CLEANER AIR BETTER COMMUNITIES

Community Land Use Planning for Air Quality

Iowa Department of Natural Resources

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AIR AGENCY CONTACTS

We hope you find this guide practical for your community's air quality planning.

DNR Air Quality Bureau
7900 Hickman Road Ste 1
Windsor Heights, IA 50324
(515) 725-9500 or 1-877-AIR-IOWA

www.iowadnr.gov/InsideDNR/RegulatoryAir

Air quality news, monitoring data, permitting assistance, and links to air quality rules and guidance

Small Business Liaison - Air Quality
DNR Air Quality Bureau
7900 Hickman Rd. Ste. 1
Windsor Heights, IA 50324
(515) 725-9575

www.iowadnr.gov/Environment/AirQuality/SmallBusinessAssistance

Technical referral assistance, complaint resolution, outreach assistance

Air Quality Division
Linn County Public Health Department
501 13th St. NW
Cedar Rapids, IA 52405-3700
(319) 892-6000

www.linncleanair.org

Information on air pollution monitoring, permitting, and Linn County air rules and guidance

Air Quality Division
Polk County Public Works
5885 NE 14th Street
Des Moines, IA 50313
(515) 286-3705

www.polkcountyiowa.gov/airquality

Information on air pollution monitoring, permitting, and Polk County air rules and guidance

Iowa Air Emission Assistance Program
Iowa Waste Reduction Center
University of Northern Iowa
Suite 113, BCS Building
Cedar Falls, IA 50614-0185
(319) 273-8905

www.iwrc.org/services/iaeap

Small business education and training on air emissions regulations and requirements

Office of Systems Planning
Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010
(515) 239-1528

www.iowadot.gov/local_systems/index.htm

Guidance for development of transportation projects

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Terms and Acronyms

Act When both houses of congress approve a bill and the president approves it, the new law is called an act.

Ambient air The air to which the general public has access.

Area source Refers to a series of small sources that together can affect air quality in a region, such as a community of homes using wood stoves for heating.

Attainment An area that meets or is better than the primary National Ambient Air Quality Standard.

Biogenic sources Air pollution sources that are natural, such as trees and vegetation.

CAA Clean Air Act.

Code of Federal Regulations (CFR) The official record of all regulations created by the federal government. It is divided into 50 volumes, called titles, each of which focuses on a particular area.

DERA Diesel Emissions Reduction Act

Federal Register Regulation proposals are listed in the Federal Register so that members of the public can consider it and send their comments to the EPA. Notices in the Federal Register include the original proposal, requests for public comment, notices about meetings where the proposal will be discussed (public meetings) and the text of the final regulation.

Fugitive Dust Emissions of airborne solid particulate matter which could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening.

HAPS Hazardous air pollutants, also called toxic air pollutants, or air toxics. These pollutants are known or suspected to cause cancer or other serious health effects such as reproductive effects or birth defects, or adverse environmental consequences.

Mobile sources On-road and off-road transportation, passenger vehicles, light-, medium, and heavy-duty including vehicles, quarrying and mining equipment, and agricultural machinery.

NAAQS National Ambient Air Quality Standards established by the EPA under the authority of the CAA for outdoor air throughout the country.

NESHAPs National Emissions Standards for Hazardous Air Pollutants.

Nonattainment An area that does not meet ambient air quality standards.

Nonroad Gasoline and diesel powered vehicles, engines, and equipment operated off road used for construction, agriculture, transportation, recreation, and many other purposes.

NOx Nitrogen oxides.

Ozone Ozone in the stratosphere protects people and plant life on earth by blocking the sun's harmful ultraviolet rays. This is often referred to as "good ozone." Ozone in the troposphere, the atmospheric layer we live in, is hard on lungs and plant life and is referred to as "bad ozone."

PM Particulate matter, particles.

PM2.5 Particulate matter with an aerodynamic diameter that is less than or equal to 2.5 microns in size.

Point source A source at a fixed point, such as a smokestack or chimney that emits air pollutants.

Regulations Specific state and federal administrative rules that implement statutes.

SOx Sulfur oxides.

Stationary sources Fixed sources such as power plants and cement facilities.

tpy tons per year.

Volatile Chemicals that can evaporate or pass from a liquid state to a gaseous state.

VOCs Volatile Organic Compounds.

Introduction:

Community Land Use Planning for Air Quality

Land-use planners balance many competing interests as they weigh rural-urban-suburban uses, cost of providing services, areas of population gain and loss, property values, changes in community structure, traffic congestion and commuting times, environmental impacts and changes in perceived quality of life.

Iowa has been perceived as a clean air state, open for economic development with few restrictions compared to many other states. Except in specific, isolated cases, land use planning for air quality has not been a factor. However, as the U.S. Environmental Protection Agency reviews the latest health research, the health-based standards are becoming more stringent due to mounting evidence that humans and the environment are impacted by air pollution more than previously understood.

This guide has been created to promote better, more informed decision-making to voluntarily improve air quality and public health in communities. It will identify Iowa's particular air quality concerns and how these affect citizens' health, especially the health of those of special concern: children, seniors, and those with lung and heart diseases. It will also discuss the economic impacts if air quality does not meet federal standards.

The recommendations in this guide support Iowa smart planning principles. Legislation passed in 2010 includes 10 smart planning principles and 13 comprehensive planning elements that community land use planners may consider in their planning activities. Some of the principles and elements include consideration of evaluating impacts on air quality as part of the community planning process. Improved air quality can be a result of integrating these principles and elements, if planners and developers understand how their decisions influence air quality and ways those impacts can be reduced.

This guide's objectives are to:

1) Identify approaches that land use agencies can use to prevent or reduce potential air pollution impacts;

2) Provide recommendations on situations to avoid when siting new residences, schools, day care centers, playground and medical-related facilities;

3) Encourage collaboration between land use agencies and local and state air quality agencies to reduce community exposure to pollution impacts;

4) Communicate air quality consequences in land use decision-making.

5) Improve and facilitate access to air quality data and evaluation tools for land use decision-making by communities.

6) Help keep Iowa in federal attainment status.

Human actions are the major cause of air pollution, primarily through combustion of fuel. The largest sources of air pollution are regulated through permit programs (See Appendix A). Other sources are required to use the best control strategies available. These regulatory tools avert air pollution.

Communities have air quality control tools also: planning and zoning authority; set back and landscaping requirements; permit issuance; and ordinances.

These tools used together can help communities stay within EPA health standards and support plans for economic growth.

Considerations for New Land Uses

What land uses and facility categories potentially emit air pollutants?

The extended chart that follows contains land use classications by activity, the types of air pollutants emitted, and Iowa's regulatory requirements. This chart can help planners access air quality impacts as they weigh important factors in community land use decisions.

Air quality consideration should be given to:

- impacts on sensitive populations;
- air quality impacts during the construction of projects;
- cumulative impacts of air pollution from the communities sources; and
- implications for the project on the area's attainment status.

Following the chart is discussion of some of these concerns and how to address these for projects.

Land Use Classifications by Activity	Facility or Project Examples[1]	Key Pollutants[3]	Regulatory Requirements
COMMERCIAL/LIGHT INDUSTRIAL: SHOPPING, BUSINESS, AND COMMERCIAL			
Primarily retail shops and stores, office, commercial activities, and light industrial or small business	Dry cleaners; gas dispensing facilities; auto body shops; metal plating shops; photographic processing shops; textiles; leather and leather products; appliance repair shops; mechanical assembly cleaning; printing shops; large shopping malls; drive-through restaurants Processes using solvents[2]	VOCs, air toxics, including diesel PM, NOx, CO, SOx, PM2.5, GHGs	Limited
Goods storage or handling activities, characterized by loading and unloading goods at warehouses, large storage structures, movement of goods, shipping and trucking generators	Warehousing; freight-forwarding centers; drop-off and loading areas; distribution centers	VOCs, air toxics, including diesel PM, NOx, CO, SOx, GHGs	Yes
LIGHT INDUSTRIAL: RESEARCH AND DEVELOPMENT			
Medical waste at research hospitals and labs	Incineration; surgical and medical instrument manufacturers; pharmaceutical manufacturing; biotech research facilities	Air toxics, NOx, CO SOx, PM, diesel PM, GHGs	Yes
Electronics, electrical apparatus, components, and accessories	Computer manufacturer; integrated circuit board manufacturer; semiconductor product	Air toxics, VOCs, GHGs	Yes
College or university lab or research center	Medical waste incinerators; lab chemicals handling, storage and disposal	Air toxics, NOx CO, SOx, PM/PM10/ PM2.5, GHGs	Yes
Research and development labs	Satellite manufacturer; fiber-optics manufacturer; defense contractors; space research and technology; new vehicle and fuel testing labs	Air toxics, VOCs, GHGs	Yes
Commercial testing labs	Consumer products; chemical handling, storage and disposal	Air toxics, VOC, GHGs	Yes

[1]Not all facilities will emit pollutants of concern due to process changes or chemical substitution. Consult the Iowa DNR Air Quality Bureau or Polk or Linn county air agencies regarding specific facilities.

[2]Some solvents may emit air toxics, but not all solvents are toxic air contaminants.

