%	0.77%
Age 56	2.03%	0.84%
Age 57	2.06%	0.92%
Age 58	2.10%	1.01%
Age 59	2.13%	1.11%
Age 60	2.16%	1.22%
Age 61	2.16%	1.34%
Age 62	2.16%	1.48%
Age 63	2.16%	1.63%
Age 64	2.16%	1.81%
Age 65	2.16%	2.00%
Age 66	2.16%	2.00%
Age 67	2.16%	2.00%

Employee		
Contribution		
Rates	7.0%	8.57% (EAN)







SECTION 3 OUTLINE OF PROPOSED PLAN DESIGN

	Current OPEB Plan	Proposed OPEB Plan
Pre-Medicare Benefit	\$1,190/mo cap in 2012	\$596/mo cap in 2012
Post-Medicare Benefit	\$623.3/mo cap in 2012	\$596/mo cap in 2012
Dependents Covered	Yes	No
Benefit Increase	Kaiser 2-party rate	Lowest 1-party rate
Employee Contribution Rate (<i>Paid in Pension Plan</i>)	4% for OPEB	75% of Normal Cost 1.64% of base pay (1.61% base + bonus) for OPEB EAN, 1.13% (1.11% base + bonus) PUC
Non-Medicare "Vesting"	40% @10 yrs, 4%/yr after. 100% @25 yrs	40% @10 yrs, 3% per yr after. 100% @30 yrs
Medicare "Vesting"	75% @10 yrs, 90% @15 yrs, 100% @20 yrs	75% @10 yrs, 90% @15 yrs, 100% @20 yrs
Dental Benefit	\$44.14/mo in 2012. Assume 5%/yr increase	\$44.14/mo in 2012. Assume 5%/yr increase
Dental "vesting"	Same as non-Medicare	Same as non-Medicare
Medicare Part B	\$99.9/mo in 2012. Assume 5%/yr increase	None
Eligibility	Same as pension including deferred vested	Same as pension. Minimum commencement age 55
Disability Eligibility	Same as pension	Minimum 55/10 for 40% subsidy



SECTION 4 ACTUARIAL ASSUMPTIONS

The same assumptions were used as in Segal's 6/30/11 and Proposed New Tier reports, except for the Early Retirement Rates as discussed in Section 7. Key assumptions are summarized below.

Valuation Date	July 30, 2011					
Actuarial Funding	PUC (Projected Until Credit) with attri	bution follow	ing the accr	ual rate.		
Methods	EAN (Entry Age Normal) with normal	cost a level p	percentage of	f pay.		
Discount Rate	7.75%					
Early Retirement	Depend on benefit program and age &	service. The	average age	at		
Rates	retirement produced by each set of rate	s is shown be	elow.	7		
		Under 30	Over 30			
	Current Plan	60.2	60.2			
	Proposed Pension & OPEB: 2% @ 65	63.0	61.9			
Salary Increases	Aggregate payroll increases - 4.25%			-		
	Individual - Based on age/service, 11.2	5% to 4.65%	per year			
Mortality	RP-2000 Combined healthy, set back 2	years for ma	les and 1 yes	ar for		
	females					
Withdrawal	Based on age/service, 11.25% to 1.75%/year					
Disability	Based on age, from 0.01% to 0.2%/yea	r				
Healthcare Trend	Medical: 8.75% for 2012-2013, decrea	using 1⁄2% per	year to 5% a	after		
	8 years.					
	Dental: 5%					
	Medicare Part B: 5% after 2012-3					
Health Care	Based on service: 65% @ 10 yrs					
Participation at	80% @ 15 yrs					
Retirement	90% @ 20 yfs					
	3370 > 23 yrs	• 1 1	1 1 2			
Marriage %	Pension - 76% of males, 50% of female	es married, n	usbands 3 ye	ars		
	OPFB = 60% of males 30% of females	cover depen	dents Male			
	employees 4 years older, female emplo	vees 2 vears	vounger that	n their		
	spouses.	5	5 0			
Benefit	Age 57					
commencement						
(vested terminated)						





This study uses data based on participants hired during the three years preceding June 30, 2011. A summary of the participant data follows:

	Distribution of Study Participants by Entry Age and Salary									
	Under \$25,000	\$25,000 to \$50,000	\$50,000 to \$75,000	\$75,000 to \$100,000	\$100,000 to \$125,000	\$125,000 to \$150,000	\$150,000 to \$175,000	\$175,000 to \$200,000	Over \$200,000	Total
Under 20	0	12	2	0	0	0	0	0	0	14
20 - 24	0	63	54	12	0	0	0	0	0	129
25 - 29	0	93	102	40	3	0	0	0	0	238
30 - 34	0	41	84	31	3	4	0	0	0	163
35 - 39	0	38	58	26	3	2	0	1	0	128
40 - 44	0	29	28	29	3	0	2	0	1	92
45 - 49	0	33	41	31	2	2	2	1	0	112
50 - 54	0	23	21	15	3	2	3	1	2	70
55 - 59	0	13	10	12	2	1	3	2	2	45
60 - 64	0	8	3	3	1	1	1	1	1	19
Over 65	0	4	1	0	1	0	0	0	0	6
Total	0	357	404	199	21	12	11	6	6	1,016



The Cost Projections in this section estimate costs on both the current Projected Unit Credit (PUC) and the future Tier II Entry Age Normal (EAN) funding method. The cost patterns of the two funding methods are very different, making the comparison of costs and benefits between the methods complex. The two charts below illustrate the cost patterns of the two funding methods. These charts use actual valuation projections of Normal Cost for one employee, and so take into account probabilities of retirement and the decreasing likelihood that the participant will remain employed at the later ages. The dollar amount of Normal Cost declines after retirement eligibility because a portion of the employee is assumed to have already retired.









In projecting the Tier II payroll, we used the same actuarial assumptions as in the actuarial valuation to project the payroll of the Tier I group, taking into account the termination and retirement rates as well as assumed salary increases. Also, we assumed that during the period of no total payroll growth that current employees would receive no cost-of-living pay increase (but would continue to receive promotion increases).







The following chart estimates the savings from implementing the proposed Tier II benefits. The columns headed "Tier II Savings (Actual)" show the difference between the cost of the current plan benefits, as currently funded using the PUC funding method, and the proposed Tier II funded on the EAN method. The columns headed "Tier II Savings (EAN) show the difference between the current benefits and the proposed Tier II benefits if both were funded using the EAN method.

Estimated Savings (\$000's)									
			BASE	TIER II %		TIER II SA (Actual)	VINGS	TIER II SA (EAN)	VINGS
		PAYROLL	PAY-	PAY-	TIER II		CUMU-		CUMU-
YR	FY	GROWTH	ROLL	ROLL	PAYROLL	ANNUAL	LATIVE	ANNUAL	LATIVE
1	2013	0.00%	1,817,662	4%	67,367	1,502	1,502	4,682	4,682
2	2014	0.00%	1,817,662	8%	136,678	3,386	4,889	9,499	14,181
3	2015	0.00%	1,817,662	11%	207,949	5,699	10,588	14,452	28,634
4	2016	0.00%	1,817,662	16%	283,423	8,522	19,110	19,698	48,332
5	2017	0.00%	1,817,662	17%	312,176	10,769	29,879	21,696	70,028
6	2018	4.25%	1,894,913	22%	425,062	15,156	45,035	29,542	99,570
7	2019	4.25%	1,975,447	28%	546,806	20,433	65,468	38,003	137,573
8	2020	4.25%	2,059,403	33%	679,002	26,743	92,211	47,191	184,763
9	2021	4.25%	2,146,928	38%	819,567	34,140	126,351	56,960	241,723
10	2022	4.25%	2,238,172	43%	965,192	42,647	168,997	67,081	308,804
11	2023	4.25%	2,333,295	48%	1,115,214	52,339	221,337	77,507	386,311
12	2024	4.25%	2,432,460	52%	1,269,267	63,298	284,635	88,214	474,525
13	2025	4.25%	2,535,839	56%	1,424,722	75,551	360,186	99,018	573,544
14	2026	4.25%	2,643,612	60%	1,583,829	89,224	449,410	110,076	683,620
15	2027	4.25%	2,755,966	63%	1,748,234	102,970	552,380	121,502	805,122
16	2028	4.25%	2,873,094	67%	1,916,818	115,467	667,847	133,219	938,341
17	2029	4.25%	2,995,201	70%	2,089,671	128,420	796,266	145,232	1,083,573
18	2030	4.25%	3,122,497	73%	2,269,178	142,202	938,469	157,708	1,241,281
19	2031	4.25%	3,255,203	76%	2,457,795	158,141	1,096,610	170,817	1,412,098
20	2032	4.25%	3,393,549	78%	2,653,146	175,088	1,271,698	184,394	1,596,491
21	2033	4.25%	3,537,775	81%	2,855,257	190,178	1,461,876	198,440	1,794,932
22	2034	4.25%	3,688,130	83%	3,064,089	205,081	1,666,957	212,954	2,007,886
23	2035	4.25%	3,844,876	85%	3,277,472	220,003	1,886,960	227,784	2,235,670
24	2036	4.25%	4,008,283	87%	3,494,302	235,651	2,122,611	242,854	2,478,524
25	2037	4.25%	4,178,635	89%	3,719,586	251,233	2,373,844	258,511	2,737,035
26	2038	4.25%	4,356,227	91%	3,954,290	266,521	2,640,365	274,823	3,011,858
27	2039	4.25%	4,541,367	92%	4,195,988	282,114	2,922,479	291,621	3,303,480
28	2040	4.25%	4,734,375	94%	4,442,743	298,311	3,220,790	308,771	3,612,250
29	2041	4.25%	4,935,586	95%	4,692,460	315,663	3,536,453	326,126	3,938,376
30	2042	4.25%	5,145,348	96%	4,943,534	333,771	3,870,224	343,576	4,281,952
		Current present	value of 30-y	ear savings	s using 7.75% d	liscount rate	\$ 806,690		\$ 967,625
	Current present value of 30-year savings using 3 75% ** discount rate						\$1 734 523		\$1 985 351

