

Three Year Engineering Factors, SFY 2016 Report:

11/21/2016

Overhead Costs per Total Construction Costs

Report Key:

Projects are group by Work Type 1, and then work types are used to group projects into categories:

qry01MakeKey

11/15/2016

Category	Work Type
MAJOR PROJECT	A- ADD LANES
MAJOR PROJECT	D- DUAL DIVIDED
MAJOR PROJECT	F- FREEWAY
MAJOR PROJECT	I- INTERCHANGE
MAJOR PROJECT	M- MAJOR BRIDGE
MAJOR PROJECT	T- NEW OR IMPROVED 2 LANE
TCOS	1- ITS
TCOS	2- ADA-TRANS
TCOS	B- BRIDGE REPLACEMENT
TCOS	G- PREV MAINT-BRIDGE
TCOS	H- HIGH TYPE RESURFACING
TCOS	J- PREV MAINT-PAVEMENT
TCOS	K- MED TYPE RESURFACING
TCOS	L- LOW TYPE RESURFACING
TCOS	O- OTHER
TCOS	P- PAVEMENT REPLACEMENT
TCOS	Q- CMAQ
TCOS	R- BRIDGE REHABILITATION
TCOS	S- BRDG RETROFIT AND STR
TCOS	X- SAFETY
TCOS	Y- ROUTINE MAINTENANCE
OTHER	E- ENHANCEMENTS
OTHER	W- SHOULDER WIDENING

Note: Since SFY 2015's report, all projects are in the seven, reorganized districts. The group of "various" districts has been removed.

Calculations:

Projects completed in the time frame are tabulated and categorized by primary work type and district. Excludes payment projects, right of way only projects, and other projects without actual construction costs.

Within each line item, all projects are totaled and then converted to percentages, based on the actual construction amount (actual CN). Not based on the actual total amount (actual Total). Thus, estimated construction costs for a project can be used with factors in this report to estimate overhead costs, which add up to total costs.

$$PE\% = (\text{actual PE}) / (\text{actual CN})$$

$$CE\% = (\text{actual CE}) / (\text{actual CN})$$

$$RW \text{ acquisition} = (\text{actual land})$$

$$RW \text{ incidentals} = (\text{total actual RW}) - (\text{actual land})$$

$$RWp\% = (\text{actual land}) / (\text{actual CN})$$

$$RWi\% = (RW \text{ incidentals}) / (\text{actual CN})$$

$$\text{Total Engineering} =$$

$$((\text{actual PE}) + (\text{actual CE}) + (RW \text{ incidentals}))$$

$$\text{-----}$$

$$(\text{actual CN})$$

Note: Only the first work type is used. For instance, many projects include shoulder widening, but few projects have shoulder widening as their first work type.

If a district has no completed projects of the work type, in the time frame, then the line item is removed from their table.

Highlighted values:

n < 20 Each line item has an 'n' value indicating the number of projects included in the line. If the number of projects is low, then any unusual project can have a large effect on the results. Thus, lower 'n' values are highlighted and validity of the data should be confirmed.

0% In some line items, none of the projects will include a type of engineering expense. For instance, Routine Maintenance normally does not include Right of Way Acquisition. The calculated rate will then be 0%, and these values have been highlighted.

Three Year Average Engineering Factors Engineering Costs per Total Construction Costs

7/1/2013 - 6/30/2016
Statewide Totals

Statewide						
Work Types	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
1- ITS	1.85%	18.28%	0.31%	20.43%	0.21%	3
2- ADA-TRANS	10.56%	28.55%	0.00%	39.11%	0.00%	8
A- ADD LANES	6.34%	2.53%	0.55%	9.42%	8.51%	28
B- BRIDGE REPLACEMENT	13.77%	10.07%	0.27%	24.11%	1.12%	70
D- DUAL DIVIDED	10.26%	5.98%	0.94%	17.18%	17.96%	13
E- ENHANCEMENTS	6.31%	12.84%	0.06%	19.20%	0.58%	25
F- FREEWAY	10.24%	5.77%	1.63%	17.64%	38.11%	18
G- PREV MAINT-BRIDGE	3.04%	6.06%	0.00%	9.10%	0.00%	23
H- HIGH TYPE RESURFACING	1.99%	6.43%	0.05%	8.46%	0.23%	60
I- INTERCHANGE	6.91%	7.11%	0.32%	14.34%	4.58%	39
J- PREV MAINT-PAVEMENT	2.62%	7.75%	0.03%	10.40%	0.04%	139
K- MED TYPE RESURFACING	1.37%	6.63%	0.00%	8.00%	0.00%	205
L- LOW TYPE RESURFACING	1.39%	6.23%	0.09%	7.71%	0.14%	132
M- MAJOR BRIDGE	14.38%	2.02%	1.17%	17.57%	6.14%	8
O- OTHER	7.98%	9.84%	0.41%	18.23%	2.08%	83
P- PAVEMENT REPLACEMENT	4.15%	6.70%	0.32%	11.16%	0.12%	11
Q- CMAQ	5.12%	10.02%	0.00%	15.14%	0.00%	29
R- BRIDGE REHABILITATION	5.90%	8.35%	0.03%	14.28%	0.06%	96
* S- BRDG RETROFIT AND STR	385.83%	12.02%	5.13%	402.98%	164.31%	1
T- NEW OR IMPROVED 2 LANE	6.99%	8.76%	1.78%	17.53%	32.29%	8
W- SHOULDER WIDENING	6.36%	18.25%	0.71%	25.32%	1.13%	2
X- SAFETY	6.08%	10.05%	0.26%	16.39%	1.97%	115
Y- ROUTINE MAINTENANCE	1.64%	9.18%	0.00%	10.82%	0.02%	33
	7.03%	5.51%	0.50%	13.03%	6.58%	1,149

Work Type Categories	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
MAJOR PROJECT	8.62%	3.95%	0.76%	13.32%	10.46%	114
TCOS	4.60%	7.77%	0.10%	12.47%	0.73%	1008
OTHER	6.31%	13.01%	0.08%	19.40%	0.59%	27
	7.03%	5.51%	0.50%	13.03%	6.58%	1,149

Engineering costs are represented as percentages of corresponding actual construction costs. Based on projects completed within the indicated time frame. Excludes payment projects, right of way only projects and other projects without actual construction costs.

- * Only one project for Bridge Retrofit and Strengthening was completed during the current time frame. This one project was split into many smaller construction projects. Thus, all Preliminary Engineering is in the parent project, but most construction is in child projects, which were not included. Resulting in unusual percentage values.

Three Year Average Engineering Factors Engineering Costs per Total Construction Costs

**7/1/2013 - 6/30/2016
by District**

Northwest

Work Types	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
B- BRIDGE REPLACEMENT	18.30%	7.59%	1.53%	27.43%	10.32%	6
G- PREV MAINT-BRIDGE	0.00%	4.43%	0.00%	4.43%	0.00%	1
H- HIGH TYPE RESURFACING	0.62%	5.25%	0.00%	5.86%	0.00%	8
J- PREV MAINT-PAVEMENT	0.65%	5.99%	0.00%	6.64%	0.00%	7
K- MED TYPE RESURFACING	1.09%	5.41%	0.00%	6.50%	0.00%	8
L- LOW TYPE RESURFACING	0.56%	4.11%	0.13%	4.80%	0.06%	45
M- MAJOR BRIDGE	1.03%	4.26%	0.00%	5.30%	0.00%	1
O- OTHER	8.15%	8.83%	1.03%	18.01%	2.23%	7
P- PAVEMENT REPLACEMENT	3.61%	9.34%	0.75%	13.70%	0.11%	4
R- BRIDGE REHABILITATION	4.38%	9.47%	0.07%	13.92%	0.05%	15
X- SAFETY	4.25%	7.44%	0.21%	11.90%	0.85%	7
	3.08%	6.14%	0.25%	9.48%	0.98%	109

Work Type Categories	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
MAJOR PROJECT	1.03%	4.26%	0.00%	5.30%	0.00%	1
TCOS	3.13%	6.18%	0.26%	9.57%	1.00%	108
	3.08%	6.14%	0.25%	9.48%	0.98%	109

Engineering costs are represented as percentages of corresponding actual construction costs. Based on projects completed within the indicated time frame. Excludes payment projects, right of way only projects and other projects without actual construction costs.

Three Year Average Engineering Factors Engineering Costs per Total Construction Costs

7/1/2013 - 6/30/2016
by District

Northeast						
Work Types	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
A- ADD LANES	0.06%	14.15%	0.00%	14.21%	0.00%	2
B- BRIDGE REPLACEMENT	19.55%	13.38%	0.17%	33.10%	0.15%	12
D- DUAL DIVIDED	6.78%	8.50%	0.00%	15.28%	0.00%	2
E- ENHANCEMENTS	13.60%	26.02%	0.39%	40.02%	0.16%	3
G- PREV MAINT-BRIDGE	1.88%	14.99%	0.00%	16.87%	0.00%	7
H- HIGH TYPE RESURFACING	2.14%	6.18%	0.00%	8.32%	0.00%	5
I- INTERCHANGE	14.80%	10.79%	1.34%	26.93%	41.04%	1
J- PREV MAINT-PAVEMENT	0.87%	9.76%	0.00%	10.63%	0.00%	38
K- MED TYPE RESURFACING	3.24%	8.77%	0.00%	12.01%	0.00%	3
L- LOW TYPE RESURFACING	1.35%	8.31%	0.37%	10.02%	0.81%	24
O- OTHER	7.31%	10.73%	0.35%	18.40%	0.22%	6
P- PAVEMENT REPLACEMENT	0.00%	15.22%	0.00%	15.22%	0.00%	1
R- BRIDGE REHABILITATION	6.00%	11.32%	0.00%	17.32%	0.00%	23
X- SAFETY	12.67%	11.55%	0.77%	25.00%	10.27%	12
Y- ROUTINE MAINTENANCE	0.00%	42.24%	0.00%	42.24%	0.00%	4
	6.27%	10.08%	0.20%	16.55%	2.71%	143

Work Type Categories	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
MAJOR PROJECT	7.96%	9.33%	0.27%	17.56%	8.26%	5
TCOS	5.69%	10.06%	0.18%	15.94%	1.18%	135
OTHER	13.60%	26.02%	0.39%	40.02%	0.16%	3
	6.27%	10.08%	0.20%	16.55%	2.71%	143

Engineering costs are represented as percentages of corresponding actual construction costs. Based on projects completed within the indicated time frame. Excludes payment projects, right of way only projects and other projects without actual construction costs.

Three Year Average Engineering Factors Engineering Costs per Total Construction Costs

**7/1/2013 - 6/30/2016
by District**

Kansas City

Work Types	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
A- ADD LANES	5.60%	2.31%	0.44%	8.35%	4.05%	5
B- BRIDGE REPLACEMENT	13.54%	8.11%	0.00%	21.65%	0.04%	6
D- DUAL DIVIDED	10.01%	4.64%	1.46%	16.11%	7.75%	5
E- ENHANCEMENTS	6.64%	15.33%	0.00%	21.97%	0.00%	3
G- PREV MAINT-BRIDGE	3.83%	3.48%	0.00%	7.32%	0.00%	6
H- HIGH TYPE RESURFACING	3.66%	5.87%	0.00%	9.53%	0.00%	6
I- INTERCHANGE	6.89%	6.00%	0.31%	13.20%	4.61%	19
J- PREV MAINT-PAVEMENT	2.59%	7.97%	0.17%	10.73%	0.22%	14
K- MED TYPE RESURFACING	0.67%	8.00%	0.00%	8.68%	0.00%	19
L- LOW TYPE RESURFACING	1.60%	5.60%	0.04%	7.24%	0.00%	13
O- OTHER	9.24%	8.60%	0.36%	18.20%	1.43%	28
Q- CMAQ	0.84%	4.44%	0.00%	5.29%	0.00%	7
R- BRIDGE REHABILITATION	4.04%	6.39%	0.00%	10.43%	0.00%	14
T- NEW OR IMPROVED 2 LANE	9.26%	6.95%	1.42%	17.63%	37.55%	1
X- SAFETY	1.47%	8.78%	0.04%	10.30%	0.09%	16
Y- ROUTINE MAINTENANCE	0.03%	1.65%	0.00%	1.68%	0.00%	6
	5.77%	4.89%	0.38%	11.03%	3.70%	168

Work Type Categories	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
MAJOR PROJECT	6.65%	4.01%	0.53%	11.20%	5.37%	30
TCOS	3.89%	6.62%	0.07%	10.58%	0.24%	135
OTHER	6.64%	15.33%	0.00%	21.97%	0.00%	3
	5.77%	4.89%	0.38%	11.03%	3.70%	168

Engineering costs are represented as percentages of corresponding actual construction costs. Based on projects completed within the indicated time frame. Excludes payment projects, right of way only projects and other projects without actual construction costs.

Three Year Average Engineering Factors Engineering Costs per Total Construction Costs

7/1/2013 - 6/30/2016
by District

Central							
Work Types	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=	
A- ADD LANES	8.20%	18.00%	3.87%	30.07%	19.82%	2	
B- BRIDGE REPLACEMENT	18.44%	14.09%	0.27%	32.80%	0.62%	12	
D- DUAL DIVIDED	10.84%	8.60%	0.00%	19.44%	0.00%	1	
E- ENHANCEMENTS	5.63%	18.80%	0.29%	24.71%	0.43%	2	
G- PREV MAINT-BRIDGE	3.09%	12.04%	0.00%	15.13%	0.00%	2	
H- HIGH TYPE RESURFACING	0.73%	7.14%	0.00%	7.87%	0.00%	16	
I- INTERCHANGE	4.73%	8.39%	0.00%	13.12%	0.00%	1	
J- PREV MAINT-PAVEMENT	0.27%	7.05%	0.00%	7.33%	0.00%	23	
K- MED TYPE RESURFACING	1.69%	7.92%	0.00%	9.60%	0.00%	23	
L- LOW TYPE RESURFACING	0.54%	7.58%	0.00%	8.11%	0.00%	21	
M- MAJOR BRIDGE	14.45%	4.21%	0.02%	18.68%	0.71%	1	
O- OTHER	8.70%	11.54%	0.64%	20.87%	0.16%	7	
P- PAVEMENT REPLACEMENT	6.09%	10.37%	0.14%	16.60%	0.38%	5	
R- BRIDGE REHABILITATION	11.92%	10.69%	0.14%	22.76%	0.39%	12	
X- SAFETY	4.48%	16.83%	0.16%	21.48%	2.48%	10	
Y- ROUTINE MAINTENANCE	4.29%	18.23%	0.02%	22.53%	0.10%	8	
	6.26%	8.67%	0.07%	15.00%	0.37%	146	

Work Type Categories	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
MAJOR PROJECT	11.61%	6.36%	0.07%	18.04%	0.68%	5
TCOS	3.96%	9.51%	0.06%	13.53%	0.23%	139
OTHER	5.63%	18.80%	0.29%	24.71%	0.43%	2
	6.26%	8.67%	0.07%	15.00%	0.37%	146

Engineering costs are represented as percentages of corresponding actual construction costs. Based on projects completed within the indicated time frame. Excludes payment projects, right of way only projects and other projects without actual construction costs.

Three Year Average Engineering Factors Engineering Costs per Total Construction Costs

**7/1/2013 - 6/30/2016
by District**

St. Louis

Work Types	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
1- ITS	0.00%	0.00%	0.00%	0.00%	0.00%	1
A- ADD LANES	6.52%	1.27%	0.41%	8.20%	9.63%	4
B- BRIDGE REPLACEMENT	8.92%	8.65%	0.35%	17.91%	0.13%	6
D- DUAL DIVIDED	15.45%	6.22%	1.17%	22.84%	48.35%	2
E- ENHANCEMENTS	9.12%	15.15%	0.00%	24.27%	0.00%	3
F- FREEWAY	11.54%	5.07%	2.41%	19.02%	58.70%	3
G- PREV MAINT-BRIDGE	1.34%	6.90%	0.00%	8.24%	0.00%	7
H- HIGH TYPE RESURFACING	4.48%	8.92%	0.23%	13.63%	1.17%	14
I- INTERCHANGE	9.88%	8.16%	0.76%	18.80%	9.23%	2
J- PREV MAINT-PAVEMENT	3.96%	7.87%	0.00%	11.83%	0.00%	38
K- MED TYPE RESURFACING	5.80%	9.96%	0.00%	15.75%	0.00%	7
L- LOW TYPE RESURFACING	5.89%	17.30%	0.00%	23.19%	0.00%	1
M- MAJOR BRIDGE	14.64%	1.81%	1.30%	17.75%	6.79%	5
O- OTHER	9.57%	13.52%	0.57%	23.66%	1.99%	13
P- PAVEMENT REPLACEMENT	3.86%	2.41%	0.00%	6.26%	0.00%	1
Q- CMAQ	6.91%	12.45%	0.00%	19.36%	0.00%	21
R- BRIDGE REHABILITATION	4.55%	7.18%	0.00%	11.73%	0.00%	9
* S- BRDG RETROFIT AND STR	385.83%	12.02%	5.13%	402.98%	164.31%	1
X- SAFETY	10.65%	12.39%	0.32%	23.36%	1.01%	21
Y- ROUTINE MAINTENANCE	0.00%	1.71%	0.00%	1.71%	0.00%	8
	10.15%	3.62%	0.78%	14.55%	11.98%	167

Work Type Categories	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
MAJOR PROJECT	10.39%	2.21%	0.92%	13.53%	14.45%	16
TCOS	9.19%	9.27%	0.17%	18.64%	1.96%	148
OTHER	9.12%	15.15%	0.00%	24.27%	0.00%	3
	10.15%	3.62%	0.78%	14.55%	11.98%	167

Engineering costs are represented as percentages of corresponding actual construction costs. Based on projects completed within the indicated time frame. Excludes payment projects, right of way only projects and other projects without actual construction costs.

