AIR QUALITY MODELING ANALYAIS
ATTAINMENT AND MAINTENANCNE DEMONSTRATION

4.14.6.0: Background

The Department's dispersion modeling analysis evaluated PM_{10} concentrations throughout the Medford-Ashland AQMA, both for the 1998 attainment analysis year and the maintenance forecast year of 2015. The analysis must evaluate compliance for both the daily (24-hr average) PM_{10} standard of 150 *micrograms PM_{10} per cubic meter* (ug/m^3), and the annual average PM_{10} standard of 50 ug/m^3. The analysis must show compliance with both standards at all locations throughout the AQMA. The modeling analysis evaluates two scenarios:

Attainment Analysis ("Current" Worst-Case Potential): The Attainment Analysis must evaluate the current potential for PM_{10} impacts under "worst-case" conditions. The Attainment Analysis uses the 1998 emissions inventory, which is our most accurate for the AQMA. Modeled emissions include legally allowable emissions from major industry (not actual emissions in 1998), and 1998, 1999, 2000 local meteorology (including stagnation events). This worst-case planning approach is an EPA requirement.

Maintenance Analysis (Future Worst-Case Potential): The Maintenance Analysis is based on our emissions forecast to the year 2015. The forecast reflects anticipated emissions growth in the AQMA from all source types (cars, woodstoves, commercial activity, etc.). Major industrial sources are again modeled at their legally allowable levels. The 2015 analysis also uses meteorology from 1998, 1999, and 2000 (including air stagnation events).

Determining Compliance with PM_{10} Standards

There is an important difference between an exceedance of the daily (24-hr) standard and a violation. The form of the daily PM_{10} standard (i.e. the method used to determine legal compliance), allows an average of one exceedance of the standard per year at any given location (averaged over a consecutive three-year period). The daily PM_{10} standard is 150 ug/m^3. Three exceedances of the standard at one location in a three year period would not be a violation. Four or more exceedances of the standard at the same location in a three year period would be a violation of the standard. It is therefore the 4th highest PM_{10} value at any given location that is used to determine compliance with the standard.

For the annual average PM_{10} standard, model predicted annual average PM_{10} values must be below the annual avg. PM_{10} standard of 50 ug/m^3 in order to show compliance.

The Department's compliance analysis shows that the AQMA will continue to be in compliance with both the daily and annual average PM_{10} standards through at least the year 2015.

4.14.6.1 Attainment Analysis (1998 Worst-Case Conditions)

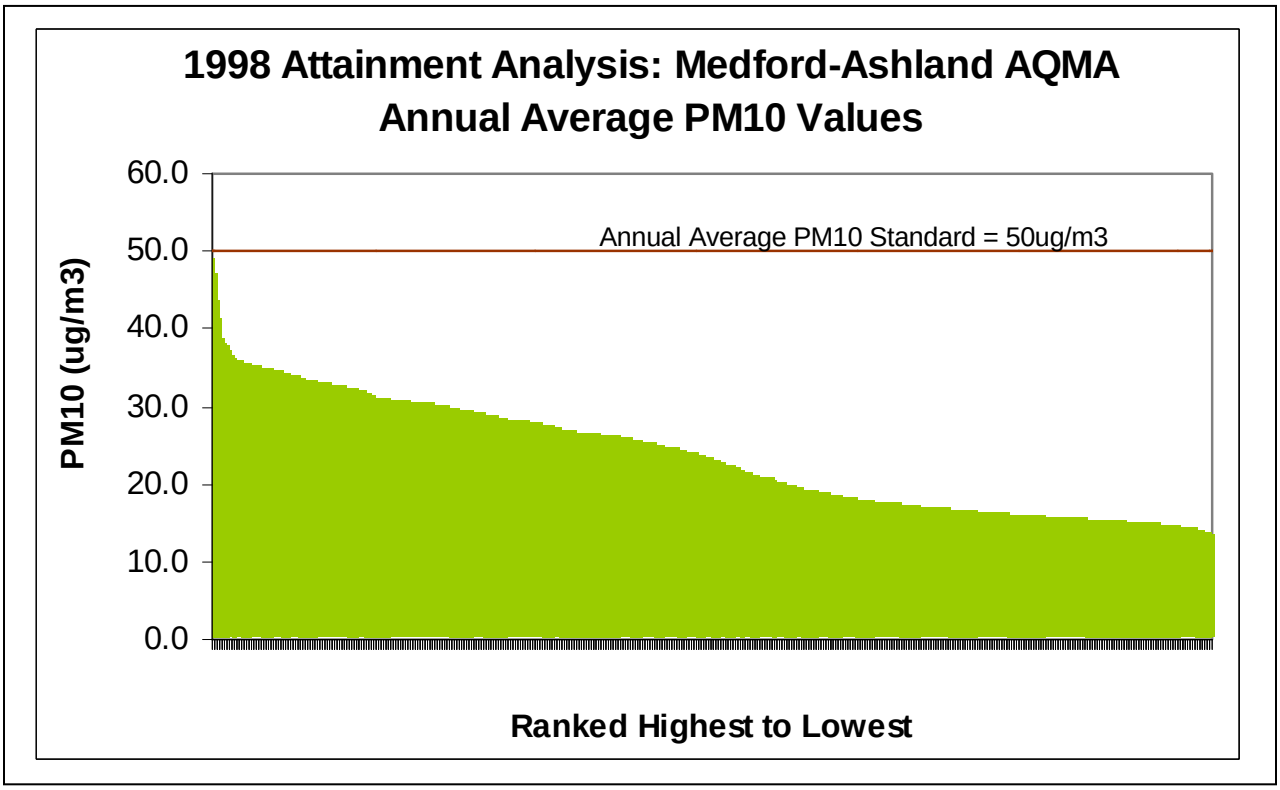
Annual Average Compliance

Table 10 shows the top 1% percent of model predicted annual average values for the 1998 (worst-case) attainment scenario (data set of 1244 receptors: initial 1-km spaced receptors plus the hot-spot modeling 0.25km spaced receptors). There are no violations predicted of the annual average PM_{10} standard. Figure 50 shows all predicted 1998 (attainment) annual average values ranked from highest to lowest.

Table 10: Top 1% of model Predicted Annual Average PM_{10} values (1998 Attainment Analysis)

Model Coordinate X	Model Coordinate Y	Predicted Annual Avg. PM_{10} (ug/m^3)	Model Coordinate X	Model Coordinate Y	Predicted Annual Avg. PM_{10} (ug/m^3)
512.00	4697.00	**49.2**	509.25	4687.00	**43.2**
512.00	4698.00	**47.5**	509.50	4687.25	**43.2**
512.00	4698.25	**47.1**	509.75	4686.75	**41.4**
512.00	4697.50	**46.2**	512.00	4697.25	**39.7**
509.25	4687.25	**45.1**	509.75	4687.25	**39.0**
509.75	4687.00	**43.5**	509.75	4686.50	**38.8**

Figure 50: Predicted Annual Average PM_{10} Concentrations (1998 Attainment Analysis)



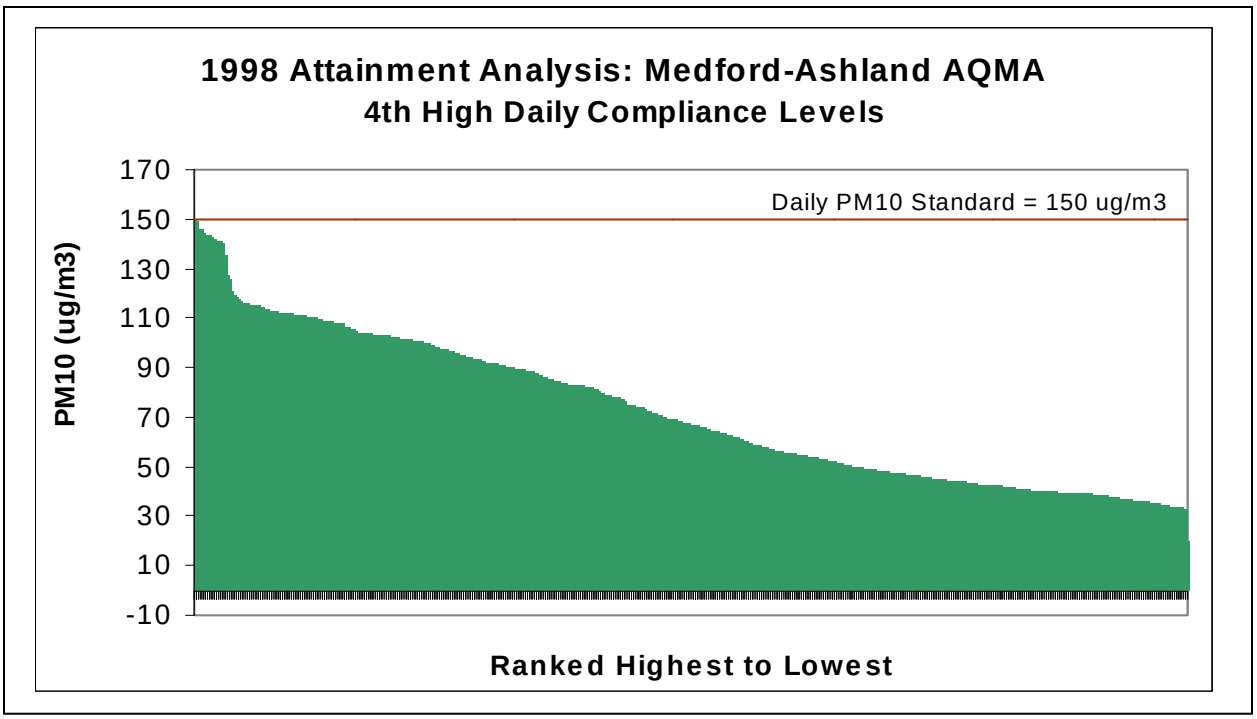
Daily (24-hr Avg.) Compliance

The modeling analysis shows that all predicted 4th highest daily PM_{10} values in the AQMA would be below the daily PM_{10} standard under worst-case conditions. Table 11 shows the top 1% of predicted 4th high daily values for the 1998 attainment scenario. Figure 51 shows all predicted 4th high daily values ranked from highest to lowest.

Table 11: Top 1% of predicted 4th Highest Daily (24-hr Avg.) PM_{10} values (1998 Attainment)

Model Receptor Coordinate X	Model Receptor Coordinate Y	Predicted 4th High Daily PM_{10} (ug/m^3)	Model Receptor Coordinate X	Model Receptor Coordinate Y	Predicted 4th High Daily PM_{10} (ug/m^3)
512.00	4697.25	**149.4**	512.75	4687.00	**145.8**
512.00	4697.75	**148.7**	513.00	4686.75	**145.7**
513.00	4687.00	**148.6**	513.50	4686.25	**145.5**
512.75	4686.75	**146.3**	513.50	4686.75	**145.0**
513.50	4686.50	**146.1**	513.25	4686.50	**144.5**
513.25	4686.75	**145.9**	513.25	4687.00	**143.9**

Figure 51: Predicted 4th High Daily PM_{10} Compliance Values

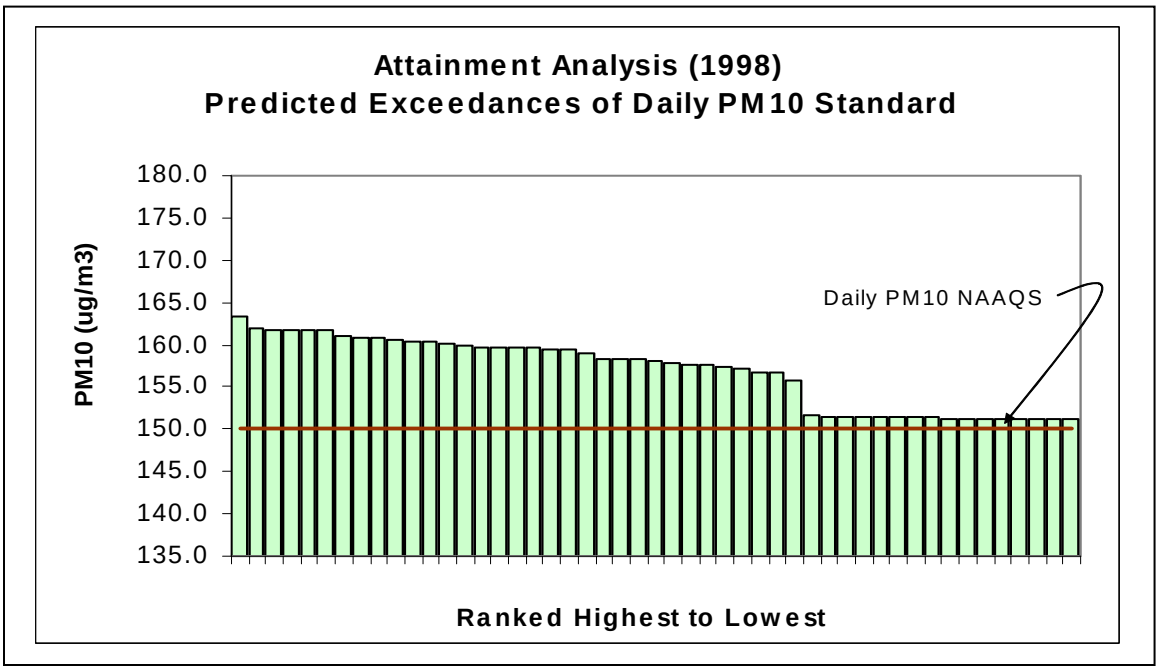


Exceedances of the Daily Standard

The attainment analysis predicts that exceedances of the daily PM_{10} standard could occur at multiple locations in the east Medford area during winter air stagnation conditions. The exceedances are predicted to occur on two winter days, in two different years (i.e. during the meteorological conditions that occurred on December 25th, 1998 and December 8th, 2000). Predicted exceedances range from approximately 151 ug/m^3 to 163 ug/m^3, and are primarily due to residential wood combustion. When woodstove curtailment is applied during these events, PM_{10} levels decrease substantially and the predicted exceedances are eliminated.

The attainment analysis also shows that one additional exceedance (156 ug/m^3) could occur under worst-case conditions in the central White City industrial area. Figure 51-1 shows the model predicted (worst-case) exceedances of the daily PM_{10} NAAQS (without the emission reduction effect of woodstove curtailment). Again, these predicted (potential) exceedances are not a violation of the PM_{10} standard.

Figure 51-1: Worst-Case exceedances of Daily PM_{10} Standard



PM_{10} levels in the AQMA: Air Quality Maps

The attached air quality maps (Figures 52-55) show predicted annual average and daily (24-hr avg.) PM_{10} levels for the attainment compliance analysis. These "isopleth" maps use contour lines to show different PM_{10} concentrations. In the maps showing daily PM_{10} values, each isopleth line changes by 10 ug/m^3. For the maps showing annual average PM_{10} concentrations, each isopleth line changes by 2 ug/m^3.

Figure 52: Annual Average PM_{10} (AQMA)

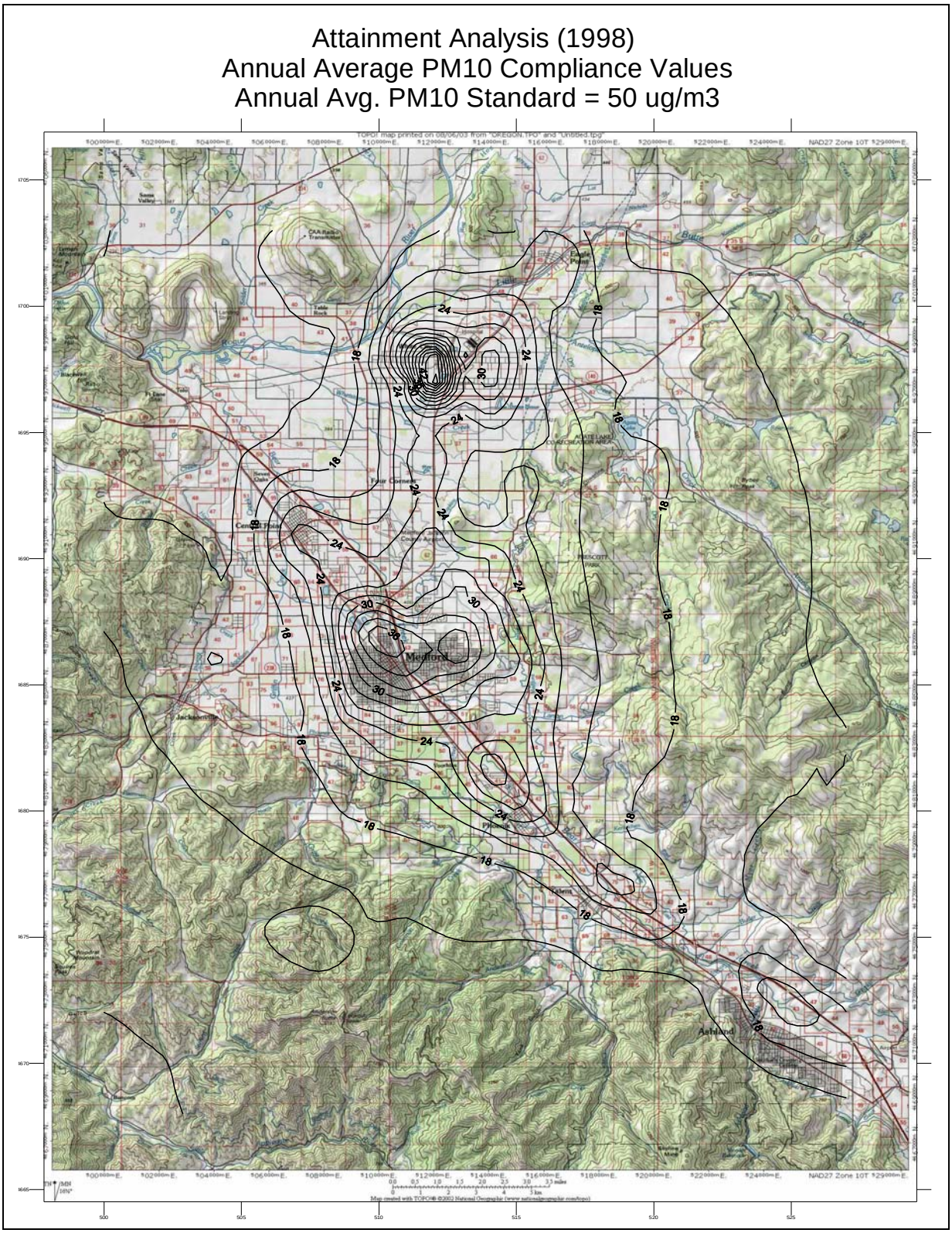

Attainment Analysis (1998)
Annual Average PM10 Compliance Values
Annual Avg. PM10 Standard = 50 ug/m3
Medford
Ashland
Central Point
Jacksonville
Phoenix
Talent
Eagle Point
Table Rock
Bear Creek
Rogue
Bybee Park
Four Corners
Prescott Park
Lamar Acres
Sams Valley
Bachelor Park
Ft Dane Park
Rogue Indian Park
Roadster Mountain
Bear Mountain
Bluebird Park
Bluebird Mtn
Bluebird Falls
Bear Creek Park
Bear Creek Park Campground
Bear Creek Park Campground Amphitheater
Bear Creek Park Campground Ranger Station
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Figure 53: Daily PM_{10} (AQMA)

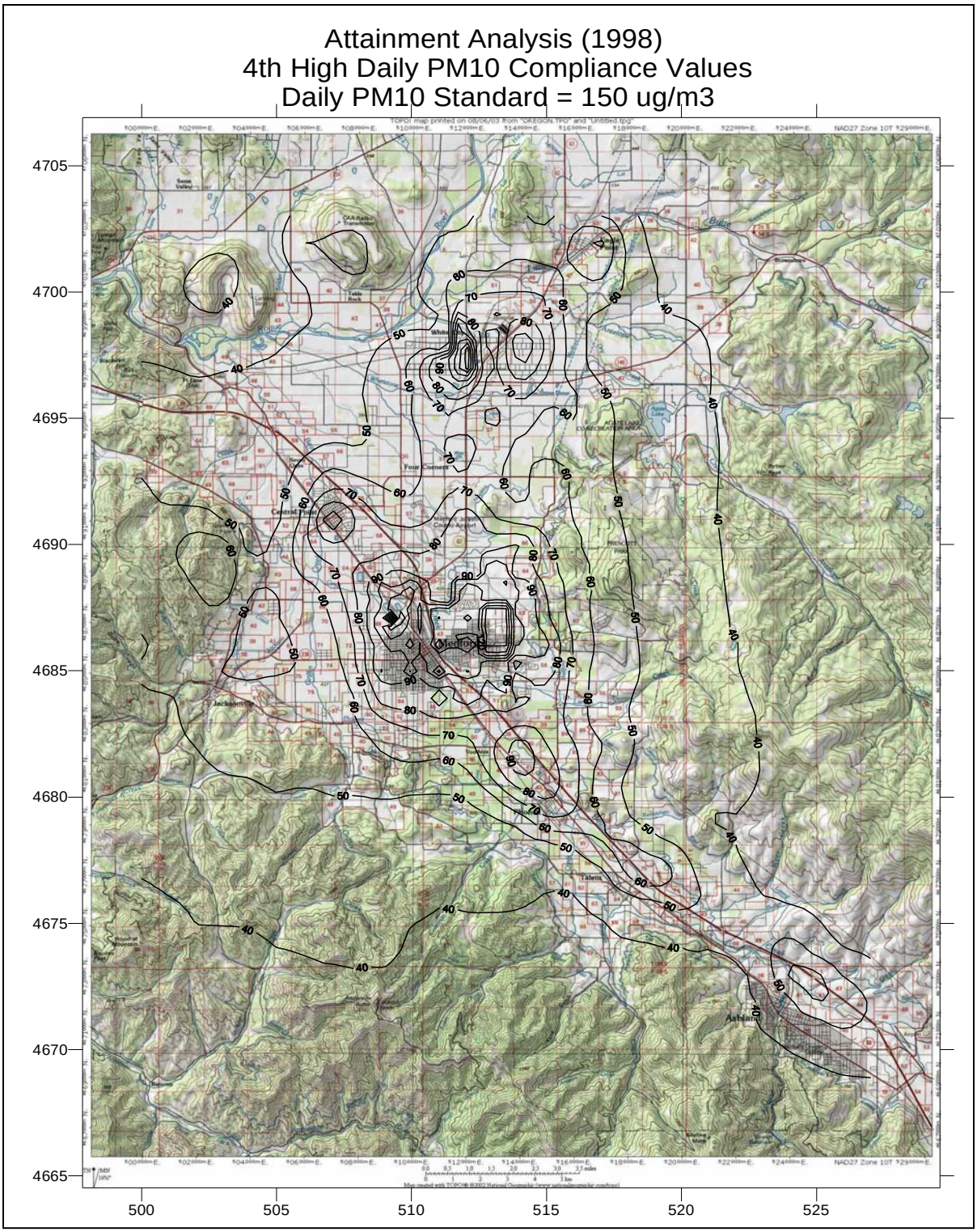

Figure 54: Annual Average PM_{10} (Medford-White City Area)

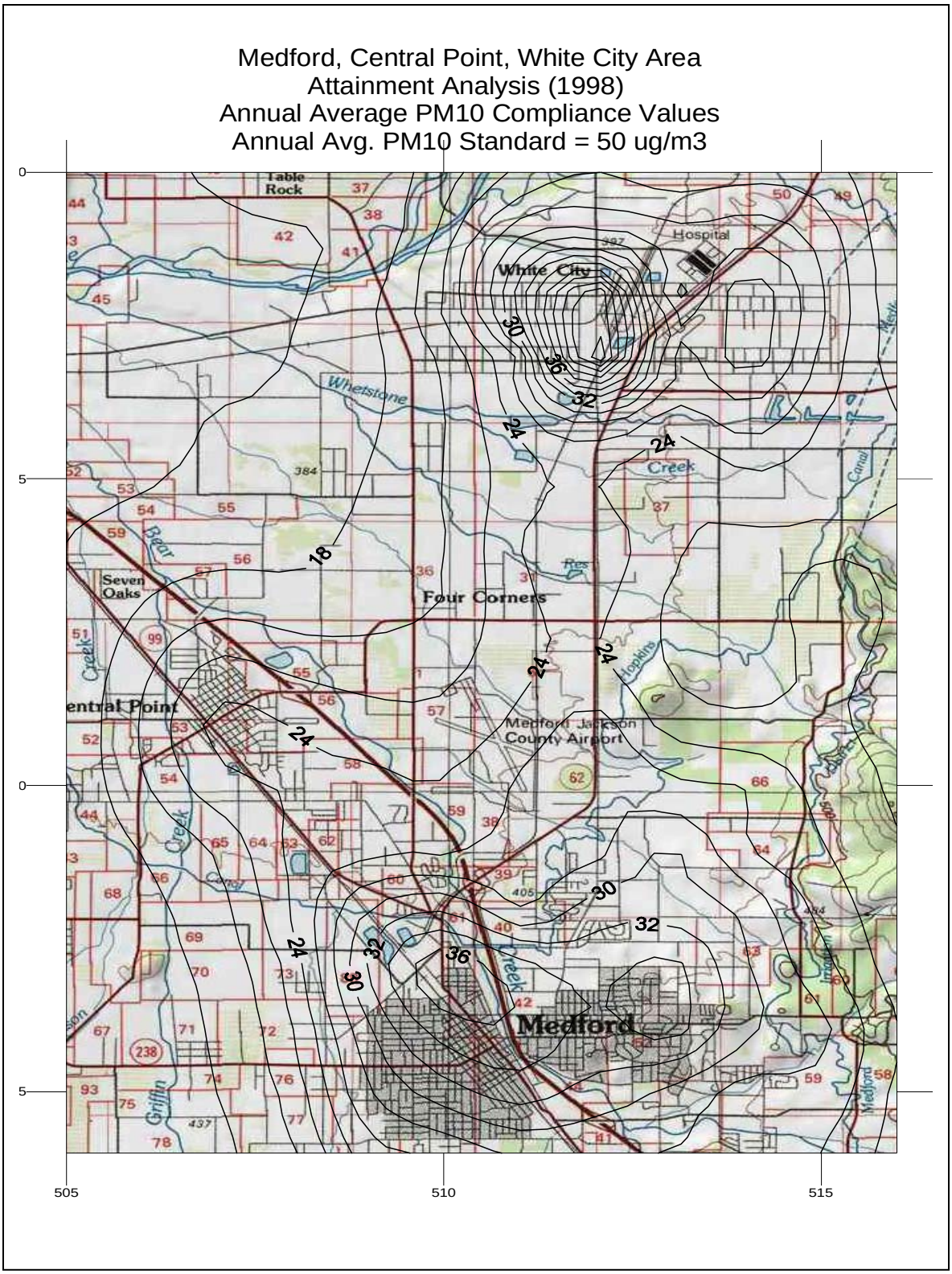
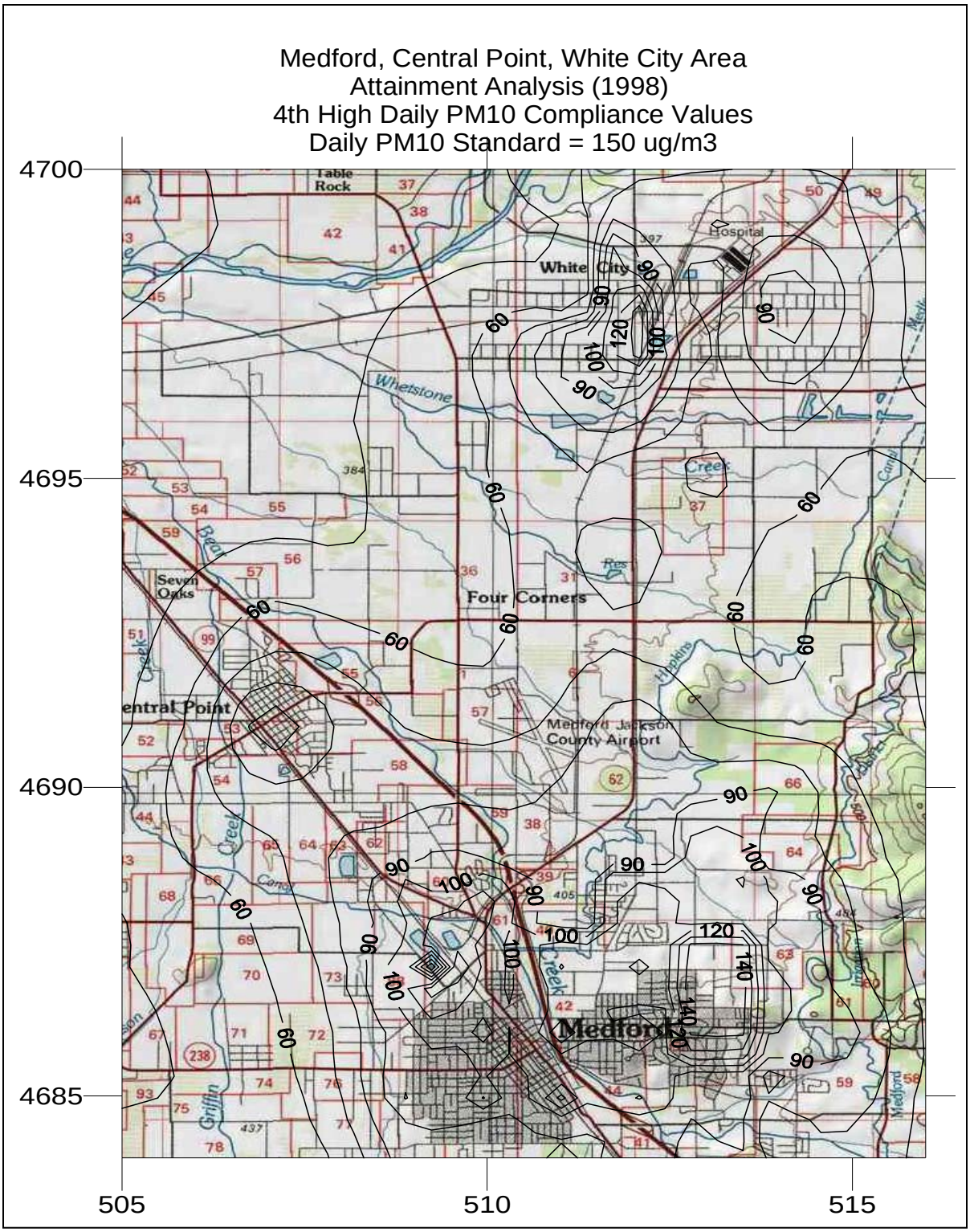
Figure 55: Daily PM_{10} (Medford-White City Area)