* Figures are provided for illustrative purposes only and are based on various assumptions, including annual growth, payroll, and Tier II % of payroll. ** Approximation of GASB 68 AA Bond rate.



Bartel Associates developed proposed early retirement rates under which participants retire, on average, at the age where their benefit under the proposed formula is the same percentage of pay as under the current formula. Those rates were used in our valuation of the proposed New Tier II benefits. We believe these rates are appropriate to use until an experience study can be completed.

The chart below compares the two sets of rates. Rather than show the actual rate table, we show the number of employees remaining active at each age. The blue horizontal line marks 50%. Where this line crosses the retirement rate curves is the point where half of the participants have retired.







In the future, if actuarial assumptions are not exactly met, the Plan will develop an unfunded or an overfunded actuarial liability (UAL), as the plan assets will not exactly equal the Actuarial Accrued Liability (AAL). The City believes that the employees should bear a portion of the cost of the required amortization payments on the UAL. We agree that this is appropriate since the UAL would not exist if the Normal Cost payments had always been exactly correct. If a UAL exists it means that on average, past Normal Costs have been too small, and thus employees have benefitted from a lower Normal Cost rate than otherwise.

The proposed Tier II includes the provision that 50% of the amortization payments attributable to the Tier II participants be allocated to employees as additional required employee contributions. To minimize fluctuations, the employee contribution rate is determined every 3 years as the average of the previous 3 years' amortization payments.

We offer the following comments on cost sharing of amortization payments.

<u>"Generational equity"</u> is one consideration. The employees who benefitted from lower Normal Cost rates will not be exactly the same employees who must make increased contributions to amortize the UAL. But similarly, the taxpayers who benefitted from the City's lower normal cost rates are not the same ones who must pay higher taxes for the additional UAL amortization.

<u>Significance</u>. In the early years of Tier II, the group's assets and liabilities are small in dollar amount as well as a percentage of Tier II payroll. The dollar amounts of any gains and losses and amortization payments will also be small and perhaps immaterial. However, as the plan's assets and liabilities grow these have the potential to become much more significant.

<u>Calculation of Amortization Payments.</u> The illustrations that follow assume that amortization payments will continue to be calculated as in the past, as an amortization of the UAL attributable to Tier II employees, and spread over a period of years as a level percentage of Tier II payroll. In the past, and in our illustrations, that calculation has assumed payroll will grow at 4.25% per year. However, the Tier II group is expanding and so its payroll increases much faster than 4.25% per year. The resulting amortization payments actually decrease over time as a percentage of Tier II total payroll.

<u>Administration</u>. In order to implement any cost sharing, the assets attributable to Tier II participants will need to be tracked separately, as will all actuarial gains and losses and amortization bases and payments. In considering a cost-sharing methodology, we believe ease of administration is very important. We believe any attempt to segregate gains and losses by type (asset losses, liability/demographic losses, changes in actuarial assumptions, etc.) will unnecessarily complicate the calculation. Similarly, we believe the use of a "corridor" where a certain level of gains or losses would not be allocated to employee contributions would be difficult to develop the required employee contribution rate, and is not necessary if a smoothing method is used as proposed.

There are several sets of illustrations to show how this would work under various scenarios.

