[3]A key pollutant is a substance in the air that, in high enough concentrations, produces a detrimental environmental effect. Information on Key Pollutants is in Appendix B

Land Use Classifications by Activity	Facility or Project Examples	Key Pollutants	Regulatory Requirements
INDUSTRIAL: NON-ENERGY-RELATED			
Assembly plants, manufacturing facilities, industrial machinery	Adhesives; chemical; textiles; apparel and furniture upholstery; clay, glass and stone products production; asphalt materials; cement manufacturers, wood products; paperboard containers and boxes; metal plating; metal and canned food product fabrication; auto manufacturing; food processing; printing and publishing; drug, vitamins, and pharmaceuticals; dyes; paints; pesticides; photographic chemicals; polish and wax; consumer products; metal and mineral smelters and foundries; fiberboard; floor tile and cover; wood and metal furniture and fixtures; leather and leather products; general industrial and metalworking machinery; musical instruments; office supplies; rubber products and plastics production; saw mills; solvent recycling; shingle and siding; surface coatings	VOCs, air toxics, including diesel PM/ PM10/PM2.5, NOx, CO, SOx, Pb, GHGs	Yes
INDUSTRIAL: ENERGY AND UTILITIES			
Water and sewer operations	Pumping stations; air vents; treatment; incinerators	VOCs, air toxics, NOx, CO, SOx, PM10, Hg, GHGs	Yes
Power generation and distribution	Power plant boilers and heaters; portable diesel engines; gas turbine engines	NOx, diesel PM/PM10/ PM2.5, NOx, CO, SOx, Pb, Hg, VOCs, GHGs	Yes
Refinery operations	Refinery boilers and heaters; coke cracking units; valves and flanges; flares	VOCs, air toxics, including diesel PM, NOx, CO, SOx, PM10/ PM2.5, GHGs	Yes
Oil and gas extraction	Oil recovery systems; uncovered wells	NOx, diesel PM, VOCs, CO, SOx, PM10/PM2.5, GHGs	Yes
Gasoline storage, transmission, and marketing	Above- and below-ground storage tanks; floating roof tanks; tank farms; pipelines; compressor stations	VOCs, air toxics, including diesel PM, PM10/ PM2.5, NOx, CO, SOx, GHGs	Yes
Solid and hazardous waste treatment, storage, and disposal activities.	Landfills; methane digester systems; process recycling facility for concrete and asphalt materials	VOCs, air toxics, NOx, CO, SOx, PM10/PM2.5 GHGs	Yes
CONSTRUCTION (NONTRANSPORTATION)			
	Building construction; demolition sites	PM (re-entrained road dust), asbestos, diesel PM, NOx, CO, SOx, PM10, VOCs, asbestos, GHGs	Limited; federal off-road equipment standards, fugitive dust rules, asbestos removal requirements

Land Use Classifications by Activity	Facility or Project Examples	Key Pollutants	Regulatory Requirements
DEFENSE			
	Ordnance and explosives demolition; range and testing activities; chemical production; degreasing; surface coatings; vehicle refueling; vehicle and engine operations and maintenance	VOCs, air toxics, diesel PM, NOx, CO, SOx, PM10/PM2.5, GHGs	Limited; prescribed burning; equipment and solvent rules
TRANSPORTATION			
Vehicular movement	Residential area circulation systems; parking and idling at parking structures; drive-through establishments; car washes; special events; schools; shopping malls, etc.	VOCs, NOx, PM (re-entrained road dust), air toxics e.g., benzene, diesel PM, formaldehyde, acetaldehyde, 1,3 butadiene, CO, SOx, PM10, GHGs	Very limited
Road construction and surfacing	Street paving and repair; new highway construction and expansion	VOCs, air toxics, including diesel PM, NOx, CO, SOx, PM10/ PM2.5, GHGs	No
Trains	Railroads; switch yards; maintenance yards	VOCs, NOx, CO, SOx, PM10/PM2.5, air toxics, including diesel PM, GHGs	Limited; applicable federal MV standards, and possible equipment rules
Marine and port activities	Recreational sailing; commercial marine operations; hotel operations; loading and unloading; servicing; shipping operations; port or marina expansion; truck idling		
Aircraft	Takeoff, landing, and taxiing; aircraft maintenance; ground support activities		
Mass transit and school buses	Bus repair and maintenance		
NATURAL RESOURCES			
Farming operations	Agricultural burning; diesel operated engines and heaters; small food processors; pesticide application; agricultural off-road equipment	Diesel PM, VOCs, NOx, PM10/PM2.5, CO, SOx, pesticides, GHGs	Limited; agricultural burning requirements, applicable federal mobile source standards; pesticide rules
Livestock and dairy operations	Dairies and feed lots	Ammonia, VOCs, PM10/PM2.5, GHGs	Generally exempt
Logging	Off-road equipment e.g., diesel fueled chippers, brush hackers, etc.	Diesel PM, NOx, CO, SOx, PM10, VOCs, GHGs	Limited; applicable federal mobile source standards
Mining operations	Quarrying or stone cutting; mining; drilling or dredging	PM10/PM2.5, CO, SOx, VOCs, NOx, GHGs, and asbestos in some geographical areas	Applicable equipment rules and dust controls

Land Use Classifications by Activity	Facility or Project Examples	Key Pollutants	Regulatory Requirements
RESIDENTIAL			
Housing	Housing developments; retirement developments; affordable housing	Fireplace emissions (PM10/PM2.5 NOx, VOCs, CO, air toxics); water heater combustion (NOx, VOCs, CO, GHGs)	No
ACADEMIC AND INSTITUTIONAL			
Schools, including school-related recreational activities	Schools; schoolyards; vocational training labs/classrooms such as auto repair/painting and aviation mechanics	Air toxics, VOCs, PM10/PM2.5, GHGs	Yes
Medical waste	Incineration	Air toxics, NOx, CO, PM10/PM2.5, GHGs	Yes
Clinics, hospitals, convalescent homes		Air toxics, GHGs	Yes

Will sensitive populations be impacted?

The proximity of certain facilities to sensitive populations is of special concern. Sensitive populations include children, the elderly, pregnant women and those with existing health problems (such as asthma and emphysema) that make them especially vulnerable to the effects of air pollution. The costs of increased hospitalizations, medication use, and lost work and school days are burdens we all share when the air is not healthy for sensitive populations.

For example, the location of schools, day care centers, playgrounds, senior living facilities, nursing homes and medical facilities should have an appropriate separation from industrial facilities, freeways, rail yards, chrome platers, dry cleaners using perchloroethylene, and other emitters of air toxics and criteria pollutants.

The chart on page 6, "Recommended Siting Distances for Source Categories from the Vicinity of Sensitive Populations," is based on recommendations from the California Environmental Protection Agency and the California Air Resources Board. Those entities carefully reviewed data available for each air pollution source category and epidemiological studies of health risks by relative exposure for non-cancer and cancer impacts and established these recommended minimum separation distances for siting new land uses.

The information is not regulatory or binding. Keep in mind that wind, meteorology, and topography could possibly increase or decrease risks depending on local conditions. These recommendations are offered to fill a gap where information about existing facilities may not be readily available.

Land use planners should work with the local emergency planning committees (LEPCs) to develop maps that locate facilities with chemical inventories to make sure facilities that serve sensitive populations and residential areas will not be at risk by accidential releases.

What is immediately downwind from the proposed project?

Wind variables are speed and direction. Wind speed determines the amount of initial pollution dilution experienced and how high the pollution may rise. Wind direction determines the transport direction of emitted pollution. Terrain features and urban structures also influence air flow.

Sensitive populations that are in a prevailing wind direction from a proposed project are considered to be downwind from the proposed project. This makes the sensitive populations more likely to be impacted by the proposed project. More information on weather and terrain effects on pollution movement is in Appendix C.

Is the project designed to reduce air pollution exposure?

A number of design options can impact air quality, depending on the site concerns. Natural barriers of shrubs and trees or constructed barriers could

Recommended Siting Distances for Source Categories from the Vicinity of Sensitive Populations

Source Category	Advisory Recommendations
Freeways and High-traffic Roads	Avoid siting new land uses of concern within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day.
Distribution Centers	Avoid siting new land uses of concern within 500 feet of a freeway, urban roads with 100,000 vehicles/day, or rural roads with 50,000 vehicles/day. Avoid siting new land uses of concern within 1,000 feet of a distribution center that accommodates more than 100 trucks per day, more than 40 trucks with operating transport refrigeration units (TRU) per day, or where TRU unit operations exceed 300 hours per week. Take into account the configuration of existing distribution centers and avoid locating residences and other new land uses of concern near entry and exit points.
Rail Yards	Avoid siting new land uses of concern within 1,000 feet of a major service and maintenance rail yard. Within one mile of a large rail yard, consider possible siting limitations and mitigation approaches.
River Ports	Avoid siting new land uses of concern immediately downwind of river ports with heavy diesel engine use.
Refineries	Avoid siting new land uses of concern immediately down wind of petroleum refineries. Consult with local air agencies or the Iowa DNR Air Quality Bureau to determine an appropriate separation.
Chrome Platers	Avoid siting new land uses of concern within 1,000 feet of a chrome plater.
Dry Cleaners using Perchloroethylene	Avoid siting new land uses of concern within 300 feet of any dry cleaning operation. For operations with two or more machines, provide 500 feet. For operations with 3 or more machines, consult with the local air agency or the Iowa DNR Air Quality Bureau. Do not site new sensitive land uses in the same building with perc dry cleaning operations.
Gasoline Dispensing Facilities	Avoid siting new land uses of concern within 300 feet of a large gas station (defined as a facility with a throughput of 3.6 million gallons per year or greater). A 50 foot separation is recommended for typical gas dispensing facilities.

The relative risk for the above categories varies greatly. Risk from diesel fine particles will decrease over time as cleaner technology phases in. Also, site-specific project design improvements may help reduce air pollution exposures and should also be considered for siting land uses in the vicinity of sensitive populations.

deflect the direction or absorb pollution emissions. Building improvements, such as enhanced building ventilation or an improved filtering system, can protect those inside a building. Paved surfaces could reduce dust emissions. Traffic could be routed in a direction away from sensitive populations.

What data is available to characterize the relative exposure and health risk of air emissions?

The DNR air quality bureau maintains the state's air emissions inventory: a listing, by source, of the amounts of pollutants discharged annually. Emissions inventory staff can provide you with inventory information and help characterize your community's air quality concerns.

Health risks for pollutants are available from the EPA. For Hazardous Air Pollutants, go to www.epa.gov/ttnatw01/hlthef/hapindex.html. For criteria air

pollutants, go to www.epa.gov/air/urbanair/.

Is an air agency looking at this area for additional emissions control?

Depending on the community, contact either DNR Air Quality Bureau or the Polk or Linn county air agency to find out if additional emissions controls are being considered in the area.

Additional information about how air pollution is regulated at the federal or state levels is available in Appendix A.

What are the known air pollution risks?

Refer to the facility category chart on pages 2-5 to determine possible air pollution risks.

Air Quality Impacts During Construction

Although air quality impacts may be temporary during construction, they can still cause conditions that could impact the safety of citizens.

Will project construction activities, such as grading, leveling and earth moving activities on newly disturbed ground surfaces, result in increased air pollutants?

These activities will create fugitive dust fine particle pollution. When breathed deep into the lungs they cause respiratory problems. State law requires individuals and organizations to take reasonable precautions to prevent visible fugitive dust generated on site from crossing the property line.

Use of water or dust control chemicals is required during demolition of buildings or structures, construction operations, road grading, or land clearing. Any substance used for dust control other than water must not be applied in a place or in such quantities that the result is runoff that reaches either surface or ground water.

- Cover open-bodied vehicles transporting materials that will likely emit dust.
- Promptly remove earth and other materials from paved streets, whether deposited by trucking or earth-moving equipment, erosion by water, or other means.
- Reduce vehicle speed over on-property surfaces to minimize dust.

The complete text of the Iowa fugitive dust regulation is in Appendix D.

Some proactive measures to consider other than those in Iowa regulations may be to:

- Require the construction of natural or artificial wind breaks or wind screens and the planting of grass or application of mulch to open ground that won't receive vehicle traffic.
- Encourage the use of paved roads, as dust from travel on paved surfaces is typically less than on unpaved ones.
- Lower the speed limit on dirt roads.

Will project construction equipment generate PM2.5 emissions?

Exhaust from nonroad heavy-duty diesel engines used to operate construction equipment contains fine particles and 40 toxic air pollutants. Engines built prior to 2003 emit the most pollution.

There are several strategies that can reduce the amount of pollution these engines produce:

- properly maintain the equipment;
- reduce idling;
- retrofit diesel engines with verified technologies;

- replace older equipment;
- use cleaner fuels; and
- repower equipment (i.e. replace older engines with newer, cleaner engines).

For more information on these strategies, go to www.epa.gov/cleandiesel/construction/index.htm.

Will the project emit organic gases?

Paints, lacquers varnishes, paint strippers, cleaning supplies, building materials and furnishings, office equipment such as copiers and printers, glues and adhesives all omit volatile organic compounds (VOCs). VOCs are problematic in that they are ozone precursors and most contain hazardous air pollutants. Workers should keep lids on chemical containers.

Will traffic generated by the proposed project increase carbon monoxide levels along local roadways?

Carbon monoxide levels will increase due to idling vehicles. Mitigate traffic tie-ups at intersections through improvements such as traffic signals, roadway widening, turning restrictions, roadway realignment and traffic control officers to reduce carbon monoxide and ozone precursor buildups. Contractors should be refrained from unnecessary vehicle idling on the construction site.

Air Quality Index

The AQI is an index for reporting daily air quality. The higher the AQI value, the greater the level of air pollution and the greater the health concern. For example, an AQI value of 50 represents good air quality with little potential to impact public health, while an AQI value greater than 300 represents hazardous air quality. Most days in Iowa are in the good to moderate level. Sensitive groups are affected when the index is over 100. The daily forecast is at www.airnow.gov.

Cumulative Impact Assessment and Policy Making

During the assessment of a project, land use planning should include an evaluation of the cumulative effects of changes to air quality caused in combination with other past, present and future community land uses.

Comprehensive Plan. The most efficient way to handle the cumulative impact assessment is with the policies and direction in the community's comprehensive plan. For instance, if a source has a lot of HAPs, what considerations are built in the plan to protect citizens from HAPS? Federal requirements may not be enough protection.

Can a policy encourage heavy-duty diesel trucks to take an alternate route away from residential areas? Are areas identified as future industrial, commercial and residential uses? These policies could introduce design and distance parameters to reduce emissions, exposure, and risk from industrial and commercial land uses that are in close proximity to residential areas or schools.

Zoning. With the popularity of mixed-use areas, zoning ordinances may need to be reviewed to determine how to avoid exacerbating poor land use practices of the past or contributing to localized and cumulative air pollution impacts in the community. Is a proposed assisted living project adjacent to an existing chrome plating facility or several dry cleaners? Are multiple industrial sources located directly upwind of a new apartment complex? Is a new housing development downwind from a distribution center attracting diesel-fueled delivery trucks?

If changes to zoning are needed, this is a good opportunity to work with community planning groups, local businesses and community residents to figure out the best way to address existing incompatible land uses. An option is to add land use-based performance standards to zoning ordinances in existing mixed-use communities for certain air pollution project categories.

In developing project design or performance standards, consult with the DNR Air Quality Bureau or your local air agency.

Examples of land use-based air quality-specific performance standards include:

- Placing a process vent away from the direction of the local playground.
- Requiring setbacks between the project fence line and the population center.
- Limiting the hours of operation of a facility.

Cumulative Impact Assessment Questions

1. Is the community home to multiple industrial facilities with close proximity?

2. Do one or more major freeways or high-traffic volume surface streets cut through the community?

3. Is the area classified for mixed-use zoning?

4. Has a walk-through of the community been conducted to gather the following information:

   - land use activities in the area, such as types of businesses, housing developments and locations of sensitive populations;
   - proximity of existing and anticipated future projects to residential areas or sensitive populations; and
   - concentration of emission sources including anticipated future projects to residential areas or sensitive populations.

5. Has the DNR or local air agency been contacted to obtain location of sources of emissions?

6. What categories of commercial establishments are currently located in the area and does the air agency have these sources on file as being regulated or permitted?

7. What categories of sources such as distribution centers or warehouses are currently located in the area?

8. Does the community have a history of multiple complaints about air quality?

9. Have community leaders or groups been contacted about pre-existing or chronic community air quality concerns?

The questions in the box on page 9 can be used to provide the decision-maker with a better understanding of the potential for cumulative air pollution impacts to an affected community. Answers to these questions will help to determine if new projects or activities warrant a more detailed review. It may also help to see potential environmental concerns from the perspective of the affected community. Additionally, responses can provide local decision-makers with information with which to assess the best policy options for addressing neighborhood-scale air pollution concerns.

Cumulative impact questions can also be used to identify whether existing tools and procedures are adequate to address land use-related air pollution issues. This assessment can also be used to pinpoint project characteristics that may have the greatest impact on community-level emissions, exposure and risk. Such elements can include: the compliance record of existing sources including those owned or operated by the project proponent; the concentration of emissions from polluting sources within the approximate area of sensitive sites; transportation circulation in proximity to the proposed project; and compatibility with the General Plan and General Plan elements.

The DNR Air Quality Bureau or Linn or Polk County air agencies can provide useful assistance in the collection and evaluation of air quality information for some of the questions and should be consulted early in the process.

Mitigation. Sometimes a land use planner may not find a feasible alternate project location. Design improvements or other strategies may reduce the risk. Such strategies could include performance or design standards. Potential mitigation measures should be feasible, cost-effective and within the available resources and authority of implementing agencies to enforce. Examples of solutions to reduce cumulative air pollution impacts without denying what might otherwise be a desirable project are:

School children are one of the sensitive population groups that should be protected from cumulative air pollution impacts.

- A dry cleaner could open a storefront operation in a community with actual cleaning operations performed at a remote location away from residential areas.
- Gas dispensing facilities with lower fuel throughput could be sited in mixed-use areas.

Green Streets Initiative

The Iowa Department of Economic Development's (IDED) Green Streets initiative supports efforts to promote sustainability through building preservation and reinvestment in existing communities. The Green Streets initiative tool box includes the Iowa Green Streets criteria, a set of design and construction guidelines that promote public health, energy efficiency, water conservation, water quality, hazard mitigation, smart locations, operational savings, sustainable building practices and air quality.

The Iowa Green Streets Criteria apply to the IDED Housing Fund, Community Development Block Grant Program Community Facilities and Services Fund, Disaster Recovery projects, Neighborhood Stabilization Program, and Main Street Iowa Challenge Grant projects. As a result, the strategies enhance affordable housing, community facilities, town centers and communities as a whole.

Cities or counties may also develop incentive programs that encourage smart growth. IDED offers smart planning related training and resource information for communities working toward cleaner air and a more sustainable community. See www.iowalifechanging.com/community/green_initiatives.aspx for more information.

Community Development Block Grant

The primary goal of the Iowa Department of Economic Development's (IDED) Community Development Block Grant (CDBG) program is "the development of viable communities, by providing decent housing and suitable living environment and expanding economic opportunities, principally for persons of low and moderate incomes."

All incorporated cities and all counties in Iowa, except those designated as HUD entitlement areas, are eligible to apply for and receive funds under this program. Eligible activities include public facilities (such as water and sewer facilities and community buildings), housing rehabilitation, economic development and job training.

Air Quality Criteria in the CDBG Environmental Assessment Worksheet

1. Does the project require an installation permit, operating permit or indirect sources permit in accordance with the Clean Air Act (42 U.S.C. 7400 Section 176 and 171) and follow local pollution control agency rules? For questions contact Iowa DNR Air Quality (515) 725-9500.

2. Provide information on the sources and types of air emissions from the proposed project.

3. Provide information on the anticipated effects on air quality from operation of the facility; and sources or odors and mitigation measures necessary to minimize off-site migration of odors.

4. Provide information on the anticipated effects (including duration) on air quality from construction activities.

5. Will the project emit large quantities of air pollutants?

6. Are there air quality concerns in the vicinity of the project that could have a negative impact?

- Areas of the country where air pollution levels persistently exceed the national ambient air quality standards may be designated as "non-attainment" areas. Iowa does not have any "non-attainment" areas at this time.
- To determine emissions from other facilities in the project area check the EPA website at www.epa-echo.gov/echo.

- Enhanced building ventilation or filtering systems in schools or senior care centers can reduce ambient air from nearby busy arterials.
- Landscaping and regular watering can be used to reduce fugitive dust at a building construction site near a schoolyard.

Engage citizens to help evaluate various options to address a community's cumulative air pollution impacts.

Community Consequences of Nonattainment

Areas that have more pollution than allowed under the EPA health standard for a particular criteria pollutant may be declared as a "nonattainment area." This means that the area has air pollution levels that impact young children, the elderly and people with respiratory problems such as asthma and emphysema. If the EPA declares an area in "nonattainment," several activities must be undertaken.

The state or local permitting authority or EPA may conduct a computer modeling analysis to help determine how the pollution in the region is being transported and what areas or sources are contributing to pollution. This analysis typically looks at nine subject areas: 1) population and urbanization; 2) traffic and commuting; 3) area growth; 4) current emission controls; 5) political and other boundaries; 6) topography, 7) meterorology; 8) air quality monitoring data; and 9) emissions.

The state or local air quality authority may need to work with surrounding communities that potentially impact the nonattainment area to reduce their emissions. The degree to which surrounding communities or businesses must reduce their emissions will depend on their level of contribution, the type of pollutant, sources of the pollutant and other factors specific to that area.

Air agencies develop the steps to reduce the pollutant emissions and regain compliance with the standard. Depending on the standard to be attained, a diversity of emission reduction measures with both direct and indirect costs to citizens and business may be required, such as:

- More stringent and expensive control equipment for industries most affected, such as sources using burners, boilers and heavy engines.
- New facilities wanting to locate in a nonattainment area would be required to install pollution controls to meet the lowest achievable emission rates. For each ton of new emissions of the pollutant in question from the project, at least one ton of emissions would need to be reduced from elsewhere at the facility or another facility in the nonattainment area.
- Transportation planning requirements, including establishing a mobile emissions "budget," would have to be completed. Transportation projects would proceed if they can demonstrate that they will not result in increased emissions.
- Possible reduction of speed limits on highways in the nonattainment area could be required.
- Additional improvements to air quality could be gained by promoting the use of mass transit systems; providing incentives to reduce emissions from motor vehicles such as carpool lanes and encouraging biking and walking; reducing idling emissions, especially from diesel buses and trucks; and providing incentives to use renewable fuels.

Baghouse at a metals facility

Community Understanding of Land Use Policies for Air Quality

To improve outreach, land use planners could consider the following activities:

- Hold meetings in communities affected by agency programs, policies and projects at times and in places that encourage public participation, such as evenings and weekends at centrally located community meeting rooms, libraries and schools.
- Hold community meetings to discuss and evaluate the various options to address cumulative impacts in the community.
- Make staff available to attend meetings of community organizations and neighborhood groups to listen to and, where appropriate, act upon community concerns.
- Establish a specific contact person for air quality issues.
- Make air quality and land use information available to communities in an easily understood and useful format, including fact sheets, mailings, brochures, public service announcements and web pages.
- On the local community web site, dedicate a page or section to what the land use program is doing regarding air quality and cumulative environmental impacts, and, as applicable, activities conducted with air agencies such as air monitoring studies, pollution prevention, air pollution concerns in neighborhoods, and risk reduction.
- Distribute information as needed on how to contact agencies to obtain information and assistance regarding air quality programs, including how to participate in public processes.

Tools Communities Can Use to Evaluate Potential Air Impacts

The following tools and approaches, generally accessible from the local land use planning agency, can be useful in performing an analysis of potential air pollution impacts associated with new projects.

- Base map of the city or county planning area and terrain elevations.
- Comprehensive plan designations of land use (existing and proposed).
- Zoning maps.
- Land use maps that identify existing land uses, including the location of facilities that are permitted or otherwise regulated for air quality.
- Demographic data, e.g., population location and density, distribution of population by income, and distribution of population by age. The use of population data is a normal part of the planning process. However, from an air quality perspective, these data are useful to identify potential community health issues.
- Emissions, monitoring and risk-based maps that show air pollution-related health risks by community across the state.

- Location of public facilities that enhance community quality of life, including parks, community centers and open space.
- Location of industrial and commercial facilities and other land uses that use hazardous

materials, or emit air pollutants. These include chemical storage facilities, hazardous waste disposal sites, dry cleaners, large gas dispensing facilities, auto body shops and metal plating and finishing shops. The Local Emergency Planning Committee may be able to help with these locations

- Check the EPA's web-based tool that enables the public to search for and have easy access to health and safety studies on industrial chemicals at www.epa.gov/oppt/existingchemicals/pubs/transparency.html.
- The EPA's chemical action plans are available at www.epa.gov/oppt/existingchemicals/pubs/ecactionpln.html.
- Location of sources or facility types that result in diesel on-road and off-road emissions, e.g., stationary diesel power generators, forklifts, cranes, construction equipment, on-road vehicle idling and operation of transportation refrigeration units. Distribution centers, marine terminals and ports, rail yards, large industrial facilities and facilities that handle bulk goods are all examples of complex facilities where these types of emission sources are frequently concentrated.
- Location and zoning designations for existing and proposed schools, buildings or outdoor areas where sensitive individuals live or play.
- Location and density of existing and proposed residential development.
- Zoning requirements, property setbacks, traffic flow requirements, and idling restrictions for trucks, trains, construction equipment or school buses.
- Traffic counts (including diesel truck traffic counts) within a community to validate or augment existing regional motor vehicle trip and speed data.

Looking for the best performing, lowest polluting vehicles for government fleets?

EPA's Green Vehicle Guide scores vehicles by air pollution, fuel economy and greenhouse gas emissions at www.epa.gov/greenvehicles/Index.do.

Traffic and Commuting

The largest source of pollution, 56 percent in Iowa, is from sources that the DNR Air Quality Bureau and local air agencies have little jurisdiction over: on-road and off-road mobile sources. These sources include light- and heavy- duty gasoline and diesel automobiles and trucks, as well as railroad locomotives, aircraft, commercial marine vessels, farm equipment, construction equipment, recreational boating and lawn equipment. The air pollution they create are fine particles, carbon monoxide, air toxics and ozone precursors of hydrocarbons and nitrous oxides.

The EPA regulates air pollution from motor vehicles, engines and the fuels used to operate them, and by encouraging travel choices that minimize emissions. Although recent changes are making headway, there are a lot of vehicles and engines in use that were manufactured before more stringent standards were introduced. Technologies to reduce emissions on older engines and vehicles that have been verified by the EPA are listed at www.epa.gov/oms/retrofit/verif-list.htm or by the California Air Resources Board at www.arb.ca.gov/diesel/verdev/vt/cvt.htm.

Through the Diesel Emissions Reduction Act (DERA) the EPA provides pass through grants to the DNR Air Quality Bureau to reduce diesel exhaust from older diesel engines in Iowa. Funding for school districts is announced in the media and on the DNR School Bus Emissions web site at www.iowadnr.gov/InsideDNR/

Strategies for Reducing Community Vehicle Emissions

- Promote land use planning practices that lead to a reduced dependence on fossil-fuel powered automobiles.
- Encourage flexible work days at workplaces so employees can schedule transportation to avoid peak traffic hours.
- Save both travel time and auto emissions by teleconferencing or videoconferencing. Consider positions that can be performed by telecommuting.
- Use electric rather than gasoline-powered carts and vehicles for onsite maintenance and security personnel.
- Use native plants in landscaping. They require less mowing, watering and use of chemicals. Select grass types and landscaping that minimize the need for mowing and trimming.
- Left turn lanes and signals, rapid clearing of traffic accidents, and advance notice of construction detours improve traffic flow and avoid engine idling emissions.
- Increase the number of services available by phone or electric media to reduce vehicle travel.
- Practice proper vehicle maintenance. Proper maintenance can reduce fuel demand up to 15 percent with regular tune-ups, filter replacements and engine diagnostics.
- For cities too small to support city transit systems, promote carpooling.
- Refuel cars and trucks after dusk. Be sure to avoid "topping off" the gas tank.
- Combine errands and reduce trips.
- Limit engine idling to reduce engine wear, save fuel and reduce ozone precursors.

RegulatoryAir.aspx. Funding for diesel emissions reductions for city and county fleets in areas of concern for air pollution will be announced on the DNR website when available.

The Iowa Department of Transportation's Clean Air Attainment Program (ICAAP) helps finance transportation projects and programs that result in attaining or maintaining the national ambient air quality standards (NAAQS). ICAAP funds are awarded to projects and programs with the highest potential for reducing transportation-related congestion and air pollution, thereby maintaining Iowa's clean air quality.

Eligible activities under the program are proposals that improve motor vehicle traffic flow, public transit service and intermodal freight movement; reduce traffic congestion and single-occupant vehicle travel; and help finance the purchase of publicly owned alternative fuel vehicles and bicycle and pedestrian facilities and programs.

The Iowa DOT administers ICAAP on a statewide competitive application basis and awards federal funds to proposals with the highest potential for reducing transportation-related air pollution and congestion. Applications for ICAAP funding may be submitted by cities, counties, public transit agencies, metropolitan planning organizations (MPOs), and regional planning affiliations (RPAs) and state and federal agencies. For more information go to www.iowadot.gov/systems_planning/icaap.htm.

The Department of Transportation Federal Highway Administration offers free clean air promotional tools for organizations that are easy to adapt for local use. Go to www.italladdsup.gov/tools/.

Biking and Walking Trails

Bicycling and walking are legitimate modes of transportation, but are often overlooked in transportation plans. Grants are available for the construction of trails, but usually sponsoring organizations must provide for trail maintenance over the long term.