* Only one project for Bridge Retrofit and Strengthening was completed during the current time frame. This one project was split into many smaller construction projects. Thus, all Preliminary Engineering is in the parent project, but most construction is in child projects, which were not included. Resulting in unusual percentage

Three Year Average Engineering Factors Engineering Costs per Total Construction Costs

**7/1/2013 - 6/30/2016
by District**

Southwest							
Work Types	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=	
1- ITS	2.55%	25.18%	0.42%	28.15%	0.28%	2	
2- ADA-TRANS	10.56%	28.55%	0.00%	39.11%	0.00%	8	
A- ADD LANES	8.91%	8.07%	1.02%	18.00%	12.76%	11	
B- BRIDGE REPLACEMENT	10.08%	9.82%	0.00%	19.91%	0.00%	13	
D- DUAL DIVIDED	3.08%	5.03%	0.00%	8.12%	0.00%	1	
E- ENHANCEMENTS	9.45%	16.94%	0.00%	26.38%	0.00%	8	
F- FREEWAY	7.90%	7.02%	0.23%	15.15%	1.04%	15	
H- HIGH TYPE RESURFACING	0.69%	5.80%	0.00%	6.49%	0.00%	3	
I- INTERCHANGE	6.69%	8.36%	0.28%	15.33%	2.82%	10	
J- PREV MAINT-PAVEMENT	0.43%	7.54%	0.00%	7.97%	0.00%	11	
K- MED TYPE RESURFACING	1.19%	6.10%	0.01%	7.29%	0.00%	112	
L- LOW TYPE RESURFACING	2.89%	7.00%	0.00%	9.88%	0.00%	3	
M- MAJOR BRIDGE	3.57%	1.49%	0.00%	5.06%	0.00%	1	
O- OTHER	6.27%	14.66%	0.37%	21.29%	3.50%	13	
Q- CMAQ	0.00%	1.63%	0.00%	1.63%	0.00%	1	
R- BRIDGE REHABILITATION	4.96%	7.45%	0.00%	12.41%	0.00%	13	
T- NEW OR IMPROVED 2 LANE	6.43%	9.61%	2.28%	18.31%	54.16%	3	
X- SAFETY	7.36%	10.33%	0.31%	17.99%	1.87%	38	
Y- ROUTINE MAINTENANCE	2.82%	12.75%	0.00%	15.57%	0.00%	2	
	4.83%	7.61%	0.27%	12.72%	3.79%	268	

Work Type Categories	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=	
MAJOR PROJECT	7.03%	7.70%	0.56%	15.29%	8.12%	41	
TCOS	2.99%	7.45%	0.04%	10.49%	0.30%	219	
OTHER	9.45%	16.94%	0.00%	26.38%	0.00%	8	
	4.83%	7.61%	0.27%	12.72%	3.79%	268	

Engineering costs are represented as percentages of corresponding actual construction costs. Based on projects completed within the indicated time frame. Excludes payment projects, right of way only projects and other projects without actual construction costs.

Three Year Average Engineering Factors Engineering Costs per Total Construction Costs

**7/1/2013 - 6/30/2016
by District**

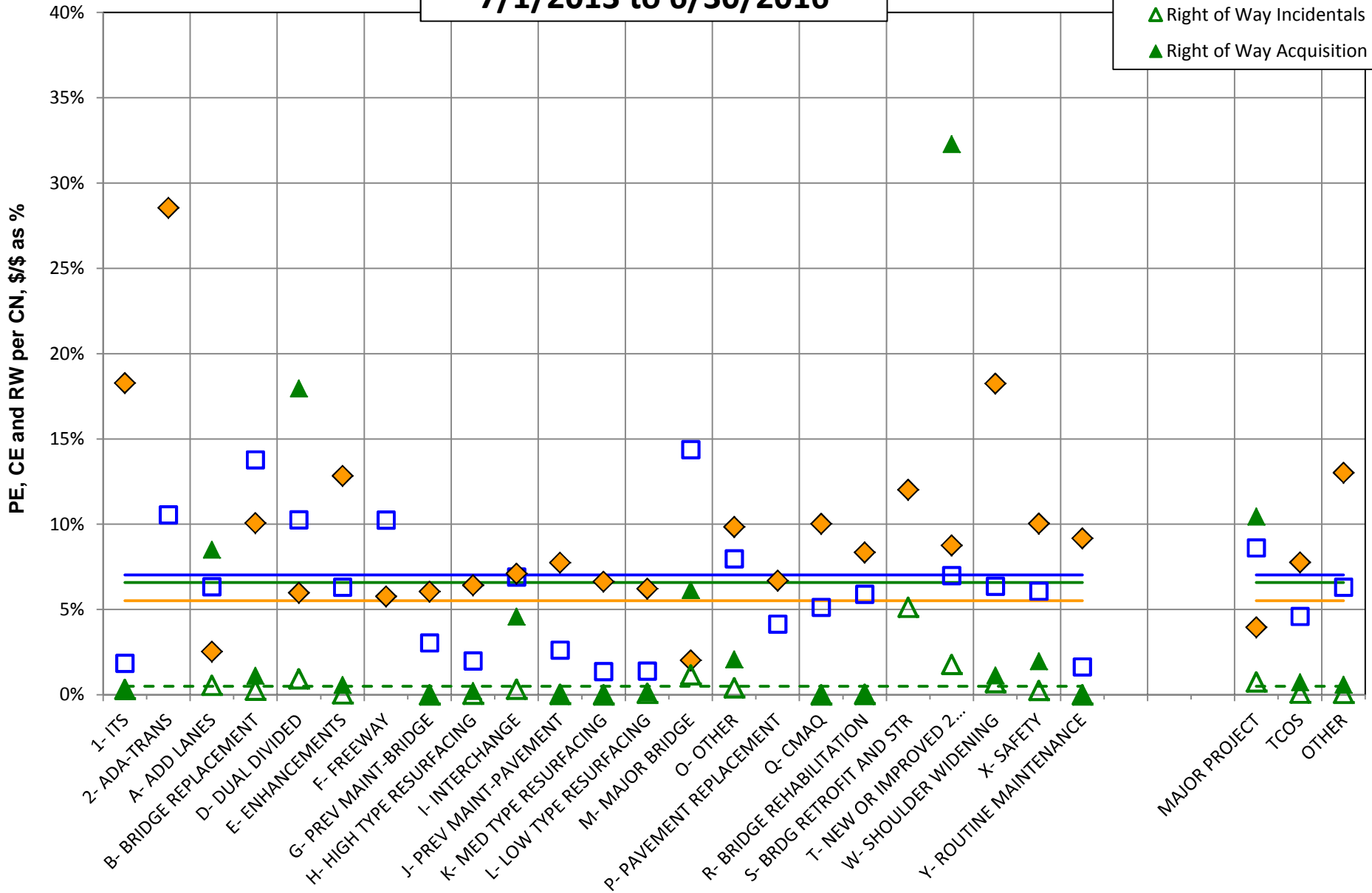
Southeast							
Work Types	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=	
A- ADD LANES	6.21%	7.27%	1.65%	15.12%	16.52%	4	
B- BRIDGE REPLACEMENT	13.50%	9.25%	0.16%	22.91%	0.24%	15	
D- DUAL DIVIDED	6.50%	6.18%	1.12%	13.79%	12.97%	2	
E- ENHANCEMENTS	3.23%	6.57%	0.01%	9.81%	1.25%	6	
H- HIGH TYPE RESURFACING	0.39%	5.32%	0.00%	5.71%	0.00%	8	
I- INTERCHANGE	3.73%	9.79%	0.00%	13.52%	0.00%	6	
J- PREV MAINT-PAVEMENT	0.19%	3.49%	0.00%	3.68%	0.00%	8	
K- MED TYPE RESURFACING	1.52%	6.31%	0.00%	7.83%	0.00%	33	
L- LOW TYPE RESURFACING	2.14%	4.38%	0.00%	6.52%	0.00%	25	
O- OTHER	4.08%	5.63%	0.04%	9.75%	3.46%	9	
R- BRIDGE REHABILITATION	10.57%	13.00%	0.08%	23.64%	0.08%	10	
T- NEW OR IMPROVED 2 LANE	6.13%	9.15%	1.61%	16.89%	13.04%	4	
W- SHOULDER WIDENING	6.36%	18.25%	0.71%	25.32%	1.13%	2	
X- SAFETY	2.33%	6.15%	0.18%	8.65%	1.54%	11	
Y- ROUTINE MAINTENANCE	4.42%	18.93%	0.00%	23.35%	0.00%	5	
	4.18%	7.01%	0.56%	11.76%	5.66%	148	

Work Type Categories	Preliminary Engineering	Construction Inspection	Right of Way Incidentals	Total Engineering	Right of Way Acquisition	n=
MAJOR PROJECT	5.86%	7.77%	1.29%	14.91%	12.70%	16
TCOS	2.95%	6.41%	0.04%	9.40%	0.56%	124
OTHER	3.46%	7.43%	0.06%	10.96%	1.25%	8
	4.18%	7.01%	0.56%	11.76%	5.66%	148

Engineering costs are represented as percentages of corresponding actual construction costs. Based on projects completed within the indicated time frame. Excludes payment projects, right of way only projects and other projects without actual construction costs.

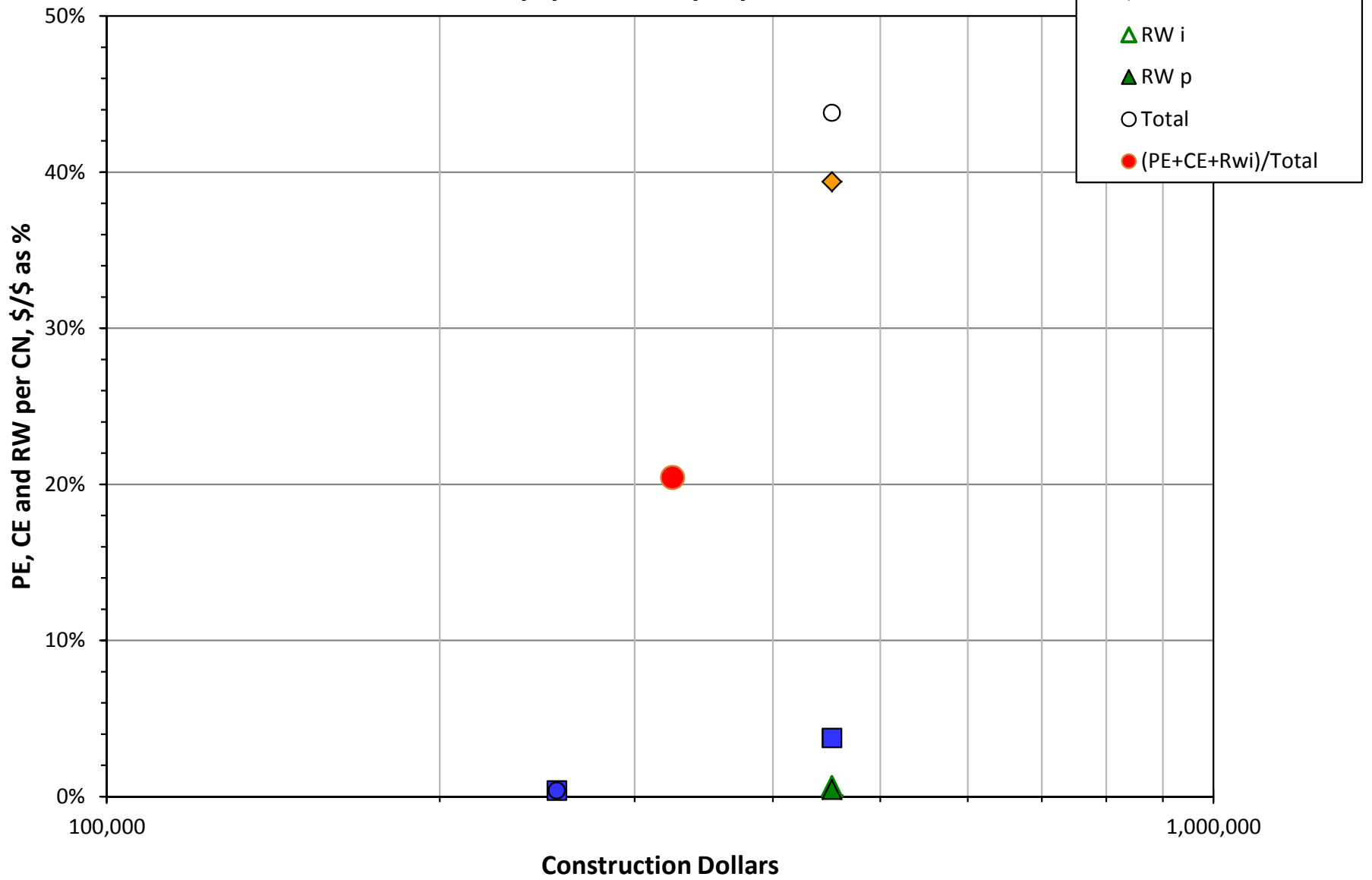
Statewide Engineering Factors 7/1/2013 to 6/30/2016

- Preliminary Engineering
- ◆ Construction Inspection
- △ Right of Way Incidentals
- ▲ Right of Way Acquisition



