Appendix C: Air Quality

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

GIVEN DATA FROM PLANT DESIGN

Plant Capacity (hP): 900

Consumption	Peak (CF/hr):	Annual (CF/Yr):	Peak (Gal/hr):	Annual (Gal/Yr):	Boiler Size (mmBtu/hr)[1]	Stack Diameter (in)[2]	Stack Diameter (m)	Flowrate (acfm)[2]	Veocity (ft/min)	Veocity (ft/sec)	Stack Velocity (m/s)	Exhaust Temp (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:
(1) 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^3/yr / 2,400hrs/yr * 1020 Btu/ft^3 / 10^6 MMBtu/Btu.
(2) 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[3]

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

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 Annnual 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	**1.82**	2 / 5
	Annual	0.08	NA	**0.08**	0.3
NOx[4,5]	1-hour	41.96	134.7	**176.66**	188
SO2	1-hour	0.56	138.0	**138.56**	196

AERMOD MAXIMUM IMPACTS

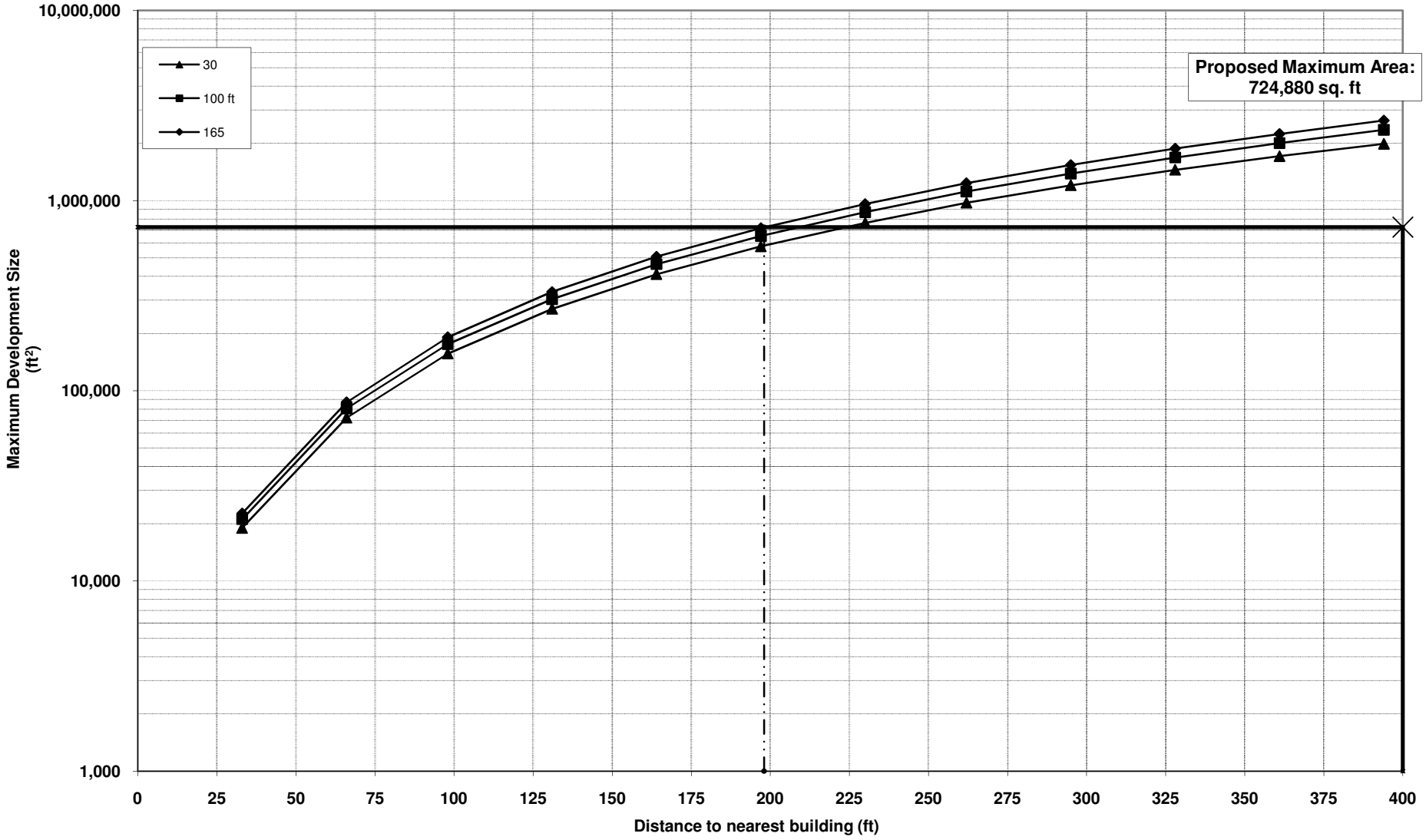
Scenario	Averaging Period	Max Impact (ug/m3)
PM2.5	24-hour	**1.82**

Notes:

(4) For NO_2 annual concentrations, a conversion ratio of NO_2 to NOx (modeled emission rates are based on NOx; the air quality standard is for NO_2) 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_2 or: 0.63
(5) 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 Modeing Guidance for the 1-hour NO2 National Ambient Air Quality Standard", March 1, 2011.