Resource Enhancement and Protection (REAP) funds can assist with the development of green corridors that provide recreation and safe corridors for walking and biking. For more information, go to www.iowadnr.gov/Environment/REAP.aspx.

The Department of Transportation Safe Routes to


Keosauqua

School Program provides infrastructure and non infrastructure improvements for state, local and regional agencies, nonprofits, schools (public and private), and parent-teacher associations. Go to www.iowadot.gov/saferoutes/ for more information.

The Federal Recreational Trails Program provides funding for motorized and non-motorized recreational trails and trail-related projects (trail heads, kiosks, lighting etc.). Public agencies, non-profit organizations and private organizations (including individuals) are eligible to sponsor, although private sponsorship requires a public agency co-sponsor. Go to www.iowadot.gov/systems_planning/fedstate_rectrails.htm for more information.

Funding for public recreation trails is also available through the State Recreational Trails Program at DOT. State agencies, counties or cities and non-profit organizations may sponsor applications. Proposed projects must be a part of a local, area-wide, regional or statewide trail plan. For more information go to www.iowadot.gov/systems_planning/fedstate_rectrails.htm.

The Federal Transportation Enhancement Program will fund trails and bikeways, including facilities for pedestrians and bicycles, safety and educational activities for pedestrians and bicyclists, and the preservation of abandoned railway corridors, including the conversion and use of those corridors for pedestrian or bicycle trails. Depending on the regional or statewide impact of the project, applications can be submitted to either the DOT (www.iowadot.gov/systems_planning/trans_enhance.htm) or the appropriate Regional Planning Affiliation (RPA) or Metropolitan Planning Organization (MPO).

Collaboration for Better Air Quality Land Uses

Air pollution is not constrained to geographic boundaries. Cities and counties are encouraged to collaborate on visioning efforts as well as decisions for land use compatibility, common requirements, and reduction of cumulative air quality impacts.

The DNR Air Quality Bureau and local air agencies are available to help Iowa's Councils of Government (COGs) and communities with information about areas of air quality concern, pollutants of concern and air quality impacts as communities plan regional housing development, workforce development and economic development.

Test your knowledge

To test your knowledge of material covered in this manual, go to Appendix E where five scenarios are presented for your consideration. Some possible solutions are provided on the next page.

APPENDIX A

Federal Regulatory Programs for Air Pollution

The Clean Air Act (CAA) of 1970 and its revisions are the laws passed by the U.S. Congress that establish the scope of clean air management and provide the authority to implement and control air emission standards. The U.S. Environmental Protection Agency (EPA) was established to provide a degree of national uniformity in air quality standards and approaches to pollution mitigation to assure that all individuals have a basic level of environmental protection.

The CAA is divided into segments or "titles," and is found in the Code of Federal Regulations (CFR) under CFR Title 40.

The programs developed under the CAA and its revisions include the National Ambient Air Quality Standards, the New Source Performance Standards, the National Emissions Standards for Hazardous Air Pollutants, Acid Deposition Control, Stratospheric Ozone Protection, and Regional Haze. The Title V Operating Permits program ensures that all applicable requirements for all regulated air pollutants are included in operating permits for major sources of air pollution emissions.

National Ambient Air Quality Standards (NAAQS) are standards established by the EPA for outdoor air throughout the country. Primary standards are designed to protect human health, with an adequate margin of safety, including sensitive populations such as children, the elderly and individuals suffering from respiratory disease. Secondary standards are designed to protect public welfare from any known or anticipated adverse effects of a pollutant. The EPA extensively reviews each NAAQS every five years using the latest scientific and health research.

State and local governments are given much of the responsibility for implementing and enforcing the federally mandated rules and regulations within their jurisdictional domains, including developing and implementing specific strategies and control measures to meet national air quality standards and goals.

More about the CAA is available at www.epa.gov/air/caa/.

National Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard
Ozone	8-Hour	0.75 ppm
Carbon Monoxide	8-Hour	9.0 ppm
	1-Hour	35.0 ppm
Nitrogen Dioxide	Annual	0.053 ppm
	1-Hour	0.100 ppm
Sulfur Dioxide	1-Hour	0.075 ppm
PM2.5	Annual	15 µg/m^3
	24-Hour	35 µg/m^3
PM10	24-Hour	150 µg/m^3
Lead	Rolling 3-Month Average	0.15 µg/m^3

µg/m^3 = micrograms per cubic meter of air
ppm = parts per million
µg/m^3 = micrograms per cubic meter

Regulation of Greenhouse Gases Begins

Most scientists agree that there is a strong correlation between the increase in global temperatures and the increased concentration of greenhouse gases in the atmosphere resulting from human activity. The burning of fossil fuels to generate electricity and power automobiles has had the largest contribution to the increase in greenhouse gases.

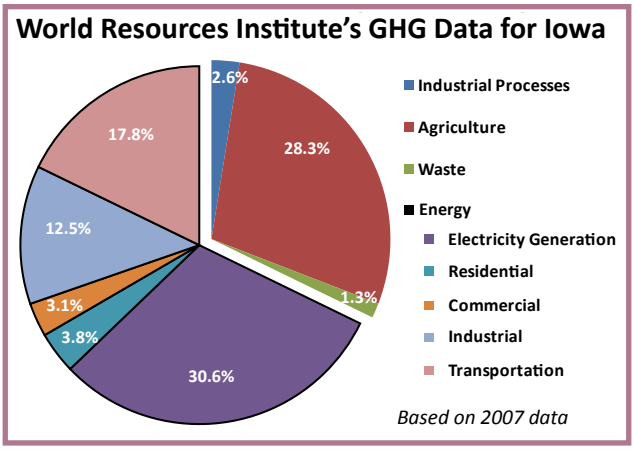
As stated in the American Planning Association's Climate Change Policy Guide (available at **www.planning.org/policy/guides/pdf/climatechange.pdf**), addressing climate change issues will require proactive response across all planning sectors, from land use to transportation to natural resource management to public health and safety to economic development.

In response to the U.S. Supreme Court decision in Massachusetts v. EPA (April 2007), the EPA published its finding on Dec. 15, 2009 that greenhouse gases in the atmosphere endanger both the public health and the environment for

current and future generations. EPA also found that the combined emissions of greenhouse gases from new motor vehicles contribute to the greenhouse gas air pollution which endangers public health and welfare.

Iowa emits two percent of the United States' greenhouse gas emissions, or 108 MtCO2e.As shown at right, nearly 90 percent of Iowa's GHG emissions are from electric generation, transportation, agriculture and industrial energy use.

Regulatory requirements. In Iowa, emissions of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride are classified as greenhouse gases and are subject to some regulatory requirements. Sources are required to include estimates of emissions of some greenhouse gases in air permit applications. Large sources may be subject to federal permitting and reporting programs depending on the amount of GHGs they emit or may emit in the future if facility modifications are made that increase or add new GHG emissions.



Important information about which greenhouses gases need to be quantified, tools to help complete the emissions estimates, and guidance on permitting and reporting requirements can be found at www.iowadnr.gov/InsideDNR/RegulatoryAir/GreenhouseGasEmissions.aspx.

How Iowa's Air Quality Is Regulated

The Department of Natural Resources Air Quality Bureau, along with Linn and Polk county air agencies, are responsible for keeping Iowa's air within attainment of National Ambient Air Quality Standards (NAAQS), often referred to as the EPA's health standards for criteria air pollutants. The DNR's authority to regulate air quality is found in Iowa Code 455A and 455B.

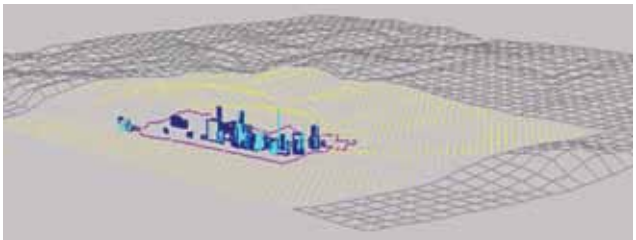
Construction permits are issued to limit the amount of pollution emitted into the air. Construction permits are required for all emission sources constructed after Sept. 23, 1970, and for modifications to existing emissions units. There are some exemptions from these requirements for certain types of equipment or processes. Applications for construction permits are reviewed prior to issuance to verify that the planned operation of an emissions unit will not cause or contribute to an air quality problem.

The air emissions inventory is a listing, by source, of the amounts of pollutants discharged annually. It helps in the evaluation of the existing air quality to initiate changes as needed.

Computer modeling is used to predict regional and local pollution dispersion. The selection of an air quality model for a particular air quality analysis is dependent on the type of pollutants being emitted, the complexity of the source and the type of topography surrounding the facility.
Models incorporate complete terrain and source information and use actual meteorological data from the National Weather Service.

Stack testing guarantees the quality of emissions data to determine compliance with mission limits in permits or regulations. Stack testing measures the amount of a specific pollutant being emitted from smokestacks at industrial sources. Stack tests are also used to set operating parameters for the source and evaluate air pollution control equipment performance.

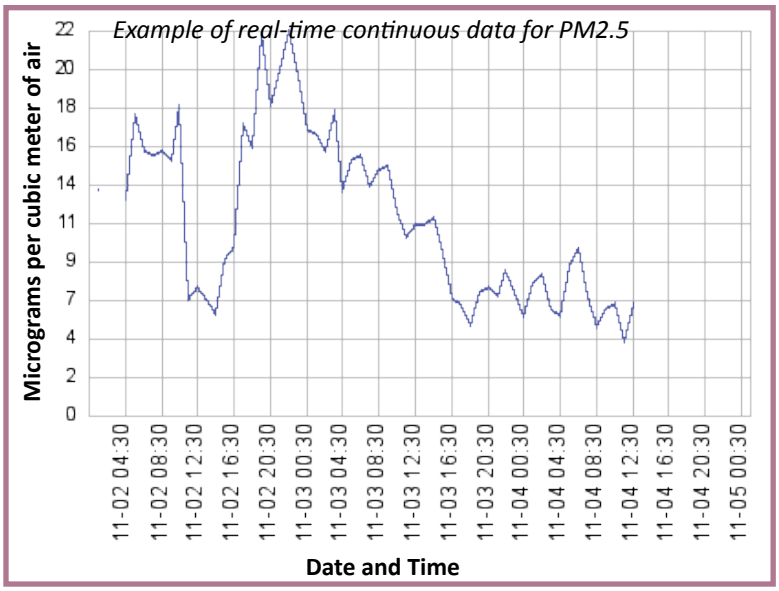
Stack test data is entered into a database so it is available to other air quality bureau program areas for decision making and planning.
Air monitors ascertain how well the state's air quality policies and programs are keeping Iowa's air


Modeling example incorporating terrain

within attainment of EPA health standards. Real-time monitors also signal when an air pollution event is occurring so that sensitive populations can be warned to take precautions.

Iowa's real time monitor information can be accessed at www.shl.uiowa.edu/services/ambient/. Click "Real-time Continuous Data" in the tan navigation bar for current air quality monitor readings.

Air quality is currently measured at 36 individual sites across Iowa. The pollutants measured and the frequency of measurements varies by site. Monitoring sites are located in 1) open, rural areas to determine general background levels or the amount of pollution entering the state;




Air monitor

2) near industrial facilities to determine the impacts of emissions from different sources on attainment with the national ambient air quality standards; and 3) in urban areas to assess population exposure.

There are also logistical considerations that limit where a monitor can be located, including proximity of structures such as trees or buildings that could influence the monitor measurements, access to utility connections, and the availability of property owners willing to allow a monitor to be located on their property for one or more years.

How Industries Control Pollution Emissions

Industries use a number of particle and gaseous pollutant emissions control systems. Particles are captured through the use of cyclones, bag houses, electrostatic precipitators and wet scrubbers. These devices all capture particles by mechanisms involving applied forces.

Depending on the physical and chemical properties of both the pollutant and the exhaust stream, gaseous pollutants are controlled by:

- Absorbers (gases are dissolved in a liquid);
- Adsorbers (gaseous pollutants adhere to a solid surface like activated carbon);
- Incinerators (oxidizes the pollutant); and →
- Condensers (vapor is condensed into liquid droplets).

Industries often use more than one control system to remove pollutant emissions, depending on the various processes that go into the production of their products.

Stacks. Stacks are structures that release gases from industry processes high enough above the Earth's surface so that emitted pollutants can sufficiently disperse before reaching ground level. The structure can be as small as a vent on a building's roof or a tall stack. The higher the dispersion, the greater depth of atmosphere the gases can disperse in before they reach the ground.

Fans may push out the emissions, which are often heated and warmer than the outdoor air. The momentum and buoyancy of gases cause them to rise, which helps in dispersion. The velocity of the exhaust gases (stack diameter and volumetric flow rate) determines the plume's momentum.

APPENDIX B

Air Pollutants and Health Threats

An air pollutant is defined as a substance in the air that, in high enough concentrations, produces a detrimental environmental effect. A pollutant can affect the health of humans, plants and animals, and nonliving materials such as paints, metals and fabrics.

Air pollutants can either be particles or gases. A primary pollutant is one that is emitted into the atmosphere directly from its source and retains the same chemical form, such as solid waste ash. A secondary pollutant is one that is formed by atmospheric reactions of precursor or primary emissions. Secondary pollutants undergo a chemical change once they reach the atmosphere. Ozone is an example of a secondary pollutant.

Secondary pollutants are more problematic to control because precursor compounds and their sources need to be identified to understand the specific chemical reactions that result in the formation of the secondary pollutant.

Criteria Pollutants

Criteria pollutants are those identified as being both common and detrimental to human welfare and are found over all the United States. These are ozone (0_3), carbon monoxide (CO), nitrogen oxides (NO_x), sulfur oxides (SO_x), particulate matter (PM2.5 and PM10) and lead (Pb).

Ozone is formed during a photochemical reaction, meaning several common airborne pollutants react with sunlight to form another pollutant called ozone. Ideal conditions for ozone formation are warm, windless days with bright sunlight found during the summer and early fall.

During these conditions, volatile organic compounds (VOCs) react with nitrogen oxides, also called "ozone precursors," to form ozone. Volatile organic fumes come from evaporation of gasoline, paint, solvents, consumer products, varnishes and industry chemicals. Nitrogen oxides come from high-temperature combustion found in exhaust from auto and truck engines, boilers, utilities and other sources. The concentration of these precursor gases, the volume of air to dilute and mix, the temperature and intensity of ultraviolet light affect this process.

Both urban and rural areas of the state are subject to elevated ozone levels as winds carry emissions hundreds of miles away from their original sources.

Ozone has the same chemical structure whether it occurs miles above the earth or at ground level and can be "good" or "bad," depending on its location in the atmosphere. Six miles up is the second layer of atmosphere called the stratosphere. The stratosphere, or "good" ozone layer, extends upward from about 6 to 30 miles and it protects life on Earth from the sun's harmful ultraviolet (UV) rays. Ground-level or "bad" ozone is an air pollutant that is harmful to breathe and it damages crops, trees and other vegetation.

Carbon monoxide is an odorless, invisible gas that reduces the ability of blood to carry vital oxygen. Persons with heart conditions are at special risk when exposed to elevated levels. Visual impairment, reduced coordination and mental confusion are all associated with exposure. High exposure can poison, and even cause death, in healthy persons.

Carbon monoxide is especially dangerous inside homes and buildings. In heavily traveled and congested urban areas, carbon monoxide levels can be elevated. Extended exercise such as running and cycling in these areas may not be advisable.

Carbon monoxide is emitted from automobiles and from oxygen-starved fires, such as a smoldering pile of leaves or dampened-down fireplaces.

Widespread leaf burning and storm-related disaster burning of large quantities of brush and downed trees can impact local carbon monoxide levels. This can be magnified during thermal inversions (warm air trapping cool air beneath, causing carbon monoxide molecules to concentrate rather than disperse).

Nitrogen oxides are emitted from high temperature combustion sources such as autos, trucks, aircraft and from boilers used to provide heat, steam or electricity.

Since air is made up of almost 80 percent nitrogen, when high temperature burning occurs, some of the nitrogen in the air is burned to release nitric oxide

or nitrogen dioxide gas. These gases can form a reddish-brown haze over urban areas or areas near large emitters.

Airborne nitrates reduce visibility, contribute to acid rain, play a major role in the formation of ozone smog or react with other chemicals to form particulate matter. These particles can fall to earth in rain or snow to increase nitrogen levels in soils and water bodies. Nitrates deposited into water contribute to algae blooms that can cause depleted oxygen.

Sulfur dioxide is the leading contributor to acid precipitation that can harm water bodies, fish and amphibian populations, and forests across the Upper Midwest, Northeast and Canada. Acid rain also impacts portions of the Rocky Mountains and other areas.

Sulfuric gases and particles can slowly degrade building materials such as brick and mortar, pipes and metal surfaces, paints, stone and monuments. Airborne sulfates, along with particulate and nitrogen oxides, also contribute to visibility loss or haze. In Iowa, visibility loss due to sulfates and other airborne particles may be approximately one-third natural visibility on average days and less on the worst days.

When sulfur-containing fuels such as gasoline, coal and fuel oil are burned, the sulfur is released. Citizens can help reduce emissions by conserving electricity, properly maintaining vehicles, driving less and by consolidating errands.

Particulate matter is airborne mists, fumes, soot, aerosols, ash or dusts. Smoke is the most obvious form of particulate matter. Smoke is visible when dense concentrations of microscopic particulates are present. Airborne particles invisible to the naked eye can remain suspended in the air for weeks. Particulate matter can also form when airborne chemicals react to change from gases into liquid aerosols or solids. Some particles carry attached molecules of toxic substances.

Particulates can harm lung tissue, cause eye and throat irritation, premature death and reduced visibility from haze. Very fine particulates can travel hundreds, even thousands of miles in the wind before settling out or falling to earth in rain, snow or fog.

Two particulate sizes, PM10 and PM2.5, are regulated pollutants for health and environmental concerns. PM10 means each microscopic particle is 10 microns or smaller in diameter and these particles are created in the cutting, grinding and crushing of materials. PM2.5 includes particles 2.5 microns or smaller in diameter. They are so small they bypass respiratory defenses to penetrate the deepest lung passages and can even become absorbed into the bloodstream. In the bloodstream, they contribute to plaque buildup in arteries and increase the risk for and effects of heart disease, and enter the organs and the nervous system, including the brain. Sources of PM2.5 are industrial and residential combustion, vehicle exhaust and wood burning.

Lead is a metal found naturally in the environment as well as in manufactured products. Since lead has been phased out as a component of gasoline, the major source of lead emissions is metals processing. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities and lead-acid battery manufacturers.

Criteria Pollutants

Pollutant	Characteristics	Health Effects	Major Sources
Ozone (O_3)*	Ozone is a highly reactive photochemical pollutant created by the action of sunshine on ozone precursors (primarily reactive hydrocarbons and oxides of nitrogen). Often called photochemical smog.*	Eye irritation Respiratory function impairment	Major sources of ozone precursors are combustion sources such as factories and automobiles, and evaporation of solvents and fuels.
Carbon Monoxide (CO)	Carbon monoxide is an odorless, colorless gas that is highly toxic. It is formed by the incomplete combustion of fuels.	Impairment of oxygen transport in the bloodstream Aggravation of cardiovascular disease Fatigue, headache, confusion, dizziness Can be fatal in very high concentrations	Automobile exhaust, combustion of fuels, combustion of wood in wood stoves and fireplaces
Nitrogen Dioxide (NO_2)	Nitrogen dioxide is a reddish-brown gas that discolors the air; formed during combustion.	Increased risk of acute and chronic respiratory disease	Automobile and diesel truck exhaust, industrial processes, fossil-fueled power plants
Sulfur Dioxide (SO_2)	Sulfur dioxide is a colored gas with a pungent, irritating odor.	Increased risk of acute and chronic respiratory disease Aggravation of chronic obstruction lung disease	Coal-fired power plants, industrial sources using coal-fired boilers
Fine Particles 2.5 microns or smaller in diameter (PM2.5)	PM2.5 solid and liquid particles of dust, soot, aerosols and other matter which are small enough to remain suspended in the air for a long period of time.	Aggravation of chronic disease and heart/lung disease symptoms	Combustion, automobiles, field burning, factories and unpaved roads Also a result of photochemical processes
Lead (Pb)	Lead is persistent in the environment and accumulates in soils and sediments through deposition from air sources, direct discharge of waste streams to water bodies, mining and erosion.	Affects the nervous system, kidney function, immune system, reproductive and developmental systems and the cardiovascular system Lead exposure also affects the oxygen carrying capacity of the blood	Lead contaminated dust and residential soil Foundries and coal combustion

This chart was prepared by the California Environmental Protection Agency and the California Air Resources Board and published in their Air Quality and Land Use Handbook: Community Health Perspective.

** Stratospheric ozone, often referred to as "good" ozone, is described on the Terms and Acronyms page at the front of this publication. Ozone in the troposphere (the layer closest to Earth) is "bad" ozone.*

Greenhouse Gases

Gases that trap heat in the atmosphere are often called greenhouse gases. Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities. The principal greenhouse gases that enter the atmosphere because of human activities are:

Carbon Dioxide (CO2): Carbon dioxide enters the atmosphere through the burning of fossil fuels (oil, natural gas, and coal), solid waste, trees and wood products, and also as a result of other chemical reactions (e.g., manufacture of cement). Carbon dioxide is also removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle.

Methane (CH_4): Methane is emitted during the production and transport of coal, natural gas, and oil. Methane emissions also result from livestock and other agricultural practices and by the decay of organic waste in municipal solid waste landfills.

Nitrous Oxide (NOx): Nitrous oxide is emitted during agricultural and industrial activities, as well as during combustion of fossil fuels and solid waste.

Fluorinated Gases: Hydrofluoro-carbons, perfluorocarbons, and sulfur hexafluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for ozone-depleting substances (i.e., CFCs, HCFCs, and halons). These gases are typically emitted in smaller quantities, but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases").

Increases in GHG emissions leads to increases in:
- heat-related illnesses and deaths;
- respiratory problems; and
- diseases and allergies.

Hazardous Air Pollutants

Hazardous air pollutants (HAPs), also known as air toxics, are pollutants known or suspected to cause cancer or other serious health effects such as reproductive effects or birth defects, or adverse environmental consequences. The presence of air toxics is more localized than are the criteria pollutants and are usually found at highest levels close to their sources. Most air toxics originate from man-made sources, including cars and trucks, factories, power plants and refineries, as well as some building materials and cleaning solvents.

National Emission Standards for Hazardous Air Pollutants (NESHAPs) specify controls or best management practices, or process changes for a given source category, with the intent to reduce emissions of one or more HAP. The majority of HAPs are volatile organic compounds (VOCs).

Vermiculite wall insulation contains asbestos. If you suspect a material contains asbestos, have a licensed asbestos inspector sample it for analysis before disturbing the material. Exposure to asbestos is known to cause disease and cancers. For more information go to www.iowacleanair.com.

Chemical Names of the EPA's Regulated Hazardous Air Pollutants

Acetaldehyde
Acetamide
Acetonitrile
Acetophenone
2-Acetylaminofluorene
Acrolein
Acrylamide
Acrylic acid
Acrylonitrile
Allyl chloride
4-Aminobiphenyl
Aniline
o-Anisidine
Asbestos
Benzene
(including benzene from gasoline)
Benzidine
Benzotrichloride
Benzyl chloride
Biphenyl
Bis (2-ethylhexyl) phthalate (DEHP)
Bis (chloromethyl) ether
Bromoform
1,3-Butadiene
Calcium cyanamide
Caprolactam
Captan
Carbaryl
Carbon disulfide
Carbon tetrachloride
Carbonyl sulfide
Catechol
Chloramben
Chlordane
Chlorine
Chloroacetic acid
2-Chloroacetophenone
Chlorobenzene
Chlorobenzilate
Chloroform
Chloromethyl methyl ether
Chloroprene
Cresols/Cresylic acid
(isomers and mixture)
o-Cresol
m-Cresol
p-Cresol
Cumene
2,4-D, salts and esters
DDE
Diazomethane
Dibenzofurans
1,2-Dibromo-3-chloropropane
Dibutylphthalate
1,4-Dichlorobenzene(p)
3,3-Dichlorobenzidene
Dichloroethyl ether
(Bis(2-chloroethyl)ether)
1,3-Dichloropropene
Dichlorvos
Diethanolamine
N,N-Dimethylaniline
Diethyl sulfate
3,3-Dimethoxybenzidine
Dimethyl aminoazobenzene
3,3'-Dimethyl benzidine
Dimethyl carbamoyl chloride
Dimethyl formamide
1,1-Dimethyl hydrazine
Dimethyl phthalate
Dimethyl sulfate
4,6-Dinitro-o-cresol, and salts
2,4-Dinitrophenol
2,4-Dinitrotoluene
1,4-Dioxane (1,4-Diethyleneoxide)
1,2-Diphenylhydrazine
Epichlorohydrin
(l-Chloro-2,3-epoxypropane)
1,2-Epoxybutane
Ethyl acrylate
Ethyl benzene
Ethyl carbamate (Urethane)
Ethyl chloride (Chloroethane)
Ethylene dibromide
(Dibromoethane)
Ethylene dichloride
(1,2-Dichloroethane)
Ethylene glycol
Ethylene imine (Aziridine)
Ethylene oxide
Ethylene thiourea
Ethylidene dichloride
(1,1-Dichloroethane)
Formaldehyde
Heptachlor
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Hexamethylene-1,6-diisocyanate
Hexamethylphosphoramide
Hexane
Hydrazine
Hydrochloric acid
Hydrogen fluoride (Hydrofluoric acid)
Hydroquinone
Isophorone
Lindane (all isomers)
Maleic anhydride
Methanol
Methoxychlor
Methyl bromide (Bromomethane)
Methyl chloride (Chloromethane)
Methyl chloroform
(1,1,1-Trichloroethane)
Methyl ethyl ketone (2-Butanone)
Methyl hydrazine
Methyl iodide (Iodomethane)
Methyl isobutyl ketone (Hexone)
Methyl isocyanate
Methyl methacrylate
Methyl tert butyl ether
4,4-Methylene bis(2-chloroaniline)
Methylene chloride
(Dichloromethane)
Methylene diphenyl diisocyanate
(MDI)
4,4'-Methylenedianiline
Naphthalene
Nitrobenzene
4-Nitrobiphenyl
4-Nitrophenol
2-Nitropropane
N-Nitroso-N-methylurea
N-Nitrosodimethylamine
N-Nitrosomorpholine
Parathion
Pentachloronitrobenzene
(Quintobenzene)
Pentachlorophenol
Phenol
p-Phenylenediamine
Phosgene
Phosphine
Phosphorus
Phthalic anhydride
Polychlorinated biphenyls (Aroclors)
1,3-Propane sultone
beta-Propiolactone
Propionaldehyde

Diesel exhaust contains nearly 40 toxic air contaminants, including benzene, formaldehyde, acetaldehyde, and 1,3-butadiene as well as diesel fine particles.

Propoxur (Baygon)
Propylene dichloride
(1,2-Dichloropropane)
Propylene oxide
1,2-Propylenimine (2-Methyl aziridine)
Quinoline
Quinone
Styrene
Styrene oxide
2,3,7,8-Tetrachlorodibenzo-p-dioxin
1,1,2,2-Tetrachloroethane
Tetrachloroethylene
(Perchloroethylene)
Titanium tetrachloride
Toluene
2,4-Toluene diamine
2,4-Toluene diisocyanate
o-Toluidine
Toxaphene (chlorinated camphene)
1,2,4-Trichlorobenzene
1,1,2-Trichloroethane
Trichloroethylene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
Triethylamine
Trifluralin
2,2,4-Trimethylpentane
Vinyl acetate
Vinyl bromide
Vinyl chloride
Vinylidene chloride
(1,1-Dichloroethylene)
Xylenes (isomers and mixture)
o-Xylenes
m-Xylenes
p-Xylenes
Antimony Compounds
Arsenic Compounds
(inorganic including arsine)
Beryllium Compounds
Cadmium Compounds
Chromium Compounds
Cobalt Compounds
Coke Oven Emissions

Hazards Air Pollutant Compounds

Cyanide Compounds[1]
Glycol ethers[2]
Lead Compounds
Manganese Compounds
Mercury Compounds
Mineral fibers[3]
Nickel Compounds
Polycylic Organic Matter[4]
Radionuclides (including radon)[5]
Selenium Compounds

NOTE: For all listings above which contain the word "compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named chemical (i.e., antimony, arsenic, etc.) as part of that chemical's infrastructure.

[1] X'CN where X = H' or any other group where a formal dissociation may occur. For example KCN or Ca(CN)2.

[2] Includes mono- and di- ethers of ethylene glycol, diethylene glycol, and triethylene glycol R-(OCH2CH2)n -OR' where n = 1, 2, or 3
R = alkyl or aryl groups.
R' = R, H, or groups which, when removed, yield glycol ethers with the structure: R-(OCH2CH)n-OH. Polymers are excluded from the glycol category.

[3] Includes mineral fiber emissions from facilities manufacturing or processing glass, rock, or slag fibers (or other mineral derived fibers) of average diameter 1 micrometer or less.

[4] Includes organic compounds with more than one benzene ring, and which have a boiling point greater than or equal to 100 º C.

[5] A type of atom which spontaneously undergoes radioactive decay.

APPENDIX C

How Weather, Meteorology and Terrain

Proximity, controls and alteratives are tools humans use to avert air pollution. Nature has tools of its own: weather and topography. The following is a brief description of how wind, meteorology and topography affect pollution movement, concentration and diffusion. A basic understanding of these principles will help planners understand how pollution travels through their communities.

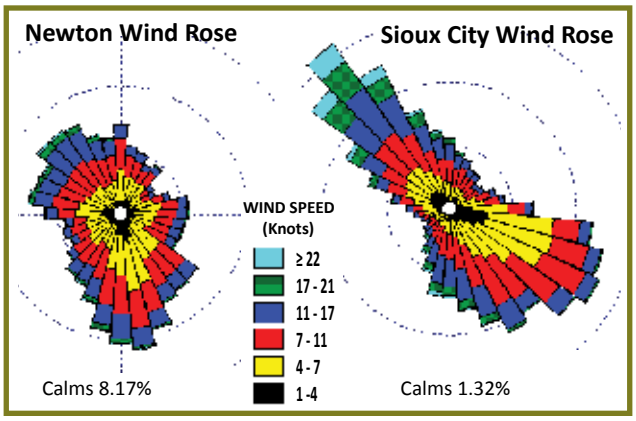
Wind. Gravity keeps the majority of the air near the earth, but air is not static. As it absorbs heat, it expands and rises. As it rises, the air cools, becomes more dense and flows down. Air moves horizontally to replace the rising air, and turns due to the rotation of Earth on its axis. The combination of all air movements creates wind and weather patterns.

Jet streams are concentrated channels of high-altitude, high-speed winds that move primarily from west to east impacting how major weather systems move. Earth's surface is dotted with high- and low-pressure areas. High-pressure areas are generally associated with clear skies and low-pressure areas are generally associated with cloudy skies and precipitation. Winds tend to blow clockwise and spiral outward around high-pressure areas and winds tend to blow counterclockwise and spiral in around low-pressure areas.

Places where cold and warm air masses meet are called fronts and are usually accompanied by precipitation. When fronts meet, warm air tends to rise up above cold air.

Wind variables are speed and direction. Wind speed determines the amount of initial pollution dilution experienced and how high the pollution may rise. Wind direction is measured in degrees clockwise from true north and determines the transport direction of emitted pollution.

Meteorology. While the speed and direction of is influenced by the thermal structure of the atmosphere, as well as by mechanical agitation of the air as it moves over the different surface features of the planet. Transformation of air pollutants is impacted by exposure to sunlight and moisture as well as reactions with other gases and pollutants in the air. The removal of pollutants occurs through rain or snow and settling due to gravity.



A wind rose is a graphic tool that shows how wind speed and direction are typically distributed at a particular location, taking into account geographic features and land cover. The above wind roses are based on 2000-2004 data. Communities needing to understand local wind movement may contact the DNR Air Quality Bureau.

When meteorological conditions develop that are not conducive to pollutant dispersion, air pollution levels become more concentrated. An inversion (when cooler air near the surface is covered by a layer of warmer air) is an example of a condition that increases pollutant concentrations. The layer of warmer air traps pollutant emissions below it until a weather pattern disrupts the inversion.

Topography. The physical characteristics of an area's surface influence both air temperature and the way air flows. Different objects give off heat at different rates. For instance, a grassy area does not absorb and release as much heat as an asphalt parking lot. Terrain features such as flatness, mountains and valleys, land and water, and urban structures affect air flow. Turbulence is caused by the wind flowing over different sizes and shapes of objects. For example, buildings affect wind flow differently than a cornfield.

APPENDIX D

Iowa Fugitive Dust Regulation
567 Iowa Administrative Code 23.3(2)“c”

(1) Attainment and unclassified areas. A person shall take reasonable precautions to prevent particulate matter from becoming airborne in quantities sufficient to cause a nuisance as defined in Iowa Code section 657.1 when the person allows, causes or permits any materials to be handled, transported or stored or a building, its appurtenances or a construction haul road to be used, constructed, altered, repaired or demolished, with the exception of farming operations or dust generated by ordinary travel on unpaved roads. Ordinary travel includes routine traffic and road maintenance activities such as scarifying, compacting, transporting road maintenance surfacing material, and scraping of the unpaved public road surface. All persons, with the above exceptions, shall take reasonable precautions to prevent the discharge of visible emissions of fugitive dusts beyond the lot line of the property on which the emissions originate. The public highway authority shall be responsible for taking corrective action in those cases where said authority has received complaints of or has actual knowledge of dust conditions which require abatement pursuant to this subrule. Reasonable precautions may include, but not be limited to, the following procedures.

1. Use, where practical, of water or chemicals for control of dusts in the demolition of existing buildings or structures, construction operations, the grading of roads or the clearing of land.

2. Application of suitable materials, such as but not limited to asphalt, oil, water or chemicals on unpaved roads, material stockpiles, race tracks and other surfaces which can give rise to airborne dusts.

3. Installation and use of containment or control equipment, to enclose or otherwise limit the emissions resulting from the handling and transfer of dusty materials, such as but not limited to grain, fertilizer or limestone.

4. Covering, at all times when in motion, open-bodied vehicles transporting materials likely to give rise to airborne dusts.

5. Prompt removal of earth or other material from paved streets or to which earth or other material has been transported by trucking or earth-moving equipment, erosion by water or other means.

6. Reducing the speed of vehicles traveling over on-property surfaces as necessary to minimize the generation of airborne dusts.

APPENDIX E Air Quality Scenarios: What Would You Do?

Take a few moments to gauge your understanding of how these situational sketches impact air quality for citizens. What could be done to ensure good air quality at these projects? Jot your ideas down and check them with the considerations on the next page. Has your awareness of possible concerns broadened?

1 A school district decides to insert a school in the downtown area as both a convenience for downtown workers and so parents can be involved in daily school activities for a more vibrant learning environment. A business donates land for a playground along a major arterial entryway to the Interstate. What should be considered before accepting the land?	
2 To encourage town-centeredness, a makeover is planned for an older business area several blocks long on an artery to metropolitan downtown. The area includes four intersections with cross-town traffic and city bus stops in both directions. The businesses located there serve mostly walk-in customers and are close to several apartment complexes. Large old trees shade the buildings. Curb planting areas are cut into the sidewalk. The four-lane street is reworked into two vehicle lanes with a shared turning lane in the center and bicycle lanes on both sides of the street. Diagonal parking is replaced by parallel parking to the right of the bicycle lanes. Delivery trucks park in the street to deliver and pick up products. Is this project now pedestrian friendly?	
3 A child care center and nursing home share a building in a new area opened for development. A successful delivery service company plans business expansion and wants to purchase the land across the street from the care centers to build a new facility. The land is along a major road leading to the on ramp of a divided highway bypass around the city. How would you address having a business that serves sensitive populations in a high traffic development?	
4 A dry cleaning operation considers moving from an older part of the city to lease space on the first floor of a new mixed-use development with apartments on the upper floors. The development owner is pleased because this will provide an excellent service for the growing neighborhood. What concerns should be addressed before the business begins operating in the new location?	
5 A monitored area for fine particle pollution has exceeded the EPA's health standard too many times. How can city and county officials in the monitored area help lower the concentration of fine particles?	

Scenario Considerations

1 This is not a good site for a playground. It exposes children at ground level to the toxic particle emissions from diesel- and gasoline-powered vehicles accessing the Interstate. If the land had a natural barrier of shrubs and trees or a constructed noise barrier next to the street edge to force emissions overhead, that would improve the site.

2 There are some positives in this project for a pedestrian and bicycle-friendly town center: trees, buildings close to the sidewalk, and nice plantings. However, the addition of the bicycle lanes and reduction of vehicle lanes with no plan for delivery trucks and no attempt to reduce vehicle traffic will increase congestion and reduce safety. Plus, a high traffic area is likely to expose pedestrians to elevated levels of fine particles, air toxics, and in warm sunny weather, ozone.

3 Children and the elderly or medically compromised populations are pollution-sensitive. Because of the direct and easy access to the bypass, this area should be zoned for uses related to heavy traffic. If the day care and nursing home were already established before the street became an access way to the bypass, this concern could be addressed by offering the owner: 1) an alternative location with incentives to move the facility; 2) assistance to make building improvements to protect the people inside, such as enhanced building ventilation or an improved filtering system; 3) plant trees or erect a tall barrier between the building and the roadway. The delivery service and other businesses that could impact sensitive populations should have adequate setbacks imposed as they construct buildings in this area. Idling reduction policies could be required.

Another concern in a high traffic area is to control dust emissions. Businesses could be required to have paved driveways.

3 cont.

The nursing home and child care facility could protect their patrons further by locating outdoor areas as far from sources of dust and traffic as possible and plant shrubs and trees or build barriers to deflect air pollution from the outdoor areas.

4 The first question to ask is, does this dry cleaner use perchloroethylene? These cancer-causing vapors can easily escape into the building and float up into areas where children, elderly, or those with lung or heart disease may live. If a safer dry cleaning chemical is used, the dry cleaning operation may be fine in this location. If perchloroethylene is used, ask if the operations in the mixed use building can be operated as a storefront, with the cleaning operations done in a separate building sited according to the distances recommended in the chart on page 6.

5 City or county operations can assimilate strategies to reduce fine particle pollution, such as mowing in the evening; look at activities occurring in the area that may be contributing to fine particle pollution and implement strategies to reduce fine particles, such as a construction site not following fugitive dust rules or a distribution center that allows diesel trucks to idle their vehicles during the loading and unloading of packages; promote strategies citizens can do to reduce fine particles; consider an ordinance to discontinue burning of trash and leaves, or start a carpool program.

Iowa Department of
Natural Resources