



St. Vincent's Catholic Medical Center  
HVAC Emissions and AERMOD Impacts

**GIVEN DATA FROM PLANT DESIGN**

Consumption	Peak (CF/hr):	Annual (CF/Yr):	Peak (Gal/hr):	Annual (Gal/Yr):	Boiler Size	Stack Diameter	Stack Diameter (m)	Flowrate	Veocity	Veocity	Stack Velocity	Exhaust Temp
					(mmBtu/hr) <sup>1</sup>	(in) <sup>2</sup>		(acfm) <sup>2</sup>	(ft/min)	(ft/sec)	(m/s)	(F)
NG Only	34,003	35,703,750	--	--	15.17	30	0.762	8750	1800	30.00	9.144	200
Oil Only	--	--	243	304,500	17.76	30	0.762	8750	1800	30.00	9.144	200
Dual Fuel	22,830	28,397,000	243	60,950	15.62	30	0.762	8750	1800	30.00	9.144	200

Nat. Gas. HHV (Btu/cf): 1,020  
No. 2 Fuel oil HHV (Btu/gal): 140,000

Notes:

<sup>(1)</sup> Boiler size is based on a fuel consumption rate of and the assumption that all fuel is consumed in a 100 day (2,400 hrs) heating season.

Ex: MMBtu/hr = X ft<sup>3</sup>/yr / 2,400hrs/yr \* 1020 Btu/ft<sup>3</sup> / 10<sup>6</sup> MMBtu/Btu.

<sup>(2)</sup> Stack diameter, flowrate, velocity, and exhaust temperature is based on best engineering design from the Design Team for 5 condensing draft induced boilers.

Parameters assume full capacity at 100% load.

**EMISSION CALCULATIONS<sup>3</sup>**

Pollutant	Natural Gas Emission Factor	Short-term Emissions		Annual Emissions		No. 2 Fuel Oil Emission Factor	Short-term Emissions		Annual Emissions		Max Short-term	Max Annual
	(lbs/mmcf)	(lbs/hr)	(g/s)	(lbs/yr)	(g/s)	(lbs/1000 gals)	(lbs/hr)	(g/s)	(lbs/yr)	(g/s)	(g/s)	(g/s)
PM2.5	7.6	0.26	0.0326	271.35	0.0039	2.13	0.518	0.0652	648.585	0.0093	<b>0.0652</b>	<b>0.0093</b>
NOx	100	3.40	0.4284	3570.38	0.0514	20	4.86	0.6123	6090.00	0.0876	<b>0.6123</b>	<b>0.0876</b>
SO2	0.6	0.02	0.0026	21.42	0.0003	0.213	0.051759	0.0065	64.86	0.0009	<b>0.0065</b>	<b>0.0009</b>

**PREDICTED CONCENTRATIONS FROM AERMOD**

Maximum 1-hour Normalized Impact (ug/m3/g/s): 85.66  
Maximum 24-hour Normalized Impact (ug/m3/g/s): 27.88  
Maximum Annual Normalized Impact (ug/m3/g/s): 8.60

**CALCULATION OF MAXIMUM IMPACTS**

Scenario	Averaging Period	Max Impact (ug/m3)	Background (ug/m3)	Total Impact (ug/m3)	NAAQS / Threshold
PM2.5	24-hour	1.82	NA	<b>1.82</b>	2 / 5
	Annual	0.08	NA	<b>0.08</b>	0.3
NOx <sup>4,5</sup>	1-hour	41.96	134.7	<b>176.66</b>	188
SO2	1-hour	0.56	138.0	<b>138.56</b>	196

**AERMOD MAXIMUM IMPACTS**

Scenario	Averaging Period	Max Impact (ug/m3)
PM2.5	24-hour	<b>1.82</b>

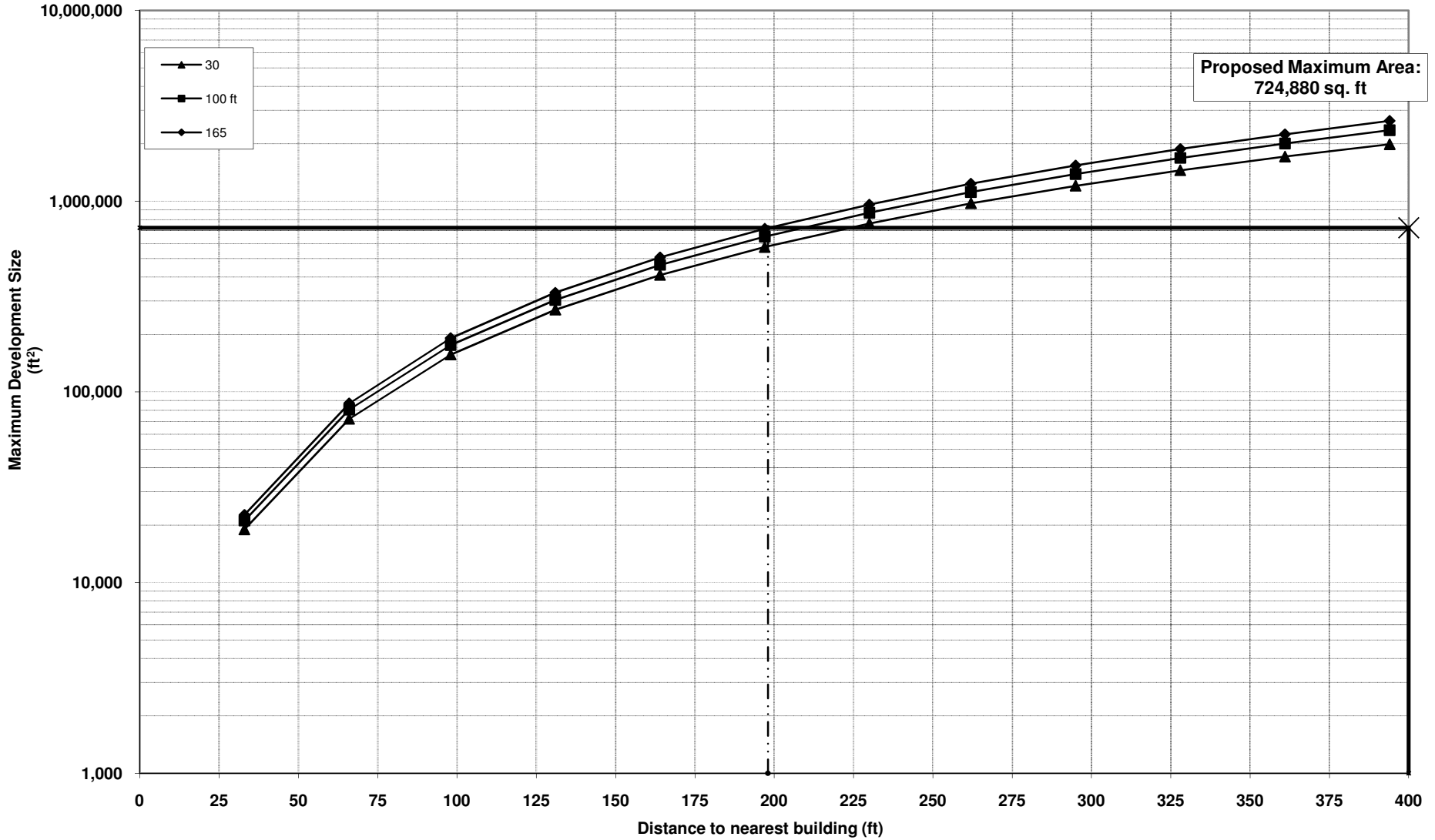
Notes:

<sup>(4)</sup> For NO<sub>2</sub> annual concentrations, a conversion ratio of NO<sub>2</sub> to NOx (modeled emission rates are based on NOx; the air quality standard is for NO<sub>2</sub>) was utilized in accordance with recommendations provided in the USEPA's *Guideline on Air Quality Models*. Based on the latest 3 years of NYSDEC air quality monitoring data from the IS52 monitoring station, the conversion ratio was calculated to be equal to 63 percent NO<sub>2</sub> or: 0.63

<sup>(5)</sup> For NOx 1-hour concentrations, a conversion ratio of 80 percent or: 0.8 was used per the memo: "Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard", March 1, 2011.

**FIG App 17-7  
NO<sub>2</sub> BOILER SCREEN  
RESIDENTIAL DEVELOPMENT - NATURAL GAS**

**HVAC Screening Analysis**  
**Site:** Tower Bldg  
**Date:** 4/6/2011  
**Pass**

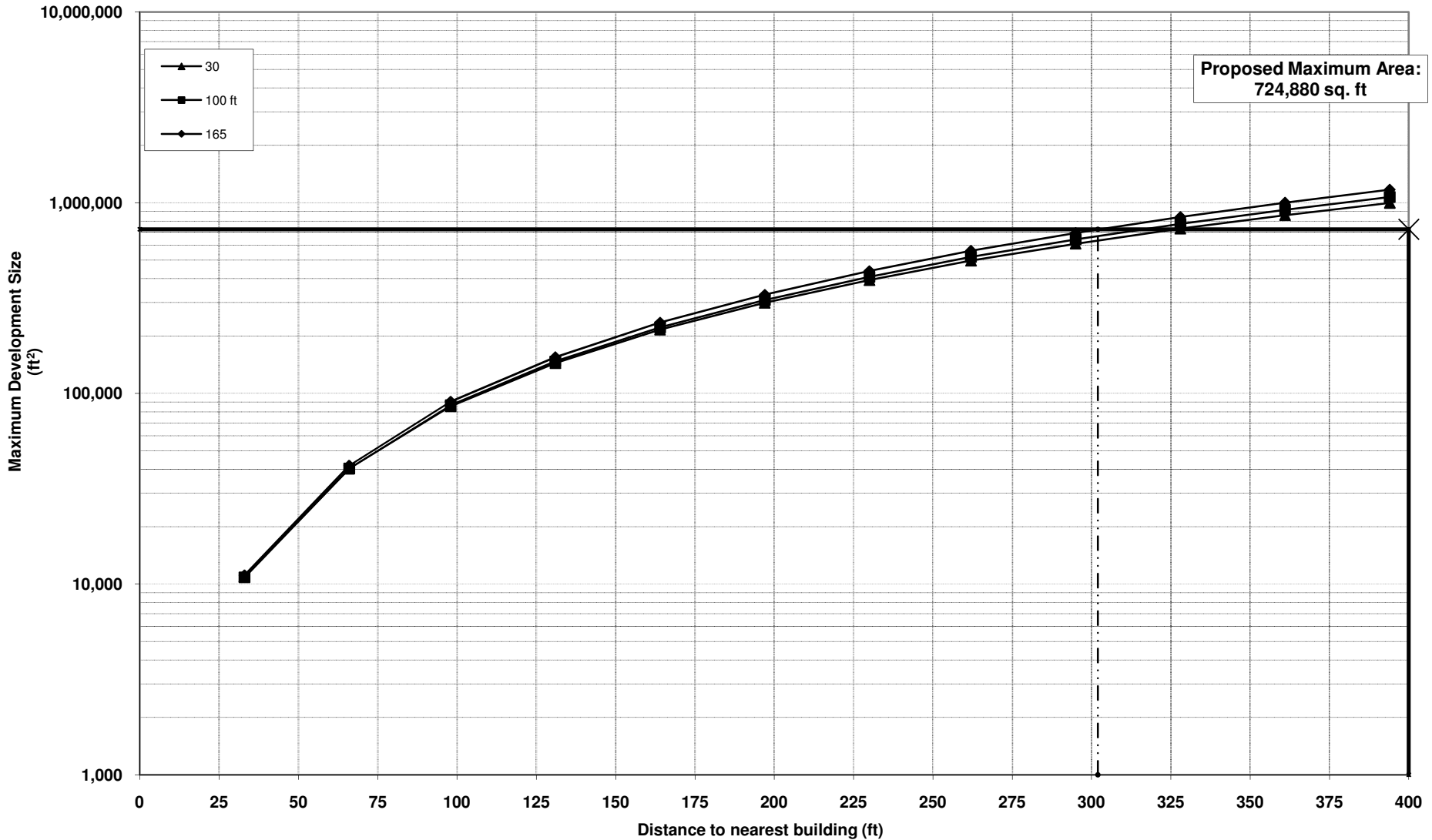


**Stack Height:** 206 ft  
**Distance to Nearest Building of Similar or Greater Height:** 400 ft  
**Proposed Maximum SQFA:** 724,880 sq. ft  
**Minimum Allowable Distance to Nearest Building:** 198 ft

**Notes:**

**FIG App 17-5  
SO<sub>2</sub> BOILER SCREEN  
RESIDENTIAL DEVELOPMENT - FUEL OIL #2**

**HVAC Screening Analysis**  
**Site:** Tower Bldg  
**Date:** 4/6/2011  
**Pass**



**Stack Height:** 206 ft  
**Distance to Nearest Building of Similar or Greater Height:** 400 ft  
**Proposed Maximum SQFA:** 724,880 sq. ft  
**Minimum Allowable Distance to Nearest Building:** 302 ft

Notes: