Raintree Site, Sunnyvale, CA - Construction Impacts - Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.8 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Child - Exposure Information DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Adult - Exposure Information Modeled DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2014	0.0215	10	1.88	2014	0.0215	1	0.10	0.0116	0.033
2	1	2015	0.0432	10	3.78	2015	0.0432	1	0.20	0.0141	0.057
3	1	2016	0.0284	4.75	1.18	2016	0.0284	1	0.13	0.0029	0.031
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**6.84**				**0.42**		

Raintree Site, Sunnyvale, CA - Construction Impacts - Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 4.85 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Child - Exposure Information DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Adult - Exposure Information Modeled DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2014	0.0216	10	1.89	2014	0.0216	1	0.10	0.0099	0.032
2	1	2015	0.0434	10	3.80	2015	0.0434	1	0.20	0.0122	0.056
3	1	2016	0.0286	4.75	1.19	2016	0.0286	1	0.13	0.0025	0.031
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**6.89**				**0.43**		

Sares Regis Site, Sunnyvale, CA - Without Mitigation
DPM Construction Emissions and Modeling Emission Rates

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2014	Construction	0.1582	SARESREG	316.4	0.09632	1.21E-02	15,934	7.62E-07
	Sewer Const	0.0030	SEW_DPM	6.0	0.00184	2.32E-04	629	3.68E-07
2015	Construction	0.0538	SARESREG	107.6	0.03275	4.13E-03	15,934	2.59E-07
2016	Construction	0.0000	SARESREG	0.0	0.00000	0.00E+00	15,934	0.00E+00

Notes:
Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7 am - 4 pm)
days/yr =	365	
hours/year =	3285	

Sares Regis Site, Sunnyvale, CA - With Mitigation
DPM Construction Emissions and Modeling Emission Rates

Construction Year	Activity	DPM (ton/year)	Area Source	DPM Emissions (lb/yr)	DPM Emissions (lb/hr)	DPM Emissions (g/s)	Modeled Area (m^2)	DPM Emission Rate ($g/s/m^2$)
2014	Construction	0.0616	SARESREG	123.2	0.03750	4.73E-03	15,934	2.97E-07
	Sewer Const	0.0022	SEW_DPM	4.3	0.00132	1.66E-04	629	2.63E-07
2015	Construction	0.0141	SARESREG	28.2	0.00858	1.08E-03	15,934	6.79E-08
2016	Construction	0.0000	SARESREG	0.0	0.00000	0.00E+00	15,934	0.00E+00

Notes:
Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7 am - 4 pm)
days/yr =	365	
hours/year =	3285	

Sares Regis Site, Sunnyvale, CA - Without Mitigation
PM2.5 Fugitive Dust Construction Emissions for Modeling

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	(lb/yr)	(lb/hr)	(g/s)	Modeled Area (m^2)	DPM Emission Rate $g/s/m^2$
2014	Construction	SARESREG	0.0525	105.0	0.03196	4.03E-03	15,934	2.53E-07
	Sewer Const	SEW_FUG	0.0007	1.4	0.00042	5.29E-05	629	8.42E-08
2015	Construction	SARESREG	0.0013	2.6	0.00079	9.97E-05	15,934	6.26E-09
2016	Construction	SARESREG	0.0000	0.0	0.00000	0.00E+00	15,934	0.00E+00

Notes:
Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7 am - 4 pm)
days/yr =	365	
hours/year =	3285	

Sares Regis Site, Sunnyvale, CA - With Mitigation
PM2.5 Fugitive Dust Construction Emissions for Modeling

Construction Year	Activity	Area Source	PM2.5 Emissions (ton/year)	(lb/yr)	(lb/hr)	(g/s)	Modeled Area (m^2)	DPM Emission Rate $g/s/m^2$
2014	Construction	SARESREG	0.0128	25.6	0.00779	9.82E-04	15,934	6.16E-08
	Sewer Const	SEW_FUG	0.0007	1.4	0.00042	5.29E-05	629	8.42E-08
2015	Construction	SARESREG	0.0013	2.6	0.00079	9.97E-05	15,934	6.26E-09
2016	Construction	SARESREG	0.0000	0.0	0.00000	0.00E+00	15,934	0.00E+00

Notes:
Emissions assumed to be evenly distributed over each construction areas

hr/day =	9	(7 am - 4 pm)
days/yr =	365	
hours/year =	3285	

Sares Regis Health Impacts

Health Impact Summary - 1.8 meter Receptor Height

Construction Year	UNMITIGATED					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2014	0.1667	0.0597	14.6	0.8	0.033	0.226
2015	0.0566	0.0015	5.0	0.3	0.011	0.058
2016	0.0000	0.0000	0.0	0.0	0.000	0.000
Total	-	-	**19.5**	**1.0**	-	-
Maximum Annual	0.1667	0.0597			**0.033**	**0.226**

Construction Year	MITIGATED					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2014	0.0651	0.0146	5.7	0.3	0.013	0.080
2015	0.0148	0.0019	1.3	0.1	0.003	0.017
2016	0.0000	0.0000	0.0	0.0	0.000	0.000
Total	-	-	**7.0**	**0.4**	-	-
Maximum Annual	0.0651	0.0146	-	-	**0.013**	**0.080**

Health Impact Summary - 4.85 meter Receptor Height

Construction Year	UNMITIGATED					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2014	0.1627	0.0568	14.2	0.7	0.033	0.220
2015	0.0552	0.0017	4.8	0.3	0.011	0.057
2016	0.0000	0.0000	0.0	0.0	0.000	0.000
Total	-	-	**19.1**	**1.0**	-	-
Maximum Annual	0.1627	0.0568			**0.033**	**0.220**

Construction Year	MITIGATED					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2014	0.0635	0.0139	5.6	0.3	0.013	0.077
2015	0.0145	0.0017	1.3	0.1	0.003	0.016
2016	0.0000	0.0000	0.0	0.0	0.000	0.000
Total	-	-	**6.8**	**0.4**	-	-
Maximum Annual	0.0635	0.0139	-	-	**0.013**	**0.077**

Sares Regis Site, Sunnyvale, CA - Construction Impacts - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.8 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Child - Exposure Information DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Adult - Exposure Information Modeled DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2014	0.1667	10	14.60	2014	0.1667	1	0.76	0.0597	0.226
2	1	2015	0.0566	10	4.95	2015	0.0566	1	0.26	0.0015	0.058
3	1	2016	0.0000	4.75	0.00	2016	0.0000	1	0.00		0.000
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**19.55**				**1.02**		

Sares Regis Site, Sunnyvale, CA - Construction Impacts - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 4.85 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Child - Exposure Information DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Adult - Exposure Information Modeled DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2014	0.1627	10	14.24	2014	0.1627	1	0.74	0.0568	0.220
2	1	2015	0.0552	10	4.83	2015	0.0552	1	0.25	0.0017	0.057
3	1	2016	0.0000	4.75	0.00	2016	0.0000	1	0.00	0.0000	0.000
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**19.07**				**0.99**		

Sares Regis Site, Sunnyvale, CA - Construction Impacts - Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.8 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2014	0.0651	10	5.70	2014	0.0651	1	0.30	0.0146	0.080
2	1	2015	0.0148	10	1.30	2015	0.0148	1	0.07	0.0019	0.017
3	1	2016	0.0000	4.75	0.00	2016	0.0000	1	0.00	0.0000	0.000
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**7.00**				**0.36**		

Sares Regis Site, Sunnyvale, CA - Construction Impacts - Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 4.85 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Child - Exposure Information DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Adult - Exposure Information Modeled DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2014	0.0635	10	5.56	2014	0.0635	1	0.29	0.0139	0.077
2	1	2015	0.0145	10	1.27	2015	0.0145	1	0.07	0.0017	0.016
3	1	2016	0.0000	4.75	0.00	2016	0.0000	1	0.00	0.0000	0.000
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**6.83**				**0.35**		

Raintree and Sares Regis Combined Health Impacts

Health Impact Summary - 1.8 meter Receptor Height

Construction Year	UNMITIGATED					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2014	0.1659	0.1312	14.5	0.8	0.033	0.297
2015	0.1204	0.1119	10.5	0.5	0.024	0.232
2016	0.0410	0.0029	1.7	0.2	0.008	0.044
Total	-	-	**26.8**	**1.5**	-	-
Maximum Annual	0.1659	0.1312			**0.033**	**0.297**

Construction Year	MITIGATED					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2014	0.0658	0.0189	5.8	0.3	0.013	0.085
2015	0.0324	0.0142	2.8	0.1	0.006	0.047
2016	0.0125	0.0029	0.5	0.1	0.002	0.015
Total	-	-	**9.1**	**0.5**	-	-
Maximum Annual	0.0658	0.0189	-	-	**0.013**	**0.085**

Health Impact Summary - 4.85 meter Receptor Height

Construction Year	UNMITIGATED					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2014	0.1606	0.1133	14.1	0.7	0.032	0.274
2015	0.1176	0.0962	10.3	0.5	0.024	0.214
2016	0.0404	0.0025	1.7	0.2	0.008	0.043
Total	-	-	**26.0**	**1.4**	-	-
Maximum Annual	0.1606	0.1133			**0.032**	**0.274**

Construction Year	MITIGATED					
	Maximum Concentrations		Cancer Risk (per million)		Hazard Index	Maximum Annual PM2.5 Concentration
	Exhaust PM2.5/DPM ($\mu g/m^3$)	Fugitive PM2.5 ($\mu g/m^3$)	Child	Adult	(-)	($\mu g/m^3$)
2014	0.0637	0.0173	5.6	0.3	0.013	0.081
2015	0.0316	0.0123	2.8	0.1	0.006	0.044
2016	0.0123	0.0025	0.5	0.1	0.002	0.015
Total	-	-	**8.9**	**0.5**	-	-
Maximum Annual	0.0637	0.0173	-	-	**0.013**	**0.081**

Raintree Site, Sunnyvale, CA - Construction Impacts - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.8 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Child Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Adult Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2014	0.1659	10	14.52	2014	0.1659	1	0.75	0.1312	0.297
2	1	2015	0.1204	10	10.54	2015	0.1204	1	0.55	0.1119	0.232
3	1	2016	0.0410	4.75	1.70	2016	0.0410	1	0.19	0.0029	0.044
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**26.77**				**1.49**		

Raintree Site, Sunnyvale, CA - Construction Impacts - Unmitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 4.85 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2014	0.1606	10	14.06	2014	0.1606	1	0.73	0.1133	0.274
2	1	2015	0.1176	10	10.30	2015	0.1176	1	0.54	0.0962	0.214
3	1	2016	0.0404	4.75	1.68	2016	0.0404	1	0.18	0.0025	0.043
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**26.03**				**1.45**		

Raintree Site, Sunnyvale, CA - Construction Impacts - Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 1.8 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Child Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Adult Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2014	0.0658	10	5.76	2014	0.0658	1	0.30	0.0189	0.085
2	1	2015	0.0324	10	2.84	2015	0.0324	1	0.15	0.0142	0.047
3	1	2016	0.0125	4.75	0.52	2016	0.0125	1	0.06	0.0029	0.015
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**9.11**				**0.50**		

Raintree Site, Sunnyvale, CA - Construction Impacts - Mitigated Emissions
Maximum DPM Cancer Risk Calculations From Construction
Off-Site Residential Receptor Locations - 4.85 meters

Cancer Risk (per million) = CPF x Inhalation Dose x 1.0E6

Where: CPF = Cancer potency factor $(mg/kg\text{-}day)^{-1}$

Inhalation Dose = C_{air} x DBR x A x EF x ED x 10^{-6} / AT

Where: C_{air} = concentration in air ($\mu g/m^3$)
DBR = daily breathing rate (L/kg body weight-day)
A = Inhalation absorption factor
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time period over which exposure is averaged.
10^{-6} = Conversion factor

Values

Parameter	Child	Adult
CPF =	1.10E+00	1.10E+00
DBR =	581	302
A =	1	1
EF =	350	350
AT =	25,550	25,550

Construction Cancer Risk by Year - Maximum Impact Receptor Location

Year	Exposure Duration (years)	Child - Exposure Information DPM Conc (ug/m3) Year	Child - Exposure Information DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Child Cancer Risk (per million)	Adult - Exposure Information Modeled DPM Conc (ug/m3) Year	Adult - Exposure Information Modeled DPM Conc (ug/m3) Annual	Exposure Adjust Factor	Adult Cancer Risk (per million)	Fugitive PM2.5	Total PM2.5
1	1	2014	0.0637	10	5.58	2014	0.0637	1	0.29	0.0173	0.081
2	1	2015	0.0316	10	2.77	2015	0.0316	1	0.14	0.0123	0.044
3	1	2016	0.0123	4.75	0.51	2016	0.0123	1	0.06	0.0025	0.015
4	1		0.0000	3	0.00		0.0000	1	0.00		
5	1		0.0000	3	0.00		0.0000	1	0.00		
6	1		0.0000	3	0.00		0.0000	1	0.00		
7	1		0.0000	3	0.00		0.0000	1	0.00		
8	1		0.0000	3	0.00		0.0000	1	0.00		
9	1		0.0000	3	0.00		0.0000	1	0.00		
10	1		0.0000	3	0.00		0.0000	1	0.00		
11	1		0.0000	3	0.00		0.0000	1	0.00		
12	1		0.0000	3	0.00		0.0000	1	0.00		
13	1		0.0000	3	0.00		0.0000	1	0.00		
14	1		0.0000	3	0.00		0.0000	1	0.00		
15	1		0.0000	3	0.00		0.0000	1	0.00		
16	1		0.0000	3	0.00		0.0000	1	0.00		
17	1		0.0000	1.5	0.00		0.0000	1	0.00		
18	1		0.0000	1	0.00		0.0000	1	0.00		
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65	1		0.0000	1	0.00		0.0000	1	0.00		
66	1		0.0000	1	0.00		0.0000	1	0.00		
67	1		0.0000	1	0.00		0.0000	1	0.00		
68	1		0.0000	1	0.00		0.0000	1	0.00		
69	1		0.0000	1	0.00		0.0000	1	0.00		
70	1		0.0000	1	0.00		0.0000	1	0.00		
Total Increased Cancer Risk					**8.85**				**0.49**		

Raintree and Sates Regis Construction Sites Off-Site Truck Emissions: 2014 - 2016

Truck Route/Location	Line Source Name	Vehicle Type[1]	Annual Trips[2] 2014	Annual Trips[2] 2015	Annual Trips[2] 2016	Travel Speed (mph)	PM2.5 Emission Factors[3] (g/mi) 2014	PM2.5 Emission Factors[3] (g/mi) 2015	PM2.5 Emission Factors[3] (g/mi) 2016	Truck Schedule (hrs/day)	Trip Travel Distance (feet)	Trip Travel Distance (miles)	Annual DPM Emissions (lb/year) 2014	Annual DPM Emissions (lb/year) 2015	Annual DPM Emissions (lb/year) 2016	Annualized Average Hourly Emissions (lb/hr) 2014	Annualized Average Hourly Emissions (lb/hr) 2015	Annualized Average Hourly Emissions (lb/hr) 2016
Raintree Site																		
North Fair Oaks	FAIROAK	HHDT	5,809	14,115	2,353	25	0.1497	0.1004	0.0696	9	940	0.18	0.34	0.56	0.06	1.04E-04	1.69E-04	1.96E-05
		MHDT	4,488	13,464	2,244	25	0.1420	0.0965	0.0799	9	940	0.18	0.25	0.51	0.07	7.6E-05	1.6E-04	2.14E-05
		Total	***10,297***	***27,579***	***4,597***	25							***0.59***	***1.07***		***1.80E-04***	***3.25E-04***	***4.10E-05***
East Weddell Drive	R_WEDDEL	HHDT	5,809	14,115	2,353	25	0.1497	0.1004	0.0696	9	450	0.09	0.16	0.27	0.03	4.97E-05	8.11E-05	9.36E-06
		MHDT	4,488	13,464	2,244	25	0.1420	0.0965	0.0799	9	450	0.09	0.12	0.24	0.03	3.6E-05	7.4E-05	1.03E-05
		Total	***10,297***	***27,579***	***4,597***	25							***0.28***	***0.51***	***0.06***	***8.62E-05***	***1.55E-04***	***1.96E-05***
Sares Regis																		
North Fair Oaks	FAIROAK	HHDT	3,626	3,361	0	25	0.1497	0.1004	0.0696	9	940	0.18	0.21	0.13	0.00	6.48E-05	4.03E-05	0.00E+00
		MHDT	2,420	2,860	0	25	0.1420	0.0965	0.0799	9	940	0.18	0.13	0.11	0.00	4.1E-05	3.3E-05	0.00E+00
		Total	***6,046***	***6,221***	***0***								***0.35***	***0.24***	***0.00***	***1.06E-04***	***7.33E-05***	***0.00E+00***
East Weddell Drive	S_WEDDEL	HHDT	3,626	3,361	0	25	0.1497	0.1004	0.0696	9	600	0.11	0.14	0.08	0.00	4.14E-05	2.57E-05	0.00E+00
		MHDT	2,420	2,860	0	25	0.1420	0.0965	0.0799	9	600	0.11	0.09	0.07	0.00	2.6E-05	2.1E-05	0.00E+00
		Total	***6,046***	***6,221***	***0***								***0.22***	***0.15***	***0.00***	***6.76E-05***	***4.68E-05***	***0.00E+00***

[1] HHDT = heavy heavy duty truck & MHDT = medium heavy duty truck

[2] Annual trips - see calculations below. Assumes trucks travel on Fair Oaks and East Weddell in vicinity of the site.

[3] Emission factors from EMFAC2011 for Santa Clara Co. and assumes all trucks are diesel.

Raintree Site	**2014**	**2015**	**2016**	**Total**
No. Construction Days	88	264	44	396
Heavy Duty Truck Trips				
Demolition - HHDT	792	0		792
Grading/Excavation - HHDT	312	0		312
Cement Trucks - HHDT	217	651	109	977
Construction Vendor Trips*	**2014**	**2015**	**2016**	**Total**
HHDT	4,488	13,464	2,244	20,196
MHDT	4,488	13,464	2,244	20,196
Total Trips	**2014**	**2015**	**2016**	**Total**
HHDT	5,809	14,115	2,353	22,277
MHDT	4,488	13,464	2,244	20,196
All	***10,297***	***27,579***	***4,597***	***42,473***

Sares Regis Site	**2014**	**2015**	**2016**	**Total**
No. Construction Days	110	130	0	240
Heavy Duty Truck Trips				
Demolition - HHDT	406	0	0	406
Grading/Excavation - HHDT	376	0	0	376
Cement Trucks - HHDT	424	501	0	925
Construction Vendor Trips*	**2014**	**2015**	**2016**	**Total**
HHDT	2,420	2,860	0	5,280
MHDT	2,420	2,860	0	5,280
Total Trips	**2014**	**2015**	**2016**	**Total**
HHDT	3,626	3,361		6,987
MHDT	2,420	2,860		5,280
All	***6,046***	***6,221***		***12,267***

* Assumes vendor trucks are 50% HHDT and 50% MHDT

VOC Paint Content and Revised Truck Trip (Raintree) Information

From:	Ryan Kuchenig
To:	Amy Skewes-Cox
Cc:	Josh Carman; jreyff@illingworthrodkin.com
Subject:	Re: Response to Comments - E Weddell Sunnyvale - IMPORTANT
Date:	Friday, November 01, 2013 11:25:40 AM
Attachments:	ree_weddellvocinformation.zip

Amy & Josh,

Below and attached includes information regarding VOCs and truck trip for Raintree:

1. VOC Information: Raintree will be using similar specifications to the attached Sherwin-Williams Specification Sheet. The basic summary is as follows with different areas requiring different levels of VOCs (i.e., eaves, siding, railings, interior walls, primer vs. top coat, etc.) information summarized as follows:

a. Interior Paint:

i. Primer: less than 75 VOC (spec attached is 74 grams per liter)

ii. Top Coat: less than 50 VOC (spec attached is 47 grams per liter)

b. Exterior Paint:

i. Primer: less than 50 VOC (spec attached is 47 grams per liter)

ii. Top Coat: less than 50 VOC (spec attached is 47 grams per liter)

iii. Gutters and Railings: less than 100 VOC (spec is 96 grams per liter)

2. Revised Truck Trips:

a. Please see the attached spreadsheet for revised truck trip figures. This is the spreadsheet Raintree completed in April for the air quality consultant. Everything highlighted in yellow remained the same. All changes are highlighted in green. The summary is as follows:

i. Added trips during demolition: Net add of 292 one-way trips

ii. Reduced concrete truck trips during construction: Net reduction of 690 round trips for concrete (or reduction of 1,380 one-way trips).

iii. Net change results in a reduction of 1,088 one-way

truck trips (demolition and construction combined).

Thank you,

Ryan Kuchenig, Associate Planner
Department of Community Development
City of Sunnyvale
(408) 730-7431
rkuchenig@sunnyvale.ca.gov

Save the environment. Please don't print this email unless you really need to.

Recommended Coatings Systems

Thank you for the submittal of Sherwin-Williams products on the above referenced project. The Sherwin-Williams Co. certifies that the products we intend to furnish will meet or exceed the performance requirements of the job specifications.

Surface preparation, application methods, spreading rates, wet and dry film thicknesses will be determined by the attached specifications and our material data sheets, available at www.sherwin-williams.com, except as noted below.

Be sure to read and follow the *Data Pages* before application.

Exterior Eves, Gutters, Drip Edge Metal (Car Ports down spouts, gutters)(2 coats),

A. Spot Prime Coat: B42 SWB Summit Primer, apply at 5 mils wet, 1.5 mils dry/ 320 sq ft/gal: VOC 47 g/L; 0.39 lb/gal / CARB compliant meets GS-11

B. Finish Coat: CK6688 Series Acrystain Acrylic latex Flat, apply at 4 mils WFT / 1.7 mils DFT per coat, self-priming over most surfaces. VOC: 96 grams/liter / CARB compliant meets GS-11

Exterior Siding / Hardie plank

A. Spot Prime Coat: B42 SWB Summit Primer, apply at 5 mils wet, 1.5 mils dry/ 320 sq ft/gal: VOC 47 g/L; 0.39 lb/gal / CARB compliant meets GS-11

B. Two Coats: C7 Series Duracraft Latex acrylic Satin, apply at 4mils wft / 400 sq ft/gal: VOC <50 g/L; <0.42 lb/gal / CARB compliant meets GS-11

Exterior Metal Hand Railings, Doors and jambs

A. Spot Prime Coat: B66W310 Pro Industrial Procryl Universal Primer, apply at 5-10 mils WFT / 2-4 mils DFT: VOC <100g/L; <0.83 lb/gal / CARB compliant meets GS-11

B. Two Coats: B40 Sonoran Semi-Gloss Acrylic Enamel, apply at 400 Square Feet per Gallon: VOC 44 g/L; 0.37 lb/gal / CARB compliant meets GS-11

ANTI-GRAFFITI GOATINGS SYSTEM FOR CONCRETE UNIT MASONRY / FOR COATED SURFACES

A. Coat 1: ProSoco, Inc., Defacer Eraser® Sacrificial Coating SC-1: 75--400 square feet per US gallon

B. Coat 2: ProSoco, Inc., Defacer Eraser® Sacrificial Coating SC-1: 75--400 square feet per US gallon

Interior Gypsum boards all Walls, Ceiling, and Doors, Door Jambs/plaster, Latex, (2 coats)

A. Prime Coat: B28W8601 Hi Build Primer, apply at 4 mils WFT / 0.8 mils DFT per coat, apply at 80 to 400 SFT per gallon per coat : VOC 74 g/L; 0.62 lb/gal / CARB compliant meets GS-11

B. Two Coats: B20WJ2511 SWB HB Latex Enamel Eggshell, apply at 8 mils WFT / 2.7 mils DFT per coat, apply at 200 SFT per gallon per coat, self-priming over textured drywall. : VOC: 47.6 gpl Meets SCAQMD Rule 1113 requirements

Interior Wood

A.	Prime Coat:	B28W8601 Hi Build Primer, apply at 4 mils WFT / 0.8 mils DFT per coat, apply at 80 to 400 SFT per gallon per coat : VOC 74 g/L; 0.62 lb/gal / CARB compliant meets GS-11
B.	Two Coats:	B40 Sonoran Semi-Gloss Acrylic Enamel, apply at 400 Square Feet per Gallon VOC 44 g/L; 0.37 lb/gal / CARB compliant meets GS-11

If you have any questions regarding the specifications, please do not hesitate to contact me.

Respectfully,

Joseph Yslas

Cell: 760-218-1197

Paint Submittal

For

Heritage Commons

191 Heritage Commons
Dixon, CA 95620

Prepared

By

The Sherwin-Williams Company

08/15/12

Joseph Yslas

Professional Coatings Representative

760-218-1197

Recommended Coatings Systems

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If you have any questions regarding the specifications, please do not hesitate to contact me.

Respectfully,

Joseph Yslas

Cell: 760-218-1197

MERV16 Product Sheets and Information

amazing filtration

Healthy Climate® Carbon Clean 16 Media Air Cleaner

Innovation in whole-home filtration

An innovative solution that takes more out of your air.

Today's homes are better built and better insulated than ever. While this is great for energy savings, it also means that millions of airborne particles are trapped indoors, where they continue to circulate throughout your home and the air your family breathes. The new Healthy Climate® Carbon Clean 16 combines industry-leading MERV 16 filtration with a coconut-activated carbon coated fiber matrix that works with your heating and cooling system to provide a thorough, whole-home solution to remove these particles and dramatically improve the quality of your indoor air.

Cleaner air throughout your home starts with the Carbon Clean 16

The Carbon Clean 16's MERV 16* Precision Pleat™ media filter protects your family from more than 95% of allergy-aggravating particles ranging in size down to 0.3 microns—the same level of filtration used by hospitals for inpatient and general surgery areas.

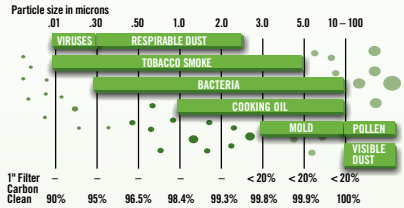
Reduces ground-level ozone in the home

Unlike electrostatic air cleaners that can elevate indoor ozone levels, the Carbon Clean 16 provides thorough filtration throughout your home while reducing ozone, a known lung irritant. Much like plants and trees absorb carbon dioxide and release oxygen back into the atmosphere, the Carbon Clean 16 air filter removes harmful ozone from indoor air and converts it into clean, healthy oxygen. As part of this natural and efficient purification process, carbon inside the filter that's treated with oxygen reacts with odors and airborne pollutants to neutralize them before they're circulated back into your home's air.

More than clean air

Besides providing filtration unmatched by any manufacturer, the Carbon Clean 16's unique design will also help prolong the life of your heating and cooling system by keeping it free from dirt and dust buildup. Since it installs without the need for an external power supply and is compatible with any HVAC system, no major modifications are made to your home comfort system. And it's backed by the peace of mind of a 5-year limited warranty on covered components.**

PARTICLE-REMOVAL EFFICIENCY – HEALTHY CLIMATE AIR CLEANERS

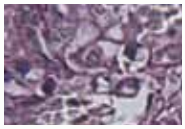


The Carbon Clean 16 is effective against common household allergens and viruses that can aggravate asthma and respiratory illnesses.

Pet dander

Pollen

Dust mites


Viruses

Bacteria

Mold/fungi

Carbon Clean 16 Media Air Cleaner Specifications

Efficiency	**MERV-16**		
Filter Life	Up to 12 months		
Dimensions HxWxD (in)	16x25x5	20x20x5	20x25x5

Note: Due to Lennox' ongoing commitment to quality, all specifications, ratings and dimensions are subject to change without notice.

*The MERV (Minimum Efficiency Reporting Value) rating of a filter describes the size of the holes in the filter that allow air to pass through. The higher the MERV rating (categories range from 1 to 16), the smaller the holes in the filter, and the better the filtration.
**Applies to residential applications only. See actual warranty certificate for details.

For a complete list of the registered and common law trademarks owned by Lennox Industries Inc., please visit www.lennox.com.

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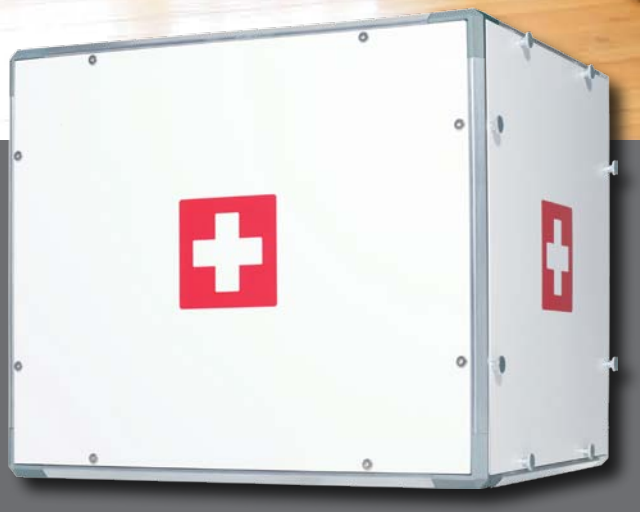
IQAir®
First in Air Quality

Celebrate Your Freedom from Allergens & Particulate Pollution

Transform your home and office into a virtually allergen-free zone with the most effective in-duct air cleaning system.



The No.1 Rated In-Duct Air Purification System

Highest Efficiency – Lowest Air Restriction

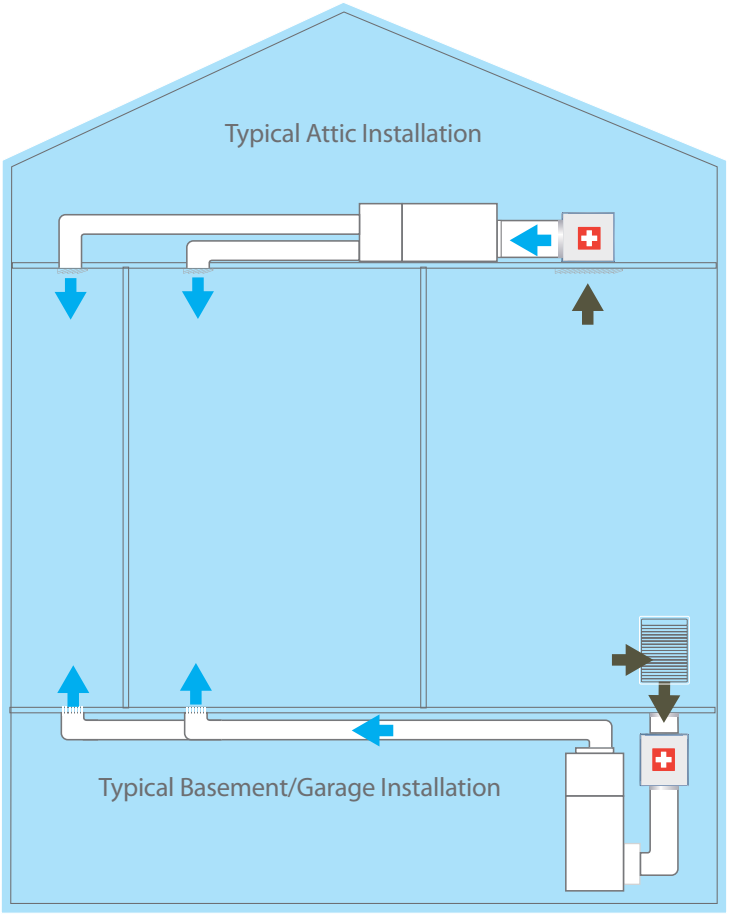
The Perfect 16™ is the only system that is rated a perfect MERV 16, the highest filtration rating possible for air conditioning filters. MERV stands for Minimum Efficiency Reporting Value. The MERV system was created by the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) to independently verify how well an air filtration system really cleans the air. Until the Perfect 16, no residential/office air cleaning system had ever achieved this ultra-high rating.

While efficiency is very important, low air restriction is equally important. Conventional air filters can decrease the airflow of your central heating and air conditioning system by as much as 50%. As a result, the forced air system has to work harder and longer to cool or heat your home. Increased energy consumption adds to your monthly electricity bill. In contrast, the Perfect 16 has the highest filtration efficiency coupled with one of the lowest air restrictions* in the industry. In fact, it actually improves the performance of your heating and air cooling system when compared to conventional air cleaners.

The Perfect 16 powerfully removes more allergens, bacteria, dust, pollen and other airborne contaminants that are detrimental to your health. It's the perfect system for people who suffer from allergies, asthma or for people who simply want to breathe the cleanest air possible. Let IQAir® transform your home or office into a healthy living and work space.

**44 Pa (0.18 inches of water) at 2040 m^3/h (1,200 cfm) and 54 Pa (0.22 inches of water) at 3400 m^3/h (2,000 cfm) for the Perfect 16 2225 and 2530 models respectively.*

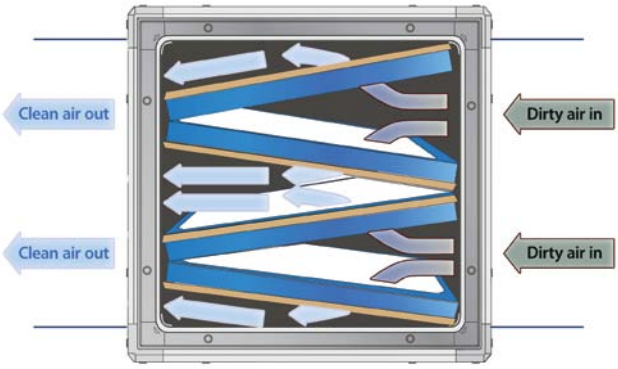
How It Works



Seamless Integration

Unlike other air cleaning systems, the Perfect 16™ is seamlessly retrofitted into your existing heating and/or air conditioning system. It cleans 100% of the air flowing through the system. No partial cleaning or limited bypass installation.

Air is drawn through the return grill typically located in a common area such as a hallway, then filtered through pleated micro-fiber filtration panels. This traps harmful micro-particles each and every time the air circulates through the system.



Purified air goes through your central air handling unit where it is distributed to every corner of your home or office. The air gets filtered through this system up to 125 times per day.

IQAir: First in Air Quality

In 1963, the brothers Klaus and Manfred Hammes introduced the world's first residential air cleaner. It was designed to help people who had coal burning stoves remove dust and soot from the air. Soon they discovered that people who had their air cleaners were experiencing better health. Manfred, a life-long allergy and asthma sufferer, was the first person to benefit from his own machine.

Swiss Craftsmanship - The Highest Quality

Crafted, assembled, individually inspected and tested at IQAir's Swiss factory, each Perfect 16™ meets our high standards before it leaves our facility. IQAir expert craftsmen construct each unit with dedication and extreme attention to detail.

IQAir's passion for the highest product quality extends to our expert, professional installation practices.

The Perfect 16™ Delivers up to 50 Times More Filtration Power

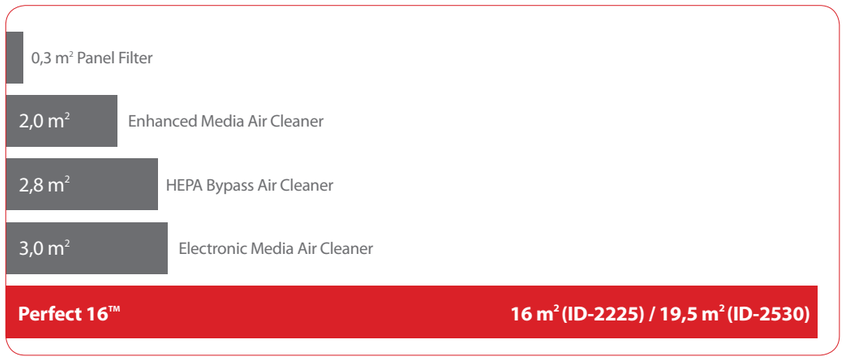
Frank Hammes, President of IQAir®

The Secret is the Revolutionary V2 Design

The V2 Difference: Perfect 16's revolutionary V2 design

Most air filters have a single flat surface that fits squarely into the housing of the system. The Perfect 16's filters are positioned in a double "V" shape. This V2 design allows the Perfect 16 to use 16 square metres of filter media. This is up to 50 times more filtration material than that of ordinary filtration systems. The additional surface area creates higher filtration efficiency, while allowing more air to pass through the system. This truly innovative design with substantially increased collection area provides superior filtration power over ordinary filtration systems.

More Collection Area Provides Better Filtration



Extreme Makeover: Home Edition

When the popular ABC television show Extreme Makeover: Home Edition (French title: "Les Maçons du Coeur") needs to create an ultra-clean home for a deserving family with health concerns, they turn to the world's leader in advanced air cleaning solutions.

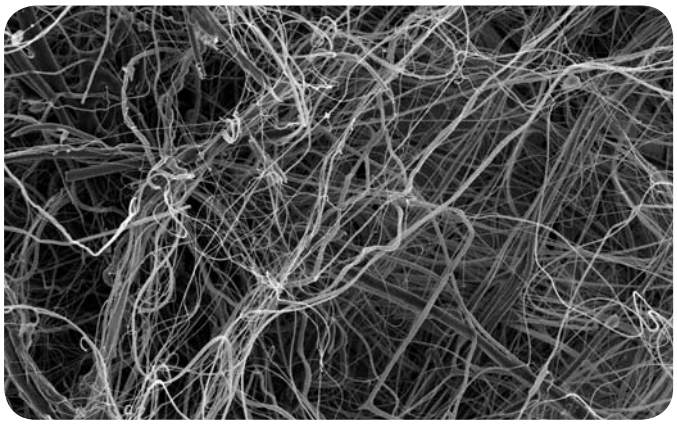
Over the years, IQAir is proud to have been able to improve the quality of lives for so many families through the power of clean air.

Extreme Makeover: Home Edition Clean Air Team led by Frank Hammes, President of IQAir®

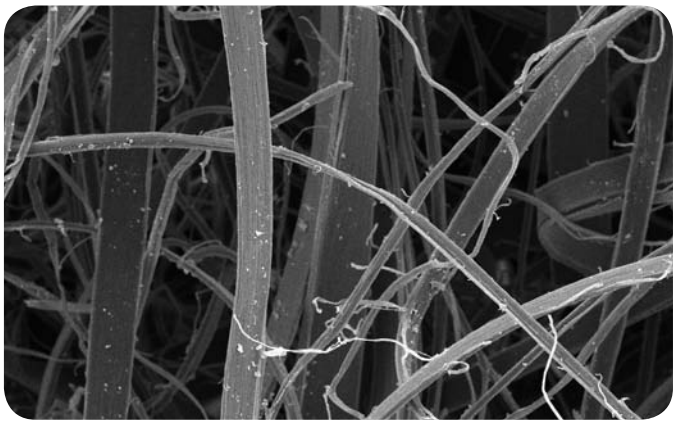
Featuring Unique AMF Technology

The Perfect 16™ is the first in-duct air cleaning system to utilize advanced micro-fiber filtration technology. Filter fibers are 10 times thinner than those used in standard air filters. This allows air to easily pass through the filters, while the ultra-fine threads create an almost impenetrable barrier for pollution particles. The result is an air filter that sets a new standard for air cleaning efficiency as well as airflow.

Perfect 16™ micro-fibers



Conventional air filter fibers



100x magnified images generated on scanning electron microscope by Washington University School of Medicine.

No Filter Replacements for 3 Years!

Most in-duct air filtration systems and furnace filters require monthly changing and many even require weekly cleaning. The Perfect 16 takes the worry and hassle out of frequent filter changes and servicing.

The Perfect 16's extra large filter surface area is so efficient and long lasting that you won't need service or replacements for up to three full years.*

**At average pollution levels, your filters will last approximately 3 years based on 50% HVAC usage.*

Compare for Yourself

Many manufacturers make impressive advertising statements about the performance of their air cleaning systems. Unfortunately, these claims often fall far short of their real world performance. This is because their statements are based on theoretical efficiencies – not what their air cleaners can actually achieve in real homes and offices.

This is why IQAir® has scientifically validated the performance of the Perfect16™ in real-life applications. Take a look at how the Perfect 16 outperforms other types of in-duct air cleaners.

Special Features	**Panel Filter**	**Electronic Air Cleaner**	**Enhanced Media Filter**	**HEPA Bypass Air Cleaner**	**IQAir Perfect 16™**
MERV 16 tested & certified					✓
Captures over 95% of bacteria					✓
Captures over 95% of pet allergens					✓
Captures over 95% of mold spores					✓
Captures over 95% of dust and pollen					✓
Filters 100% of central air (no bypass)	✓	✓	✓		✓
Ultra-low air restriction				✓	✓
100% ozone-free technology	✓			✓	✓
100% ion-free technology	✓			✓	✓
Medical-grade air cleaning					✓
Uses no electricity	✓				✓
Maintenance-free for up to three years					✓
Lifetime clean duct guarantee					✓
Absolutely silent	✓		✓		✓

IQAir - The No.1 for Hospitals

IQAir® makes the No.1 air purifier used in hospitals worldwide. Many people consider hospitals to be the most critical health environment – a place where clean air literally means the difference between life and death. Doctors and other caregivers need to be protected from cross contamination of infectious disease while they care for patients. Patients need to be protected from viruses, bacteria, and other microscopic airborne pollutants that can hinder their recovery. Patients with severe allergies and asthma need relief from their respiratory symptoms. Patients with lung infections need an environment that is free of airborne contaminants. IQAir is very proud of its history of providing hospitals with the very best in air filtration systems.

In a comprehensive research study published in the February 2010 issue of the American Journal of Infection Control, it was shown that IQAir systems reduced the rate of airborne infections (invasive aspergillosis) by over 50%. The research also concluded that the cost of procuring IQAir systems will be offset many times by the huge cost savings associated with the decreases in patient infections.

Product of the Year

IQAir's In-Duct Air Cleaning System Wins Reviewboard's Product of the Year

Written by Philip Ferreira, Editor-in-Chief of Reviewboard Magazine

The home we tested the Perfect 16™ in was immaculate, but like many homes it had a hidden problem – unhealthy indoor air. We used advanced laser particle counting equipment before and after installation so that our readers could see what they could really expect if they had this system installed in their own home.

The Perfect 16 delivers the highest level of air cleaning effectiveness available to homeowners. Reviewboard tested the system in a real home, not in a laboratory, and we saw an almost 95% improvement in air quality.

The Perfect 16 retrofits into existing heating and/or air conditioning (HVAC) systems. It uses the existing duct work of a home to provide clean air to every room of the house. The Perfect 16 utilizes IQAir's Advanced Micro-Fiber Filtration technology. The ultra-fine fibers used in the Perfect 16's filters are ten times thinner than the fibers used in standard air filters. This allows air to pass easily through the filter mesh while creating an almost impenetrable barrier for common household pollutants like dust, pollen, mold spores, allergens, even bacteria and viruses.

We also noted that the Perfect 16 does away with a major annoyance of other whole-house air purifiers: frequent cleaning or filter changes. Most air purifier systems require cleaning or filter changes every few months. The Perfect 16 is filter replacement and maintenance free for up to three years.

The Perfect 16 utilizes the circulation of a home's forced air HVAC system. It does not require additional electricity to operate, and unlike electronic air purifiers, it produces absolutely no ozone.

The Perfect 16 is a truly amazing product. In our judgment, it is the best whole-house air purification system on the market. It is exceptional in its air cleaning effectiveness and ultra-low maintenance. It's a true winner and deserving of Reviewboard's Product of the Year award.

The Perfect 16 can be seen Sundays on ABC's popular television show "Extreme Makeover: Home Edition" (French title: "Les Maçons du Coeur"), as IQAir® helps the show's Design Team build healthy homes for deserving families. It is also currently featured in "Esquire House 360" in Beverly Hills, California.

About Reviewboard – Alexa ranking lists Reviewboard Magazine as the third largest consumer product review publication in the world. Their product reviews are read each year by more than 110 million readers in 54 countries worldwide. Alexa also lists Reviewboard as the #1 user ranked consumer publication in the world.

High-Quality, Expert Installation

The IQAir authorised installers manage your Perfect 16™ installation process – from the pre-installation evaluation to the final system testing.

Step 1: Pre-Installation Evaluation

The IQAir autorised installer arranges the pre-installation evaluation with you and inspects your HVAC system for compatibility and tonnage to determine which Perfect 16 model(s) you'll need. Larger homes and offices (over 230 m^2) usually have more than one HVAC system.

Step 2: System Installation

Upon completed evaluation, an appointment to install the unit(s) is arranged. The IQAir authorised installer will place the Perfect 16(s) into your HVAC system(s). In less than a day, your Perfect 16 is up and running.

Step 3: Post-Installation Testing and Verification (subject to availability)

After the installation, your system will be tested and verified with an advanced laser particle counter. The system performance will be detailed in a personalised owner's certificate. Within one hour after installation, the Perfect 16 provides at least 10 times cleaner air – guaranteed!

Frequently Asked Questions

Can the Perfect 16 in-duct air filter system be installed in any home or office?

The Perfect 16 can be installed in the vast majority of homes and offices with forced air heating, ventilation and air conditioning systems (HVAC). If for any reason it is determined that your home or office is not suited for a Perfect 16 in-duct air filter system, we will be happy to suggest an alternate IQAir® product to suit your particular needs.

Do I need to run my heating or air conditioning system for the Perfect 16 to work?

No. The Perfect 16 works whenever you run your HVAC fan. You don't need to run your heating or air conditioning. Simply place your thermostat control setting to "Fan On".

Does the Perfect 16 make noise?

No. The Perfect 16 is absolutely silent.

Does the Perfect 16 affect the look of my house?

No. The system is out of view in your attic, basement, or garage, depending on where your central forced air system is located.

Can I replace the filters myself?

Yes, you can replace the filters yourself. However, we recommend that your IQAir Authorized Installer replace your filters, so that your system can be retested and verified at the time of filter replacement.

Does running the Perfect 16 increase my electric bill?

No. The Perfect 16 makes your HVAC system run more efficiently than with a conventional air cleaner. This can actually lower your electricity bill.

How long does the installation take?

The typical installation for the Perfect 16 is 4-6 hours. Actual time required may vary.

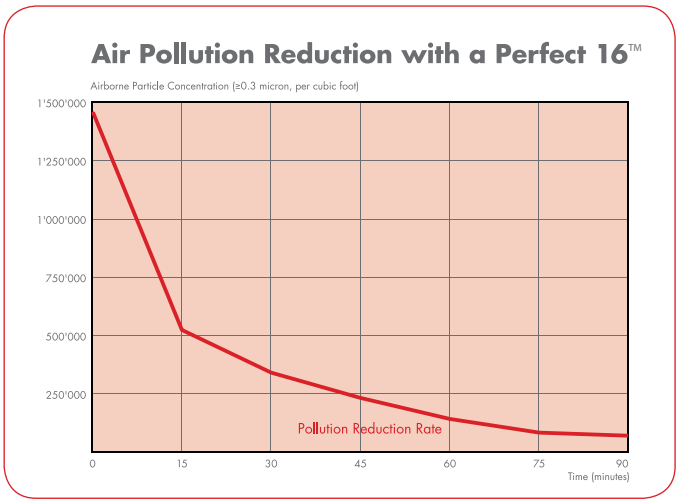
Does the Perfect 16 eliminate my existing air filters?

Yes, once the Perfect 16 is installed, you can dispose of any other filters that were previously used in your HVAC system.

What difference will the Perfect 16 make in your home or office?

Take a look at the results achieved in this old home built in 1928. It is hillside property in Los Angeles, a city known for its poor air quality. Indoor air quality specialists used advanced laser particle counters to measure the home's indoor air quality before and after the installation. The instruments recorded the microscopic airborne pollution particles in the home including dust, mold, pollen, bacteria, and other irritants. Before the installation the air pollution levels throughout the home were at approximately 1.5 million particles per cubic foot. After the Perfect 16 was installed, the air quality was improved by over 90% in just 60 minutes. After 90 minutes, air quality was improved by over 95%. The home went from an unhealthy indoor environment to one of America's cleanest homes in just an hour and a half.

This home's air quality was improved by over 95% within 90 minutes of installation, and that's a typical result.



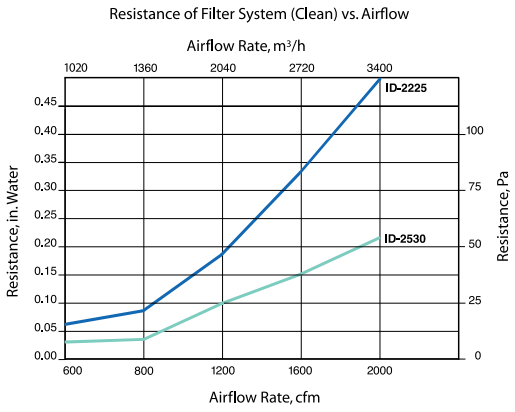
Location: Los Angeles County, California | HVAC System airflow: 1200 cfm (2040 m³/h), Air Cleaning: Perfect 16 ID-2225

Minimal Resistance - Maximum Performance

While high efficiency is an important performance criteria for an in-duct filter system, it is equally important that the filter has a minimal impact on the airflow of the air handling system. The IQAir Perfect 16 offers the highest filtration efficiency coupled with one of the lowest air resistance values for maximum air cleaning performance.

Airflow vs. Filter Resistance

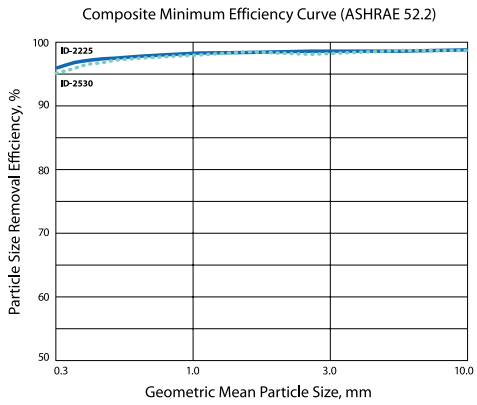
	Supply Airflow vs. Filter System Resistance			
	ID-2225		ID-2530	
cfm (m³/h)	in H_2O	Pa	in H_2O	Pa
600 (1020)	0.06	14	0.03	8
800 (1360)	0.09	21	0.04	12
1200 (2040)	0.18	44	0.10	24
1600 (2720)	0.33	82	0.15	38
2000 (3400)	0.49	122	0.22	54



Efficiency for Various Particle Sizes

Composite Minimum Efficiency Table (%)		
Size Range (µm)	Efficiency ID-2225*	Efficiency ID-2530*
0.30 – 0.40	**96.2**	**94.9**
0.40 – 0.55	**96.6**	**95.9**
0.55 – 0.70	**97.0**	**96.3**
0.70 – 1.00	**97.2**	**96.6**
1.00 – 1.30	**97.4**	**96.8**
1.30 – 1.60	**97.5**	**97.2**
1.60 – 2.20	**97.8**	**97.5**
2.20 – 3.00	**98.0**	**97.7**
3.00 – 4.00	**98.3**	**98.0**
4.00 – 5.50	**98.4**	**98.5**
5.50 – 7.00	**98.6**	**98.1**
7.00 – 10.00	**98.6**	**98.7**

*Perfect 16 ID-2225 at 1400 cfm (2380 m³/h)
*Perfect 16 ID-2230 at 2000 cfm (3400 m³/h)



Technical Specifications

	Perfect 16 ID-2225	**Perfect 16 ID-2530**
Dimensions (width x lenght x height)	54 x 64 x 54 cm	64 x 74 x 54 cm
Weight	approx. 27 kg	approx. 33.5kg
Power Requirements	None, no electrical parts	None, no electrical parts
Rating	MERV 16 rated at 295 fpm (2000 m³/h)	MERV 16 rated at 192 fpm (3400 m³/h)
Efficiency	≥95% for particles 0.3µm and greater ≥75% for particles 0.003 µm and greater	≥95% for particles 0.3 µm and greater ≥75% for particles 0.003µm and greater
Maximum Recommended Airflow	2040 m³/h	3400 m³/h
Pressure Drop	0.18" wc at 2000m³/h	0.22" wc at 3400 m³/h
Insulation	Pre-installed, fiberglass-free aluminum-foam insulation	Pre-installed, fiberglass-free aluminum-foam insulation
Minimum Efficiency Reporting Value (MERV)	MERV 16 @ 498 fpm (2.5 m/s)	MERV 16 @ 492 fpm (2.5 m/s)
Rated Airflow	1400 cfm (2380 m³/h)	2000 cfm (3400 m³/h)
Composite Average Efficiency	E1 (0.3 – 1.0 µm) = 96.7% E2 (1.0 – 3.0 µm) = 97.7% E3 (3.0 – 10.0 µm) = 98.5%	E1 (0.3 – 1.0 µm) = 96.9% E2 (1.0 – 3.0 µm) = 97.8% E3 (3.0 – 10.0 µm) = 98.3%
Media Area	170 sq ft. (16 m²)	210 sq ft. (19.5 m²)

The Leading Air Filtration Specialist

For over 45 years, the IQAir Group has been an industry leader for indoor air quality.

IQAir systems are built exclusively in Switzerland to the highest quality standards and in accordance with strict international norms.

Leading institutions around the world are relying on IQAir to protect against airborne infectious diseases,toxic chemicals and particulate contaminants.

Whenever the best air quality is required, IQAir provides a powerful solution.

Applications

IQAir® systems are used in over 70 countries worldwide in a great variety of indoor environments:

Medical & Healthcare

- clinics/hospitals
- IVF-Laboratories
- medical practices
- microbiological & research laboratories
- pulmonary medicine
- pharmacies
- sanitary facilities
- waiting rooms

Public & Institutional

- airports
- archives/libraries
- cafeterias
- military
- museums
- nursing homes
- places of worship
- schools & kindergartens

Trade & Industry

- bars/restaurants
- data centres/network server rooms
- fitness studios & wellness centres
- hotels
- laboratories
- mechanical workshops
- offices/open-plan offices

For more information, contact your IQAir® Authorized Installer or Retailer:

To find your local autorised installer or retailer please contact us at:
www.iqair.com/uk

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UCR College of Engineering- Center for Environmental Research & Technology

Performance Evaluation of Air Filtration Devices

Dennis Fitz and Robert Russell

University of California

College of Engineering Center for Environmental Research

Indoor Air Quality in Schools: VOC Removal Technology

Technology Forum

South Coast Air Quality Management District Headquarters

August 30, 2011

www.cert.ucr.edu

Project Objectives

- Evaluate the removal efficiency of particulate matter (PM) by filters and filtration devices in a classroom
- Measure the pressure drop through filters used in existing HVAC systems
- Measure the noise level of stand-alone filtration devices

Approach

- **Measure PM concentrations up and downstream of the filtration device, ambient air, and in the classroom**
  - Upstream: At return air duct or inlet of stand-alone
  - Downstream: At outlet of register or stand-alone
  - Ambient Air: At outside air inlet duct of HVAC
  - Classroom: Center of classroom, 3ft above floor
- **Measurements for 6 hours during normal class times**
- **Calculate removal efficiencies relative to ambient air**

Measurements

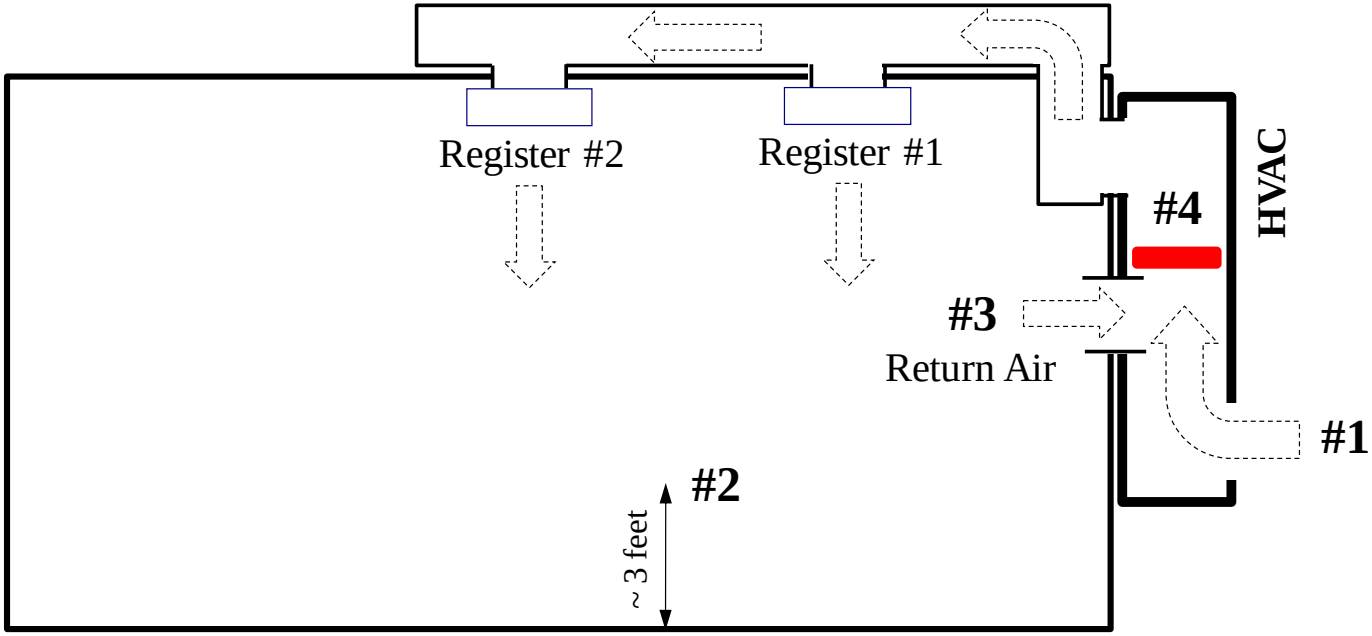
- **Ultrafine Particles (UFP), less than 100nm dia**
  - Condensation particle counter (TSI model 3781)
- **Black Carbon (BC)**
  - Aethelometer (Magee Scientific model AE42)
- **Pressure drop across panel filters**
  - Magnihelic
- **Flow rates into and out of HVAC system**
  - Turbine flow meter
- **Room air exchange rate**
  - ThermoEnvironmental CO analyzer (model 48C)
- **Noise level of stand-alone units**
  - Extech model 403407

Filtration Device Types

- Return filters (inlet of HVAC system)
- Register filters (outlet of HVAC system)
- Stand-alone devices

Testing Layout-Return Filter

a)

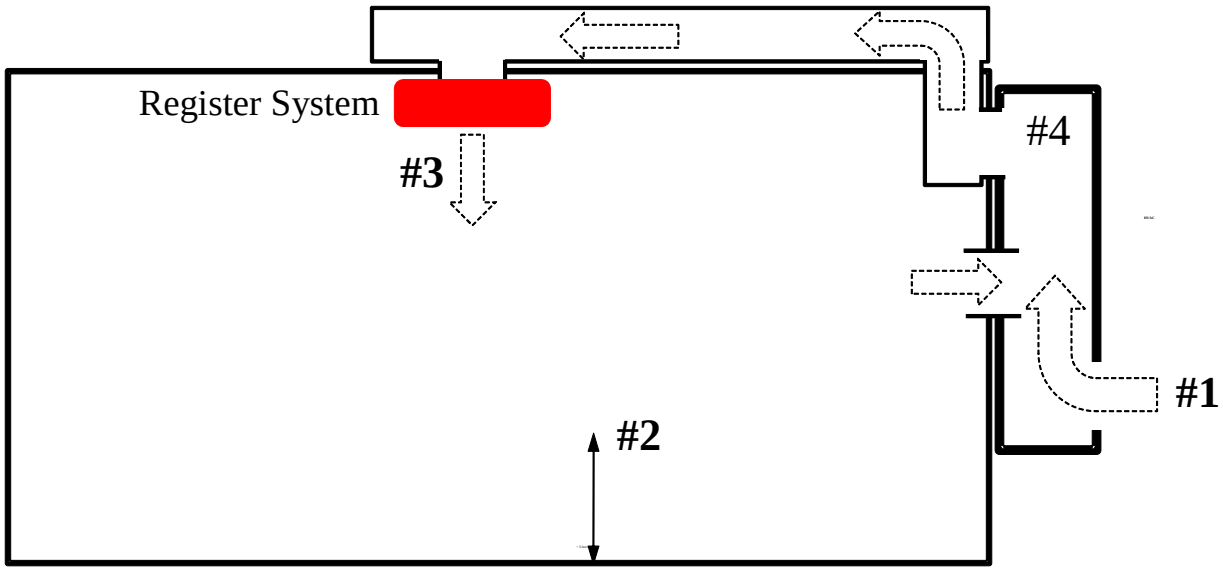


#1: Ambient / upstream of HVAC
#3: Upstream of return air duct
Panel Filter

#2: Classroom
#4: Downstream of filter

Testing Layout-Register Filter

b)

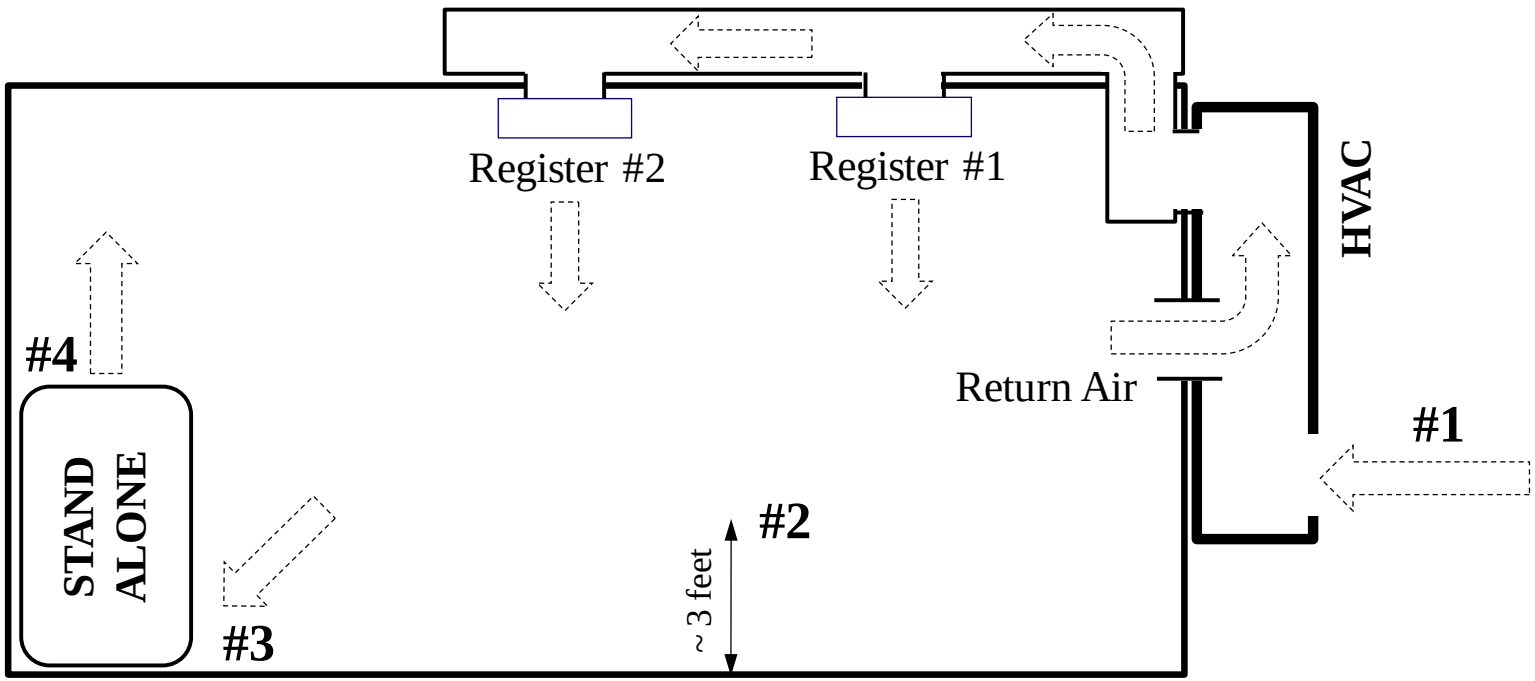


#1: Ambient / upstream of HVAC
#3: Downstream of register
Panel Filter

#2: Classroom
#4: UPstream of register

Layout-Stand-Alone

c)



#1: Outside the classroom
#2: Inside the classroom
#3: Stand-Alone Inlet
#4: Stand-Alone outlet

Device Procurement

- SCAQMD Testing Announcement
- Notification of known vendors
- Outreach at vendor conferences
- Advertisements in local newspaper
- 150 Potential manufacturers contacted
- 9 Manufactures responded with 15 devices
  - 10 Return
  - 1 Register
  - 4 Stand-alone

Manufacturer	Model	Nominal Size	MERV
Environmental Dynamics Group	1V8-4812-29/2	Register Mount	NA
Camil Farr	30/30®-M8	20”x30”x1”	8
Air Cleaners, Inc	Wash Electrostatic	20”x30”x1”	7
Air Cleaners, Inc	Wash Electrostatic	20”x30”x2”	7
Freudenburg Filtration Tech Inc.	Ultra 1500	20”x30”x1”	11
Freudenburg Filtration Tech Inc.	Maxx 2000	20”x30”x1”	12
eSpin Technologies, Inc	Exceed	20”x30”x2”	11
eSpin Technologies, Inc.	Exceed	20”x30”x2”	13
eSpin Technologies, Inc.	Exceed	20”x30”x2”	14
IQ Air	IQ Air MERV 13	20”x30”x2”	13
IQ Air	Nanomax S-220	20”x30”x2”	16
IQ Air	CleanZone SL	Stand Alone	NA
Pure Air	HPS 350	Stand Alone	NA
NQ Industries, Inc.	NQ 400	Stand Alone	NA
NQ Industries Inc.	NQ Clarifier	Stand Alone	NA

Testing Location

- Sunnyslope Elementary School, Jurupa Valley, CA
  - Approximately 1000 feet north of 60 freeway
  - Area is well known (as Rubidoux) as an area of high PM concentrations
  - A “portable” classroom was used (no students)
    - 39ft x 23ft x 8.5ft
    - Bard model WH483 heat pump for HVAC
    - HVAC maintained 74ºF; fan on continuously
    - Measured air exchange rate of 6.8/hr

BARD HVAC

Instrumentation in Classroom

Data Collection and Efficiency Calculations

- **Collected as 1-minute averages for efficiency calculations and averaged over the 6-hr duration**
- **Calculated Efficiencies:**

• Relative Removal Efficiency: percentage reduction in the concentration of UFP (or BC) downstream of the device tested (position #4) relative to its concurrent ambient (outdoor) level upstream of the HVAC (position #1)

$$RRE = 100 \times (P_{\#1} - P_{\#4})/P_{\#1}$$

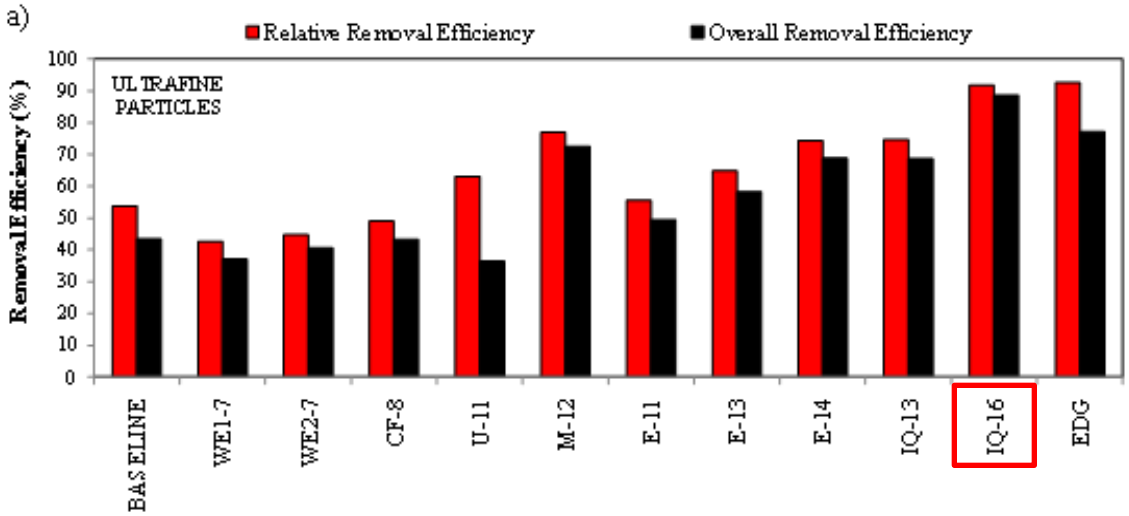
• Overall Removal Efficiency: percentage reduction in the concentration of UFP (or BC) inside the classroom (position #2) relative to its concurrent ambient (outdoor) level (position #1)

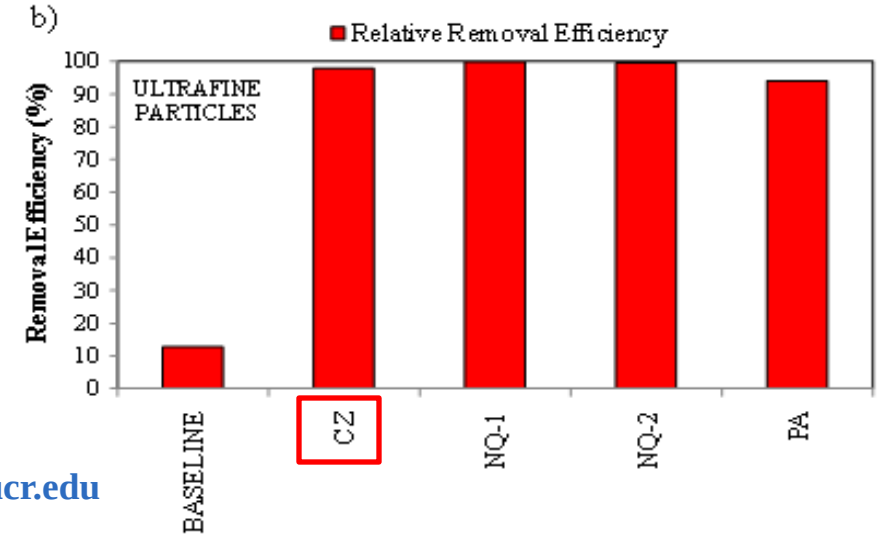
$$ORE = 100 \times (P_{\#1} - P_{\#2})/P_{\#1}$$

Quality Control

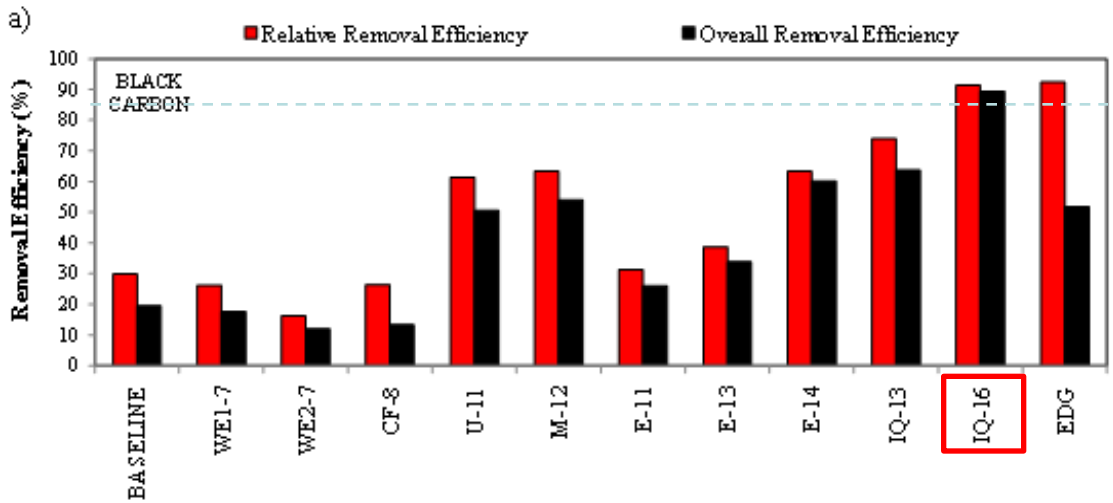
- Collocated BC and UFP measurements before and after each measurement period
- Baseline BC and UFP measurements prior to device installation
- Zero BC and UFP sensors with particle-free air

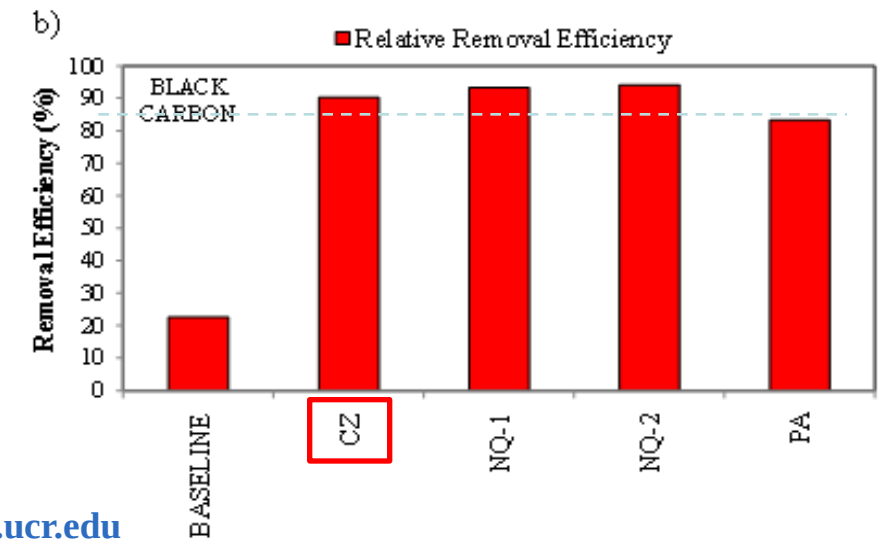
Summary of Results- UFP





Summary of Results - BC





Conclusions

- The only return filter meeting the SCAQMD overall removal efficiency for UFP's and BC of >=85% was the IQ Air 16
- All return filters, and the register system, had a low pressure drop across the filter and minimal impact on the airflow.
- A noise level below 45 decibels [db(A)] (for stand alone units) was only met by IQ Air
  - threshold set by many school districts for new in classroom equipment

Acknowledgements

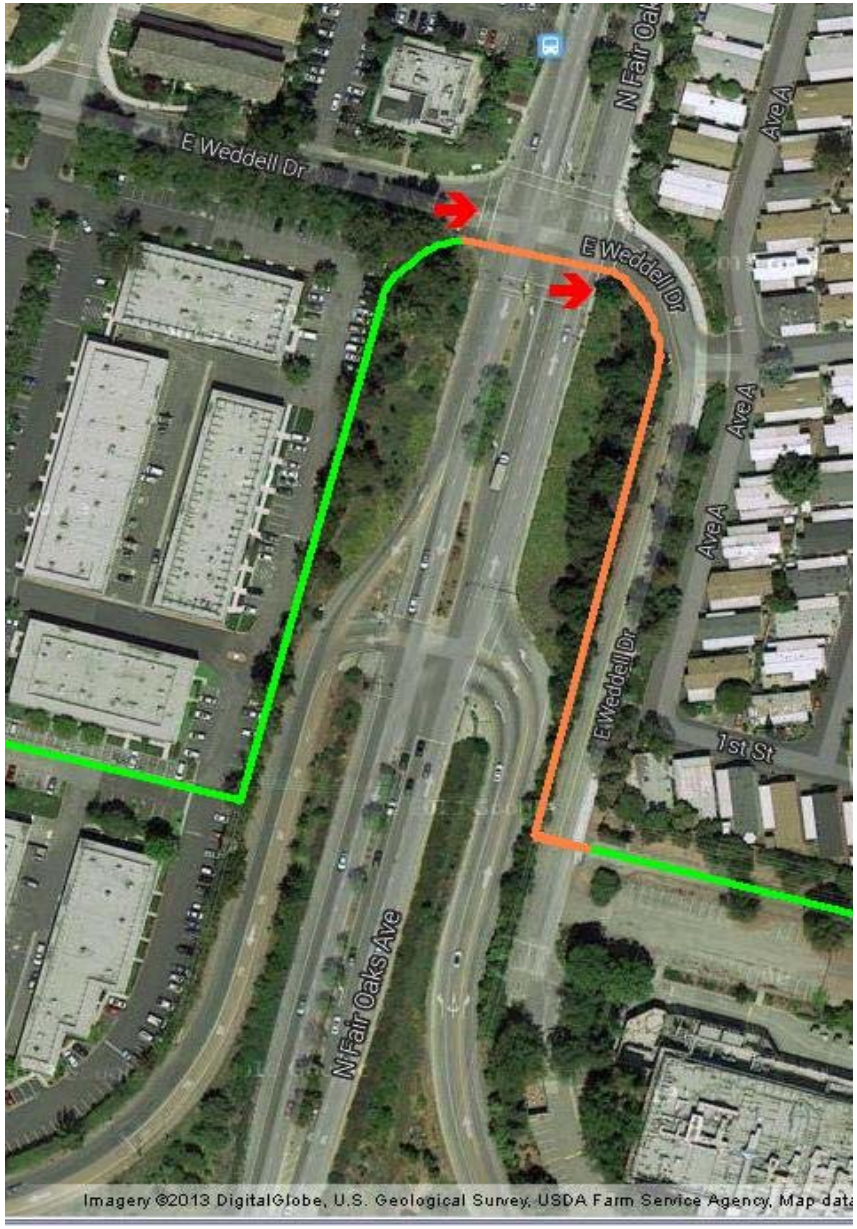
- Andrea Polidori (SCAQMD)
- Dan Baldwin and Gary Dixon (JVUSD)
- Chuck Bufalino, Kurt Bumiller, Jim Gutierrez Ehsan Hosseini, Varalakshmi Jayaram, Bill Welch (CE-CERT)

SCAQMD for financial and technical support

APPENDIX E
POWERPOINT SLIDES PRESENTED AT OCTOBER 21, 2013 PLANNING COMMISSION PUBLIC HEARING

← Private access to public space / thoroughfare? I sure hope this is a misprint otherwise it must be modified!

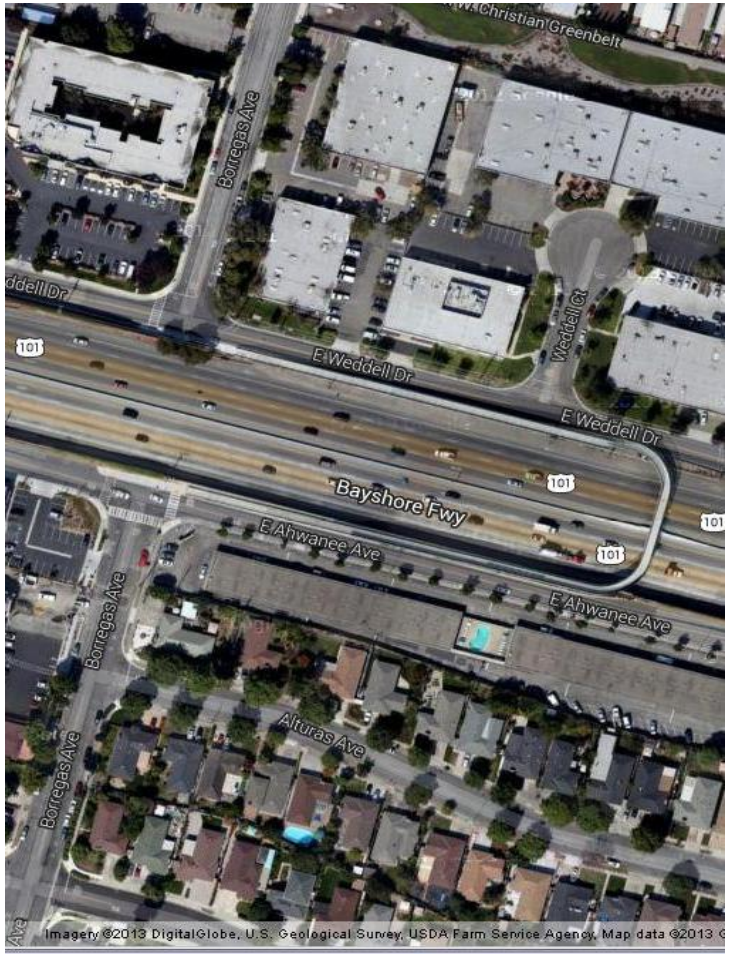
Weddell Ave. is currently the on-street continuation of the JWC Greenbelt – this route would be MUCH better than the existing configuration and should be made PUBLIC.



We should use this opportunity to make the JWC Greenbelt contiguous and safe across Fair Oaks

JWC Greenbelt

Cycletrack with controlled crossings

No right turn on red

Another option would be a bicycle / pedestrian bridge (similar to those on Borregas Ave. crossing HWY 101 & HWY 237).
Would these developments prevent such an option in the future?