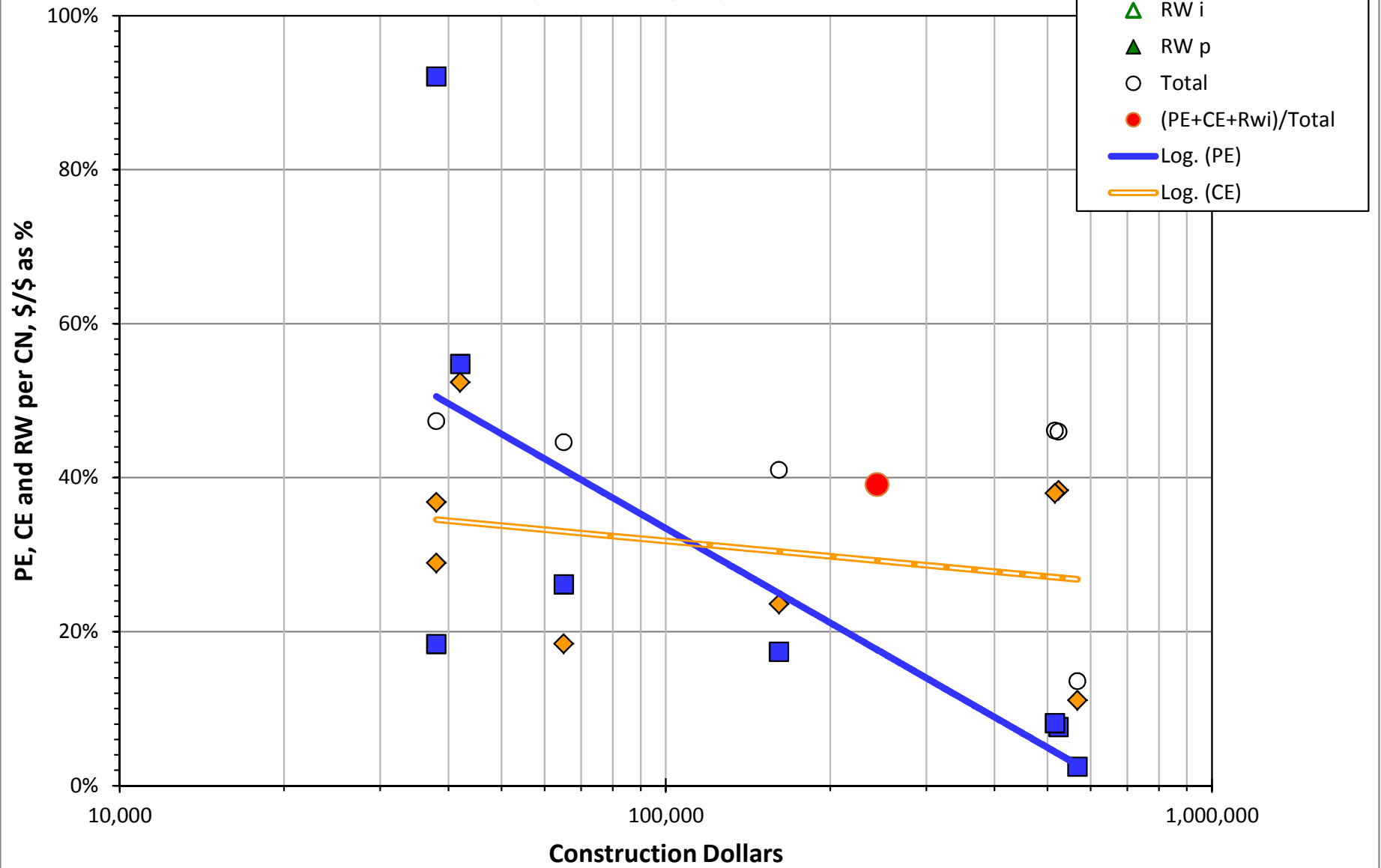
Factors for ITS

7/1/2013 to 6/30/2016

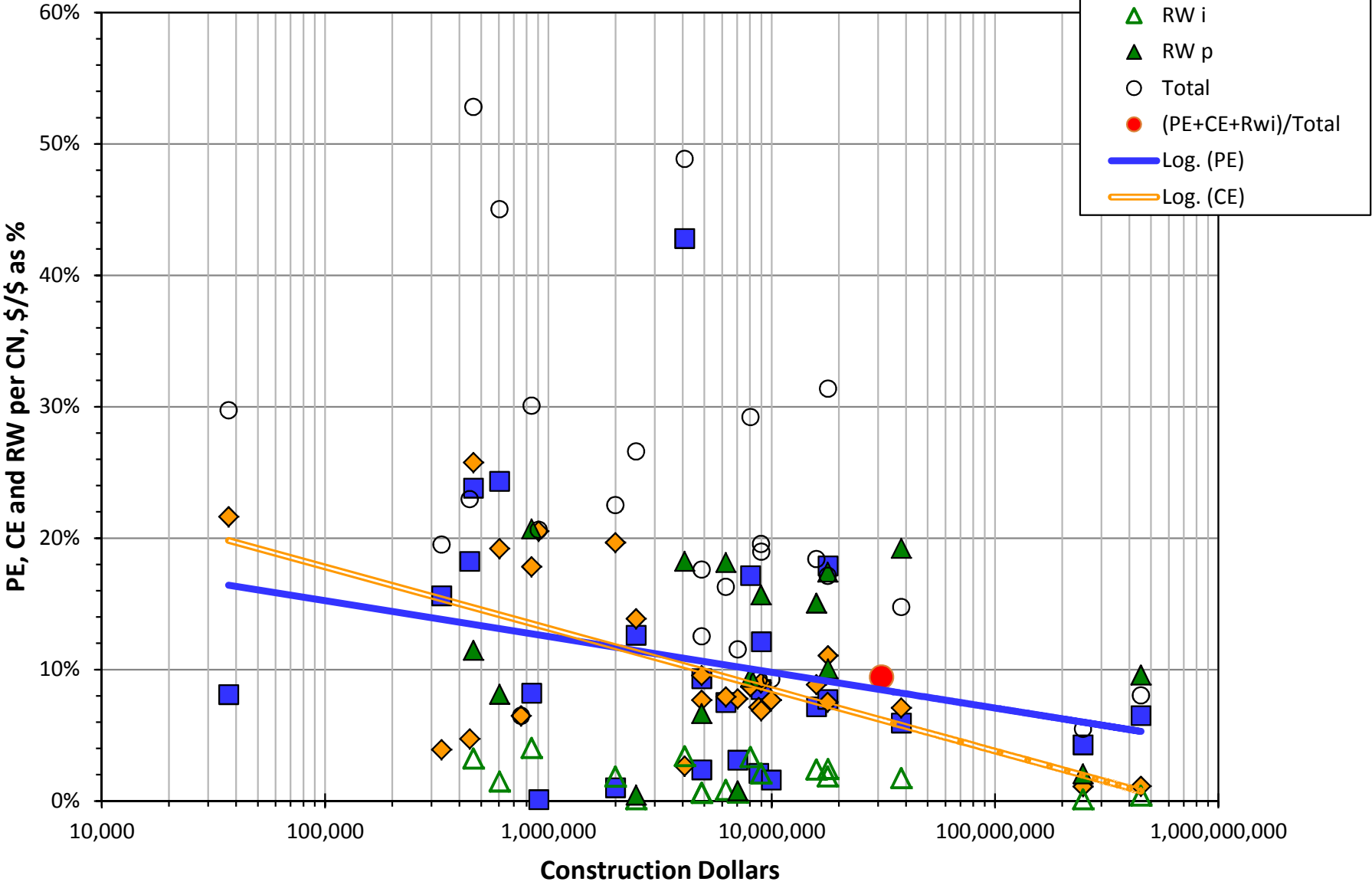


Factors for ADA Transistion

7/1/2013 to 6/30/2016

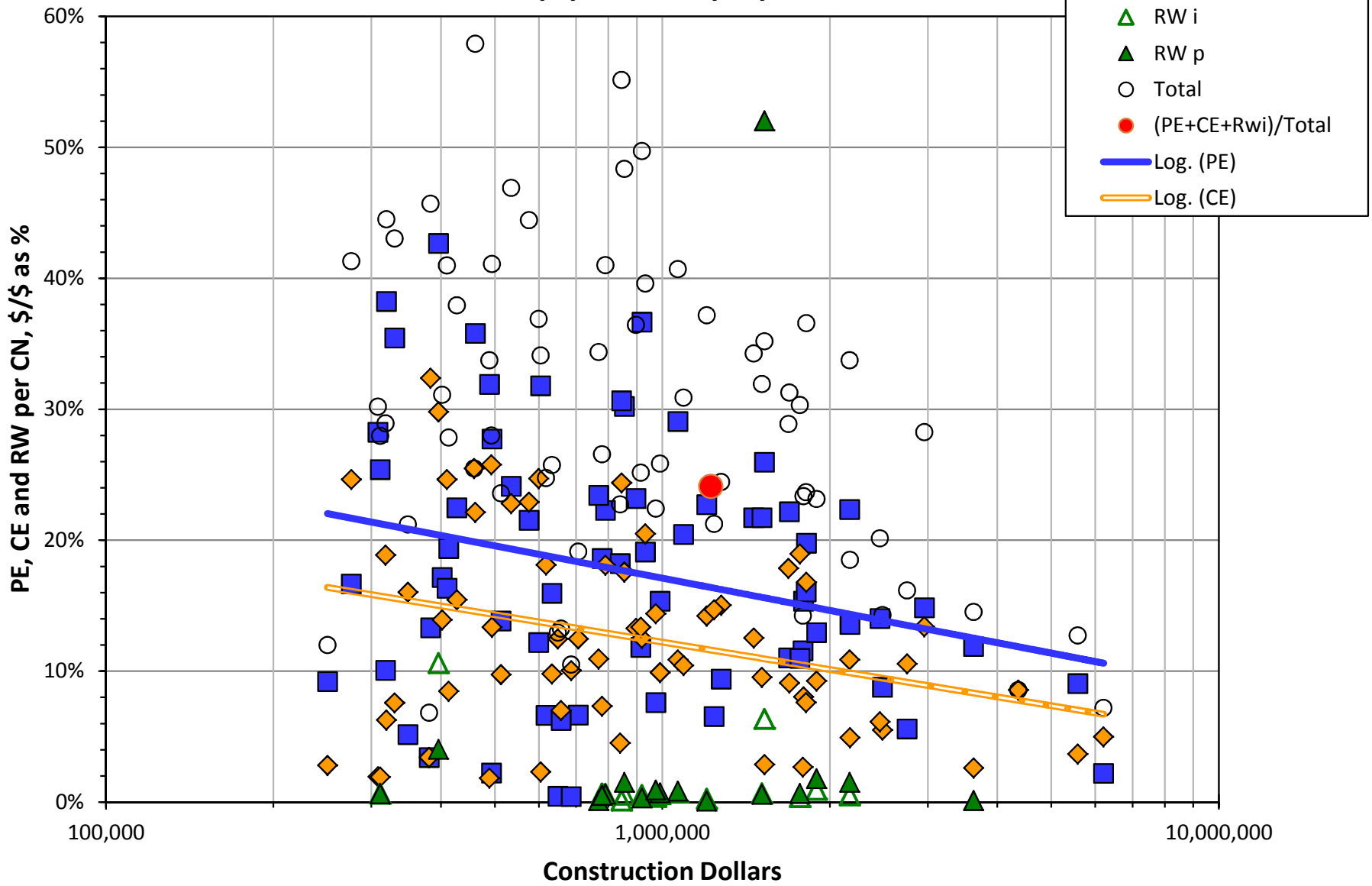


Factors for Add Lanes 7/1/2013 to 6/30/2016

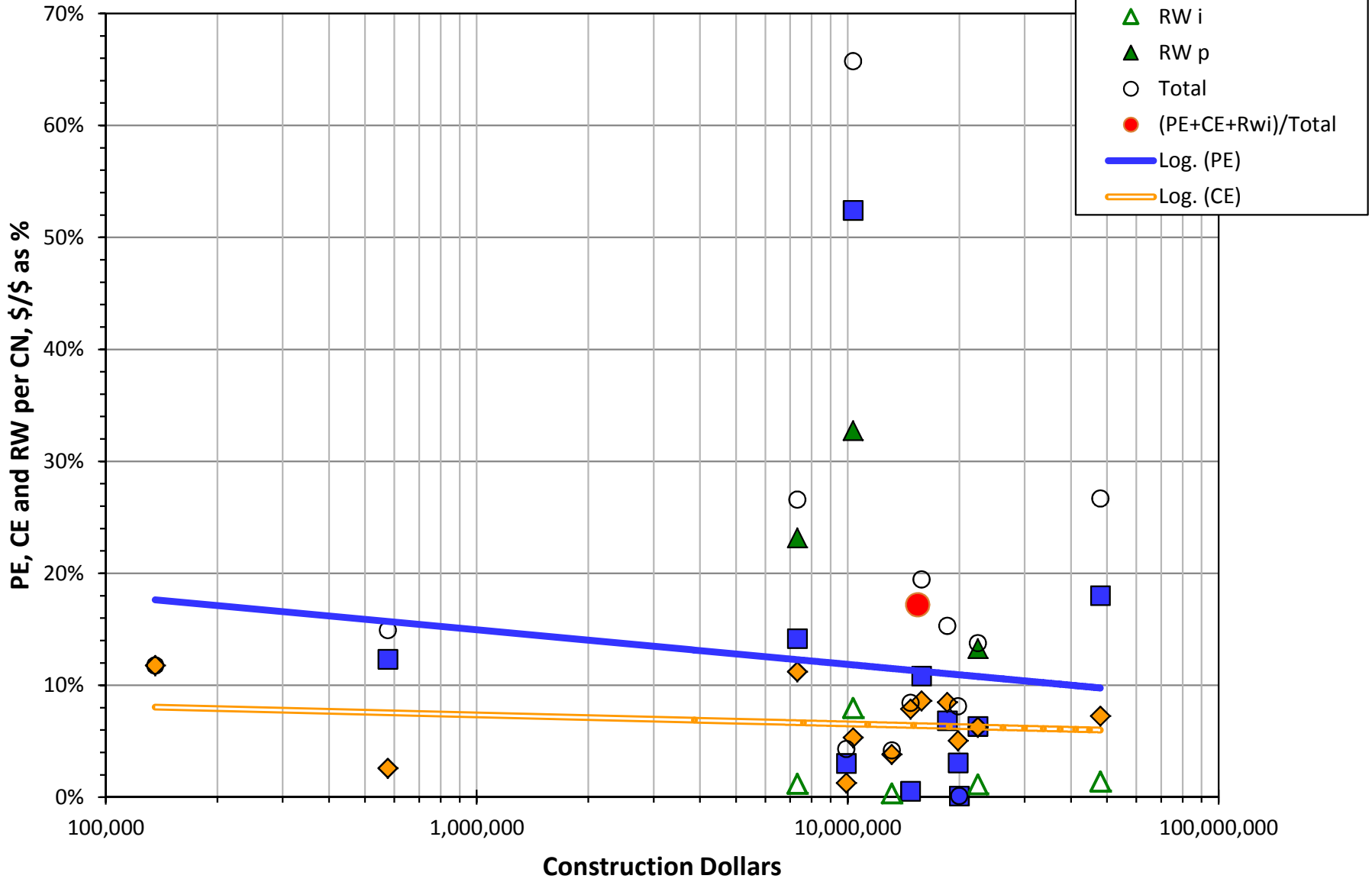


Factors for Bridge Replacement

7/1/2013 to 6/30/2016

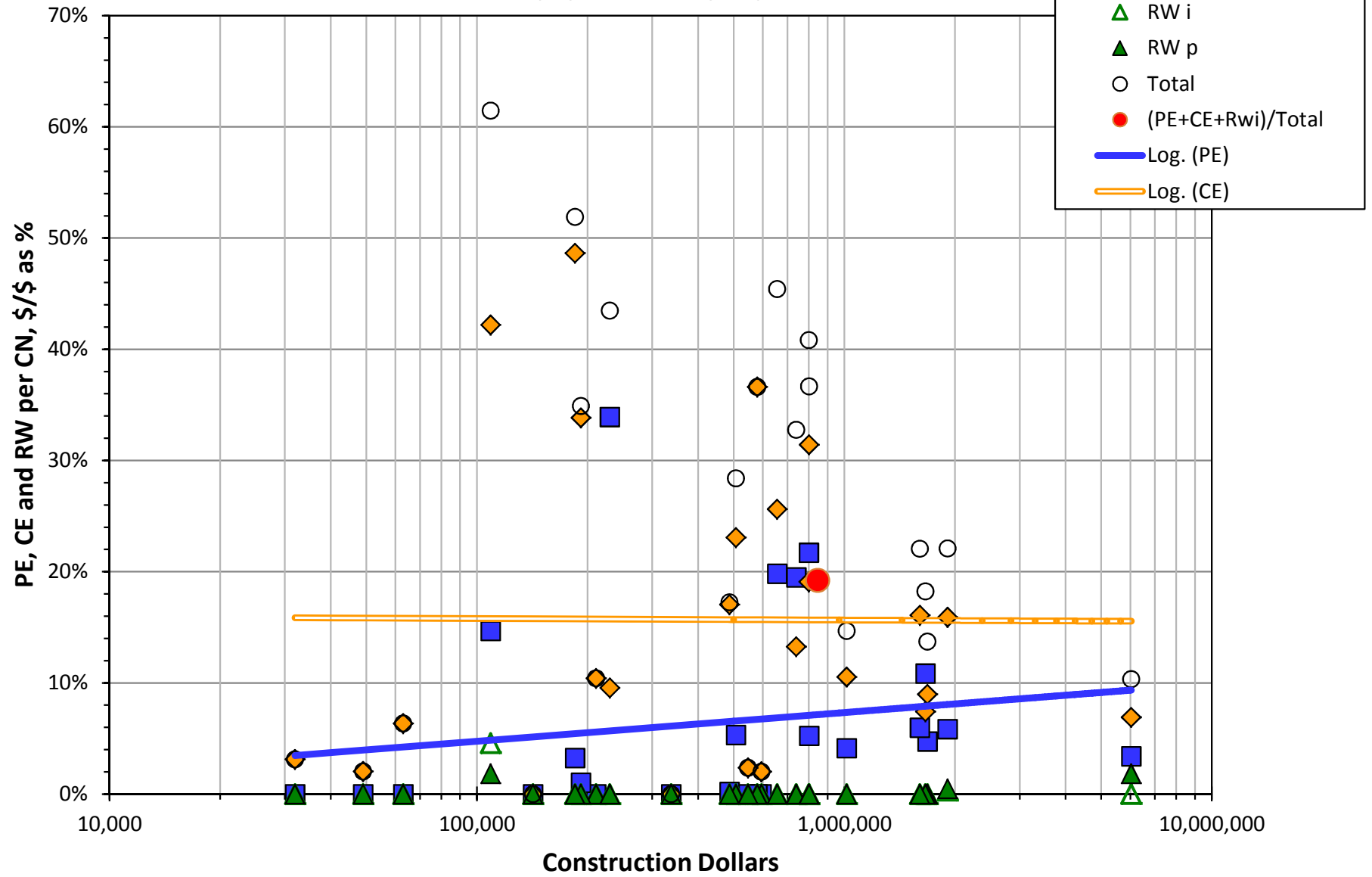


Factors for Dual Divided 7/1/2013 to 6/30/2016

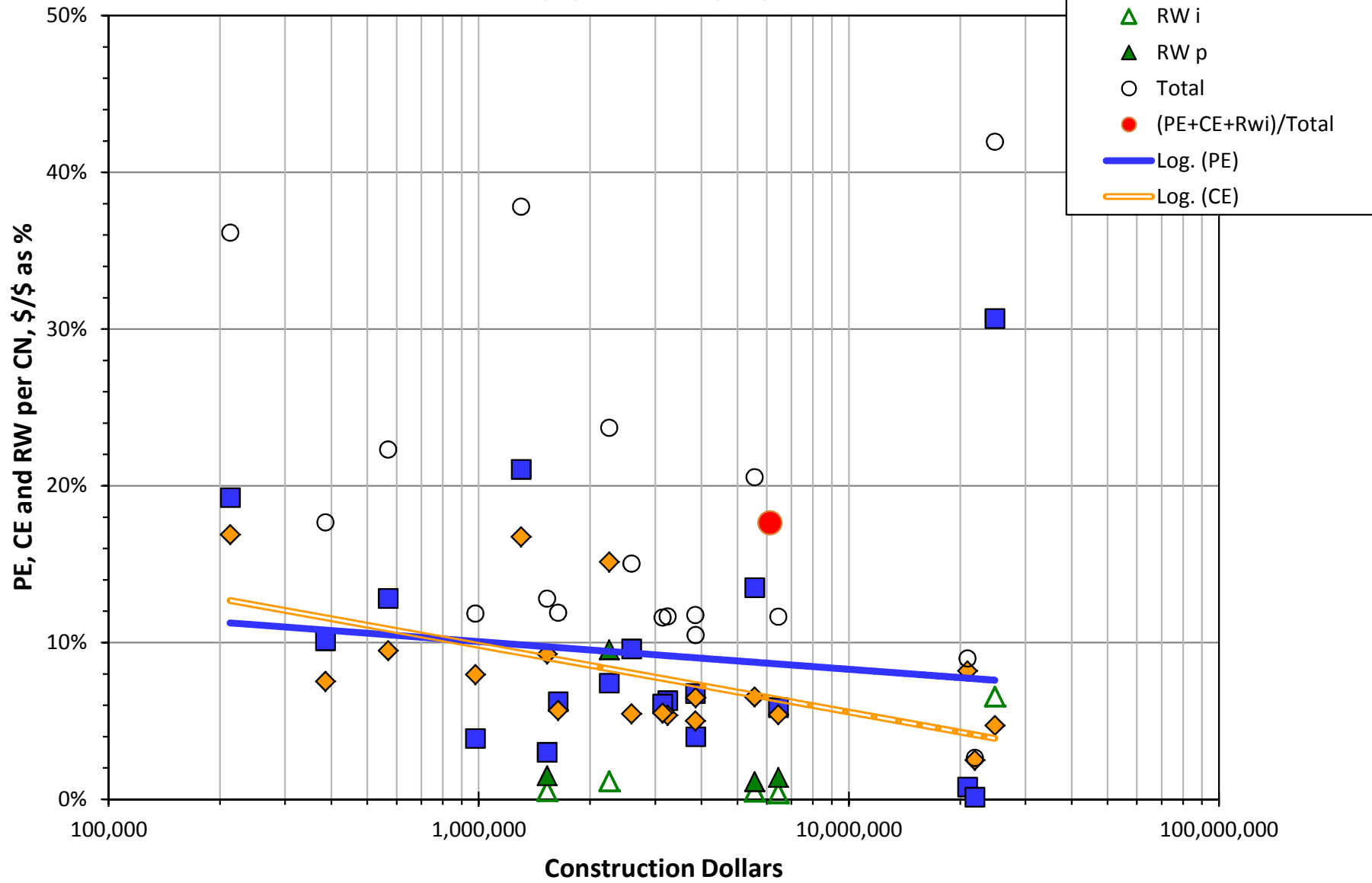


Factors for Enhancements

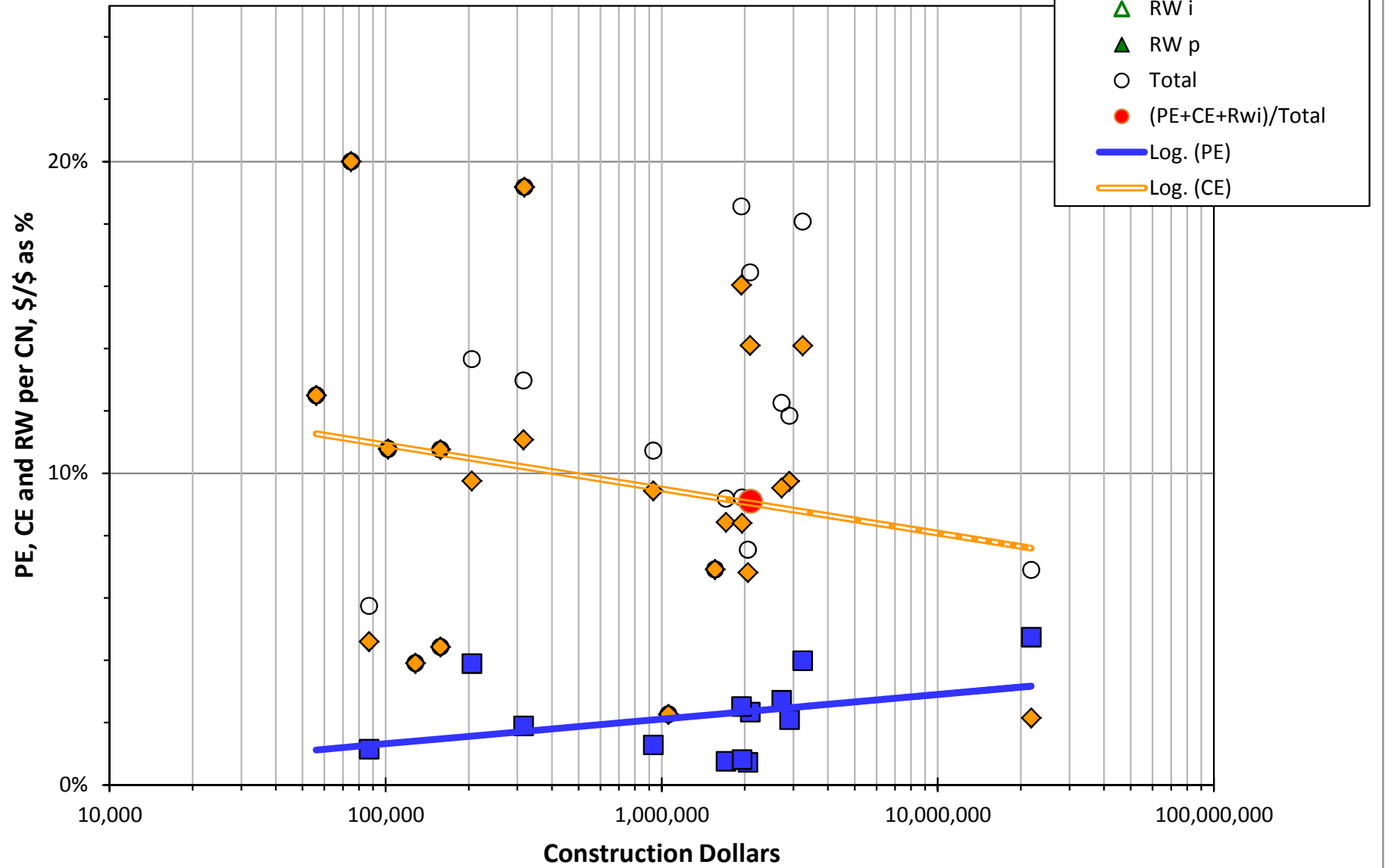
7/1/2013 to 6/30/2016



Factors for Freeway 7/1/2013 to 6/30/2016

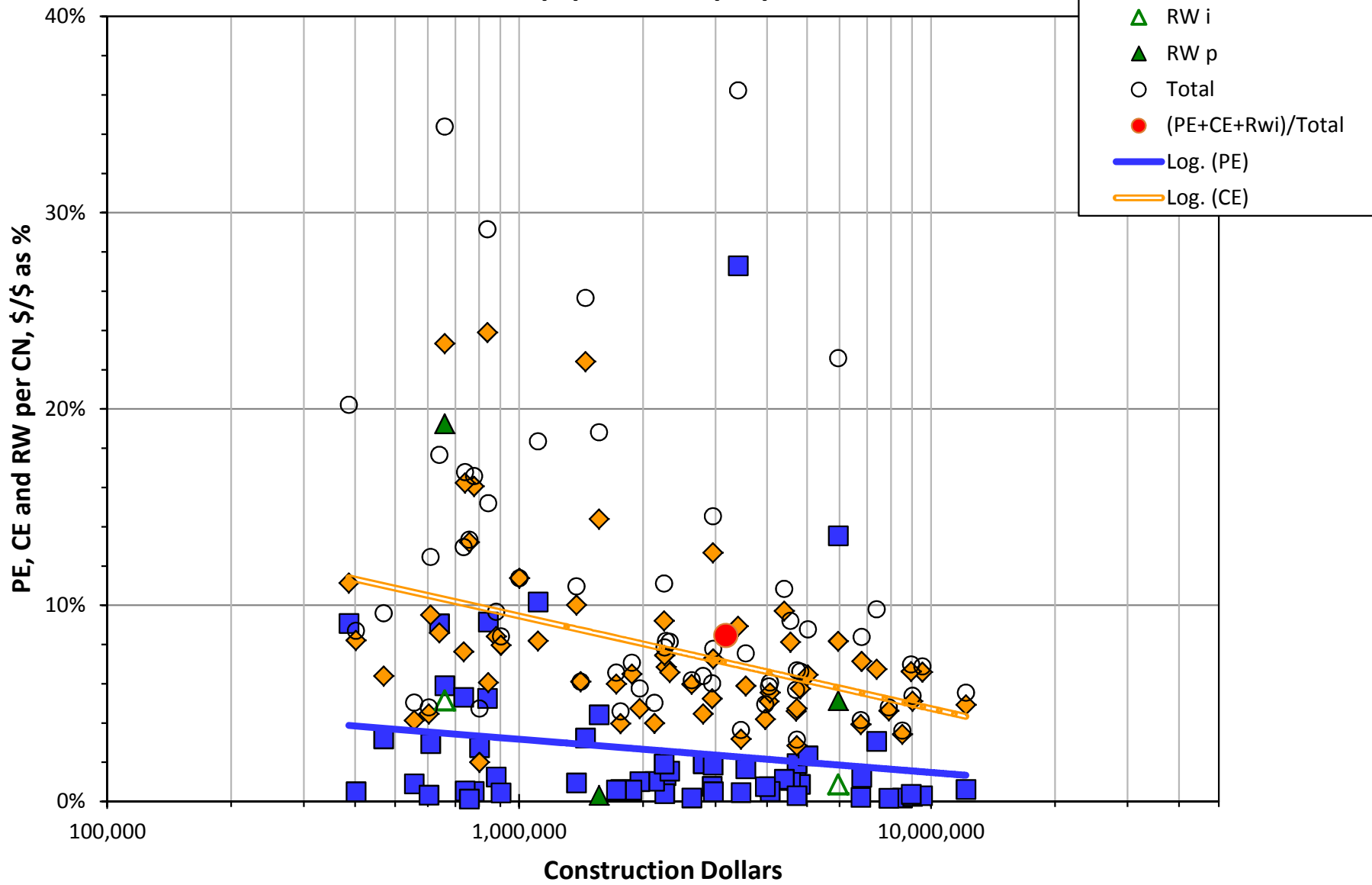


Factors for Prev Maint - Bridge 7/1/2013 to 6/30/2016



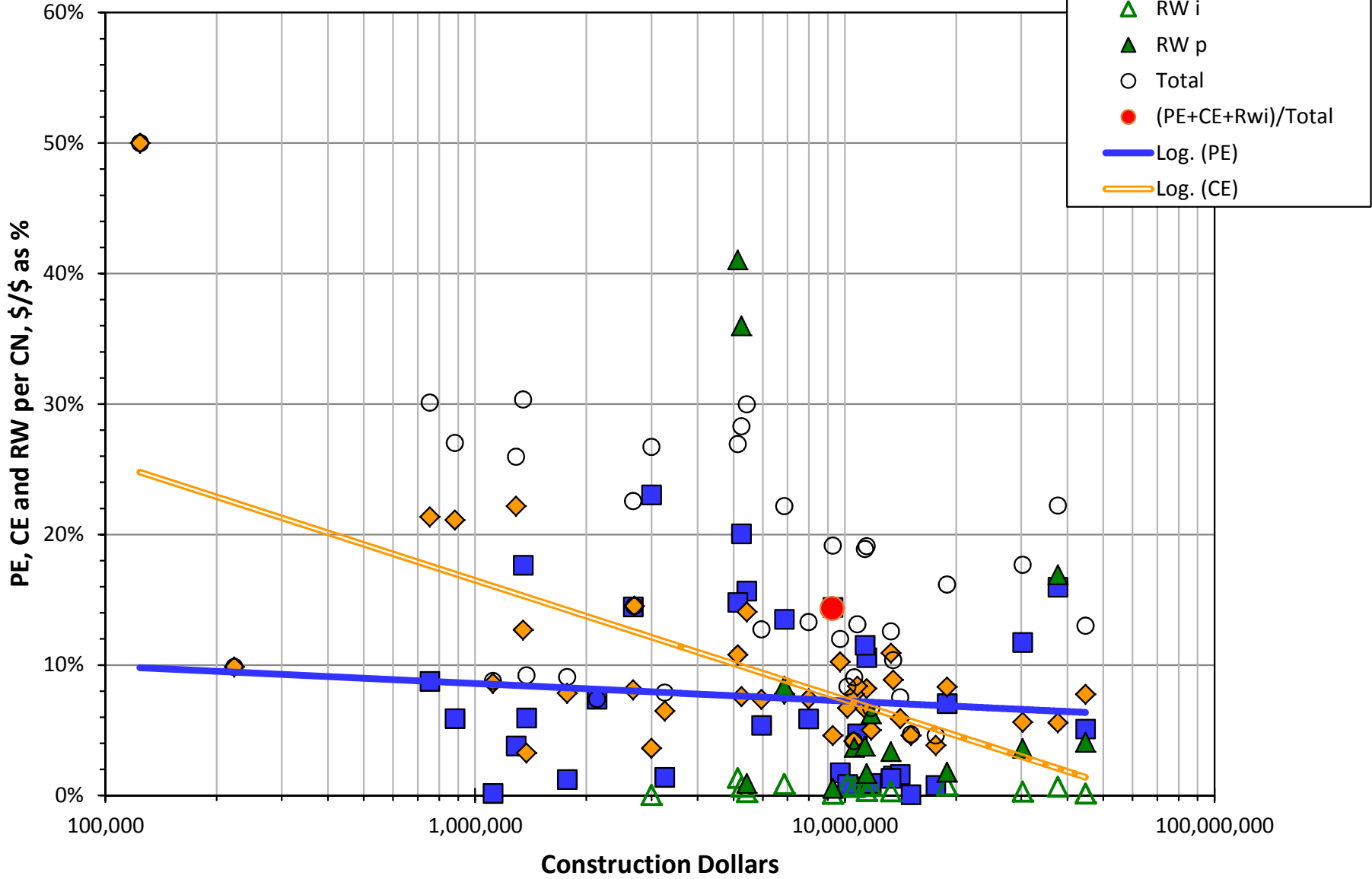
Factors for High Type Resurfacing

7/1/2013 to 6/30/2016



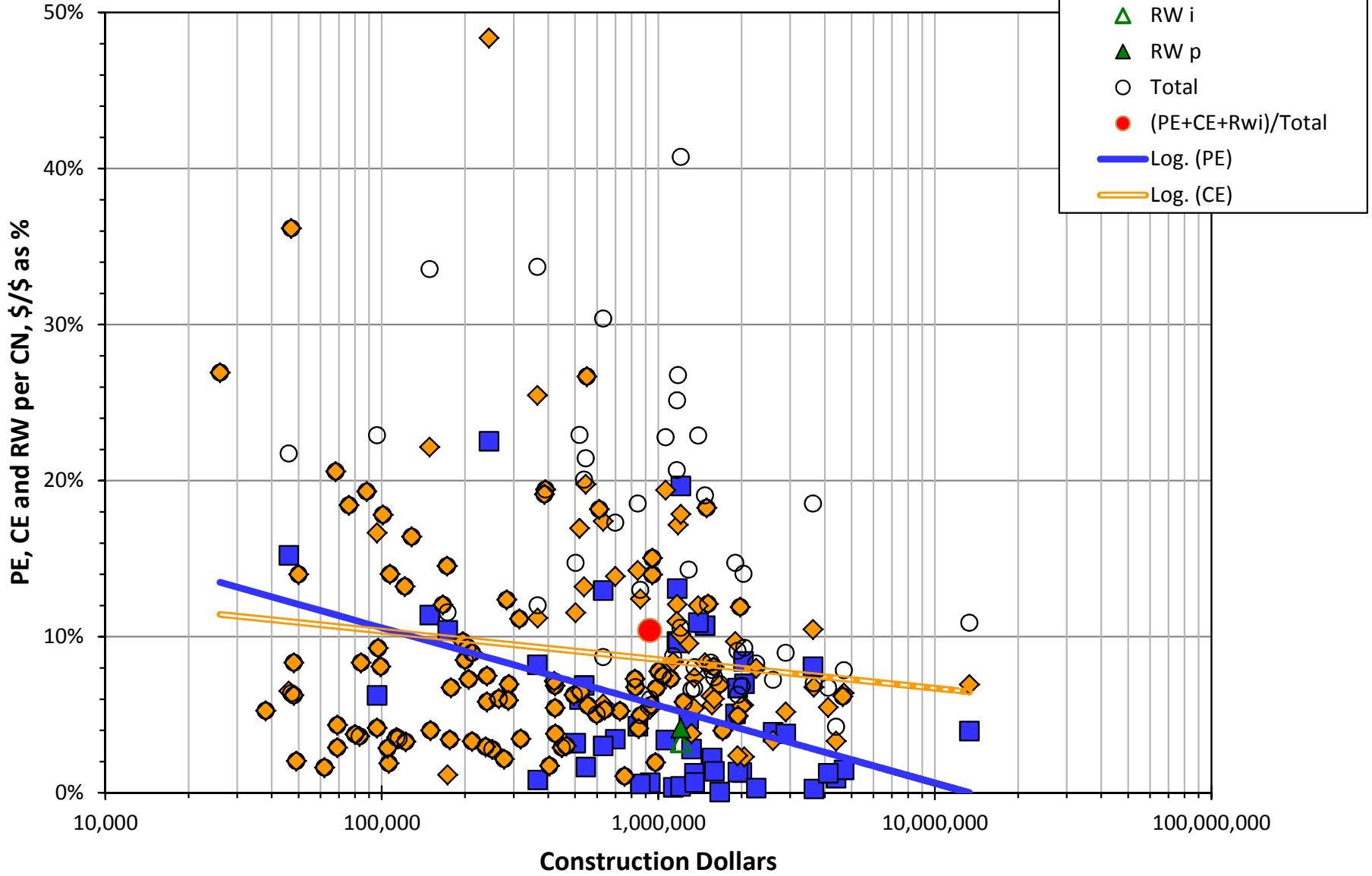
Factors for Interchange

7/1/2013 to 6/30/2016

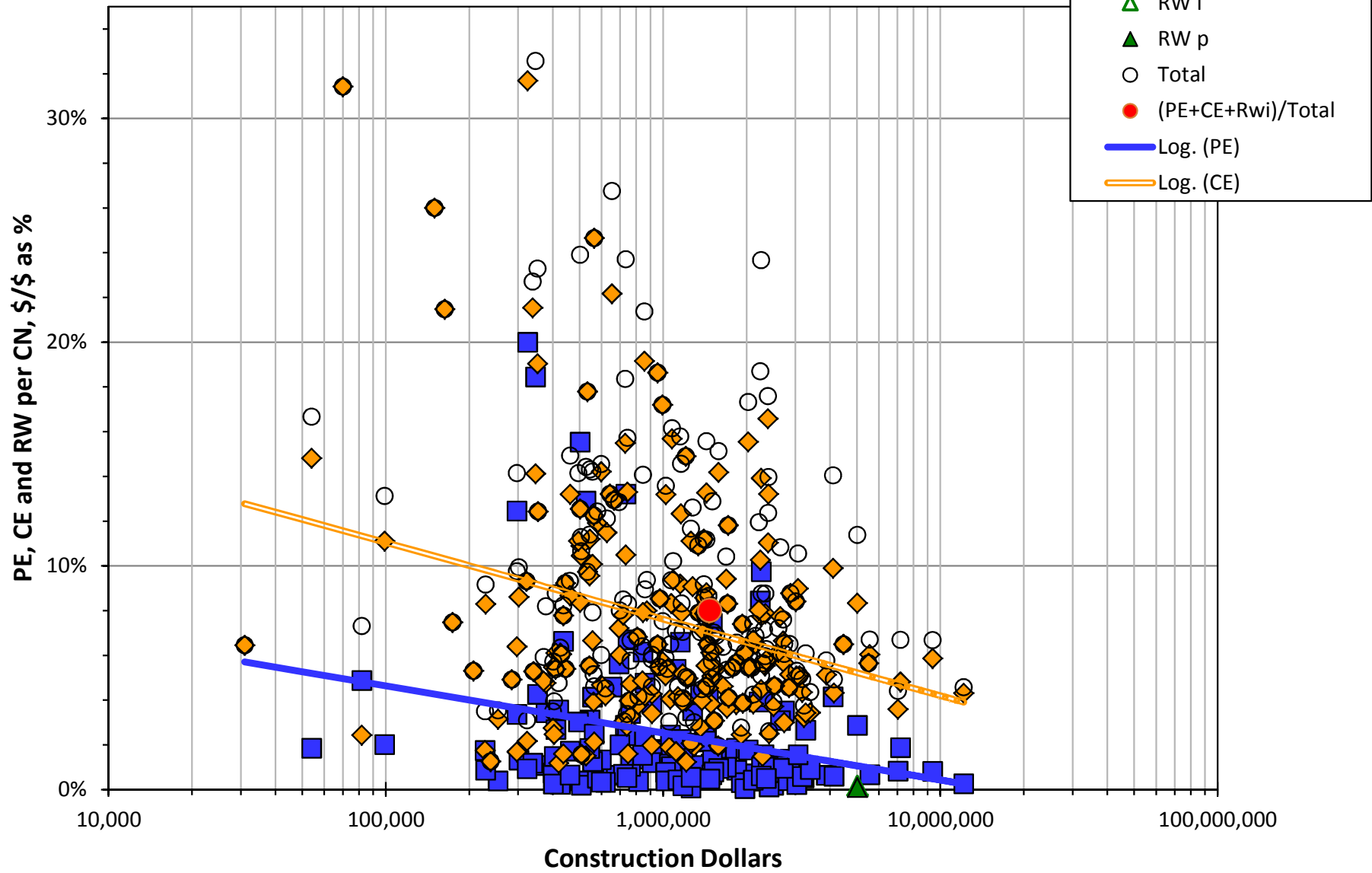


Factors for Prev Maint - Pavement

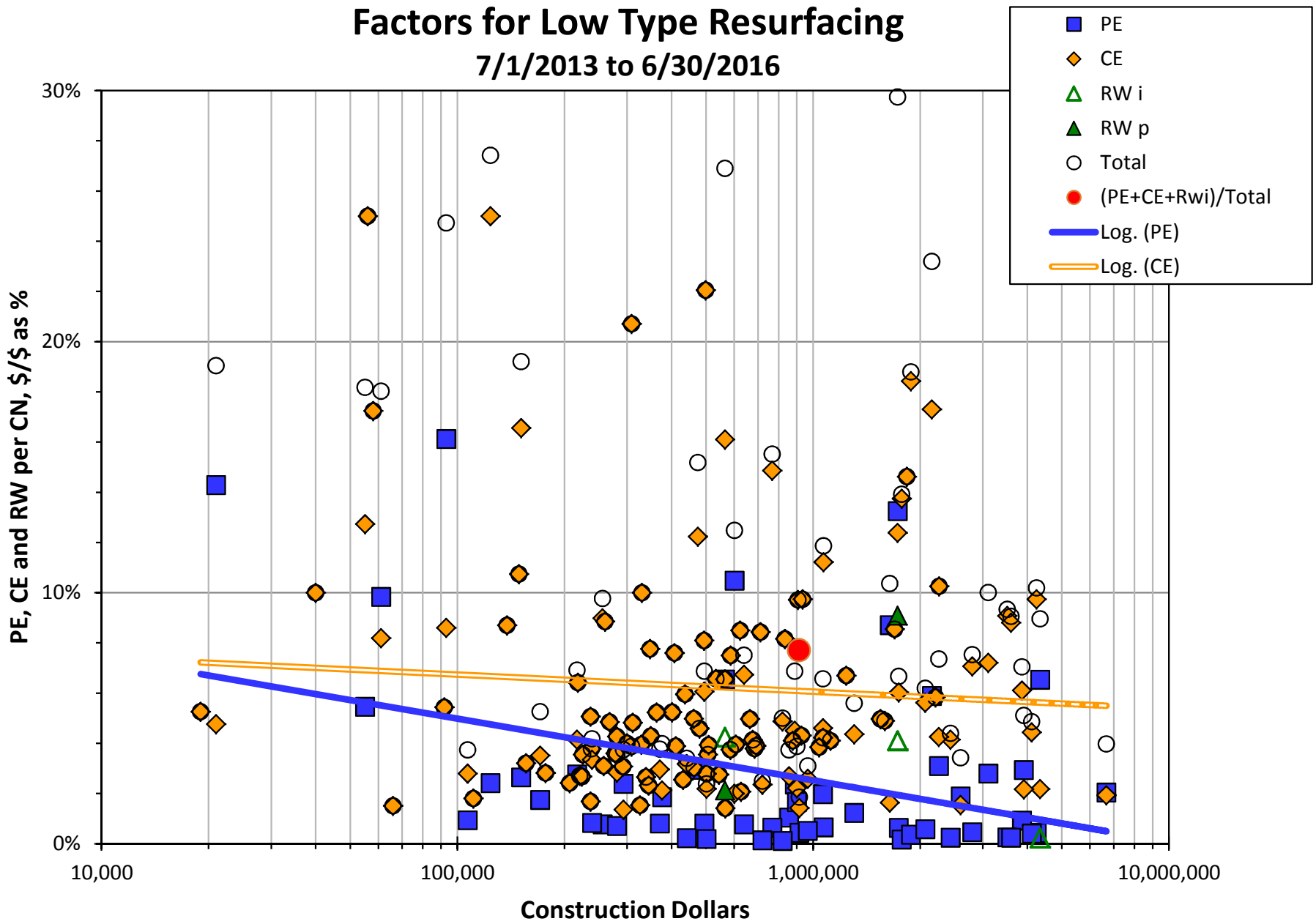
7/1/2013 to 6/30/2016



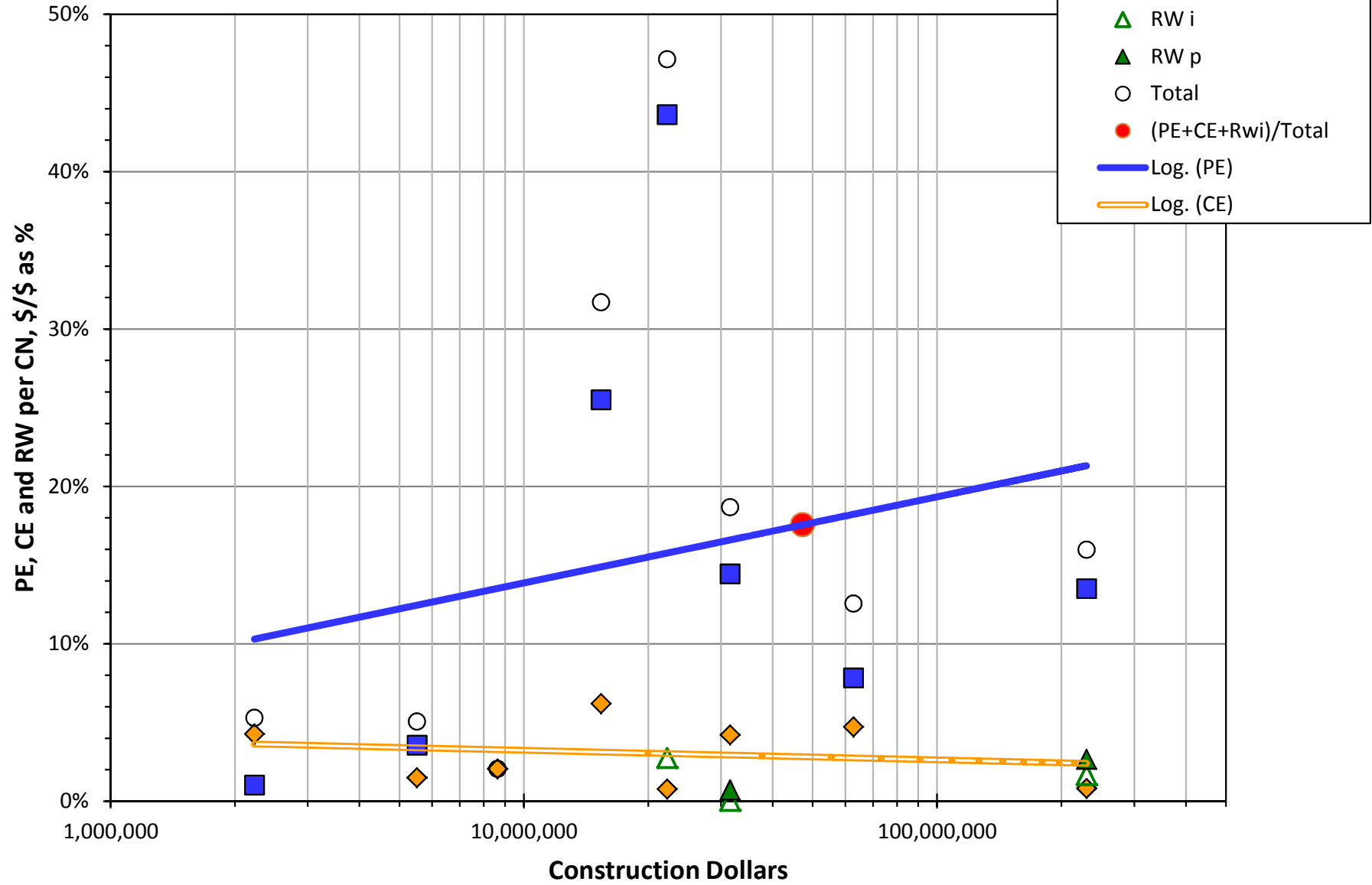
Factors for Med Type Resurfacing 7/1/2013 to 6/30/2016



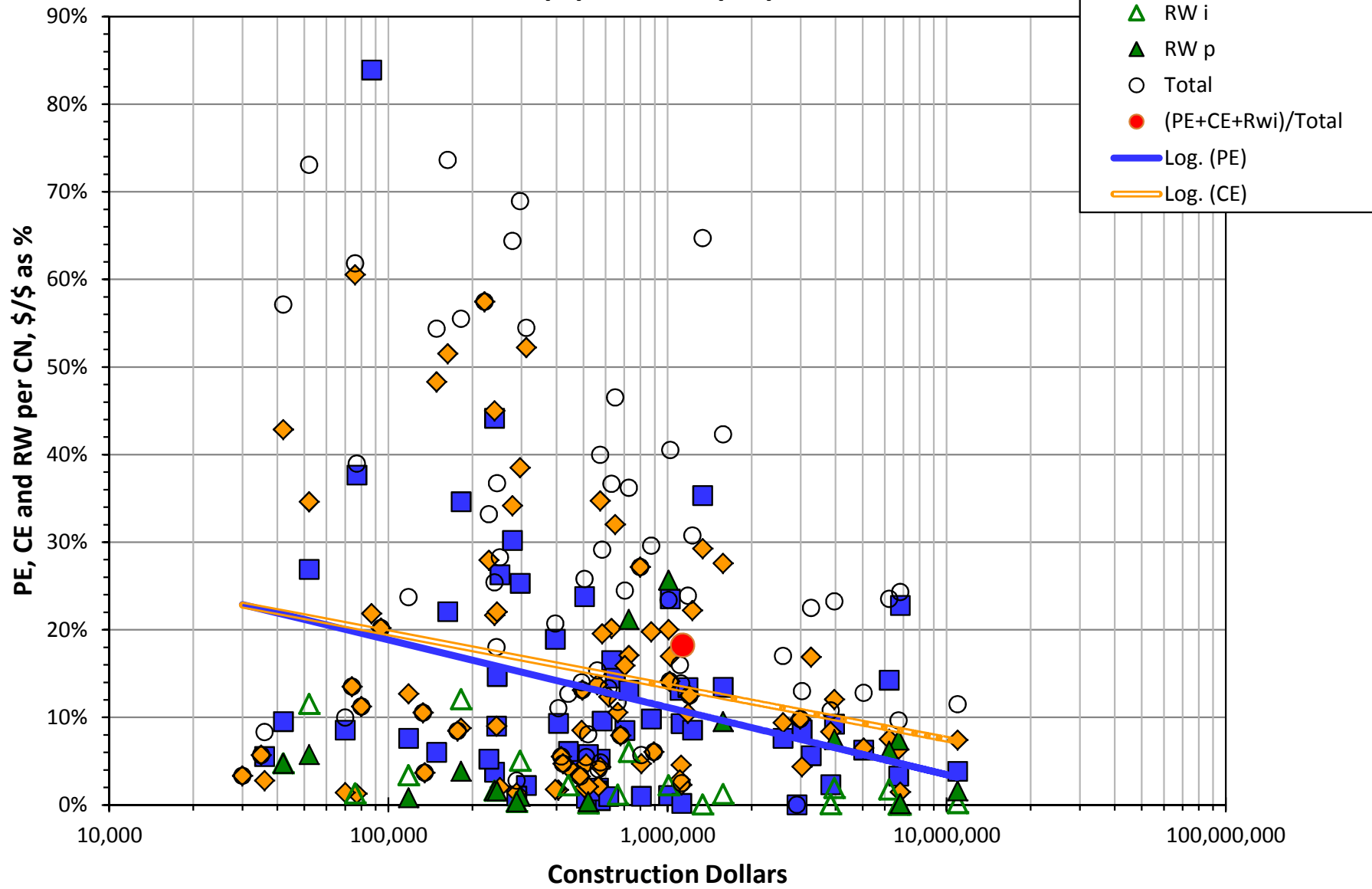
Factors for Low Type Resurfacing 7/1/2013 to 6/30/2016



Factors for Major Bridge 7/1/2013 to 6/30/2016

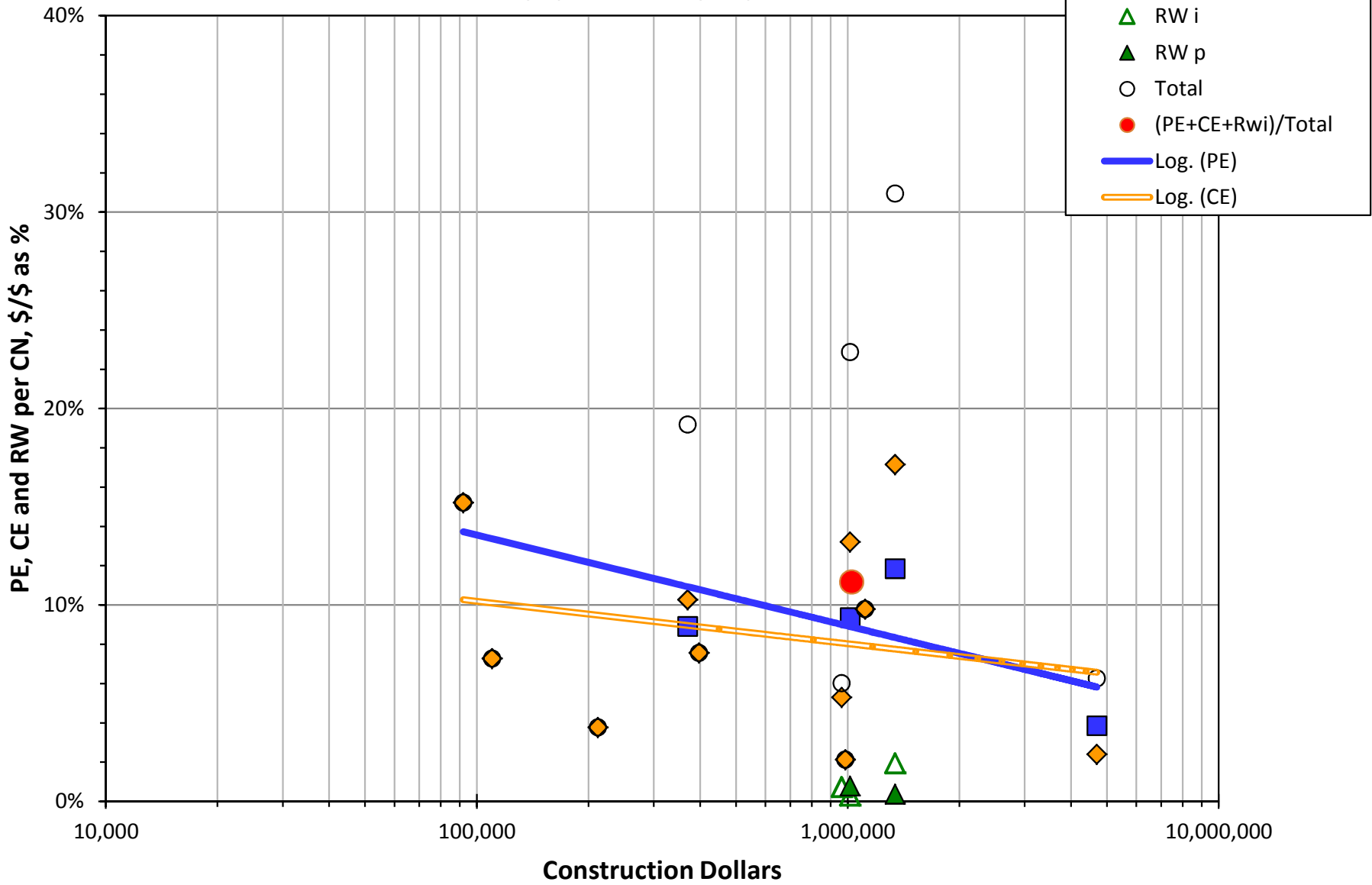


Factors for Other 7/1/2013 to 6/30/2016

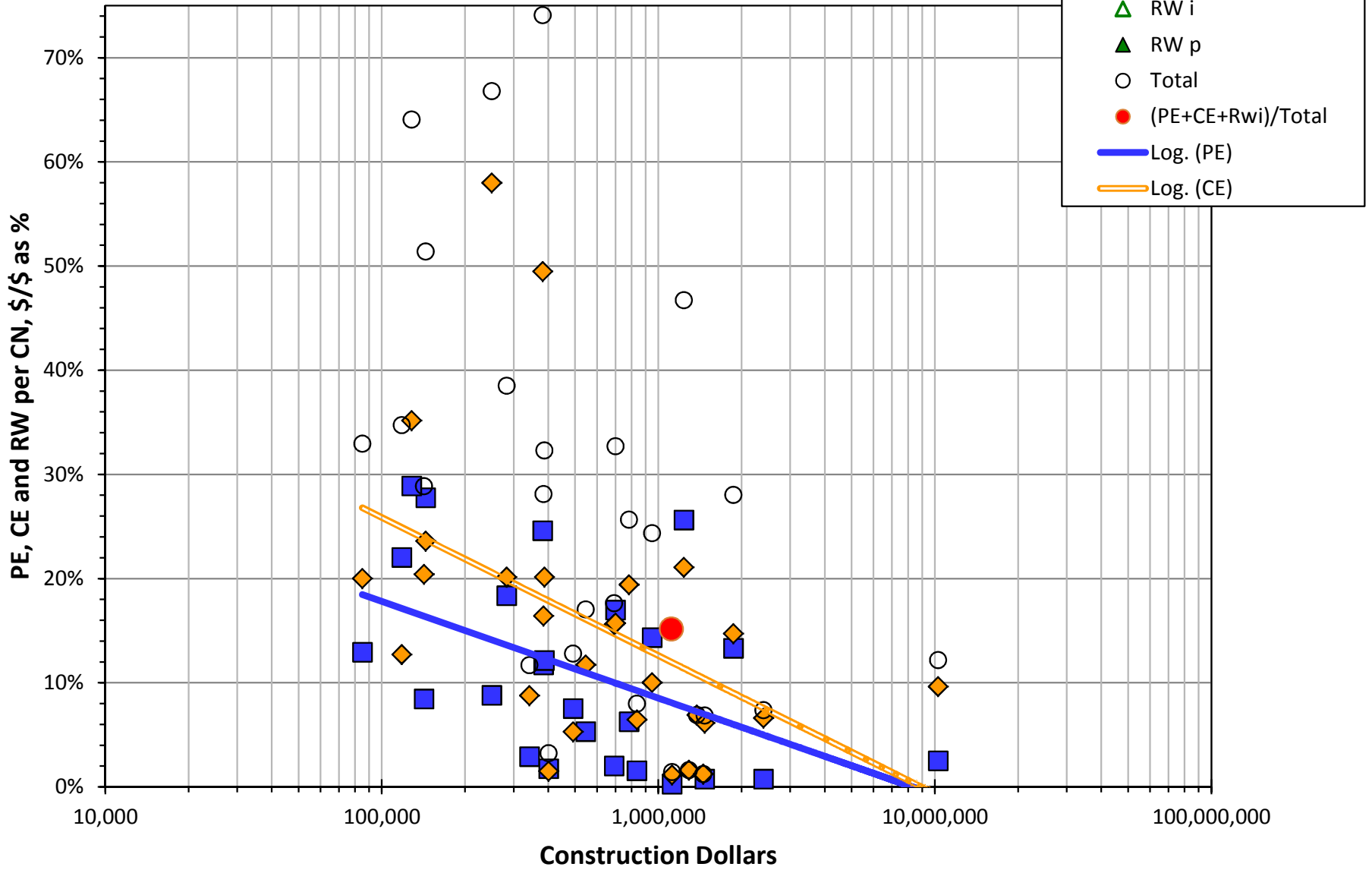


Factors for Pavement Replacement

7/1/2013 to 6/30/2016

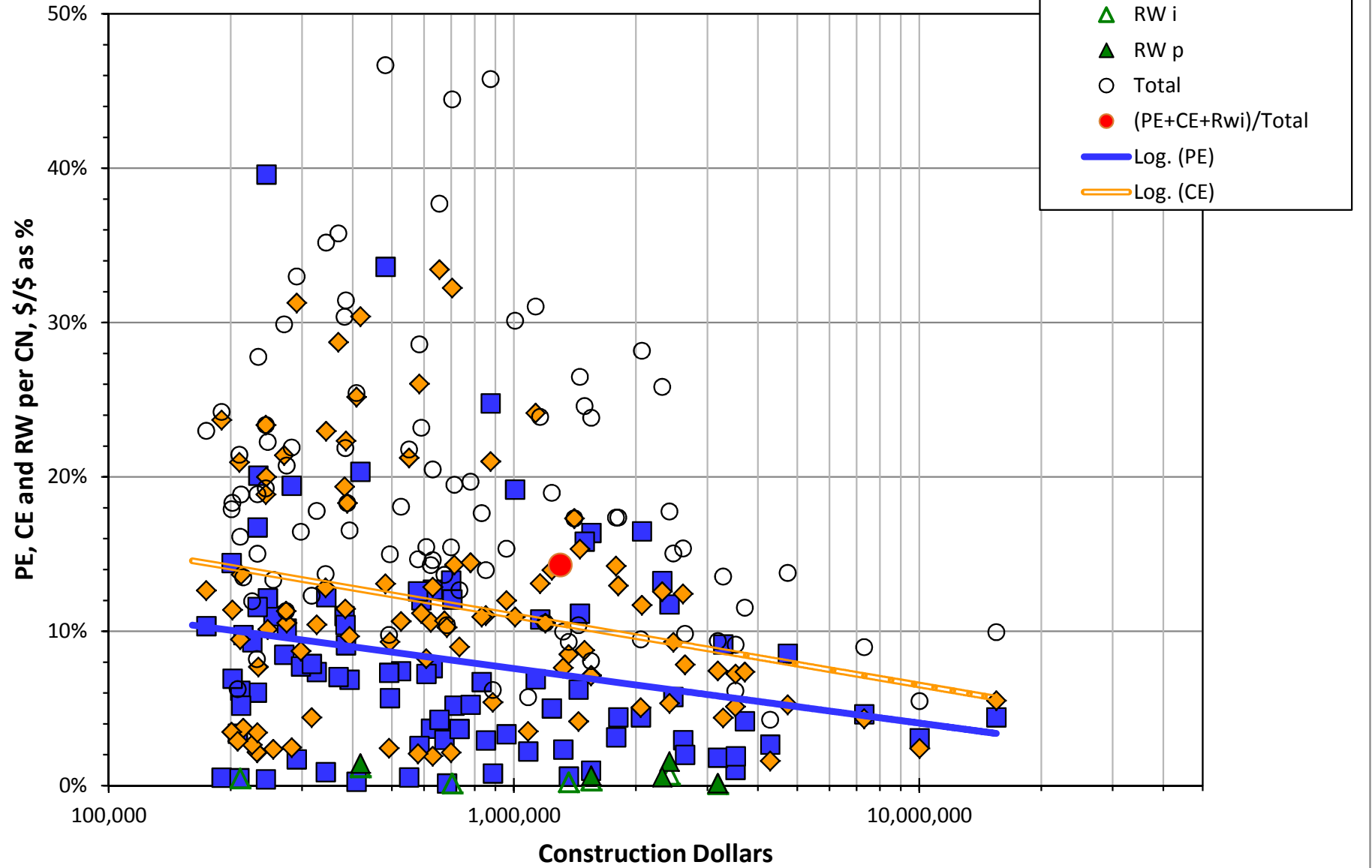


Factors for CMAQ 7/1/2013 to 6/30/2016



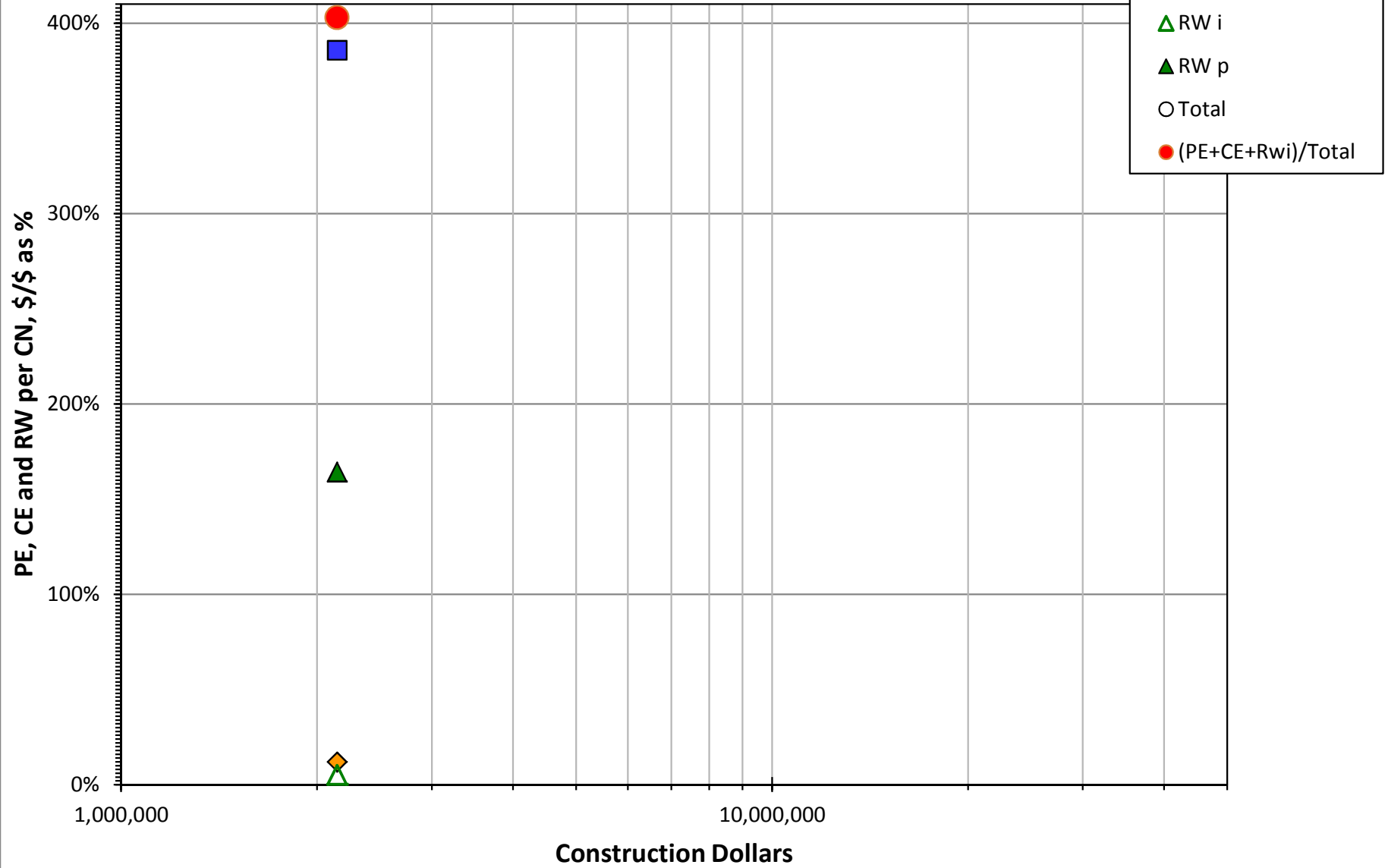
Factors for Bridge Rehabilitation

7/1/2013 to 6/30/2016

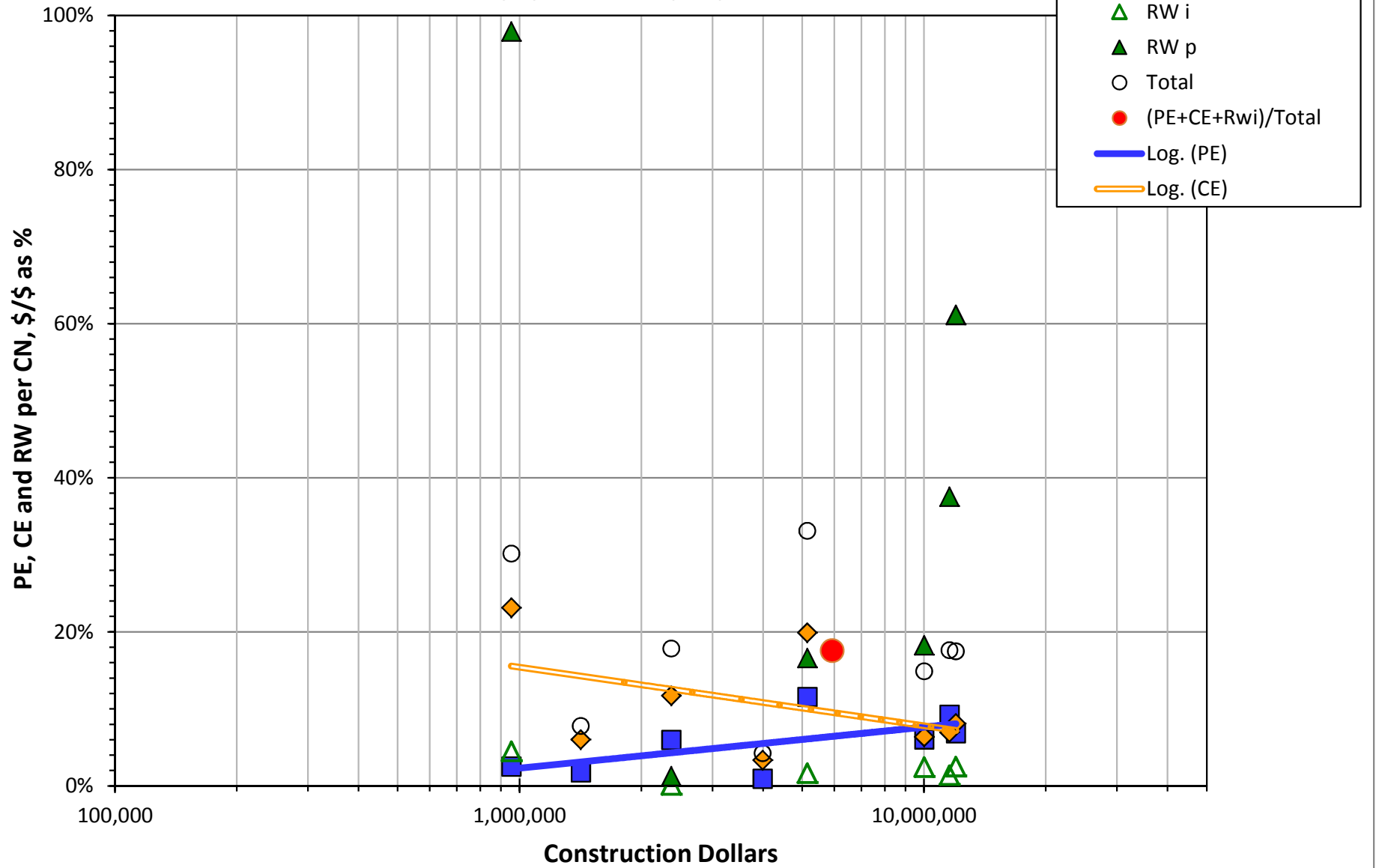


Factors for Bridge Retrofit and Strengthening

7/1/2013 to 6/30/2016

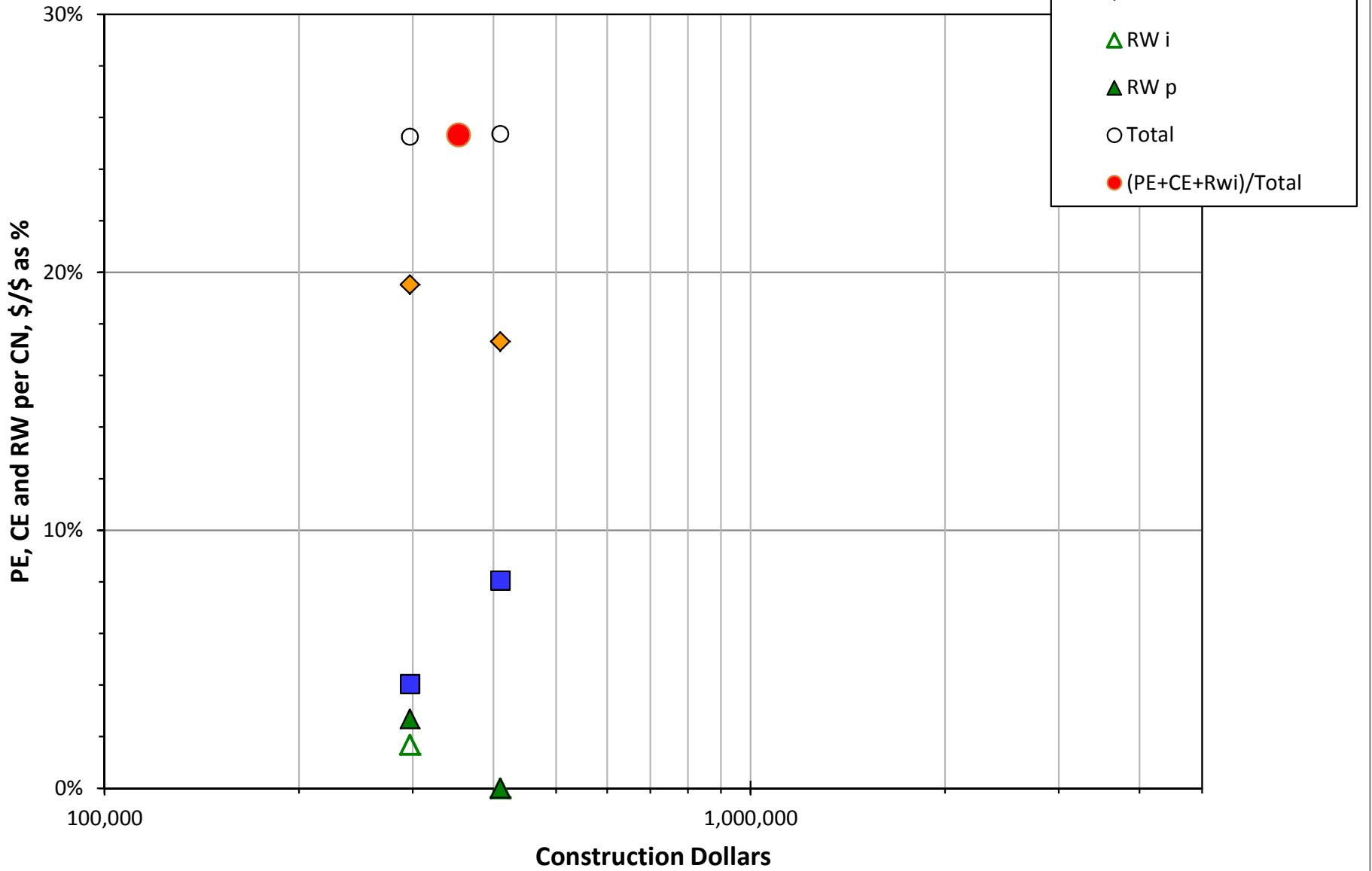


Factors for New or Improved 2 Lane 7/1/2013 to 6/30/2016



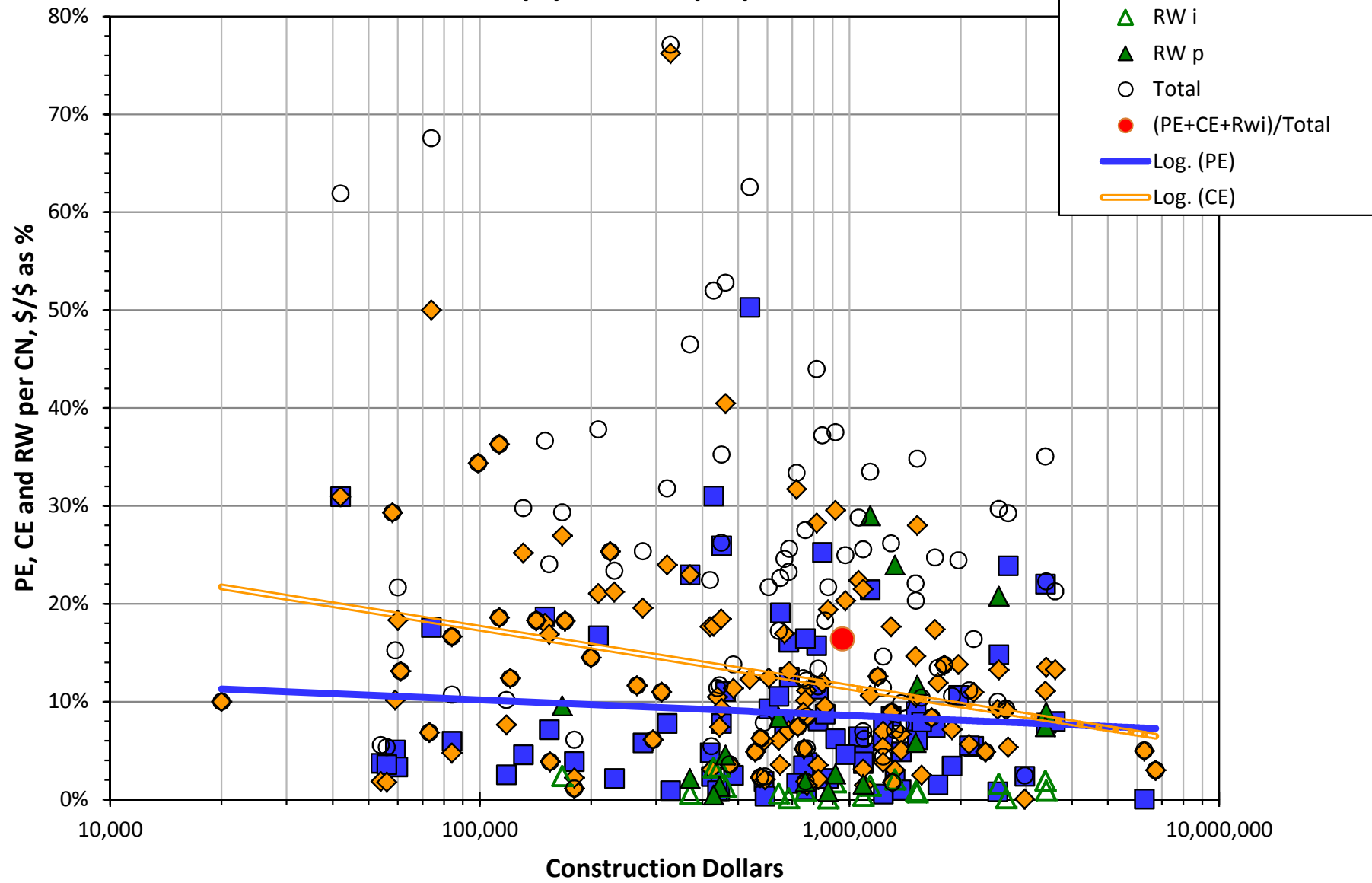
Factors for Shoulder Widening

7/1/2013 to 6/30/2016



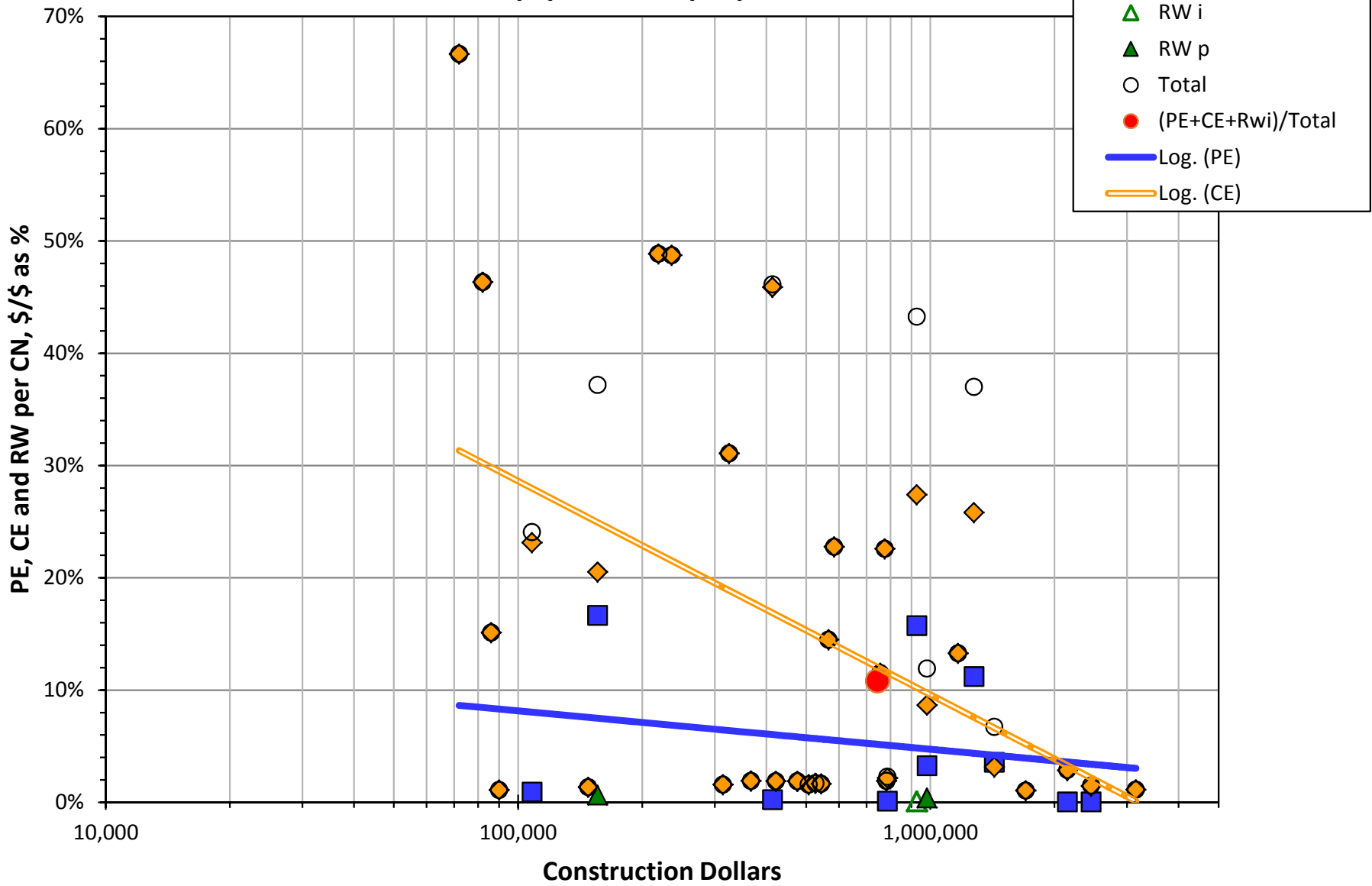
Factors for Safety

7/1/2013 to 6/30/2016



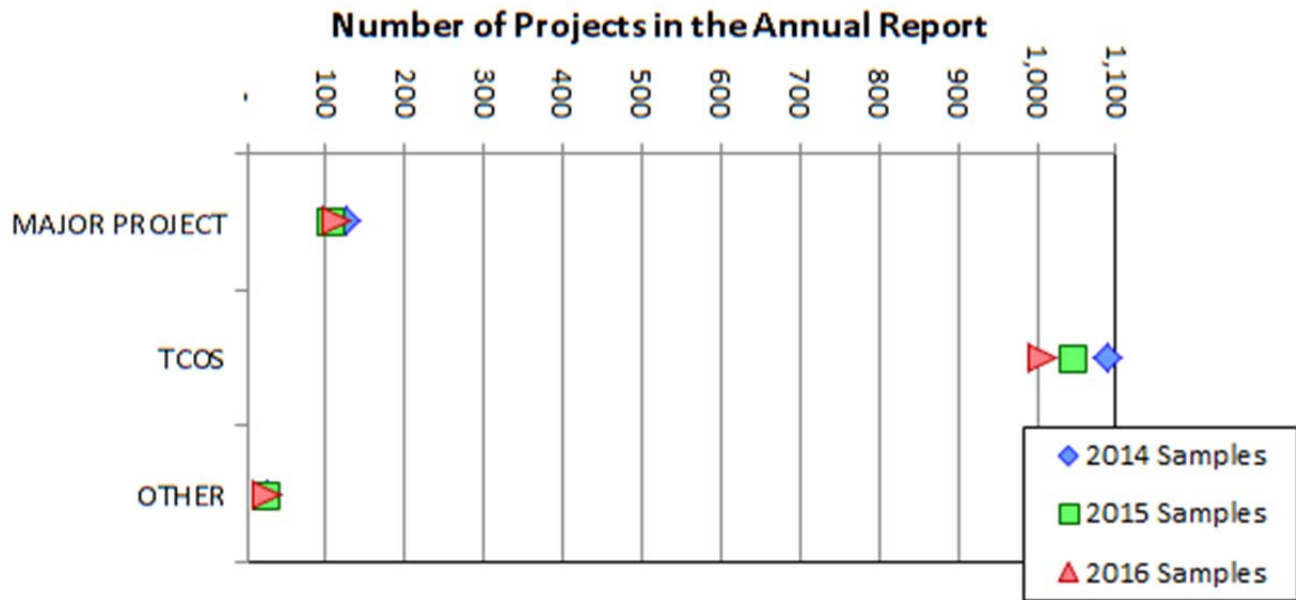
Factors for Routine Maintenance

7/1/2013 to 6/30/2016

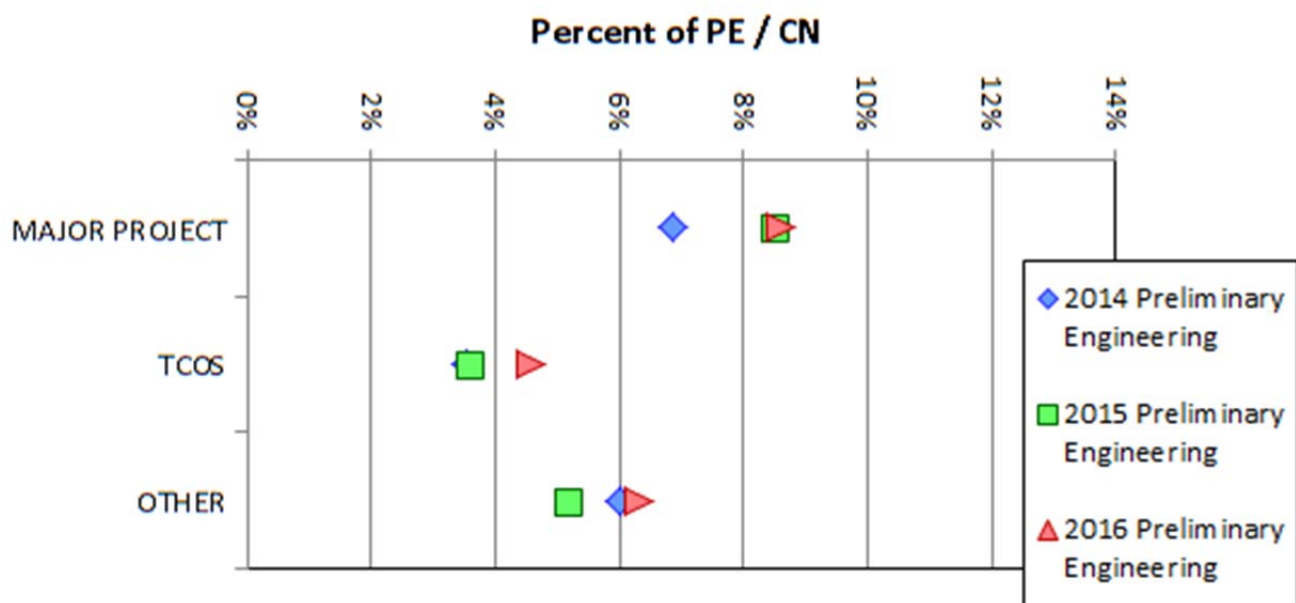


Three Year Engineering Factors, SFY 2016 Report Appendix: Comparison of Multi-Year Reports

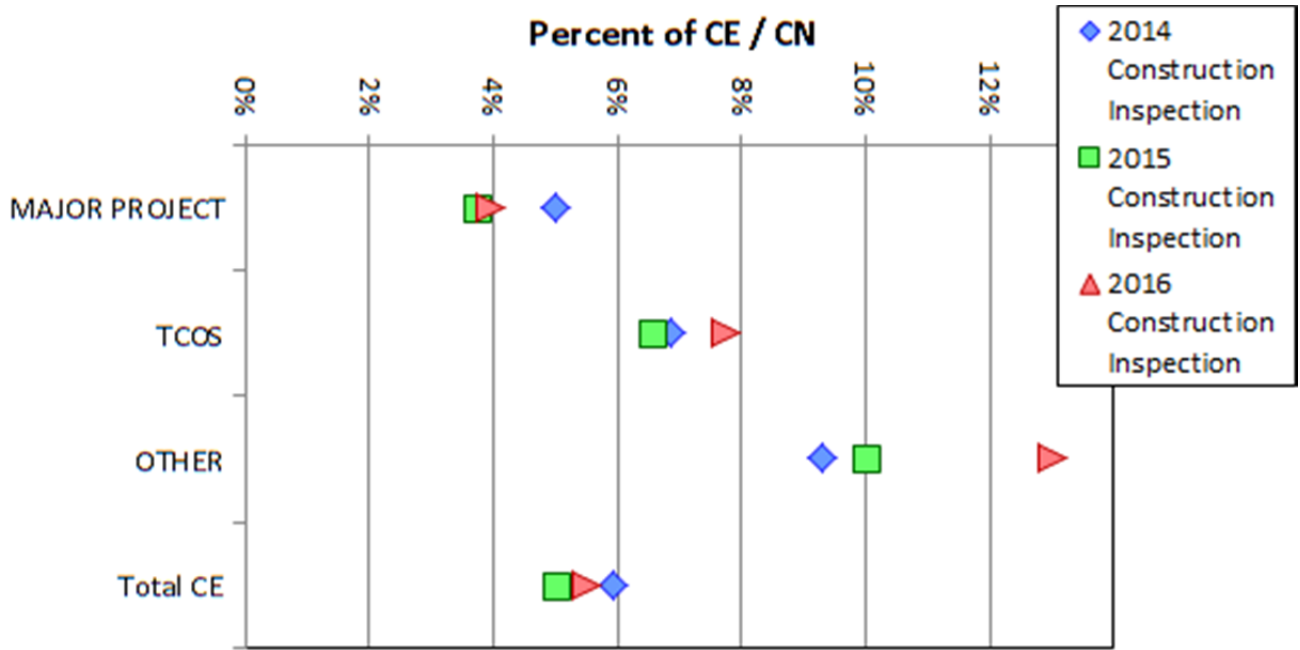
The following compares Engineering Factors data for the last three reports. Each report includes the previous three years of data, so that each report includes some data overlapping previous reports. The 'year' indicated in each case is the year of the report. Thus, the "2016 Samples" are number of projects in State Fiscal Years 2014 to 2016. The purpose of this comparison is to check on consistency between multiple years. Projects are classified by work type and then grouped into three categories. These first graphs report on categories, and later graphs focus on work types.



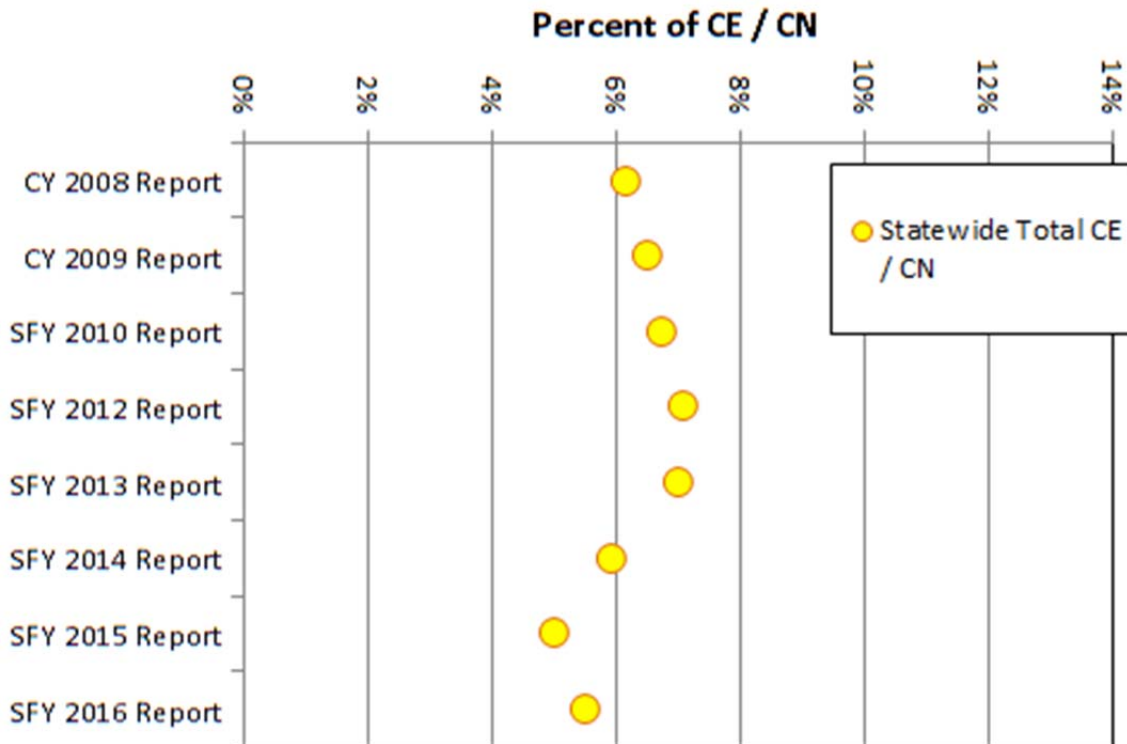
The first graph shows statewide number of projects (samples sizes) in each year's report. A group with more samples (projects) is likely to produce better average values. For instance, the 'Other' category has about 25 samples per year. If one of them has unusual engineering costs, it will affect the group more than one out of a hundred or thousand samples in the other groups.



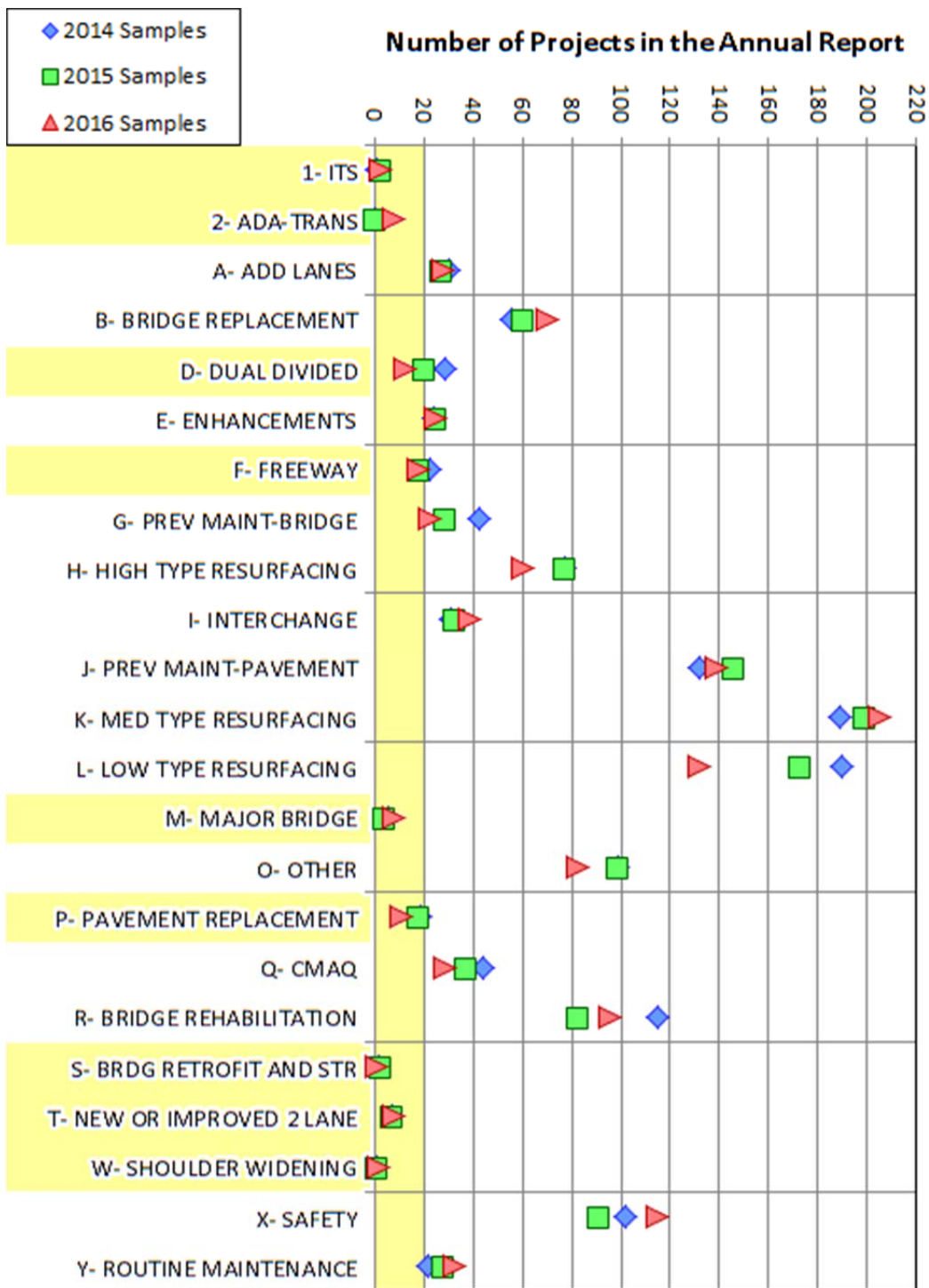
The second graph shows Preliminary Engineering (PE) per Construction (CN) has varied by about 2%, per report.



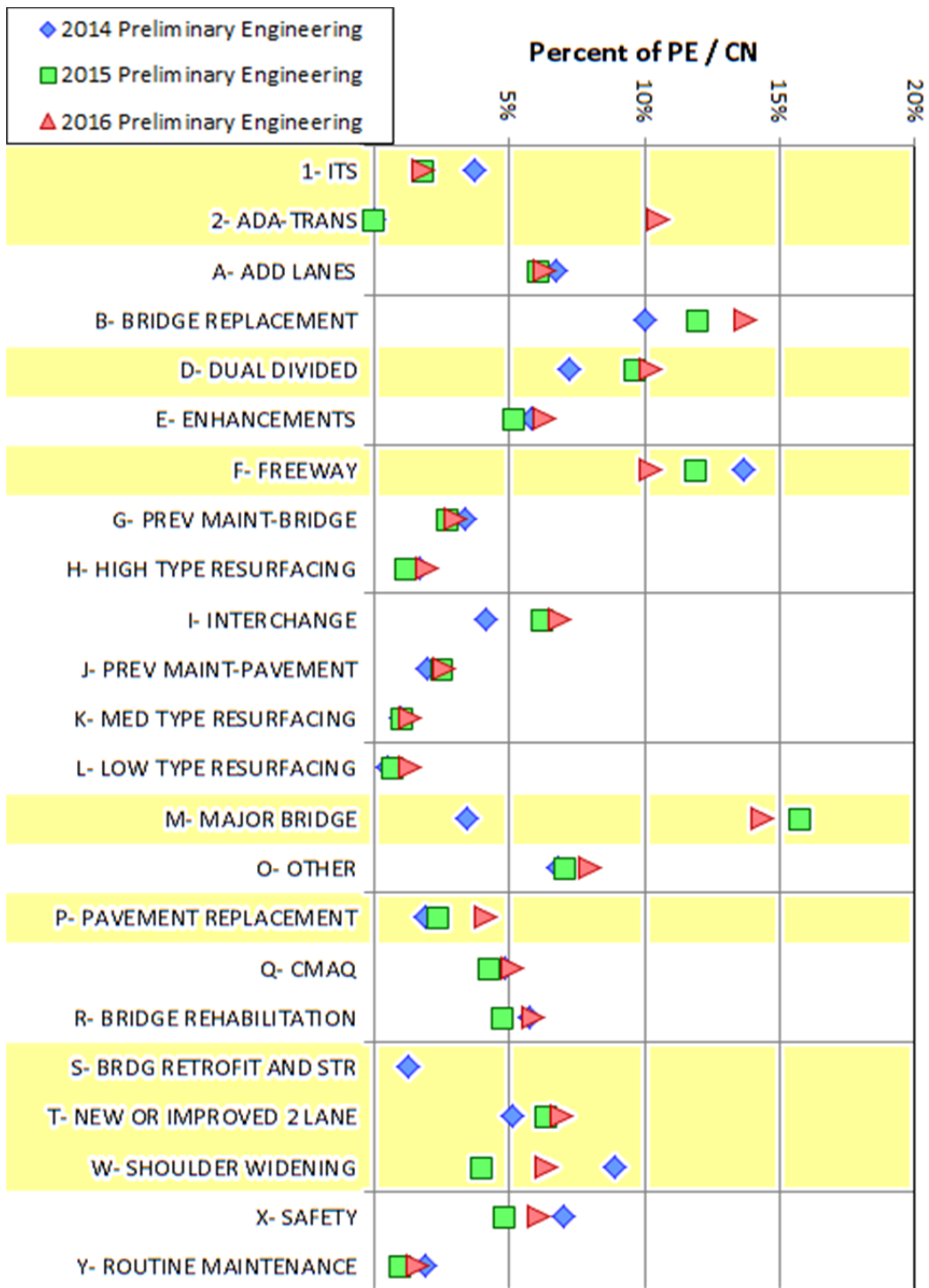
The third graph shows Construction Engineering (CE) per Construction (CN) has varied by about 2% per report, except the 'Other' category is up by about 3% with this year's report. In Total, CE has been 5% to 6% of CN in the last three reports.



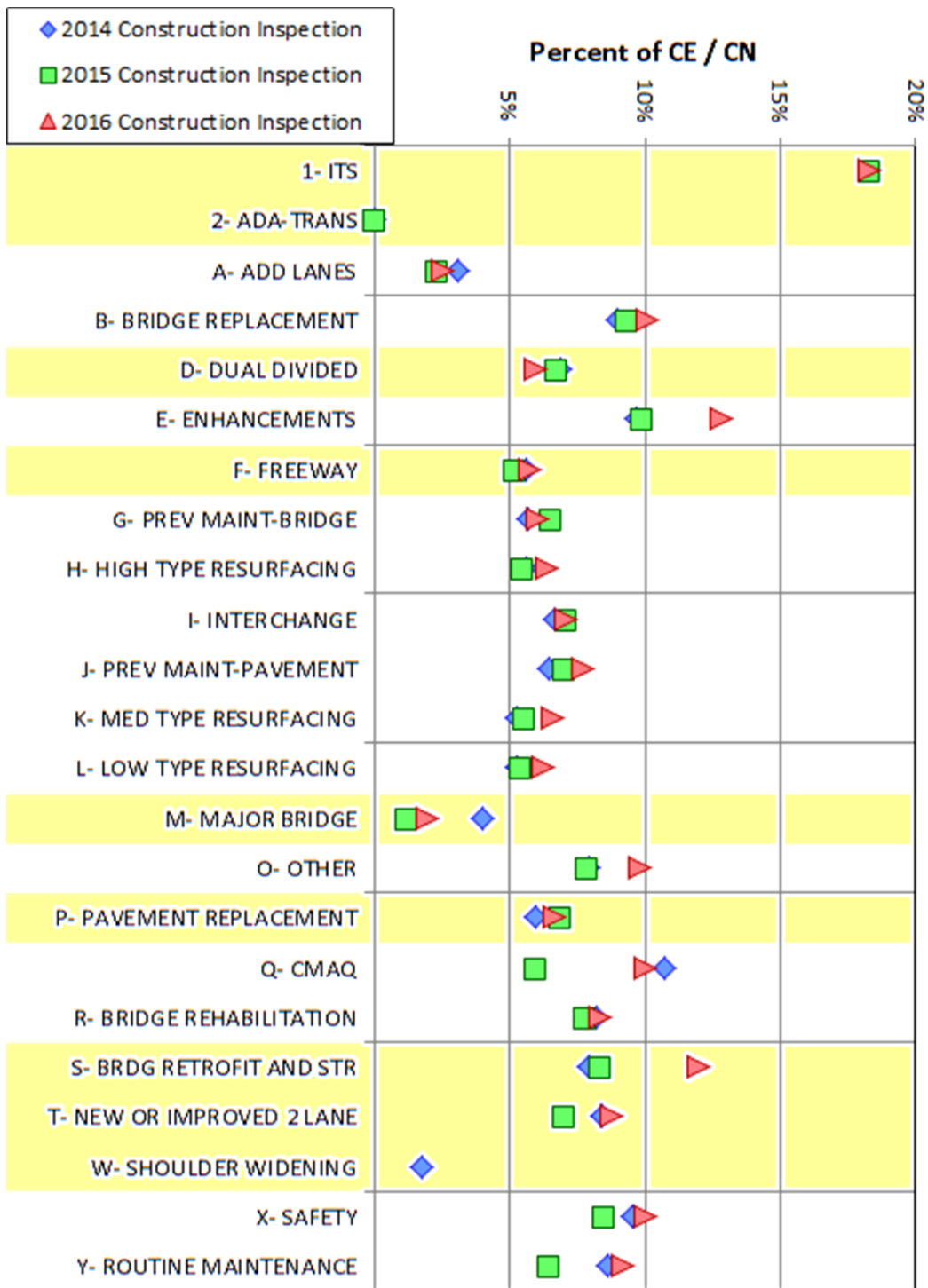
Although there have been many changes over the years, we now have 8 Engineering Factor Reports. These show a trend for statewide CE / CN to be between 5% and 7%, with the average of all eight reports being 6.25%. SIMS uses a default CE value of 7% of CN.



This graph shows the last three years of engineering factor data, statewide, per work type. Several of the work types have less than 20 projects in one or more reports. These work types are more likely to be affected by one unusual project, as opposed to types that have many samples. In particular, S- Bridge Retrofit and Strengthening has 1 to 3 projects per report, and one of the projects in two of the reports is highly unusual. Thus, results for bridge retrofit and strengthening are not good predictors. Other low sample work types may have similar problems. Low sample work types have been highlighted in this and the following graphs.



This graph shows (per work type) percent factor of actual PE total divided by actual construction totals. In work types with large sample sizes, values changed between reports by less than +/- 2.3%



This graph shows (per work type) percent factor of actual CE total divided by actual construction totals. In work types with large sample sizes, values changed between reports by less than +/- 2.8%; except for Q – CMAQ projects, which had a change of about 4% per report.