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

FIG App 17-7
NO_2 BOILER SCREEN
RESIDENTIAL DEVELOPMENT - NATURAL GAS

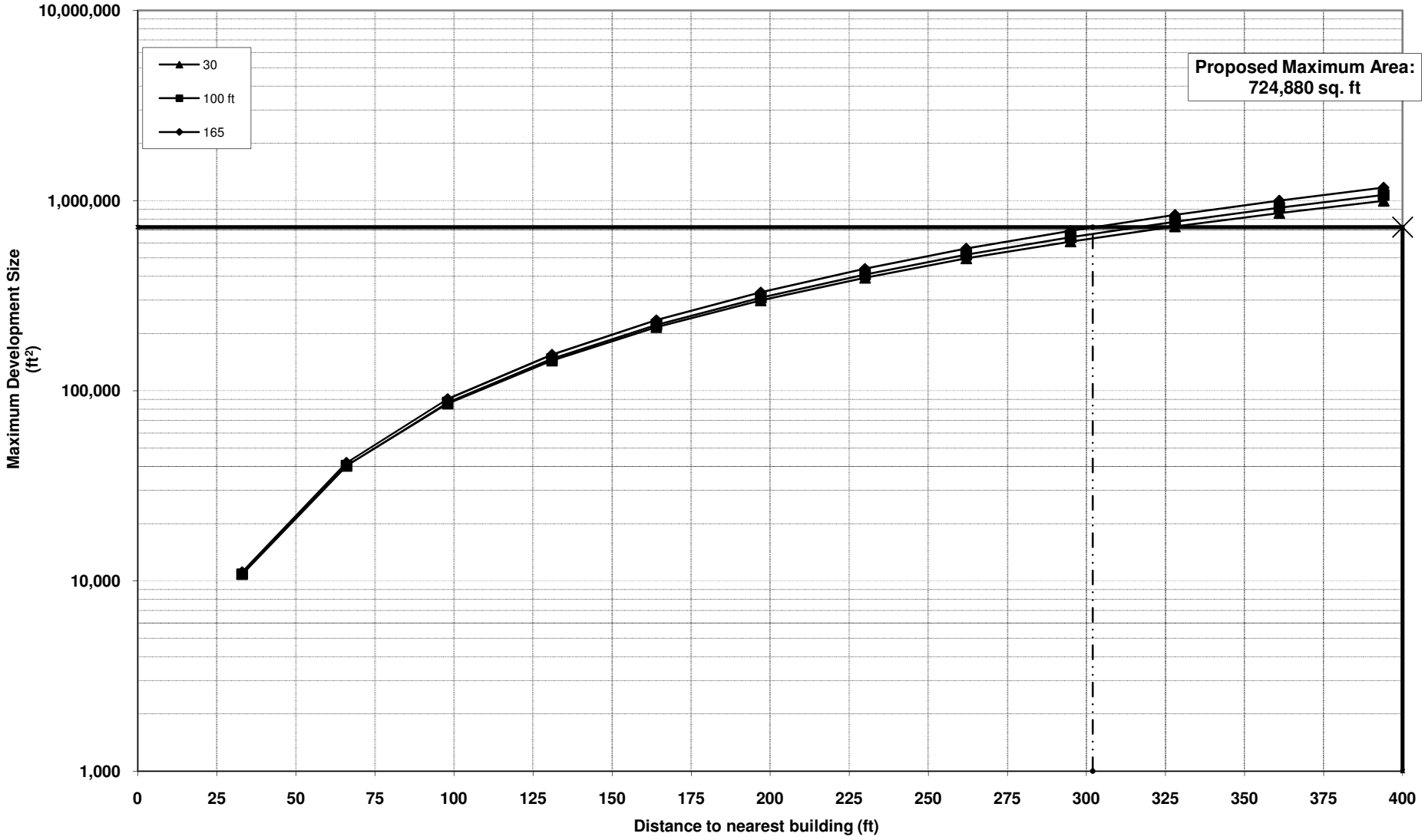


Stack Height: 206 ft
Distance to Nearest Building of Similar or Greater Height: 400 ft
Proposed Maximum SQFA: 724,880 sq. ft
Minimum Allowable Distance to Nearest Building: 198 ft

Notes:

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

FIG App 17-5
SO_2 BOILER SCREEN
RESIDENTIAL DEVELOPMENT - FUEL OIL #2



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: