★ planning advisory service

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INDUSTRIAL ZONING STANDARDS*

At the end of World War II an era of unprecedented industrial expansion opened in the United States. In their efforts to find suitable sites for new plants, industrialists soon found themselves faced with a great shortage of industrial land. By 1946 most of the land in cities and much of the land in the periphery of cities was zoned. And almost without exception industrial expansion was left with the dirty end of the zoning stick.

The problem was so serious that in 1950 six national organizations established an inter-group committee to do something about it. (They include the American Society of Civil Engineers, the American Institute of Planning, the Association of State Planning and Development Agencies, the American Railway Development Association, the American Industrial Development Council, and the Society of Industrial Realtors. Later, when the secretariat of ASPDA was established as a separate office, the American Society of Planning Officials joined the group.) The new group was named the National Industrial Zoning Committee (NIZC). The first action of NIZC was to prepare and issue a pamphlet, Principles of Industrial Zoning. The NIZC pamphlet contains 12 precepts to guide planning and zoning commissioners, professional planners, and city councilmen when they come to adopting or revising zoning ordinances. The pamphlet was printed in large quantity and was distributed widely through the efforts of the constituent members of the NIZC.

Principle six for the industrial zone reads as follows: "There is a need for a reclassification of industry based on modern manufacturing processes and the prevailing policy of plant construction so as to determine the desirability or lack of desirability for inclusion in a given area."

At the National Planning Conference of the American Society of Planning Officials, held in Pittsburgh in 1951, principle six was expanded in a paper delivered at one of the sessions.* In brief, the thesis of the paper was this: zoning ordinances generally attempt to classify industries by name. With the rapid changes in industrial processes, such classification quickly becomes obsolete, if the classification is meant to keep similar industries together in the conventional "light" and "heavy" industrial districts. It is not the name of an industry that determines whether it is more or less obnoxious (the original basis for segregation) but is rather the external effects of the industrial operations.

Therefore, it was proposed that industries be classified and grouped solely on the basis of external effects. Zoning districts would be described by listing the measurable limits of noise, smoke, odor, vibration, glare, etc. that would be permitted for any industrial use in that particular district but the uses would not be listed by name.

By analogy to similar objective descriptions in building codes, these limiting measurements were called "performance standards."

The basic idea of leaving a group of industries unnamed and, instead, setting limits to the obnoxious effects they might create was essentially the purpose of a catchall provision that appeared quite widely in zoning ordinances - - "Any other lawful use which is not obnoxious by reason of its creation of noise, odor, glare, dust, or excessive vibration." This phrase frequently was put at the end of the list of specific uses permitted in the least restricted industrial district. The refinement introduced by performance standards was to substitute objective measurements for the idea of "obnoxious." Then description by measurement is extended to all industrial districts.

In this report we discuss in general terms the progress thus far in the use of standards for the control of uses placed in industrial districts. The comments will be based on a detailed analysis of 11 zoning ordinances either adopted or proposed in cities throughout the United States that introduce this concept.

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* Dennis O'Harrow, "Performance Standards in Industrial Zoning," Planning 1951 (Chicago: American Society of Planning Officials, 1952) pp. 42-45; Performance Standards in Industrial Zoning, PLANNING ADVISORY SERVICE Information Report No. 32, November 1951 (Chicago: ASPO); Performance Standards in Industrial Zoning (Columbus, Ohio: National Industrial Zoning Committee, 820 Huntington Bank Building).

What was actually the first zoning ordinance to use a performance standard would probably be difficult to uncover. Certainly one of the earliest was the ordinance for Niagara Falls, New York (1951), prepared by Hugh Pomeroy. In this ordinance the uses permitted in the M-1 industrial zoning district were described as:

> Any manufacturing or other industrial operation from which no dust, smoke, fumes, gas, noxious odor or other atmospheric effluence is disseminated beyond the boundaries of the M-1 district in which such use is located, and which produces no noise exceeding in intensity at the boundary of such M-1 district the average intensity of noise of street traffic at that point; . . .

Another ordinance that introduced several new ideas in zoning was the proposed New York zoning resolution published in 1950. Although the New York proposal did not go all the way to a substitution of performance standards for lists, it was designed specifically with the idea that numerical standards could be easily introduced later as simple amendments.

The first two ordinances to attempt to use performance standards in the manner envisioned by the NIZC were the ordinances for Warren Charter Township, Wayne County, Michigan, and Parsippany-Troy Hills Township, Morris County, New Jersey. Warren Township is in the metropolitan Detroit area and already contains quite a bit of industry. Parsippany-Troy Hills Township is primarily a residential area in the New York metropolitan region.

Several other ordinances have been written since the Warren and Parsippany-Troy Hills ordinances but a quite significant step was taken by the city of Chicago in 1954. In that year the city (which was completely revising its zoning ordinance) appropriated $12,000 for research to establish appropriate standards. The contract was awarded to Armour Research Foundation, an affiliate of Illinois Institute of Technology. The proposals for control of industrial zoning districts were made public late in 1955.

There has been general endorsement of the theory of performance standards in zoning. At the same time there have been serious practical questions on administration. The questions have been directed toward these points:

1 - What are reasonable standards?
2 - How can you tell prior to actual construction whether or not the plant, when it is built and operating, will comply with the standards?

3 - Can you train the ordinary building inspector to make the necessary and quite complex measurements used?
4 - How will you handle future violations by a plant that originally complied with all regulations?
5 - How will you handle existing uses that do not comply with new standards (uses nonconforming as to noise, or smoke, etc.)?

The experience in administering performance standards zoning as of today is practically nil, so the final answers to these questions are not available. The best one can do is to try to discover, from the texts, how the writers of the zoning ordinances propose to answer these questions, if they do.

Effects Regulated

In Performance Standards in Industrial Zoning, 11 effects are discussed and the possibilities of establishing numerical standards for each of them briefly explored. With three exceptions -- traffic, aesthetics, and psychological effects -- each of these is included in one or more of the performance standards ordinances analyzed here. In addition to those effects listed in the 1951 discussion, three other sources of annoyance -- vibration, electromagnetic interference, and radioactive emissions -- are listed in some of the ordinances.

Table 1 shows a breakdown of the subjects covered in the performance standards ordinances to date. The table also distinguishes between those effects for which numerical standards are given and those which are completely prohibited. Of course, the complete prohibition of an emission can also be stated as placing a maximum of zero units (whatever the suitable unit might be) on the emission. However, in some cases complete prohibition has been used because the writer of the ordinance could not find satisfactory units of measurement or numerical standards for that particular effect.

Number of Zones

One basic weakness of industrial zoning has been the use of the terms "light" and "heavy" industry. Planners could get together and agree that watch manufacturing was definitely "light" and blast furnaces definitely "heavy" but there was no agreement on the exact point at which "light" changed to "heavy." Besides, industries that might have been considered "heavy" ten years ago had changed their processes and cleaned up their operations until they were

TABLE 1

STANDARDS USED FOR INDUSTRIAL ZONES

Ordinance	Number of Industrial Zones	Noise	Smoke	Odor	Dust and Dirt	Toxic Gases	Heat and Glare	Fire and Safety	Sewage	Vibration	Electromagnetic Interference	Radioactive Emissions
Albuquerque, N. M.	3	#	#	P	#					P		
Anne Arundel County, Md.	2	#	#	P	#	P		#	P			
Bismarck, N. D.	2	P	#	P	P	P	P					
Center Line, Mich.	3	#	#	P	#	#	P			#		P
Chicago, Ill.	3*	#	#	P	#		P	#		P		
Clarkstown, N. Y.	2	#	#	#	#	P	P	P	P	#	P	P
Parsippany-Troy Hills Township, N. J.	2	#	#	P	P	P	P	#	#			
Penn Township, Pa.	1	#		P	P	P	P	#	P			P
Rye, N. Y.	1	#	#	P	#	P			#	P	P	
Southfield Township, Mich.	2	#	#	P	#	P	P		#		#	
Warren Township, Mich.	4	#	#	P	#	P	P		#			

KEY: # - Numerical standards used
P - Included as a separate standard but numerical limits not used
* - Bulk sub-districts used to make a total of 11 different types of industrial zones

no more obnoxious than industries once classed as "light."

Table 2 shows, in an abbreviated version, the manner in which the various districts are differentiated from one another. Thus, the two industrial districts in the Parsippany-Troy Hills ordinance differ in these respects: in the second zone, plants are permitted to create more noise and more smoke and are required to have larger lots. All other regulations are the same for the two districts.

In two ordinances, only one industrial district is established. In another, the standards apply to all zones -- residential and commercial, as well as industrial. This raises a question on a fundamental point in zoning. Is the use of standards in these cases a proper function of a zoning ordinance? Or should this type of regulation be the subject of separate ordinances?

This is more than an academic question. There is evidence that some planners have seized on the idea of performance standards as an opportunity to introduce a type of regulation that has not previously been acceptable to the city council.

As an example: a zoning ordinance establishes Ringelmann No. 2 as the limit of permissible smoke in its industrial zone. This is a reasonable maximum for smoke for the entire city. But for one reason or another the city has not been able to adopt a general smoke abatement ordinance, so that in all other districts, residential and commercial, smoke can go to any density to Ringelmann No. 5, 100 per cent opaque, with no legal sanctions forthcoming. There are certainly temptations for the zealous planner to see performance standards as a vehicle by which he can introduce reforms that could not yet stand alone.

On the other hand, the planner may reason that smoke abatement must come some day to every city. It is much less expensive to build smoke control into the plant at the time it is originally constructed than it is to add the necessary equipment later

The Administration of the Ordinance

It is believed that in large cities it will be relatively simple to employ inspectors with enough technical training and skill to make the rather complex measurements necessary to determine compliance with performance standards. In Chicago, for example, there is a department of smoke abatement with a

TABLE 2

DIFFERENTIATION BETWEEN ZONING DISTRICTS

Ordinance	Number of Districts	Standards varied for:
Albuquerque	3	Noise, smoke, odor, vibration
Anne Arundel County	2	Noise, smoke, odor, dust, toxic gases
Bismarck	2	Smoke, vibration, lot area
Center Line	3	Noise, safety, yards, height
Chicago	3	Smoke, odor, dust, safety, vibration
Clarkstown	4	(Permitted and prohibited uses listed)
Parsippany-Troy Hills Township	2	Noise, smoke, lot area
Penn Township	1	———
Rye	1	———
Southfield Township	17	(Standards apply to all zones)
Warren Township	4	Noise, safety, working shifts, yards, height

trained inspection staff competent to carry out the very complicated measurements of particulate matter proposed in the new zoning ordinance.

But for smaller cities, the Chicago provisions will certainly look forbidding. To forestall anxiety concerning an ordinance he was preparing for Kettering, Ohio (population 28,000) Ladislas Segoe wrote:

> A preliminary investigation made by us indicates that certain of the industrial research organizations in southern Ohio do consider themselves capable of performing the measurements and evaluations required by the proposed ordinance. Where such services are required, the cost of hiring the research firm is paid by the industry desiring to locate in the city.

The Parsippany-Troy Hills and Penn Township ordinances place the burden of proof on the applicant for proving that he will meet the standards. In these townships, all applications for industrial use occupancy permits are reviewed by the boards of adjustment.

> An application for a Certificate of Occupancy for a building or land use in any Industrial Zone shall be accompanied by:
>
> (1) A plot plan of the lot showing the location of all present and proposed buildings, drives, parking lots, waste disposal fields and other constructional features on the lot; and all buildings, streets, alleys, highways, streams and other topographical features outside of the lot and within 200 feet of any lot line;
>
> (2) Architectural plans for any proposed buildings;
>
> (3) A description of the industrial operations proposed in sufficient detail to indicate the effects of those operations in producing traffic congestion, noise, glare, air pollution, water pollution, fire hazards or safety hazards;
>
> (4) Engineering and architectural plans for the treatment and disposal of sewage and industrial waste;
>
> (5) Engineering and architectural plans for the handling of any excess traffic congestion, noise, glare, air pollution, water pollution, fire hazard or safety hazard;

(6) Designation of the fuel proposed to be used and any necessary architectural and engineering plans for controlling smoke;

(7) The proposed number of shifts to be worked and the maximum number of employees on each shift;

(8) Any other data or evidence that the Board of Adjustment may require. (Parsippany-Troy Hills)

These ordinances go further for certain industries. They recognize that it is unfair to judge the possible annoyance of a new plant by the annoyance created by the same kind of industry in an old plant operated somewhere else. At the same time, the governing body knows that just because it is possible to minimize noise, odor, smoke, etc., there is no certainty that the proper control devices will be installed. Therefore, the ordinances list groups of uses that have a reputation for unpleasant emissions and require applicants for these uses to submit detailed plans of their proposed control methods. But the ordinances go further and require a public hearing on an application so that the citizens can also be assured of the inoffensive nature of the proposed operation.

While it may be practical to call in outside experts to review original applications, it may not be so convenient to use such consultants for routine inspections after the plant is operating. The Parsippany-Troy Hills ordinance attempts to meet this problem by allowing the board of appeals to require automatic recording devices.

> . . . Where appropriate, the Board may require the installation, maintenance and operation by the applicant of continuous recording instruments to demonstrate the operation or effect of operation of any machines or devices used to control or lessen noise, glare, air pollution, water pollution, fire hazards or safety hazards.

* * * * *

The detailed analysis of the standards used in the 11 zoning ordinances follows below. Again, it should be emphasized that there has been practically no experience in administering these provisions. The analysis is based on the text of the ordinances, together with some experience in enforcing related ordinances, such as those for citywide noise abatement.

Noise

In all of the ordinances, noise is one of the effects mentioned, and in all but one, numerical standards limiting noise are given. In three ordinances, the unit of measurement is the sone. In all of the others, the unit used is the decibel. Only in the Chicago and Clarkstown ordinances is there a breakdown of intensity limits for different portions of the sound spectrum.

The sone is a unit of loudness, an explanation of which is beyond the scope of this report.* It does give a reasonably accurate measurement of the annoyance created by various sounds but it does not have general acceptance among acoustical scientists yet. Also, it cannot be measured directly by any instrument so that it does not lend itself to the establishment of a standard easily administered. However, we can probably say that the ordinances using sones to measure noise limits are reasonable.

The decibel is a measure of sound pressure. Low-pitched sounds are considerably less annoying than those of high pitch. Therefore, greater intensity of sound can be permitted in the low end of the noise spectrum than in the high end. There is no instrument available that automatically takes into account this subjective psychological characteristic of noise. The practical way to handle it at present is through the establishment of decibel limits for the sound levels at each of several frequencies. The only ordinances that thus far do set up various limitations for the several parts of the sound spectrum are those for Chicago and Clarkstown.

The Chicago ordinance establishes standards in terms of sound levels for the several audible octave bands. Table 4 gives the standards proposed for Chicago. The ordinance does not differentiate among the five industrial zones as to permissible noise; there is one maximum.

The Clarkstown ordinance establishes two sets of noise limits -- one for noises between the hours of 7 a.m. and 10 p.m., the other for the hours between 10 p.m. and 7 a.m. Actually, the ordinance lists only the nighttime limits, allowing five decibels greater pressure for each octave band during the rest of the day.

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* For an explanation of the use of the sone as a unit of loudness, see "The Measurement of Industrial Noise," G. L. Bonvallet in American Industrial Hygiene Quarterly, September 1952 (reprinted by National Association of Mutual Casualty Companies, 20 North Wacker Drive, Chicago 6).

TABLE 3

STANDARDS FOR NOISE LIMITS

Ordinance	Maximum Noise
Albuquerque	
C-3 Unlimited Commercial	50 sones
M1 Industrial	No maximum
M2 Industrial	No maximum
Anne Arundel County	
Light Industrial	70 decibels
Heavy Industrial	70 decibels at zone boundaries
Center Line	
M1 Industrial	75 db. day; 70 db. night
M2 Industrial	80 db. day; 75 db. night
M3 Industrial	85 db. day; 80 db. night
Chicago (See Table 4)	
Clarkstown (See Table 4)	
Parsippany-Troy Hills Township	
A Industrial	20 sones
B Industrial	40 sones
Penn Township	
Restricted Industrial	20 sones
Rye	
Office-Laboratory	50-70 db. (See Table 5)
Southfield Township	
Technical Education-Research	50-75 db.
Warren Township	
M1 Industrial	60 decibels
M2 Industrial	65 decibels
M3 Industrial	70 decibels
M4 Industrial	75 decibels

TABLE 4

PROPOSED NOISE STANDARDS.
CHICAGO AND CLARKSTOWN ZONING ORDINANCES

Octave Band in Cycles per Second	Maximum Sound Pressure Level in Decibels 0.0002 dynes per square centimeter			
	Chicago		Clarkstown	
	Residence District Boundaries	Business District Boundaries	7 a.m. to 10 p.m.	10 p.m. to 7 a.m.
0-75	72	79	———	———
20-75	———	———	74	69
75-150	67	74	59	54
150-300	59	66	52	47
300-600	52	59	46	41
600-1,200	46	53	42	37
1,200-2,400	40	47	39	34
2,400-4,800	34	41	36	31
Above 4,800	32	39	———	———
4,800-10,000	———	———	33	28

The Chicago ordinance allows greater noise at business district boundaries than at residence district boundaries and, by inference, unlimited noise within the industrial districts themselves. This differentiation according to the use of adjacent property is carried into much more detail in the Rye ordinance, shown below, and in the Southfield ordinance, shown in the Appendix.

A limitation on intensity alone does not guarantee that a noise will not annoy, since intermittence also annoys. This is handled in several ordinances by a provision similar to the following:

> Objectionable noises, due to intermittence, beat frequency, or shrillness, shall be muffled so as not to become a nuisance to adjacent uses. (Southfield Township)

Requirements on instrument standards are used in the Chicago, Southfield Township, and Rye ordinances, while the latter two allow for temporary violations of the noise limits.

> Sound levels shall be measured with a sound level meter and associated octave band filter manufactured according to standards prescribed by the American Standards Association. (Chicago)

The Clarkstown ordinance applies a correction factor for any "noise of impulsive character (hammering, etc.)" and for any "noise of periodic character (hum, screech, etc.)." The permissible limit for each octave band is reduced five decibels.

Comments: A noise limit specified only by a single decibel figure with no mention of octave bands, of instrument standards, or of a frequency-weighting network is meaningless under strict interpretation. It is possible that a liberal court might read into the figures a proper adjustment. But in view of the quite precise nature of the term "decibel" this is doubtful.

The sone is also a clearly (although not easily) defined term and actually needs no further elaboration in the ordinance. However, because the sone is not directly measurable by simple instruments, it is not the most practical unit to describe noise.

The standards proposed for Chicago and Clarkstown are without doubt the most

TABLE 5

PROPOSED NOISE STANDARDS
RYE ZONING ORDINANCE

Maximum Sound Level in Decibels	Location or Boundary of Adjacent Use District
50	All residence districts, when adjacent without intervening street, measured at common lot line
60	Business "A" or "AA" districts when so adjacent, measured at common lot line
60	Street not more than 50 feet wide, with residence district opposite, measured at street line
70	Business "B" districts, other property in Business "C" districts, when so adjacent, measured at lot line
70	Street with other business districts opposite, measured at street line
70	Railroad right-of-way when so adjacent with residence district opposite, measured at lot line
70	Street more than 50 feet wide with residence district opposite, measured at street line

scientifically prepared of any to date. Consultants for the Chicago standards were scientists from Armour Research Foundation; for the Clarkstown standards the consultants were Bolt, Baranek and Newman, acoustical consulting firm. For a large city, where it is financially practical to use highly trained technicians, these two sets of standards are in the most usable form. This statement should also apply to the smaller city that intends to use consultants.

In general, it would seem that the use of the decibel unit of noise, specifying measurement by a standard weighted instrument, will be the easiest to understand and to administer. It is also quite probable that this type of limit and measurement will parallel the limits and instruments used in citywide noise abatement ordinances. Nevertheless, acoustical scientists are skeptical of the value of frequency-weighting as an effective method for measuring the disturbance created by noise. It is even possible that the American Standards Association will drop it from its instrument specifications.

A provision on intermittent noises seems to be an advisable safeguard.

The best location at which to take noise measurements and a variation of permissible limits according to adjacent uses are subjects on which we must await experience. A limit based on measurement at any property line is the simplest to write and to administer. It may not be as realistic or equitable as varying the limit according to the adjacent use. Setting no limit on noise within a district might lead to abuses difficult to correct, since any industry itself has a reciprocal right to protection from annoyance by its neighbors, no matter what they are.

This is an appropriate point to comment on one of the dangers in performance standards. Unless a standard is written with the help of a competent expert in the field, it is possible to incorporate incorrect -- even ludicrous -- provisions in the ordinance. For example, the following provision appears in one ordinance:

> Method of Measurement: The sound level, in decibels, measured at the points adjacent to the various use districts shall meet the established levels ninety (90) per cent of the time, and shall at no time exceed the established sound levels by more than ten (10) per cent. The sound levels shall be measured with an approved standard sound-level meter incorporating a 40db frequency-weighing network, or by any method subsequently approved by the U. S. Bureau of Standards.

There are at least three errors in this provision: (1) To exceed a sound level by "10 per cent" is a peculiar concept. Does this mean that for a limit of 60 decibels, occasional noises up to 66 decibels will be permitted? If so, the additional 6 decibels represent an increase, not of 10 per cent, but of about 400 per cent in sound pressure. Ten per cent excess of sound pressure would permit approximately 60.3 decibels, an accuracy that is impractical for field measurements of noise. (2) The proper term is "frequency-weighting" not "frequency-weighing." (3) The U. S. Bureau of Standards establishes no standards for acoustical instruments. The proper organization is the American Standards Association. (The best specification for instruments is that in the Clarkstown ordinance.)

This is a serious problem. The improper use of one standard can cast discredit on the entire ordinance, leaving the city with less land use regulation than when there was no zoning.

Smoke

All ordinances except that for Penn Township establish numerical standards governing the emission of smoke. In every case the Ringelmann chart was specified as the measuring instrument. In the Southfield Township ordinance, the umbrascope was listed as an optional measuring device.

The limits vary from the requirement that only smokeless fuel be used, to a limitation of Ringelmann No. 3 (60 per cent density) as shown in Table 6. In line with customary smoke abatement standards, each ordinance also permits the maximum to be exceeded for short periods.

As an example of a complete provision, the following is quoted:

> Smoke: It shall be unlawful for any person, firm or corporation to permit the emission of any smoke from any source whatever to a density greater than that density described as No. 1 on the Ringlemann Chart; provided that the following exceptions shall be permitted: smoke, the shade or appearance of which is equal to but not darker than No. 2 of the Ringlemann Chart for a period, or periods, aggregating four minutes in any 30 minutes.
>
> Method of Measurement: For the purpose of grading the density of smoke, the Ringlemann Chart, as published and used by the United States Bureau of Mines, which is hereby made a part of this Ordinance, shall be the standard. However, the Umbra-

TABLE 6

SMOKE

Ordinance	Limit
Albuquerque	(See footnote)
Anne Arundel County	
Light Industrial	Smokeless fuel
Heavy Industrial	Ringelmann #2
Bismarck	
MA Industrial	Ringelmann #1
MB Industrial	Ringelmann #3
Center Line	
M1-M3 Industrial	Ringelmann #1
Chicago	
M1-M5 Industrial	Ringelmann #3
Clarkstown	
M1-M2 Industrial	Ringelmann #1
Parsippany-Troy Hills Township	
A Industrial	Smokeless fuel
B Industrial	Ringelmann #2
Rye	
Office-Laboratory	Ringelmann #1
Southfield Township	
Technical Education-Research	Ringelmann #1
Warren Township	
M1-M4 Industrial	Ringelmann #2

Note: limits smoke in the C3 unlimited commercial districts to "10% blackness, as measured by the Ringelmann chart" and in the M1 and M2 industrial districts to "20% blackness as measured by the Ringelmann chart . . . up to 30% blackness . . . 6 minutes in any hour: This is quite obviously an error, since the intervals between Ringelmann numbers are all 20 per cent and there is no way of measuring either 10 or 30 per cent densities with the chart.

scope readings of smoke densities may be used when correlated with Ringlemann's Chart. (Southfield Township)

Comments: Standards for limiting smoke emission have probably been the easiest of all to determine because of the extensive experience with smoke abatement ordinances. A simple measuring device has been developed and is readily available.

An important consideration in establishing smoke standards is whether the control is consistent with over-all municipal smoke control. Any mention of smoke was probably omitted from the Penn Township ordinance because of the excellent smoke abatement ordinance and administration for all of Allegheny County. No attempt has been made in this study to determine how the zoning standards fitted with the general smoke control ordinance, nor even whether there was general smoke control.

It can be claimed that setting limits on industrial smoke emission without similar limits for other uses is discriminatory. In answer, it can be said that eventually all municipalities will have strong smoke control programs and that it is more economical to introduce prevention at the time of new construction.

Dust and Dirt

Each of the 11 ordinances introduces a provision to limit dirt and dust emission. In three of them such emission is flatly prohibited. A typical provision limiting dust, dirt, and fly ash reads about as follows:

> Shall not exceed .3 grains per cubic foot of flue gas at stack temperature of 500 degrees Fahrenheit, of which amount, not to exceed .2 of a grain per cubic foot shall be of such size as to be retained on a 325 mesh U. S. standard sieve. The conditions are to be conformed to when the percentage of excess air in the stack does not exceed 50 per cent at full load.

The provisions on smoke and particulate matter in the Chicago ordinance, however, are quite detailed, running to some seven and one-half pages in the mimeographed draft. The ordinance sets up a rather complicated method of calculating emission, including tables allowing for different heights,

velocities, and temperatures of the emission. Then the limitation is stated in pounds of particulate matter per acre of lot area during any one hour. In the three manufacturing zones the limitations are 1 pound, 3 pounds, and 8 pounds, respectively.

For economy of space, the very elaborate Chicago provisions are reproduced only once, in the Appendix. These standards were established by scientists at Armour Research Foundation and undoubtedly represent the most careful approach to the problem of all the ordinance provisions on dust and dirt examined. To explain the reason for such detailed standards, we quote from the paper delivered by Jack Smith, senior planner with the Chicago Plan Commission, at the 1954 National Planning Conference.

> Smoke, dust and other types of particulate matter. A third major field of concentrated research was smoke and particulate matter. We are considering smoke, dust, and other forms of solid and liquid particulate matter as falling under one interrelated system of standards. The emission of particulate matter results from the combustion of solid fuel, from wind-borne dust, and from industrial operations creating dust, sprays, mists, and other finely divided materials.
>
> If only one type of pollution control were possible, this control should be imposed upon particulate matter. Particulate matter is a nuisance in the forms of cinders in the eyes, soot on shirt collars, dirt and dust on the furniture. Particulate matter is the major air pollution problem in Chicago. It is estimated that approximately 58 per cent of Chicago's monthly dust fall of 55 to 60 tons a square mile are from commercial and industrial sources. The average citywide dust fall is approximately 6 pounds an acre a day, while the average daily emission for an industrial acre is 50 pounds. Our performance standards contain these primary devices: (1) The Ringelmann Chart to limit the density of visible emissions. (2) Limits on the size of particulate matter. (The collection of particulate matter as large as 44 microns is now technologically feasible and relatively inexpensive.) (3) Limits on the total weight of particulate matter discharge for each acre of property area. (We feel that this is a much fairer method of regulating air pollution. The actual limits for the three industrial zones were established on the basis of the analysis of

> emission from various types of industrial operations and types of fuel burning equipment.) (4) Formulae for computing additional permitted discharge on the basis of (a) height of stack, (b) emission velocity, and (c) temperature of emission. These factors are important in assessing nuisance creation. For example, high stacks and high temperatures tend to cause the waste to travel greater distances and become quite dilute before reaching the ground.

It is quite probable that the provisions on particulate matter in the Chicago ordinance are the most equitable of any analyzed in this report. Again, however, measurement would not be easy, especially for small cities. The simple provisions from the other ordinances have much to recommend them. There is evidence that the writers of some of the other ordinances may have copied something about which they knew little and because of this lack of knowledge the results are garbled. The provisions that refer to standardized methods of measurement are likely to be the most satisfactory to administer.

Odor

The control of odor is provided for in each ordinance. In no ordinance are numerical standards given directly but the Clarkstown ordinance does include numerical measurements by reference. The Clarkstown provision is the most complete regulation of odors in any of the 11 ordinances.

> Odors. No emission of odorous gases or other odorous matter in such quantities as to be offensive at the specified points of measurement. Any process which may involve the creation or emission of any odors shall be provided with a secondary safeguard system, so that control will be maintained if the primary safeguard system should fail. There is hereby established as a guide in determining such quantities of offensive odors Table III (Odor Thresholds) in Chapter 5 "Air Pollution Abatement Manual" copyright 1951 by Manufacturing Chemists' Association, Inc., Washington, D. C.

The provision in the Anne Arundel County ordinance is typical of the other ordinances. Any use shall "emit no objectionable odors outside the lot lines of the tract."

The Rye ordinance contains a brief description of measurement of odor:

> Method of Measurement: A noxious concentration shall be deemed to be the point at which the measurement of the threshold of smell can be achieved, and shall be measured in ounces per thousand cubic feet of air.

The Southfield Township ordinance contains a similar provision on measurement.

Comments: While the complete prohibition of the emission of substances with unpleasant odors may have been the purpose of some of these ordinances, at least some of the provisions were included as temporary controls. There are still no simple and accurate methods for odor measurement. Even a substance of unpleasant odor is harmless in an olfactory sense until it reaches the concentration necessary to pass the threshold of smell. For this reason, complete prohibition is not too logical. Nevertheless, fully satisfactory odor standards are not yet available. The Clarkstown provision refers to Table III, Chapter 5 of the Air Pollution Abatement Manual. While this is probably one of the best compilations of odor thresholds, it is also ambiguous. Four authorities are cited in the table for the odor threshold of hydrogen sulfide and the figures range from 0.025 to 1.0 parts per million (p.p.m.). Six concentrations are given for pyridine from 0.00032 to 10.0 p.p.m. If the table is referred to, the particular value to be used -- such as the smallest -- should also be indicated.

Toxic Gases

Most of the ordinances contain provisions on toxic gases. As with odors, the provision is merely a prohibition against emission, with one exception. The Penn Township provision is typical of the prohibiting clause: "All industrial uses shall. . . emit no noxious, toxic or corrosive fumes or gases."

The Center Line ordinance establishes definite standards for certain dangerous gases:

> Gases as measured at property line. [Sulfur dioxide] gas shall not exceed an average of .3 p.p.m. over a twenty-four (24) hour period, provided, however, a maximum concentration of .5 p.p.m. will be allowed for a one (1) hour period out of a twenty-four (24) hour period; [Hydrogen sulfide] shall not exceed .1 p.p.m.; Flourine shall not ex-

ceed .1 p.p.m.; Nitrous fumes shall not exceed 5 p.p.m. [Carbon monoxide] shall not exceed 15 p.p.m.

Comments: Allowable limits for toxic gases present some difficult problems. If, for example, we take sulfur dioxide, one of the gases mentioned in the Center Line ordinance, we find the following limits in the Air Pollution Abatement Manual of the Manufacturing Chemists' Association:

Sulfur Dioxide	Parts per million (volume)
Maximum Allowable Concentration 8-hour day, 5-day week	10.0
Odor threshold	3.0
Injurious to vegetation (7-hour exposure)	0.4
Painful to eyes	6.0-12.0

* * * * *

(Maximum allowable - Center Line ordinance	0.3-0.5)

The concentration allowed by the Center Line ordinance is well below all criteria except that for vegetation injury.

Of the limits quoted above, the one most important to human health is the first -- Maximum Allowable Concentration (MAC). This limit was established for conditions under which industrial employees work. As shown, it is the danger point for exposure eight out of each 24 hours and five out of each seven days. No determination has yet been made of a maximum allowable concentration for 24 hours a day, 7 days a week, which is the exposure that neighbors might get from industrial emissions. In the example of sulfur dioxide, the MAC is substantially greater than the Center Line zoning ordinance permits. But it will be noted that the concentration injurious to vegetation likewise is for an attenuated period, seven hours, and the Center Line limit is only very slightly below the injurious concentration. The ordinance also permits a greater concentration for a shorter period, the effects of which on vegetation have not been determined.

The Center Line ordinance establishes standards for five toxic gases (con-

sidering "nitrous fumes" as one gas). The Air Pollution Abatement Manual lists the MAC for 116 "gases and vapors" and 27 chemical "dusts, fumes, and mists." Among these are many harmful pollutants that have been found and measured in urban atmospheres, such as fluorides, beryllium, copper, lead, and zinc -- not mentioned in the Center Line ordinance.

These comments are not intended as a destructive criticism of the Center Line provision. Rather they are meant as a discussion of the extreme difficulty of this particular problem. Air pollution experts are not at all agreed on the acceptable limits in this field of toxic gases, although there is complete agreement that controls and limits must be sought.

Here again we have the question, "Do limits on toxic gases belong in a zoning ordinance?" Once a safe maximum is established, it certainly should not be different in different districts. Since toxic gases are so directly connected with human health and safety, it is not logical to permit continuance of a "legal nonconforming use" that is nonconforming because of its emission of toxic gases in excess of the allowable limit.

A final comment should be made on the administration of a provision on toxic gases. The detection of toxic gases is not easy but it can be done with proper equipment. However, reliable measurements of the quantity of the pollutant are quite difficult to make.

In the present state of knowledge on toxic air pollutants, it would seem that the best provision in a zoning ordinance would be complete prohibition. Perhaps reference could be made to "Table I, Industrial Hygiene Standards, Maximum Allowable Concentration," Chapter 5 of the Air Pollution Abatement Manual, for a list of toxic pollutants to be prohibited but the values for MAC should not be taken as standards for the ordinance. Here again, however, there is a chance for a claim of unreasonableness. The table lists carbon monoxide, a clearly dangerous gas but one that is extremely difficult to eliminate completely. It is apparently reasonably harmless in concentrations that are substantially below the MAC and, most important, is one that is emitted in much greater quantity, with no controls, by motor vehicles.

Glare and Heat

Provisions on glare and heat are contained in seven ordinances but in none of them are there any numerical standards. A typical provision is that for Warren Township:

> Glare and heat from arc welding, acetylene torch cutting or similar processes shall be performed so as not to be seen from any point beyond the outside of the property.

The Clarkstown ordinance contains a different wording, one which would undoubtedly exclude Bessemer converters:

> Glare. No direct or sky-reflected glare, whether from floodlights or from high temperature processes such as combustion or welding or otherwise, so as to be visible at the specified points of measurement. This restriction shall not apply to signs otherwise permitted by the regulations.

The Penn Township ordinance is somewhat more general:

> . . . all industrial uses shall . . . carry on no operation that would produce heat or glare beyond the property line of the lot on which the industrial operation is located;

The Parsippany-Troy Hills and Penn Township ordinances also contain provisions on industrial lighting:

> . . . all industrial uses shall . . . use industrial and exterior lighting in a manner that produces no glare on public highways and neighboring property;

Comments: There are available adequate units for the measurement of heat (degrees of temperature, calories, B.T.U.) and glare (foot-candles). At the same time, it would seem unnecessary to complicate the zoning ordinance with standards expressed in such units. Prohibition in the simple terms of the quoted provisions is probably entirely satisfactory.

Industrial Sewage Waste

In four ordinances, numerical standards governing industrial wastes are established. In two others, Anne Arundel County and Penn Township, industrial sewage standards are incorporated by reference to the state department of health.

> . . . the written approval of the appropriate Official of the Water Pollution Control Commission and the state Depart-

> ment of Health [shall] be filed with the Zoning Official regarding compliance with their requirements of stream pollution prevention, prior to requesting a building permit or certificate of occupancy for an industrial use. (Anne Arundel County)

The four ordinances with numerical standards are those for Parsippany-Troy Hills, Rye, Southfield Township, and Warren Township. To save space, the provisions are omitted from this section of the report and will be found in the Appendix. The Rye ordinance, which is not included in the Appendix, uses the same standards for industrial wastes as those for Southfield Township.

The standards for industrial waste are those commonly used in sanitary engineering and stream pollution control. One different provision is introduced in the Parsippany-Troy Hills ordinance, which provides that the maximum quantity of effluent shall not exceed 10 per cent of the minimum daily stream flow.

Comments: Jack Smith, in speaking of the consideration of industrial waste in the Chicago ordinance, said:

> The analysis of industrial waste disposal as related to industrial plant location in Chicago resulted in the conclusion that this problem was handled adequately by the sanitary district on an individual plant "custom" basis. Therefore, additional zoning controls are considered unnecessary. However, this happy situation probably does not exist in most areas. Fortunately, the basic information is available for writing industrial waste standards for cities needing this control.

The need for industrial waste standards is somewhat different from the need for any of the other standards. In Performance Standards in Industrial Zoning it was described as follows:

> A municipal sewerage system is, or should be if it isn't, planned for a long time in the future. In some rare instances it may be possible to expand the system -- laterals, mains, interceptors, disposal works -- easily for any part of the city. But in the majority of cities, the sewerage system is a miscellany of sections, some of which can

> handle more sewage than they are taking, others that are up to or over capacity, still other sections that cannot be expanded economically. So it is quite important that we plan our industrial areas with the present and potential sewerage system in mind.
>
> Industrial sewage differs from the other subjects covered thus far, in that it is not necessarily a nuisance. Of course, industrial waste discharged raw into a stream can be a nuisance. However, it is assumed that state and local health laws are effective in preventing this. If they are not, the zoning ordinance cannot be a satisfactory substitute. Delineating industrial zones based on the capacity of the sewerage system is primarily a land planning problem. Still, the principal tool for carrying out the land plan is the zoning ordinance. Industrial sewage standards should be in it.

An analysis of these several ordinances would indicate that the industrial waste standards were primarily directed toward the prevention of stream pollution, perhaps with the idea of establishing higher standards than those of the state department of health. Or perhaps the standards are inserted in the zoning ordinance to give the local government the power to act quickly and directly to avoid prolonged abuse.

Smith's remarks on the Chicago experience show that the zoning study commission in that city used the other approach, i.e., a study of the capacity of the municipal sewerage system to handle wastes in different parts of the system.

Several of these ordinances have been written presumably for areas as yet undeveloped industrially (for example, Anne Arundel County). The sewerage system is also relatively undeveloped. Probably the writer of this zoning text assumed that there is not yet any limit to the capacity of a system that might be built. It is not yet necessary to make rules to limit sewage discharge on a density basis.

There is little to say either way about the adequacy of the industrial waste standards in ordinances. However, provisions relating the capacity of an existing sewer system to a specific area within a community have yet to be written.

Vibration

"Excessive vibration" is more often than not one of the manifestations forbidden in industrial districts. It appears in five of the ordinances reviewed here.

The proposed Chicago ordinance does not establish objective measurements but it does provide differentiation:

> M1 and M2 districts:
>
> . . . any use creating intense earth-shaking vibration shall be set back at least five hundred feet from the lot lines on all sides, except for lot lines adjoining an M3 District where such setback shall not be required, but in no case shall any such vibration be perceptible along the boundary line of any other zoning district except M3.
>
> M3 districts:
>
> Any use creating intense earth-shaking vibrations shall be set back at least five hundred feet from the boundary of a Residence, Business, Commercial, M1 or M2 District, but in no case shall any such vibration be perceptible along the boundary of any other zoning district.

An ordinance that contains a numerical limit on vibration is the one for Center Line:

> Machines or operations which cause vibration shall be permitted, but no operation shall cause a displacement exceeding .003 of one (1) inch as measured at the property line.

As originally written, the Clarkstown ordinance contained the following provision on vibration:

> Vibration. No vibration which is discernible to the human sense of feeling for three minutes or more duration in any one hour of the day between the hours of 7 a.m. and 7 p.m., or of 30 seconds or more duration in any one hour between the hours of 7 p.m. and 7 a.m. No vibration at any time

shall produce an acceleration of more than 0.1g or shall result in any combination of amplitudes and frequencies beyond the "safe" range of Table 7, U. S. Bureau of Mines Bulletin No. 442, "Seismic Effects of Quarry Blasting," on any structure. The methods and equations of said Bulletin No. 442 shall be used to compute all values for the enforcement of this Sec.

Before the ordinance was adopted, the first sentence ("No vibration. . . 7 p.m. and 7 a.m.") was deleted because it was felt that discretion would be involved in interpreting the word "discernible."

Comments: If the displacement maximum specified in the Center Line ordinance is equitable, that provision may be the proper approach. The prohibition of large punch presses, etc., by name has been used as a temporary expedient. The Chicago proposal might be reasonable, if one could be sure at what point "earth-shaking" vibrations became "intense" enough to call for the 500-foot setback. The Clarkstown regulation, as amended, would probably prohibit only blasting operations.

Fire and Safety

Standards to reduce fire and safety hazards, while considerably short of the ideal of objective measurement, are improved over the provisions in pre-World War II ordinances. They are customarily tied in with building or fire safety codes.

By far the most complete provision against fire and safety hazard is found in the Chicago ordinance. The Chicago provisions, in brief, are as follows:

M1 districts:

1 - Incombustible to moderate burning materials -- permitted freely.

2- Free or active burning to intense burning materials
   (a) enclosed within incombustible walls
   (b) 40-foot setback or automatic sprinkler.

3 -Flammable vapors at ordinary temperatures -- prohibited.

M2 districts

1 - Free to active burning materials
   (a) enclosed within incombustible walls

(b) protected by automatic sprinkler.
2 -Flammable vapors at ordinary temperatures -- prohibited.

M3 districts:
1 - Fast burning materials.
2 -Flammable vapors at ordinary temperatures -- permitted except within 600 feet of any other district.

Several of the ordinances include detailed standards regarding the storage of materials, particularly of flammable materials. These are directed for the most part to fire and safety protection.

Comments: The Chicago provisions were prepared with the help of Armour Research Institute fire hazard experts. This group of men has long had a high reputation in the field. If there is a clear method for classifying materials by steps from incombustible to intense burning, the provisions present no particular problems of interpretation or enforcement. Whether they are suitable as they stand for smaller cities may be questionable, so that verbatim copying should be avoided. However, they seem to be a satisfactory form for measuring this hazard. Additional standards on storage may be desirable. It would also seem desirable to specify fireproof construction for all buildings in the district if the building code does not do so.

Electromagnetic Interference

One reason for drafting the technical education-research district in Southfield Township was to establish a district in which electronic laboratories could locate with assurance that they would be free from outside electromagnetic interference. These standards are quite complex and are undoubtedly incomprehensible to anyone who is not an electronics engineer. These standards are reproduced in the Appendix. They were prepared originally by competent electronics engineers.

Comments: In the ordinary industrial district, standards such as these may be superfluous. With the increase in importance of the field of electronics and the increase in number of laboratories, there may be a wider need for such protection than we now anticipate. The equity of these electromagnetic standards and the problems of measurement and enforcement are subjects on which only electronics experts are qualified to speak.

Radioactive Emissions

The imminence of general use of nuclear reactors as a source of electric power raises the problem of protection from dangerous emissions. These first ordinances using performance standards have not attempted to set up numerical standards for such emissions, although such standards are undoubtedly available. Recognition of the possibility of dangerous radioactive emissions, however, is shown in a few ordinances.

> Radio-active materials shall not be emitted to exceed quantities established as safe by the U. S. Bureau of Standards, or as amended from time to time. (Center Line)

The Parsippany-Troy Hills ordinance recognizes "the production of materials by nuclear fission" as a special use requiring a public hearing before a permit can be issued.

Comments: There is probably no immediate need for concern over radioactive emission standards in zoning ordinances. There may be need for concern in the future.

Density and Yard Controls

In Table 7 we have assembled in a much abbreviated form the many controls used to regulate bulk, lot coverage, yards, and density. There are many supplementary provisions affecting these items but little would be gained by trying to list the permissible or required variations.

Each of the 11 ordinances contains at least one of the forms of density and open - space control.

Minimum lot area	-	5 ordinances
Front yard	-	10 ordinances
Side Yard	-	9 ordinances
Maximum height	-	9 ordinances
Lot coverage	-	3 ordinances
Floor area ratio	-	6 ordinances

Perhaps most noteworthy is the fact that controls of this type are being used in industrial districts. In most older ordinances, regulations for industrial districts were confined almost entirely to listing of permitted or prohibited uses. Except where a lot might adjoin a residential district, it was customary to

TABLE 7

DENSITY PROVISIONS

Ordinance	Minimum Lot Area Sq. Ft.	Front Yard Minimum	Side Yard Minimum	Maximum Height Stories-Feet	Lot Coverage Maximum	Floor Area Ratio Maximum
Albuquerque - C3	6,000	30'*	-	Street width and setback.	-	-
M1	-	35'*	-	Street width.	-	-
M2	-	35'*	-	-	-	-
Anne Arundel - Light	-	50'	25'	25'	-	-
Heavy	-	50'	25'	-	-	-
Bismarck - MA	5,000	-	-	4-50'	-	1.0-2.0
MB	10,000	50'	20% width	4-50'	30%	0.3-0.6
Center Line - M1	-	-	-	2-30'	-	-
M2	-	50'	20'	2-30'	-	-
M3	-	100'	50'	2-40'	-	-
Chicago** - (B) 1	-	-	-	-	-	1.2
(B) 2	-	-	-	-	-	2.2
(B) 3	-	-	-	-	-	3.0
(B) 4	-	-	-	-	-	5.0
(B) 5	-	-	-	-	-	7.0
M 3	-	-	-	-	-	7.0
Clarkstown - RO	3 acres	100'	100'	***	-	0.2
M-1, M-2	3 acres	100'	50'	***	-	0.5

* From center line of street.

** The five bulk zones combine with M1 and M2 zones. M3 has only the one bulk zone.

*** Three inches per foot of distance from front lot line.

TABLE 7 (Continued)

Ordinance	Minimum Lot Area Sq. Ft.	Front Yard Minimum	Side Yard Minimum	Maximum Height Stories - Feet	Lot Coverage Maximum	Floor Area Ratio Maximum
Parsippany-Troy Hills Township - A	20,000	50'-100'	15% width	75'	35%	0.5
B	40,000	50'-100'	15% width	75'	35%	0.5
Penn Township - Industrial	-	65'*	25'	45'	50%	1.0
Rye - Office-Laboratory	7 acres	100'	100'	3 st	-	0.3
Southfield Township - Technical-Education	-	75'	80'	3-40'	-	-
Warren Township - M1	-	8'	-	2-30'	-	-
M2	-	50'	20'	2-30'	-	-
M3	-	150'	60'	2-40'	-	-
M4	-	200'	100'	2-40'	-	-

* From center line of street.

allow construction up to any property line, unlimited height, 100 per cent ground coverage, and to specify no minimum lot area.

Comments: Bulk and density controls such as those shown in Table 7 are not performance standards but are specification standards. Their object, however, is to regulate aspects of industrial development for which we do not now have (and perhaps never will have) suitable objective measurements. These include in particular aesthetics and traffic generation.

Aesthetics. A factory kept to one or two stories and set in a large lot with wide yards is aesthetically pleasing. Several recent court decisions, and in particular the United States Supreme Court decision in Berman v. Parker, 348 U. S. 26 (1954), show that aesthetics is being recognized as a proper municipal concern. Most industrialists also recognize the importance to themselves of attractive plants, both their own and those of their neighbors.

Traffic Generation. Probably the most disliked effect of industry is the traffic it creates. The only method now known to decrease traffic is to decrease the density of development. If it were possible to set a limit on traffic generation (for example: "no use or density of development that generates in excess of 100 vehicle trips per acre per day will be permitted"), then specification controls such as these would not be needed -- at least for the control of traffic. Control of traffic generation by lot area and floor area ratio is far from satisfactory but it can bring a decrease in traffic generation, particularly where a floor area ratio of 0.50 or less is established.

Traffic Noise. Industrial noise limits are applied to the noise from processes and operations of the factory itself. Sometimes these are required only to be kept below the normal street traffic noise, a perfectly logical requirement. If a reduction of density serves to decrease traffic noise, then industrial noise must also be lessened.

More important than traffic noise as the criterion with which to compare industrial noise is the effect of traffic noise itself on neighboring property. Several studies have shown that industrial process noise is a relatively minor offender. All studies have shown traffic noise to be a major offender.

Many of the industrial annoyances for which performance standards are used have the same effects that traffic produces, and for which, when they are caused by traffic, no limits are set. Besides noise, these would include dust and dirt, vibration, carbon monoxide gas, safety, odors, and glare. For this reason, density controls, insofar as they are effective in reducing traffic, may

be the most important of all industrial zoning controls.

While it would not be practical to try to describe the density and yard provisions in detail, we can note some of the ranges that are used in the 11 ordinances.

Where minimum lot area has been specified, it various among the different ordinances from 5,000 square feet to 7 acres.

Minimum front yards run from 30 feet to 200 feet. Minimum side yards run from 25 feet to 100 feet.

One ordinance specifies the maximum height of the building to be equal to the street width and this ordinance also calls for a 35-foot front yard. Other maxima run from 25 feet to 75 feet.

In the three ordinances that have specified a maximum lot coverage, one permits a maximum of 30 per cent, another of 35 per cent, and the third of 50 per cent.

Floor area ratios (except for that proposed in the Chicago ordinance) vary from 0.2 up to 2.0

The Chicago ordinance has three industrial districts and within each industrial district there is assigned one of five different bulk maxima. These vary from 1.2 times the lot area up to 7.0 times the lot area. This seems to be the weakest part of the entire Chicago proposal.

There should be no fear that reputable industrialists would object to reasonable density standards. Most of the plants constructed recently could easily comply with standards as severe as the most strict of these ordinances. It is probable, however, that some of the more extreme yard provisions would be considered unreasonable.

Use Lists

The goal of performance standards was the complete elimination of all lists of uses. Any use that met the standards for a district was automatically permitted to locate in that district. But there were several questions left unanswered and it was recognized that the goal might never be reached. Several of the ordinances do list uses and the purpose of these lists is analyzed.

In these ordinances there are two quite different methods of applying performance

standards. The more common method is to apply the standards to the zoning district regulation: a use to be permitted in a district must meet the standards of the district. In the second method, the performance standards are applied to the description of the uses.

The second method, standards applied to uses, also retains the use lists to a great extent. This is the method used in the Bismarck and Clarkstown ordinances, although there are differences between the two ordinances.

The Bismarck ordinance establishes two manufacturing districts -- MA and MB. The major difference between the two districts is that in the MA district the principal uses are "Industrial Group A," while the principal permitted uses in MB districts are "Industrial Group B."

Industries in the two groups correspond generally to the conventional "light" and "heavy" groupings. But in addition they are required to conform to certain performance standards. A brief comparison of the two lists is shown in Table 8.

One objective of performance standards is to permit an industry to locate in any zone if it conforms with the standards set for that zone. The Bismarck ordinance does not provide for Group B uses in a MA district but it does relegate Group A uses to the MB district under the following circumstances.

> Industrial Group B. . . [shall include] the following uses:
>
> 1. Any use listed in Industrial Group A, and involving the use of a punch press over 20 tons rated capacity, a drop hammer, or an automatic screw machine, provided that all other requirements of Industrial Group B uses are complied with.
>
> 2. Any use listed under Industrial Group B which cannot comply with the requirements of an Industrial Group A use, provided that all requirements for an Industrial Group B use are complied with.

The Bismarck ordinance was intended as a compromise between true performance standards and the conventional use lists. Insofar as Group B uses cannot be located in the MA district, it fails to meet the objectives of performance standards.

TABLE 8

INDUSTRIAL USES IN BISMARCK ZONING ORDINANCE

	Industrial Group A	Industrial Group B
Smoke	Ringelmann #1	Ringelmann #2
Fire or safety hazard	None	Same
Dust and dirt	None	Same
Drop hammer	Prohibited	Permitted
Automatic screw machine	Prohibited	Permitted
Punch presses	Under 20 tons	No restrictions
Uses:	Bakery	Brick plant
	Machine shop	Junk yard (enclosed)
	Warehouse	Brewery
	Laundry	Petroleum refining
	Soft drink plant	Smelter
	Etc.	Etc.

Paragraph 4.11 of the Clarkstown ordinance states, ". . . any non-residential use except those expressly prohibited by this ordinance in Sec. 4.4 may be undertaken and maintained if it conforms to the district Regulations, and the Regulations of this Sec. 4.1, referred to herein as 'Performance Standards,' limiting Dangerous and Objectionable Elements at the point of determination of their existence as provided in this Sec."

The uses prohibited under section 4.4 of the Clarkstown ordinance are the typical list of prohibited uses appearing in earlier ordinances, i.e., asphalt, cement, acid, fertilizer manufacture, lead smelting, slaughterhouses, etc. In other words, the industries generally considered highly objectionable, even though they are able to meet the standards, are still prohibited.

The use of performance standards proposed in the Clarkstown ordinance is somewhat difficult to follow through the text of the ordinance but in brief it is as follows:

All new nonresidential uses must conform to the standards, no matter where they are located.

Certain specific uses must go through performance standards procedure in order to get a building permit or certificate of occupancy. Performance standards procedure requires a hearing before the board of appeals.

Performance standards procedure is required for stated uses in the specific zones as follows:

RO (Residence-Office) district:
- "Light" manufacturing
- Research, experimental, and testing laboratories

C-2 (Highway Commerce) district:
- "Light" manufacturing
- Dry cleaning, rug cleaning
- Laundry plants
- Laboratories

M-1 (Light Manufacturing) district:
- All manufacturing
- Dry cleaning, rug cleaning
- Laundry plants

M-2 (General Manufacturing) district:
- Same uses as in M-1
- Concrete and pavement mixing plants

Junk yards and auto-wrecking yards
Gas-holders, coal yards, and refrigerating plants
Storage and baling of papers within a completely enclosed building
Incineration of waste materials, except garbage, offal, and dead animals
Quarries, stone crushers, screening plants, and storage of quarry screenings.

The building inspector, if he has any doubts, can require any nonresidential use to go through performance standards procedure.

Another ordinance resembles the Clarkstown ordinance in permitting certain uses only after review by a board of appeals.

The Parsippany-Troy Hills Township ordinance contains a list of uses that it terms "special uses. . . in which industrial operations are customarily such as to produce traffic congestion, noise, glare, air pollution, water pollution, fire hazards or safety hazards exceeding the standards and limitations established by this Ordinance. . . . " The list includes notorious industries such as soap manufacture, acid manufacture, petroleum refining, etc. In general, these would correspond to the prohibited uses in the Clarkstown ordinance.

All certificates of occupancy for industries in Parsippany-Troy Hills must be issued by the board of adjustment after it is satisfied that the industry can and will comply with the standards. For "special uses," however, the board must hold a legal public hearing before issuing its permit.

This provision for public hearing has a two-fold purpose. The first reason for the list is to tackle the problem of psychological effects. If some of these industries, which are so often feared by people, are able to make their operations unobjectionable, then it is better that the public be given a chance to be convinced of this fact. Perhaps, in this manner, the emotional block can be removed.

The second purpose of the public hearing is to eliminate the need for prohibiting any industry by name. Much as we might wish it otherwise, there are still a number of industries that have not found an economical method to clean up their operations. We can be quite certain that such industries will not be willing to face a public hearing or would not survive one if they did.

Most of the ordinances have adhered to the principal of admitting any use in an

industrial district if it can meet the standards. The Bismarck and Clarkstown exceptions have been described above. The Anne Arundel County ordinance has a short list that includes the bottling of liquified petroleum gas and the products of nuclear fission, which are permitted only after review by the board of adjustment. The Chicago ordinance contains a list of explosive products that are permitted if licensed by the fire prevention bureau. Penn and Parsippany-Troy Hills townships list no prohibited industrial uses.

The Rye and Southfield Township provisions are for districts that are not strictly industrial. The performance standards in Rye are directed toward laboratories; in Southfield Township the uses are confined to those "charged with the principal function of basic research and technical training" plus accessory dormitory and housing uses.

Off-Street Parking and Loading

Each of the ordinances contains requirements for off-street parking and loading for industrial uses. They are not analyzed here because much more complete analyses of such provisions are available elsewhere.

General Conclusions

There is no reason to believe that the theory behind performance standards for industrial zoning is not still valid. Some major steps have been made toward putting that theory into practice. At the same time, the first handful of ordinances using performance standards exhibit some serious weaknesses.

Probably the most serious weakness is that planners may have ventured into highly technical fields to adopt standards and measurements about which they know very little. This is particularly well illustrated in the standards for noise. For example, one ordinance permits in the industrial district a noise of "85 decibels." This is a rather high level for frequencies under 150 cycles per second but it is probably bearable. However, in the higher ranges, especially above 4,000 cycles, an 85 decibel sound level would be practically insufferable.

Even the typographical errors that go unnoticed and get enacted into law are illustrations of the fact that planners may be getting out of their depth. In the Albuquerque ordinance particulate matter was limited to "0.3 grams per cubic foot" rather than "0.3 grains per cubic foot." A gram is equal to about 15.4

grains. This means that this ordinance would permit the emission of dust in some 15 times as great a quantity as normally is considered acceptable.

We still know very little about how to administer performance standards. However, this is something that we are only going to learn by experience. If some of the schemes that have been proposed thus far are unworkable, as they very well may be, we can't criticize planners too severely. Someone has to take the first steps and it will not be surprising if many of the steps are false.

APPENDIX

Status of Ordinances Used in This Report

Albuquerque, New Mexico	Adopted 1953
Anne Arundel County, Maryland	Adopted 1954
Bismarck, North Dakota	Adopted 1954
Center Line, Michigan	Adopted 1954
Chicago, Illinois	Proposed 1955
Clarkstown, New York	Proposed 1955
Parsippany-Troy Hills Township, New Jersey	Adopted 1953
Penn Township, Pennsylvania	Adopted 1954
Rye, New York	Proposed 1955
Southfield Township, Michigan	Proposed 1955
Warren Township, Michigan	Adopted 1952

Excerpts from Ordinances for:

- Chicago
- Clarkstown
- Parsippany-Troy Hills Township
- Southfield Township
- Warren Township

CHICAGO

ARTICLE 8, MANUFACTURING DISTRICTS

8.3 PERMITTED USES

A. The following uses of land or buildings are permitted in the districts indicated hereafter. With the exception of:

(1) Uses lawfully established on the effective date of this ordinance, or

(2) Special Uses allowed in accordance with the provisions of Section 8.4,

no building or tract of land shall be devoted to any use other than a use permitted hereafter in the zoning district in which such building or tract of land shall be located. Uses already established on the effective date of this ordinance and rendered non-conforming by the provisions thereof shall be subject to the regulations of Article 5 governing non-conforming uses.

B. No activities involving the storage, utilization, or manufacture of materials or products which decompose by detonation shall be permitted within the City of Chicago, except such as are licensed by the Fire Prevention Bureau. The list of such prohibited materials or products shall include, but shall not be limited to, the following:

(1) Acetylides.
(2) Azides.
(3) Chlorates.
(4) Dynamite.
(5) Blasting Gelatin.
(6) Fulminates.
(7) Anhydrous Hydrazine.
(8) Ammonium Nitrate.
(9) Dinitroresorcinol.
(10) Dinitrotoluene.
(11) Guanidine Nitrate.
(12) Guncotton (Cellulose Nitrate or Pyroxylin).
(13) Hexamine.
(14) Nitroglycerine
(15) Petn (Pentaerythritoltetranitrate).
(16) Picric Acid.
(17) Tetryl (Trinitrophenylmethyltramine).
(18) Cylonite or Hexogen (Trimethylene Trinitramine).
(19) Dinol.
(20) Petryl.
(21) TNT (Trinitrotoluene).
(22) Perchlorates (when mixed with carbonaceous materials).

(23) Black Powder.
(24) Fireworks.
(25) Greek Fire.
(26) Permanganates.
(27) Peroxides.

8.3-1 Permitted Uses - M1-1, M1-2, M1-3, M1-4, and M1-5

The following uses are permitted in the M1-1 to M1-5 Districts inclusive, provided that all activities shall take place within enclosed buildings, unless otherwise indicated and except for off-street parking and loading as regulated by Article 10.

(1) Any production, processing, cleaning, testing, repair, storage or distribution of materials, goods or products which shall conform with the standards of performance set forth in Section 8.5 to 8.11 inclusive (except such uses as are specifically excluded from the City of Chicago in accordance with the provisions of Section 8.3) and which shall not be injurious or offensive to the occupants of adjacent premises by reason of the emission or creation of noise, vibration, smoke, dust or other particulate matter, toxic and noxious materials, odors, fire or explosive hazards, or glare or heat. Within 300 feet of a Residence District all storage, except of motor vehicles under 1½ ton capacity, shall be in completely enclosed buildings, and storage located elsewhere may be out-of-doors but shall be effectively screened by a solid wall or fence (including solid entrance and exit gates) at least eight feet in height but in no case lower in height than the enclosed storage.

(2) Automobile Service Stations - Retail sale of gas and oil for motor vehicles, including minor services commonly incidental thereto, may be conducted outside of a building. Lubrication and washing facilities are permitted if completely enclosed in a building.

(3) Banks.

(4) Barber Shops, Beauty Parlors, Massage or Similar Personal Service Shops.

(5) Building Materials Sales.

(6) Contractor Offices and Shops, such as:

Building	Masonry
Cement	Painting
Electrical	Plumbing
Heating, Ventilating, and Air Conditioning	Refrigeration
	Roofing

(7) Currency Exchanges.

(8) Drug Stores.

(9) Fuel and Ice Sales, if located in completely enclosed buildings.

(10) Garages and Parking Lots - for motor vehicles.

(11) Greenhouses.

(12) Lodges and Labor Organization Headquarters

(13) Municipal or Privately-owned Recreation Buildings or Community Centers.

(14) Public Utility and Public Service Uses, including:

(a) Electric Sub-stations
(b) Water Pumping Stations
(c) Water Reservoirs
(d) Water Filtration Plants
(e) Fire Stations
(f) Police Stations
(g) Railroad Passenger Stations
(h) Railroad Rights-of-way
(i) Telephone Exchanges
(j) Bus Terminals, Bus turn-arounds

(15) Radio and Television Towers.

(16) Recreation Centers.

(17) Restaurants.

(18) Signs, as regulated by Article ____.

(19) Stadiums, Auditoriums and Arenas with a capacity of 2000 seats or less.

(20) Taverns.

(21) Trade Schools.

(22) Dwelling Units for watchmen and their families located on the premises where they are employed in such capacity.

(23) Accessory Uses.

8.3-2 Permitted Uses - M2-1, M2-2, M2-3, M2-4, and M2-5

The following uses are permitted in the M2-1 to M2-5 Districts inclusive provided that within 300 feet of a Residence District all activities, including storage, shall take place within enclosed buildings, unless otherwise indicated and except for off-street parking and loading as regulated by Article 10.

(1) Any production, processing, cleaning, testing, repair, or storage of materials, goods or products which shall conform with the standards of performance set forth in Sections 8.5 to 8.11 inclusive, (except such uses as are specifically excluded from the City of Chicago in accordance with the provisions of Article 8.3) and which shall not be injurious or offensive to the occupants of adjacent premises by reason of the emission or creation of noise, vibration, smoke, dust or other particulate matter, toxic and noxious materials, odors, fire or explosive hazards, or glare or heat.

(2) Any other use permitted in the M1-1 to M1-5 Districts inclusive and subject to the same restrictions attaching thereto within 300 feet of a Residence District.

8.3-3 Permitted Uses - M3

The following uses are permitted in the M3 District provided that all activities shall take place within enclosed buildings, unless otherwise indicated and except for off street parking and loading as regulated by Section 10.

(1) Any production, processing, cleaning, testing, repair or storage of goods or products which shall conform with the standards of performance set forth in Sections 8.5 to 8.11 (except such uses as are specifically excluded from the City of Chicago in accordance with the provisions of Section 8.3.)

(2) Any other use permitted in the M1-1 to M1-5 Districts inclusive and subject to the same restrictions attaching thereto within 300 feet of a Residence District.

8.4 SPECIAL USES

The following uses may be allowed as Special Uses in the Districts indicated hereafter by the Zoning Administrator in accordance with the provisions of Section _____.

8.4-1 Special Uses - M1-1, M1-2, M1-3, M1-4, and M1-5

(1) Airports or Aircraft Landing Fields, Heliports.

(2) House Trailer Camps.

(3) Parks and Playgrounds.

(4) Penal and Correctional Institutions.

(5) Planned Large-scale Industrial Developments.

(6) Stadiums, Auditoriums, and Arenas with a capcity of over 2000 seats.

(7) Theaters, drive-in.

8.4-2 Special Uses - M2-1, M2-2, M2-3, M2-4, and M2-5

(1) Any use allowed as a Special Use in the M1-1 to M1-5 Districts inclusive except House Trailer Camps.

(2) Junk Yards.

8.4-3 Special Uses - M3

(1) Any use allowed as a Special Use in the M2-1 to M2-5 Districts inclusive.

(2) Extraction of Gravel, Sand or Other Raw Materials.

(3) Incinerators - municipal.

(4) Area for Dumping or Disposal of Garbage, Refuse or Trash.

8.5 PERFORMANCE STANDARDS - NOISE

Any use established in a Manufacturing District after the effective date of this ordinance shall be so operated as to comply with the maximum performance standards governing noise set forth hereinafter for the district in which such use shall be located. No use already established on the effective date of this ordinance shall be so altered or modified as to exceed, or if already exceeding so as to further exceed, the maximum performance standards governing noise established hereinafter for the district in which such use is located. Objectionable sounds of an intermittent nature shall be controlled so as not to become a nuisance to adjacent uses.

Sound levels shall be measured with a sound level meter and associated octave band filter manufactured according to standards prescribed by the American Standards Association.

8.5-1 Performance Standards - Noise - M1-1, M1-2, M1-3, M1-4, and M1-5

(1) At no point on the boundary of a Residence or Business District shall the sound pressure level of any operation conducted in the M1-1 to M1-5 Districts (other than the operation of motor vehicles or other transportation facilities) exceed the decibel levels in the designated octave bands shown below for the districts indicated.

Octave Band in Cycles per Second	Along Residence District Boundaries-Maximum Permitted Sound Level in Decibels	Along Business District Boundaries-Maximum Permitted Sound Level in Decibels
0 to 75	72	79
75 to 150	67	74
150 to 300	59	66
300 to 600	52	59
600 to 1200	46	53
1200 to 2400	40	47
2400 to 4800	34	41
Above 4800	32	39

8.5-2 Performance Standards - Noise - M2-1, M2-2, M2-3, M2-4, and M2-5

The performance standards governing noise in the M1-1 to M1-5 Districts inclusive shall apply to all uses in the M2-1 to M2-5 Districts inclusive.

8.5-3 Performance Standards - Noise - M3

The performance standards governing noise in the M1-1 to M1-5 Districts inclusive shall apply to all uses in the M3 District.

8.6 PERFORMANCE STANDARDS - VIBRATIONS

Any use established in a Manufacturing District after the effective date of this ordinance shall be so operated as to conform with the performance standards governing vibration set forth hereinafter for the district in which such use shall be located. No use already established on the effective date of this ordinance shall be so altered or modified as to conflict with, or if already in conflict with, so as to further conflict with, the performance standards

governing vibration established hereinafter for the district in which such use is located.

8.6-1 Performance Standards - Vibration - M1-1, M1-2, M1-3, M1-4, and M1-5

In the M1-1 to M1-5 Districts inclusive any use creating intense earth-shaking vibration shall be set back at least five hundred feet from the lot lines on all sides, except for lot lines adjoining an M3 District where such setback shall not be required, but in no case shall any such vibration be perceptible along the boundary line of any other zoning district except M3.

8.6-2 Performance Standards - Vibration - M2-1, M2-2, M2-3, M2-4, and M2-5

The performance standards governing vibration in the M1-1 to M1-5 Districts inclusive shall apply to all uses located in the M2-1 to M2-5 Districts inclusive.

8.6-3 Performance Standards - Vibrations - M3

Any use creating intense earth-shaking vibrations shall be set back at least five hundred feet from the boundary of a Residence, Business, Commercial, M1 or M2 District, but in no case shall any such vibration be perceptible along the boundary of any other zoning district.

8.7 PERFORMANCE STANDARDS - SMOKE AND PARTICULATE MATTER

(1) Any use established in a Manufacturing District after the effective date of this ordinance shall be so operated as to conform with the performance standards governing smoke and particulate matter set forth hereinafter for the district in which such use shall be located. No use already established on the effective date of this ordinance shall be so altered or modified as to conflict with, or if already in conflict with, so as to further conflict with, the performance standards governing smoke and particulate matter established hereinafter for the district in which such use is located.

(2) In addition to the performance standards specified hereinafter, the emission of smoke or particulate matter in such manner or quantity as to be detrimental to or endanger the public health, safety, comfort, or welfare is hereby declared to be a public nuisance and shall henceforth be unlawful.

(3) For the purpose of grading the density of smoke, the Ringelmann Chart currently published and used by the United States Bureau of Mines shall be employed. The emission of smoke or particulate matter of a density equal to or greater than No. 3 on the Ringelmann Chart is prohibited at all times, except as otherwise provided hereinafter.

(4) The emission from all sources within any lot area during any one hour of particulate matter containing more than 10% by weight of particles having a particle density larger than 44 microns is prohibited.

(5) Dust and other types of air pollution borne by the wind from such sources as storage areas, yards, roads and so forth within lot boundaries shall be kept to a minimum by appropriate landscaping, paving, oiling, or other acceptable means. Emission of particulate matter from such sources in excess of the weight limitations specified hereinafter is prohibited.

8.7-1 Performance Standards-Smoke and Particulate Matter - M1-1, M1-2, M1-3, M1-4, and M1-5

(1) The emission of more than 15 smoke units per hour per stack is prohibited. However, during one 1 hour period in each 24 hour day, each stack may emit up to 30 smoke units when blowing soot or cleaning fires. Only during fire cleaning periods, however, shall smoke of a density up to Ringelmann No. 3 be permitted and then for not more than 4 minutes.

(2) The rate of emission of particulate matter from all sources within the boundaries of any lot shall not exceed a net figure of 1 pound per acre of lot area during any one hour, after deducting from the gross hourly emission per acre the correction factors set forth in Tables 1, 2, and 3 below for height, velocity, and temperature of emission respectively. Determination of the total net rate of emission of particulate matter within the boundaries of any lot shall be made as follows:

a. Determine the maximum emission in pounds per hour from each source of air pollution and divide this figure by the number of acres of lot area - thereby obtaining the gross hourly rate of emission in pounds per acre.

b. From each gross hourly rate of emission derived in a. above, deduct the appropriate correction factor (interpolating as required) for height, velocity and temperature of emission set forth in Tables 1, 2 and 3 which follow - thereby obtaining the net rate of emission in pounds per acre per hour from each source of air pollution.

c. Add together the individual net rates of emission derived in b. above to obtain the total net rate of emission from all sources of air pollution within the boundaries of the lot. Such total shall not in the M1-1 to M1-5 Districts exceed 1 pound per acre of lot area during any one hour.

Table 1

Allowance for Height of Emission*

Height of Emission in Feet Above Grade	Particulate Matter Correction in Pounds per Hour per Acre
50	.00
100	0.06
150	0.10
200	0.15
250	0.20
300	0.26
350	0.33
400	0.40
450	0.46
500	0.52
550	0.60
600	0.70

*Interpolate for intermediate values not shown on table.

Table 2

Allowance for Velocity of Emission*

Exit Velocity in Feet per Second	Particulate Matter Correction in Pounds per Hour per Acre
0	.0
10	0.1
20	0.2
30	0.3
40	0.4
50	0.5
60	0.6
70	0.7
80	0.8

*Interpolate for intermediate values not shown on table.

Table 3

Allowance for Temperature of Emission*

Temperature of Emission in Degrees of Fahrenheit	Particulate Matter Correction in Pounds per Hour per Acre
100	.00
200	0.01
300	0.02

*Interpolate for intermediate values not shown on table.

Temperature of Emission in Degrees of Fahrenheit	Particulate Matter Correction in Pounds per Hour per Acre
400	0.03
500	0.04
600	0.05
700	0.06
800	0.07
900	0.08
1000	0.09
1100	0.10
1200	0.11
1300	0.12
1400	0.13
1500	0.14
1600	0.15
1700	0.16
1800	0.17
1900	0.18
2000	0.19

8.7-2 Performance Standards - Smoke and Particulate Matter - M2-1, M2-2, M2-3, M2-4, and M2-5

(1) The emission of more than 30 smoke units per hour per stack is prohibited, including smoke of a density in excess of Ringelmann No. 2. However, during 4 one hour periods in each 24 hour day, each stack may emit up to 45 smoke units, twice for blowing of soot, and twice for cleaning fires. Only during fire cleaning periods smoke of a density up to Ringelmann No. 3 shall be permitted and then for not more than 4 minutes per period.

(2) The rate of emission of particulate matter from all sources within the boundaries of any lot shall not exceed a net figure of 3 pounds per acre of lot area during any one hour, after deducting from the gross hourly emission per acre the correction factors set forth in Tables 1, 2 and 3 below for height, velocity, and temperature of emission respectively. Determination of the total net rate of emission of particulate matter within the boundaries of any lot shall be made as follows:

a. Determine the maximum emission in pounds per hour from each source of air pollution and divide this figure by the number of acres of lot area - thereby obtaining the gross hourly rate of emission in pounds per acre.

b. From each gross hourly rate of emission derived in a. above, deduct the appropriate correction factor (interpolating when necessary) for height, velocity, and

temperature of emission set forth in Tables 1, 2, and 3 which follow - thereby obtaining the net rate of emission in pounds per acre per hour from each source of emission.

c. Add together the individual net rates of emission derived in b. above to obtain the total net rate of emission from all sources of air pollution within the boundaries of the lot. Such total shall not in the M2-1 to M2-5 Districts inclusive exceed three pounds per acre of lot area during any one hour.

Table 1

Allowance for Height of Emission*

Height of Emission in Feet Above Grade	Particulate Matter Correction in Pounds per Hour per Acre
50	.00
100	0.10
150	0.20
200	0.30
250	0.40
300	0.56
350	0.66
400	0.80
450	0.92
500	1.04
550	1.20
600	1.42

*Interpolate for intermediate values not shown on table.

Table 2

Allowance for Velocity of Emission*

Exit Velocity in Feet per Second	Particulate Matter Correction in Pounds per Hour per Acre
0	.0
10	0.3
20	0.6
30	0.9
40	1.2
50	1.5

*Interpolate for intermediate values not shown in table.

Exit Velocity in Feet per Second	Particulate Matter Correction in Pounds per Hour per Acre
60	1.8
70	2.1
80	2.4

Table 3

Allowance for Temperature of Emission*

Temperature of Emission in Degrees of Fahrenheit	Particulate Matter Correction in Pounds per Hour per Acre
100	.00
200	0.03
300	0.06
400	0.09
500	0.12
600	0.15
700	0.18
800	0.21
900	0.24
1000	0.27
1100	0.30
1200	0.33
1300	0.36
1400	0.39
1500	0.42
1600	0.45
1700	0.48
1800	0.51
1900	0.54
2000	0.57

*Interpolate for intermediate values not shown in table.

8.7-3 Performance Standards - Smoke and Particulate Matter - M3

(1) The emission of more than 42 smoke units per hour per stack is prohibited. However, during fire cleaning periods each stack shall emit not more than 4 minutes of smoke of a density in excess of Ringelmann No. 3 nor 8 minutes of smoke of a density in excess of Ringelmann No. 2, and during soot blowing periods not more than 8 minutes of smoke of a density in excess of Ringelmann No. 2.

(2) The rate of emission of particulate matter from all sources

within the boundaries of any lot shall not exceed a net figure of 8 pounds per acre of lot area during any one hour, after deducting from the gross hourly emission per acre the correction factors set forth in Tables 1, 2, and 3 below for height, velocity, and temperature of emission respectively. Determination of the net rate of emission of particulate matter within boundaries of any lot shall be made as follows:

a. Determine the maximum emission in pounds per hour from each source of air pollution and divide this figure by the number of acres of lot area - thereby obtaining the gross hourly rate of emission in pounds per acre.

b. From each gross hourly rate of emission derived in a. above, deduct the appropriate correction factor (interpolating when necessary) for height, velocity, and temperature of emission set forth in Tables 1, 2, and 3 which follow - thereby obtaining the net rate of emission in pounds per acre per hour from each source of air pollution.

c. Add together the individual net rates of emission derived in b. above to obtain the total net rate of emission from all sources of air pollution within the boundaries of the lot. Such total shall not in the M3 District exceed 8 pounds per acre of lot area during any one hour.

Table 1

Allowance for Height of Emission*

Height of Emission in Feet Above Grade	Particulate Matter Correction in Pounds per Hour per Acre
50	.00
100	0.56
150	1.00
200	1.50
250	2.00
300	2.60
350	3.30
400	4.00
450	4.60
500	5.20
550	6.00
600	7.00

*Interpolate for intermediate values not shown in table.

Table 2

Allowance for Velocity of Emission*

Exit Velocity in Feet per Second	Particulate Matter Correction in Pounds per Hour per Acre
0	.0
10	0.8
20	1.6
30	2.4
40	3.2
50	4.0
60	4.8
70	5.6
80	6.4

*Interpolate for intermediate values not shown in table.

Table 3

Allowance for Temperature of Emission*

Temperature of Emission in Degrees of Fahrenheit	Particulate Matter Correction in Pounds per Hour per Acre
100	.00
200	0.08
300	0.16
400	0.24
500	0.32
600	0.40
700	0.48
800	0.56
900	0.64
1000	0.72
1100	0.80
1200	0.88
1300	0.96
1400	1.04
1500	1.12
1600	1.20
1700	1.28
1800	1.36
1900	1.44
2000	1.52

*Interpolate for intermediate values not shown in table.

8.8 PERFORMANCE STANDARDS - TOXIC OR NOXIOUS MATTER

Any use established in a Manufacturing District before or after the effective date of this ordinance shall be so operated as to conform with the performance

standards governing emission of toxic or noxious matter set forth hereinafter for the district in which such use shall be located.

8.8-1 Performance Standards - Toxic or Noxious Matter-M1-1, M1-2, M1-3, M1-4, M1-5.

No use shall for any period of time discharge across the boundaries of the lot wherein it is located toxic or noxious matter in such concentrations as to be detrimental to or endanger the public health, safety, comfort, or welfare or cause injury or damage to property or business.

8.8-2 Performance Standards-Toxic or Noxious Matter-M2-1, M2-2, M2-3, M2-4, M2-5

Same as 8.8-1

8.8-3 Performance Standards - Toxic or Noxious Matter-M3

Same as 8.8-1

8.9 PERFORMANCE STANDARDS - ODOROUS MATTER

Any use established in a Manufacturing District after the effective date of this ordinance shall be so operated as to conform with the performance standards governing odorous materials set forth hereinafter for the district in which such use shall be located. No use already established on the effective date of this ordinance shall be so altered or modified as to conflict with, or if already in conflict with so as to further conflict with, the performance standards governing odorous materials established hereinafter for the district in which such use is located.

8.9-1 Performance Standards - Odorous Matter - M1-1, M1-2, M1-3, M1-4, M1-5

The emission of odorous matter in such quantities as to be readily detectable at any point along lot lines or as to produce a public nuisance or hazard beyond lot lines is prohibited.

8.9-2 Performance Standards - Odorous Matter - M2-1, M2-2, M2-3, M2-4, M2-5

The emission of odorous matter in such quantities as to be readily detectable at any point along lot lines when diluted in the ratio of one volume of odorous air to four or more volumes of clean air or as to produce a public nuisance or hazard beyond lot lines is prohibited.

8.9-3 Performance Standards - Odorous Matter - M3

The emission of odorous matter in such quantities as to produce a public nui-

sance or hazard beyond lot lines is prohibited.

8.10 PERFORMANCE STANDARDS - FIRE AND EXPLOSIVE HAZARDS

Any use established in a Manufacturing District after the effective date of this ordinance shall be so operated as to conform with the performance standards governing fire and explosive hazards set forth hereinafter for the district in which such use shall be located. No use already established on the effective date of this ordinance shall be so altered or modified as to conflict with, or if already in conflict with so as to further conflict with, the performance standards governing fire and explosive hazards established hereinafter for the district in which such use is located.

8.10-1 Performance Standards - Fire and Explosive Hazards - M1-1, M1-2, M1-3, M1-4, M1-5.

(1) The storage, utilization, or manufacture of materials or products ranging from incombustible to moderate burning - as determined by the Zoning Administrator in accordance with the provisions of Section _____ is permitted, subject to compliance with all other Performance Standards for the M1-1 to M1-5 Districts inclusive.

(2) The storage, utilization, or manufacture of materials or products ranging from free or active burning to intense burning - as determined by the Zoning Administrator in accordance with the provisions of Section _____ is permitted, subject to compliance with all other performance standards for the M1-1 to M1-5 Districts inclusive, and provided the following conditions are met:

a. Said materials or products shall be stored, utilized, or produced within fully enclosed buildings or structures having exterior incombustible walls.

b. All such buildings or structures shall be set back at least 40 feet from lot lines, or, in lieu thereof, all such buildings shall be protected throughout by an automatic sprinkler system complying with installation standards prescribed by the National Fire Protection Association.

(3) Materials or products which produce flammable or explosive vapors or gases under ordinary weather temperature shall not be permitted in this district.

8.10-2 Performance Standards - Fire and Explosive Hazards - M2-1, M2-2, M2-3, M2-4, M2-5

(1) In the M2-1 to M2-5 Districts inclusive and within 40 feet of the

boundary of a Residence, Business, Commercial or the M1-1 to M1-5 Districts inclusive, the storage, utilization, or manufacture of materials or products ranging from free to active burning - as determined by the Zoning Administrator in accordance with the provisions of Section _____ - is permitted, subject to compliance with all other Performance Standards for the M2-1 to M2-5 District, only under the following conditions:

a. Said materials or products shall be stored, utilized, or produced within fully enclosed buildings or structures having incombustible exterior walls.

b. All such buildings or structures shall be protected throughout by an automatic sprinkler system complying with installation standards prescribed by the National Fire Protection Association.

(2) Materials or products which produce flammable or explosive vapors or gases under ordinary weather temperature shall not be permitted in this district.

8.10-3 Performance Standards - Fire and Explosive Hazards - M3

The storage, utilization, or manufacture of materials or products rated as fast burning as determined by the Zoning Administrator - in accordance with the provisions of Section _____ - or which produce flammable or explosive vapors or gases under ordinary weather temperature conditions, shall be permitted only in the M3 District. Further, where an M3 District adjoins another zoning district no land or building located within six hundred feet of the district boundary shall be used for such activities.

8.11 PERFORMANCE STANDARDS - GLARE OR HEAT

Any use established in a Manufacturing District after the effective date of this ordinance shall be so operated as to conform with the performance standards governing glare or heat set forth hereinafter for the district in which such use shall be located. No use already established on the effective date of this ordinance shall be so altered or modified as to conflict with, or if already in conflict with so as to further conflict with, the performance standards governing glare or heat established hereinafter for the district in which such use is located.

8.11-1 Performance Standards - Glare or Heat - M1-1, M1-2, M1-3, M1-4, M1-5

Any operation producing intense glare or heat shall be performed within an enclosed building in such manner as to be completely imperceptible from any point along the lot lines.

8.11-2 Performance Standards - Glare or Heat - M2-1, M2-2, M2-3, M2-4, M2-5

Any operation producing intense glare or heat shall be performed within an enclosed building or behind a solid fence in such manner as to be completely imperceptible from any point along the lot lines.

8.11-3 Performance Standards - Glare or Heat - M3

Any operation producing intense glare or heat shall be performed within an enclosed building or behind a solid fence in such manner as to be completely imperceptible from any point along the boundary line of any other zoning district.

8.12 FLOOR AREA RATIO

The maximum Floor Area Ratio of buildings or structures on a lot or parcel shall be as follows:

8.12-1 Maximum Floor Area Ratio - M1-1, M1-2, M1-3, M1-4, M1-5

(1) In an M1-1 District, the Floor Area Ratio shall not exceed 1.2.
(2) In an M1-2 District, the Floor Area Ratio shall not exceed 2.2.
(3) In an M1-3 District, the Floor Area Ratio shall not exceed 3.0.
(4) In an M1-4 District, the Floor Area Ratio shall not exceed 5.0.
(5) In an M1-5 District, the Floor Area Ratio shall not exceed 7.0.

8.12-2 Maximum Floor Area Ratio - M2-1, M2-2, M2-3, M2-4, M2-5

(1) In an M2-1 District, the Floor Area Ratio shall not exceed 1.2.
(2) In an M2-2 District, the Floor Area Ratio shall not exceed 2.2.
(3) In an M2-3 District, the Floor Area Ratio shall not exceed 3.0.
(4) In an M2-4 District, the Floor Area Ratio shall not exceed 5.0.
(5) In an M2-5 District, the Floor Area Ratio shall not exceed 7.0.

8.12-3 Maximum Floor Area Ratio - M3

7.0

8.13 ALONG RESIDENCE DISTRICT BOUNDARIES

In a Manufacturing District and along any zoning district boundary separating such Manufacturing District from a Residence District, there shall be provided unobstructed open space from ground level to sky (except as allowed in Article _____, "Permitted Obstructions - Yards") in accordance with the following regulations:

8.13-1 Along Residence District Boundaries - M1-1, M1-2, M1-3, M1-4, M1-5

Where an M1-1, M1-2, M1-3, M1-4 or M1-5 District or portion thereof is located across a street from a Residence District, no building, structure, or other obstruction in the Manufacturing District (except as allowed in Article _____, "Permitted Obstructions - Yards") shall be located within 53 feet of the boundary of such Residence District. Further, when across the street from R1, R2, or R3, if any point on the exterior surface of any building or structure in the Manufacturing District is at a greater height than 35 feet above curb level, such point projected vertically upon the ground shall in no case be nearer to the Residence District Boundary than a horizontal distance equal to 1½ times the height of such point above curb level. However, stacks, tanks, bulkheads, or ventilating equipment shall be exempt from such height limitation if not exceeding in the aggregate 25 feet in lineal dimension parallel to the street for any 100 feet of street frontage. Parapets not exceeding 3 feet in height shall also be exempt from such limitation.

In addition, along any side lot line directly across the street from R1, R2, or R3, a side yard shall be provided on each zoning lot. Each side yard shall be equal in width to ten per cent of the width of the zoning lot, but need not exceed 20 feet in width.

Where the boundary line separating an M1-1, M1-2, M1-3, M1-4, or M1-5 District from a Residence District coincides with a property line or is located in an alley, no building, structure, or other obstruction in the Manufacturing District (except as allowed in Article _____, "Permitted Obstructions - Yards") shall be located within 20 feet of the side lot line or 30 feet of the rear lot line of any property in such Residence District. Further, if such adjacent Residence District is an R1, R2, or R3 District, and if any point on the exterior surface of any building or structure in the Manufacturing District is at a greater height than 35 feet above curb level, the vertical projection of such point upon the ground shall in no case be nearer to the side or rear lot line of any property in the adjacent Residence District than a horizontal distance equal to the height of such point above curb level. However, stacks, tanks, bulkheads, or ventilating equipment shall be exempt from such height limitation if not exceeding in the aggregate 25 feet in lineal dimension parallel to such Residential lot line(s) for any 100 feet of length of such lot line(s). Parapets not exceeding 3 feet in height shall also be exempt from such limitation.

8.13-2 Along Residence District Boundaries - M2-1, M2-2, M2-3, M2-4, M2-5

The regulations along residence district boundaries for the M1-1 to M1-5 Districts inclusive shall apply to the M2-1 to M2-5 Districts inclusive.

8.13-3 Along Residence District Boundaries - M3

In an M3 District, no building, structure, or other obstruction (except as allowed in Article _____, "Permitted Obstructions - Yards") shall be located within 125 feet of the boundary of a Residence District unless such building, structure, or other obstruction is used for, or is accessory to, a use which would qualify under the terms of this ordinance for location in an M1 or M2 District, in which case the regulations Along Residence District Boundaries for the M1-1 to M1-5 Districts inclusive shall be in effect within 125 feet of such Residence District boundary.

Article 4

OTHER USE REGULATIONS

4.1. Performance Standards.

4.11. Applicable to All Non-**Residential Uses.** No land or building shall be used or occupied for a non-**residential use** in any manner as to create any dangerous, injurious, noxious, or otherwise objectionable fire, explosive, radioactive, or other hazard; noise or vibration; smoke, dust, odor, or other form of air pollution; heat, cold, dampness, movement of air; electrical or other disturbance; glare; liquid or solid refuse or wastes, or condition conducive to the breeding of rodents or insects; or other substance, condition, or element (all referred to herein as "Dangerous or Objectionable Elements"), in a manner or amount as to adversely affect the surrounding area, provided that any non-**residential use** except those expressly prohibited by this ordinance in Sec. 4.4 may be undertaken and maintained if it conforms to the district Regulations, and the Regulations of this Sec. 4.1, referred to herein as **"Performance Standards,"** limiting Dangerous and Objectionable Elements at the point of determination of their existence as provided in this Sec.

4.12. Performance Standards Procedure. Only those **uses** specified in Use Table Cols. 2 and 3 as "subject to **Performance Standards** Procedure, Sec. 4.1" and **uses accessory** thereto are subject to **Performance Standards** procedure requiring Board of Appeals approval as specified in Sec. 8.334 in obtaining a building permit or certificate of occupancy, or both, unless the Building Inspector has reasonable grounds to believe that any other proposed **use** is likely to violate **Performance Standards,** in which event the applicant shall comply with the procedure in Sec. 8.334 in obtaining a building permit or certificate of occupancy unless the Board of Appeals finds that compliance therewith is unnecessary.

4.13. Continued Enforcement Provisions. Whether or not compliance with **Performance Standards** procedure in Sec. 8.334 in obtaining a building permit or certificate of occupancy is required for any particular **use,** initial and continued compliance with **Performance Standards** is required of every new non-**residential use** or change in such **use** in all districts as provided in Sec. 8.335.

4.14. Non-Conforming Uses. No **use** established before the effective date of this ordinance and **non-conforming** as to **Performance Standards** shall be required to conform therewith, except **manufacturing uses** in **R districts** as provided in Sec. 7.364.

4.15. Restrictions on Creation of Dangerous and Objectionable Elements. Every **use** subject to **Performance Standards** shall conform to the restrictions set forth in Secs. 4.16, 4.17, and 4.18.

4.16. Measurement at the Point of Emission. The existence of the following Dangerous and Objectionable Elements shall be determined at the location of the **use** creating same or at any point beyond, and these shall be limited as follows:

4.161. Fire and Explosion Hazards. All activities and all storage of inflammable and explosive materials at any point shall be provided with adequate safety devices against the hazard of fire and explosion and adequate fire-fighting and fire-suppression equipment and devices until the Town Board shall establish more detailed and specific standards for control of fire and explosive hazards than set forth in this Sec. Storage of explosives is prohibited except in accord with Article 16 of the Labor Law of the State of New York and regulations established thereunder, and provided no more than 50,000 pounds be stored in any one magazine. Burning of waste materials other than leaves, brush, cut timber, and similar material burned in accord with approved forestry practices, and more than two bushels of dry papers or cardboard burned in open fires in any one day, is hereby prohibited. The relevant provisions of other State and local laws and regulations shall also apply.

4.162. Radioactivity or Electrical Disturbance. No activities which emit dangerous radioactivity at any point. No electrical disturbance (except from domestic household appliances) adversely affecting the operation at any point of any equipment other than that of the creator of such disturbance.

4.163. Smoke. No emission at any point, from any chimney or otherwise, of visible grey smoke of a shade darker than No. 1 on the Ringelmann Smoke Chart as published by the U. S. Bureau of Mines (Power's Micro-Ringelmann Chart, McGraw Hill Publishing Company, 1954, may be used), except that visible grey smoke of a shade not darker than No. 2 on said Chart may be emitted for not more than four minutes in any 30 minutes. These provisions, applicable to visible grey smoke, shall also apply to visible smoke of a different color but with an equivalent apparent opacity.

4.164. Fly Ash, Dust, Fumes, Vapors, Gases, and Other Forms of Air Pollution. No emission which can cause any damage to health, to animals or vegetation, or other forms of property, or which can cause any excessive soiling at any point, and in no event any emission, from any chimney or otherwise, of any solid or liquid particles in concentrations exceeding 0.3 grains per cubic ft. of the conveying gas or air at any point. For measurement of the amount of particles in gases resulting from combustion, standard corrections shall be applied to a stack temperature of 500 degrees Fahrenheit and 50% excess air.

4.165. Liquid or Solid Wastes. No discharge at any point into any private sewage-disposal system, or stream, or into the ground of any materials in such a way or of such nature or temperature as can contaminate any water supply, or otherwise cause the emission of Dangerous or Objectionable Elements, except in accord with (a) standards approved by the State Department of Health or Water Pollution Control Board, or both, or (b) in the event neither such department nor board has jurisdiction over the particular **use** involved, then standards equivalent to those approved by such department or board or both for similar **uses** shall apply. No accumulation of solid wastes conducive to the breeding of rodents or insects.

4.17. Measurement at the **Lot Line.** The existence of the following Dangerous and Objectionable Elements shall be determined at the **lot line** of the **use** creating same or at any point beyond said **lot line,** and these shall be limited as follows:

4.171. Vibration. No vibration which is discernible to the human sense of feeling for three minutes or more duration in any one hour of the day between the hours of 7 a. m. and 7 p. m., or of 30 seconds or more duration in any one hour between the hours of 7 p. m. and 7 a. m. No vibration at any time shall produce an acceleration of more than 0.1g or shall result in any combination of amplitudes and frequencies beyond the "safe" range of Table 7, U. S. Bureau of Mines Bulletin No. 442, "Seismic Effects of Quarry Blasting," on any structure. The methods and equations of said Bulletin No. 442 shall be used to compute all values for the enforcement of this Sec.

4.172. Heat, Cold, Movement of Air, or Dampness. No activities which shall produce any material effect on the temperature, motion, or humidity of the atmosphere at the **lot line** or beyond.

4.18. Measurement at Other Specified Points. The existence of the following Dangerous and Objectionable Elements shall be determined at or beyond the different locations in different districts in relation to the establishment under consideration, and these shall be measured as follows: (a) in any **R district** and SC, LS, C-1, and C-2, 25 ft. from the principal building in any direction or at the **lot line** if closer; (b) in M-1 and M-2, the boundary of the **R district** nearest the establishment in any direction. (For the purpose of investigating any purported violation of Sec. 4.181, 4.182, and 4.183 as provided in Sec. 8.335, observations shall be taken on at least 3 non-consecutive days at no less than 3 points along or beyond the lines specified in (a) or (b) above. The angles between

lines connecting any 2 adjacent points of measurement and the establishment shall be as nearly equal as possible. If only 3 points of measurement are used such angles shall be at least 60 degrees. When more than 3 points are used such angles may be reduced proportionately.) The limitations on these elements are as follows:

4.181. Noise. At the specified points of measurement the sound-pressure level of noise radiated continuously from a facility at nighttime shall not exceed the values given in Table I in any octave band of frequency. The sound-pressure level shall be measured with a Sound Level Meter and an Octave Band Analyzer that conform to specifications published by the American Standards Association. (American Standard Sound Level Meters for Measurement of Noise and Other Sounds, Z24.3-1944, American Standards Association, Inc., New York, N. Y., and American Standard Specification for an Octave-Band Filter Set for the Analysis of Noise and Other Sounds, Z24.10-1953, American Standards Association, Inc., New York, N. Y., shall be used.)

TABLE I

Maximum permissible sound-pressure levels at specified points of measurement for noise radiated continuously from a facility between the hours of 10 p. m. and 7 a. m.

Frequency Band Cycles per Second	Sound Pressure Level Decibels re 0.0002 dyne/cm²
20-75	69
75-150	54
150-300	47
300-600	41
600-1,200	37
1,200-2,400	34
2,400-4,800	31
4,800-10,000	28

If the noise is not smooth and continuous and is not radiated between the hours of 10 p. m. and 7 a. m., one or more of the corrections in Table II below shall be added to or subtracted from each of the decibel levels given above in Table I.

TABLE II

Type of Operation or Character of Noise	Correction in Decibels
Daytime operation only	+ 5
Noise source operates less than 20% of any one-hour period	+ 5*
Noise source operates less than 5% of any one-hour period	+ 10*
Noise source operates less than 1% of any one-hour period	+ 15*
Noise of impulsive character (hammering, etc.)	— 5
Noise of periodic character (hum, screech, etc.)	— 5

*Apply one of these corrections only.

4.182. Odors. No emission of odorous gases or other odorous matter in such quantities as to be offensive at the specified points of measurement. Any process which may involve the creation or emission of any odors shall be provided with a secondary safeguard system, so that control will be maintained if the primary safeguard system should fail. There is hereby established as a guide in determining such quantities of offensive odors Table III (Odor Thresholds) in Chapter 5, "Air Pollution Abatement Manual," copyright 1951 by Manufacturing Chemists' Association, Inc., Washington, D. C.

4.183. Glare. No direct or sky-reflected glare, whether from floodlights or from high-temperature processes such as combustion or welding or otherwise, so as to be visible at the specified points of measurement. This restriction shall not apply to **signs** otherwise permitted by the Regulations.

4.2. Additional Regulations for Signs and Artificial Lights.

4.21. General Controls over **Signs.** No **sign, billboard,** advertising display or structure, poster, or device shall be erected, displayed, or used except as expressly permitted in this ordinance, and except such State, County, and Town **signs** and traffic **signs** as are installed for public purposes.

4.22. Prohibited **Signs.** The following types of **signs** or artificial lights are prohibited: (a) **flashing signs;** (b) **signs** (except **signs** painted on awnings, or **signs** on theatre marquees) which project more than 1 ft. over a **street;** (c) any artificial light or reflecting device connected or used with a **sign** or otherwise located or displayed where such light competes for attention with, or may be mistaken for, a traffic signal, and (d) **illuminated signs** outlining any part of a building such as a gable, roof, side wall, or corner.

4.23. Sign Allowances for Units of **Lot Frontage.** The number and sizes of **accessory signs** provided in Use Table Col. 5 shall apply (unless the district regulations state otherwise): (a) to each **street** frontage **for corner lots or through lots,** and (b) to every unit of **street** frontage of no less than 500 ft. abutting any **lot.**

4.24. Near Parkway and Thruway. No **sign** shall be located so as to be visible from the Palisades Interstate Parkway unless such **sign** is at least 500 ft. from the Parkway right-of-way. Within 500 ft. of the right-of-way of the New York Thruway, all **signs** must have the permission of the Thruway Authority. The length of common **lot line** with the Thruway shall be counted as **street** frontage to calculate the number and sizes of **signs** permitted facing the Thruway.

4.25. Advertising Signs. Under **Use** Table, C-2, Col. 2, No. 7, one **indirectly illuminated advertising sign** is permitted on a **lot** of not less than 100 ft. frontage on a **street** and 100 ft. in depth provided that such **lot** is not occupied by any other **sign** or other **use.** The size and location of such **signs** shall be subject to the same regulations as for **accessory business signs.**

4.4. Prohibited Uses.

The **uses** which are listed in this Sec. are prohibited in the Town.

4.41. Manufacturing uses involving primary production of the following products from raw materials:

Asphalt, cement, charcoal, and fuel briquettes.

Chemicals; aniline dyes, ammonia, carbide, caustic soda, cellulose, chlorine, carbon black and bone black, creosote, hydrogen and oxygen, industrial alcohol, nitrates (manufactured and natural) of an explosive nature, potash, plastic materials and synthetic resins, pyroxylin, rayon yarn, and hydrochloric, nitric, phosphoric, picric, and sulphuric acids.

Coal, coke, and tar products, including gas manufacturing; explosives; fertilizers; gelatin, glue and size, animal.

Linoleum and oil cloth; matches; paint, varnishes, and turpentine.

Rubber (natural or sythentic); soaps, including fat rendering; starch.

4.42. The following **manufacturing** processes: nitrating of cotton or other materials: milling or processing of flour, feed, or grain; magnesium foundry; reduction, refining, smelting and alloying of metal or metal ores; refining secondary aluminum; refining petroleum products, such as gasoline, kerosene, naphtha, lubricating oil; distillation of wood or bones; reduction and processing of wood pulp and fiber, including paper-mill operations.

4.43. Operations involving stock yards and slaughter houses, grain elevators, slag piles, and keeping, breeding, and raising of fowl, foxes, mink, pigs, or primates for commercial or laboratory purposes.

4.44. Storage of explosives, except under license from the State of New York, and in a manner and place conforming to the laws of the State and the American Table of Distances, and provided no more than 50,000 pounds be stored in any one magazine.

4.45. Bulk or wholesale storage of gasoline above ground.

4.46. Dumps, except those owned and operated by the Town.

8.334. Building Permit and Certificate of Occupancy for a **Use** Subject to **Performance Standards** Procedure.

(a) Application. An application for a building permit and certificate of occupancy for a **use** subject to **Performance**

Standards shall be submitted to the Building Inspector in duplicate on a form prescribed by the Board of Appeals, and shall be referred by the Building Inspector to the Board of Appeals. The applicant shall also submit in duplicate a plan of the proposed construction or development, including a description of the proposed machinery, operations, and products, and specifications for the mechanisms and techniques to be used in restricting the emission of Dangerous and Objectionable Elements referred to in Sec. 4.1, in accordance with rules prescribed by the Board specifying the type of information required in such plans and specifications, and an affidavit by the applicant acknowledging his understanding of the applicable **Performance Standards** and agreement to conform with same at all times. No applicant will be required to reveal any secret processes, and any information submitted will be treated as confidential if requested. The fee for such application shall include the cost of the special reports required to process it, described in subsection (b) below.

(b) Report by Expert Consultants. The Board of Appeals, if there is any reasonable doubt as to the likelihood of conformance, shall refer the application for investigation and report to one or more expert consultants selected by the Town Board as qualified to advise as to whether a proposed **use** will conform to the applicable **Performance Standards** specified in Sec. 4.1. Such consultant or consultants shall make such report within 30 days after his or their receipt of such application. A copy of such report shall be promptly furnished to the applicant.

(c) Decision of Board of Appeals. At the next regular meeting of the Board of Appeals, but in no event more than 30 days after the Board has received the aforesaid report, or within such further period as agreed to by the applicant, the Board shall decide whether the proposed **use** will conform to the applicable **Performance Standards** and on such basis shall authorize or refuse to authorize the issuance of a building permit, or require a modification of the proposed plan of construction. Such decision of the Board shall be in the form of a written report. Any building permit so authorized and issued shall be conditioned on, among other things, (i) the applicant's completed buildings and installations in operation conforming to the applicable **Performance Standards**, and (ii) the applicant's paying the fees for services of the expert consultant or consultants deemed reasonable and necessary by the Board of Appeals for advice as to whether or not the applicant's completed buildings and installations will in operation conform to the applicable **Performance Standards.**

8.335. Continued Enforcement. The Building Inspector shall investigate any alleged violation of **Performance Standards** on the part of any new non-**residential use**, and if there are reasonable grounds to believe that a violation exists he shall notify the Board of Appeals of the occurrence or existence of a probable violation thereof. The Board of Appeals shall investigate the alleged violation, and for such investigation may employ qualified experts. If after public hearing on due notice, the Board of Appeals finds that a violation occurred or exists, a copy of said findings shall be forwarded to the Town Board. The services of any qualified experts employed by the Town to advise in establishing a violation shall be paid by the violator, if a violation is proved, and otherwise by the Town.

Note: The foregoing excerpts from the proposed ordinance for the Town of Clarkstown is taken from the version advertised for public hearing. At the time this report was prepared, adoption of the ordinance was expected shortly. However, the following amendments were expected to appear in the adopted ordinance:

1. Sec. 4.12 -- accessory uses and buildings will be exempt from performance standards unless the building inspector has reasonable grounds to believe they might violate same.

2. Sec. 4.161 -- burning of more than two bushels of waste material was deleted as being too picayune.

3. Sec. 4.171 -- first portion of vibration discernible for three minutes duration, etc., was deleted because of possible discretion of determining the meaning of "discernible." The remainder of this section really only covers blasting.

4. Sec. 4.172 -- heat, cold, movement of air, or dampness deleted as too vague.

In addition to these changes, two existing industries in the town are exempted from performance standards procedure in connection with any future building or expansion. These are two quarries that were made subject to performance standards to be enforced by the building inspector instead of the board of appeals and two rodent-keeping and rodent-raising establishments for laboratory purposes for which a special district was created in which they will be permitted by right, subject to no standards.

Township of Parsippany-Troy Hills
MUNICIPAL ORDINANCE

AN ORDINANCE TO AMEND AN ORDINANCE ENTITLED "AN ORDINANCE TO PROMOTE THE PUBLIC HEALTH, SAFETY, CONVENIENCE AND GENERAL WELFARE OF THE INHABITANTS THROUGHOUT THE TOWNSHIP OF PARSIPPANY-TROY HILLS, IN THE COUNTY OF MORRIS, BY REGULATING AND RESTRICTING THE LOCATION AND USE OF BUILDING, STRUCTURES AND LAND FOR INDUSTRIAL, BUSINESS, RESIDENTIAL OR OTHER PURPOSES: THE HEIGHT AND SIZE OF BUILDINGS AND OTHER STRUCTURES AND THEIR USE, THE AREA OF YARDS AND OTHER OPEN SPACES ABOUT BUILDINGS, AND FOR SAID PURPOSES, DIVIDING THE TOWNSHIP INTO DISTRICTS AND ESTABLISHING A BOARD OF ADJUSTMENT AND PROVIDING FOR THE ENFORCEMENT OF THE PROVISIONS THEREOF, AND PRESCRIBING THE PENALTIES FOR THE VIOLATIONS OF THESE PROVISIONS," AS AMENDED.

BE IT ORDAINED by the Township Committee of the Township of Parsippany-Troy Hills, in the County of Morris and State of New Jersey, as follows:

SECTION 1. Section 4, sub-section (k) of the above-entitled ordinance is hereby amended to read as follows:

SECTION 4 (K). LOCATION AND COVERAGE OF ACCESSORY BUILDINGS.

No accessory building permitted by this Ordinance shall be placed in any required side or front yard except as specified hereinafter in this Section. The aggregate ground area covered by accessory buildings in any required rear yard, including the ground area covered by any projections hereinbefore permitted, shall not exceed 30 percent of the required rear yard area, within any class residential zone. Within any Business Zone, where a ground level rear yard is required, the aggregate area covered by accessory buildings shall not exceed 50 percent of the required rear yard area.

SECTION 2. Section 11 of the above entitled Ordinance is hereby amended to read as follows:

SECTION 11. INDUSTRIAL ZONES.

1. DECLARATION OF LEGISLATIVE INTENT. In expansion of the declaration of legislative intent contained in the title of this ordinance, it is hereby declared to be the intent of this section, with respect to industrial zones, to establish standards for the height and size of buildings, the areas and dimensions of yards and open spaces, the provision of facilities to minimize traffic congestion, and the provision of facilities and operation of industries to minimize noise, glare, air pollution, water pollution and fire and safety hazards in industrial zones.

2. USES. In order to classify the land uses which are permitted or prohibited within any industrial zone, there are hereby established four classes of uses; namely, non-industrial, exempt, industrial and special.

(a) **Non-industrial Uses.**

The following are declared to be non-industrial uses, and within an industrial zone no building may hereafter be constructed and no land may hereafter be used in whole or in part for any of the following purposes:

(1) Residence, except as provided for as an exempt use; provided, however, that on any lot containing an area of 40,000 square feet or more, a residence for a caretaker may be located. Provided further, however, that in any Industrial Zone, in addition to any other use permitted by this section, there is also permitted any use permitted in a Class A Residential Zone, subject to all lot area, height, yard, accessory use and similar regulations pertinent to such use when located in a Class A Residential Zone.

(2) Retail store, service shop, theater or other place of commercial recreation or amusement, filling station, restaurant or tavern;

(3) School, church, hospital, sanitarium, correctional institution.

(4) Airport, cemetery.

(b) **Exempt Uses.**

Notwithstanding any other provisions of this section or ordinance, in any Industrial Zone, land and buildings may be used for the following purposes, and for these purposes it will not be necessary to obtain approval of a Certificate of Occupany by the Board of Adjustment.

(1) Single detached house completed, under construction, or for which a valid building permit had been issued at the date of the adoption of this amendment, provided such house is used or intended for use as a residence for not more than one family;

(2) Agricultural buildings, private garages and stables, small roadside vending stands and other accessory buildings when incident to a single detached house permitted under paragraph 1 of this sub-section. Accessory buildings are subject to and limited by all regulations of this ordinance governing similar buildings located in Class E Residential Zone;

(3) Customary home occupations, professional offices within a residence, and professional announcement signs when incident to a single detached house permitted under paragraph 1 of this sub-section. These accessory uses are subject to and limited by all regulations of this ordinance governing similar uses in a Class E Residential Zone;

(4) Truck gardening, flower gardening, nurseries, orchards, the growing of field crops and small fruits; but not including the breeding or feeding of animals and poultry except as an accessory use incident to a single detached house as permitted in paragraphs 1 and 2 of this sub-section;

(5) Temporary use for circus, rodeo, carnival and similar activity when such use is authorized by the Township Committee of the Township of Parsippany-Troy Hills.

(c) **Industrial Uses.**

Industrial uses are the uses of land and buildings for manufacturing, processing, fabrication, assembly, freight, handling or similar operations. Any land or buildings in an Industrial Zone may hereafter be used or constructed to be used for an industrial use, provided the operation of such use complies with all standards and limitations listed herein for the zone in which it is located.

(1) In any Industrial Zone, all industrial operations shall:

(a) Be carried on only in buildings classified as fireproof by the Building Code of the Township of Parsippany-Troy Hills; and be carried on in such a manner and with such precautions against fire and explosion hazards as to produce no exposure hazard, as determined by the New Jersey Inspection Bureau, to a use on an adjacent property which would, either present or future, conform fully to these regulations;

(b) Store all raw materials, fuels, finished products, machinery and equipment, including company-owned or operated trucks and motor vehicles, within an entirely closed building. Liquids may be stored in underground tanks, subject to the provisions of appropriate fire and building codes;

(c) Emit no noxious, toxic or corrosive fumes or gases;

(d) Emit no odors;

(e) Exhaust or waste into the air no dust created by any industrial operation;

(f) Discharge no treated or untreated sewage or industrial waste into any reservoir or lake. Discharge no untreated sewage or industrial waste into any stream. All methods of sewage and industrial waste treatment and disposal shall be approved by the New Jersey State Department of Health. Effluent from a treatment plant shall at all times comply with the following standards:

Maximum 5 day biochemical oxygen demand — 5 parts per million.

Maximum quantity of effluent — 10 percent of minimum daily stream flow.

Maximum 5 day biochemical oxygen demand after dilution (B.O.D. of effluent multiplied by quantity of effluent divided by quantity of stream flow) — 0.25 part per million.

Maximum total solids — 5,000 parts per million.

Maximum phenol — 0.01 parts per million.

No effluent shall contain any other acids, oils, dust, toxic metals, corrosive or other toxic substance in solution or suspension which would create odors, discolor, poison, or otherwise pollute the stream in any way.

(g) Carry on no operation that would produce heat or glare perceptible from any property line of the lot on which the industrial operation is located;

(h) Use industrial and exterior lighting in a manner that produces no glare on public highways and neighboring property;

(i) Conduct railroad switching operations with only diesel or electric-powered locomotives;

(j) Conduct no mining, extracting, filling or soil-stripping operations in such a manner as to leave unsightly or dangerous excavations or spoil banks; or in such a manner as to increase erosion.

(2) In any Industrial Zone, in addition to the requirements listed in paragraph (1) of this subsection, all industrial operations shall:

(a) Use only oil, gas or electricity as a fuel;

(b) Produce no industrial noise in excess of 20 sones as measured from any property line of the lot on which the industrial operation is located.

(d) **Special Uses.**

The following is a list of uses in which industrial operations are customarily such as to produce traffic congestion, noise, glare, air pollution, water polution, fire hazards or safety hazards exceeding the standards and limitations established by this Ordinance. These uses are designated as Special Uses. A Certificate of Occupancy shall be applied for and issued before any building or land is issued for a Special Use, and before any building permit is issued for the construction of a building intended to be used for a Special Use. A Certicate of Occupancy for a Special Use will be issued only upon the approval of the Board of Adjustment. Before approving a Certificate of Occupancy, the Board of Adjustment will hold a public hearing in the manner provided by statute for conducting a hearing for the allowance of special exceptions to the zoning ordinance. The following are declared to be Special Uses:

(1) The cooking, distillation, processing and incineration of animal and vegetable products, including but not limited to, brewery, distillery, food-canning plant, slaughterhouse, stockyards, fat rendering, soap manufacture, glue manufacture, tannery, paper manufacture, wool-scouring and cleaning; cotton textile sizing, scouring, bleaching, dyeing and similar operations; paint and varnish manufacture, creosote and creosote products manufacture;

(2) The production of corrosive and noxious chemicals including, but not limited to, acids, acetylene gas, ammonia, chlorine, bleaching compounds;

(3) The production, processing and storage of coal, coal tar, petroleum and asphalt products including, but not limited to, coke manufacture, illuminating gas production, petroleum refining, bulk gasoline and petroleum products storage, asphalt products, linoleum manufacture, oilcloth manfacture, roofing material manufacture;

(4) The extraction, preparation and processing of dust-producing mineral products including, but not limited to, abrasives, cement, lime, fertilizer, plaster, crushed stone, stone-cutting products; mining of sand, gravel, top soil;

(5) The smelting and reduction of metallic ores including, but not limited to, blast furnace, open hearth and electric furnace, Bessemer converter, non-ferrous metal smelter;

(6) The manufacture and storage of explosive products, including, but not limited to, dynamite and com-

mercial explosives, TNT and military explosives, fire works;

(7) The production of materials by nuclear fission;

(8) The use of hammer mills, ball mills, rolling mills or drop forges in any industrial process; the testing or operation of jet engines; automatic screw machines;

(9) Freight transportation centers, including, but not limited to, rail freight terminals, truck freight terminals, rail classification yards;

(10) The storage of materials customarily stored in the open or in open or non-fireproof buildings including, but not limited to, junk, paper, scrap metal, coal, lumber, building material, contractors' equipment.

3. PARKING, LOADING AND TRAFFIC PROVISIONS.

(a) Within any Industrial Zone there shall be provided on the premises on which an industrial use is carried on, off-street parking space to the following extent:

(1) Space for one vehicle for each two persons employed on the largest shift. Space for one vehicle shall contain at least 180 square feet exclusive of drives and aisles. All drives and parking areas shall be surfaced with a bituminous or other dust-free surface. All parking areas shall be suitably illuminated for night use.

(2) Space within an enclosed building for each company-owned or operated truck or motor vehicle in addition to parking space for employees' vehicles.

(3) Space for the parking of customer vehicles for those uses for which such space is appropriate, in addition to space provided for company vehicles and employees' vehicles.

(4) Space for the parking of freight and delivery trucks during any time in which the off-street loading facilities prescribed herein are insufficient to handle all trucks waiting to use them. Such temporary parking needs may be served by the use of drives within the premises.

(b) Within any Industrial Zone there shall be provided on the premises on which an industrial use is carried on, off-street loading space to the following extent:

(1) Space for the unloading of one truck for each 10,000 square feet of industrial floor area or fraction thereof. Space for one truck shall consist of a space having a minimum horizontal width of 12 feet, a minimum horizontal depth of 45 feet and a minimum overhead clearance of 14 feet. Industrial floor area shall include floor area used for storage and for industrial operations. Unloading space shall be in addition to any space required for drives and off-street parking. All unloading space shall be surfaced with a bituminous or other dust-free surface.

(c) Within any Industrial Zone all vehicular entrances and exits on public streets, alleys and highways shall be designed and constructed in a manner to best facilitate the flow of traffic to and from the premises and such entrances and exits shall be subject to the approval of the Traffic or highway authority having jurisdiction over the street or highway on which they are located.

4. AREA OR LOT.

(a) In any Industrial Zone, no building for industrial or special uses shall be constructed and no premises shall be used for such purposes on any lot which has an area of less than 20,000 square feet or which has a frontage of less than 100 feet on one public street or highway.

5. YARD REQUIREMENTS.

(a) Within any Industrial Zone there shall be a front yard of no less depth than 25 per cent of the mean depth of the lot. However, the front yard shall in no case be less than 50 feet deep and need not exceed 100 feet in depth except as may be needed to provide setback for building height or to meet other standards or limitations established by this section. Except for necessary drives and walks, a front yard shall be planted in grass or other suitable ground cover, including flowers, ornamental shrubs and trees. One sign containing not more than 60 square feet of display surface, or two signs each containing not more than 30 square feet of display surface, used to advertise the name of the industry or the products thereof, may be placed in any required front yard. No sign shall be illuminated except by flood lights. Flood lights to illuminate a building may be placed in a front yard. On any through lot, front yards shall be maintained on both streets.

(b) Within any Industrial Zone there shall be two side yards each of no less width than 15 per cent of the mean width of the lot. However, each side yard shall be in no case less than 15 feet wide and need not exceed 100 feet in width except as may be needed to provide setback for building height or to meet other standards or limitations established by this section. On a corner lot the side yard adjacent to a street shall be subject to all regulations governing a front yard, except the regulation governing the depth of a front yard.

(c) Within any Industrial Zone there shall be a rear yard no less than 15 feet in depth, except as may be needed to provide setback for building height or to meet other standards or limitations established by this section.

(d) As a supplementary provision to any minimum yard dimension established by this section, any portion of any building that exceeds 20 feet in height shall be set back from appropriate lot lines according to the following schedule:

From side lot lines—15 per cent mean lot width plus 2 feet for each foot of height in excess of 20 feet, but in no case less than 15 feet;

From rear lot lines—15 feet plus one foot for each foot in height in excess of 20 feet;

From front lot lines—25 per cent mean lot depth plus 2 feet for each foot of height in excess of 20 feet, but in no case less than 50 feet.

(e) Open off-street parking and loading space required by this section may be placed in a required side or rear yard. Accessory athletic fields and other open land uses permitted by this section may be placed in a required side or rear yard. However, no principal and accessory buildings shall encroach in a required front, side, or rear yard, except as may be provided for cornices, eaves, ornamental features and fire escapes under the General Provisions of this Ordinance.

(f) Wherever a lot or an Industrial Zone adjoins a Business or Residential Zone, there shall be adajacent to the Business or Residential Zone a yard of a minimum width of 50 feet as measured perpendicular to the common Zone boundary. There shall also be placed within 10 feet of and parallel to the common Zone boundary a masonry fence or tight hedge at least 6 feet in height. The fence or hedge shall extend for the full length of the common Zone Boundary, except that it may be lowered in heighth or omitted within 25 feet of a street line.

6. BUILDING COVERAGE AND BULK.

(a) Within any Industrial Zone the total amount of land occupied by all principal and accessory buildings shall not exceed 35 percent of the area of the lot.

(b) Within any Industrial Zone the total amount of floor space of all principal and accessory buildings shall not exceed 50 per cent of the area of the lot. In calculating floor space to determine the floor area ration in compliance with this paragraph, the owner need not include underground storage facilities nor basements devoted to storage or plant maintenance and service facilities.

7. BUILDING HEIGHTS. Within any Industrial Zone, no building or structure shall exceed 50 feet in height. Building height shall be measured in accordance with Section 13 of this Ordinance, and shall be subject to all exceptions and regulations contained in that Section.

8. ACCESSORY BUILDINGS AND USES. Within any Industrial Zone, buildings and uses of the land customarily accessory to the principal land use are permitted. Accessory buildings and uses include, but are not limited to:

(a) Garage for the storage or repair of motor vehicles;

(b) Offices;

(c) Employees' restaurant, employees' athletic facilities;

(d) Facilities for the care and rearing of laboratory animals;

(e) Greenhouses, gardens, field crop raising.

9. CERTIFICATE OF OCCUPANCY.

(a) A Certificate of Occupancy shall be applied for and issued before any building permit is issued for the construction of a building in any Industrial Zone.

(b) The Board of Adjustment, in addition to any other duties prescribed by this Ordinance, will review and approve, approve conditionally, or disapprove the issuance of all Certificates of Occupancy for buildings and land uses, other than exempt uses, in any Industrial Zone. The Board of Adjustment will act upon an application for a Certificate of Occupancy no later than 30 days after the application is received by the Board. Failure to act within this time shall be deemed approval of the application and in such a case the Inspector is directed to issue the Certificate. No Certificate of Occupancy for a building or land use within an Industrial Zone may be issued without the approval of the Board of Adjustment.

(d) An application for a Certificate of Occupancy for a building or land use in any Industrial Zone shall be accompanied by:

(1) A plot plan of the lot showing the location of all present and proposed buildings, drives, parking lots, waste disposal fields and other constructional features on the lot; and all buildings, streets, alleys, highways, streams and other topographical features outside of the lot and within 200 feet of any lot line;

(2) Architectural plans for any proposed buildings;

(3) A description of the industrial operations proposed in sufficient detail to indicate the effects of those operations in producing traffic congestion, noise, glare, air pollution, water pollution, fire hazards or safety hazards;

(4) Engineering and architectural plans for the treatment and disposal of sewage and industrial waste;

(5) Engineering and architectural plans for the handling of any excess traffic congestion, noise, glare, air pollution, water pollution, fire hazard or safety hazard;

(6) Designation of the fuel proposed to be used and any necessary architectural and engineering plans for controlling smoke;

(7) The proposed number of shifts to be worked and the maximum number of employees on each shift;

(8) Any other data or evidence that the Board of Adjustment may require.

(d) A Certificate of Occupancy for a Special Use requires that a public hearing be held before action by the Board of Adjustment. The Board of Adjustment may elect to require a public hearing before acting upon any other application for a Certificate of Occupancy for any Industrial Zone. Such a public hearing shall be held in the manner provided by statute for conducting a hearing for the allowance of special exceptions to the zoning ordinance. Notwithstanding the provisions of paragraph 6 of this sub-section, the Board of Adjustment shall act upon an application no later than 15 days after the adjournment of a public hearing or 30 days after receiving the application, whichever is the later date. Failure to act within this time shall be deemed approval of the application. However, upon receiving written approval by the applicant, the Board of Adjustment may recess a public hearing until a later date, or the Board may postpone the final date for action upon an application.

(e) In acting upon an application for a Certificate of Occupancy for a building or land use in any Industrial Zone, the Board of Adjustment is directed to

assure itself that all of the requirements of this ordinance are met and that all of the standards and limitations established by this Section will be observed. In approving an application, the Board may require such changes in plans for land use, buildings or operations as may be necessary to assure compliance with this Ordinance and the standards and limitations established. Where appropriate, the Board may require the installation, maintenance and operation by the applicant of continuous recording instruments to demonstrate the operation or effect of operation of any machines or devices used to control or lessen noise, glare, air pollution, water pollution, fire hazards or safety hazards.

(f) A Certificate of Occupancy for a building or land use in any Industrial Zone may be revoked and withdrawn by the Board of Adjustment, if the Board finds that the holder of the Certificate of Occupancy has failed to comply with any conditions attached to the issuance of the Certificate, or if the Board finds that the operations of the building or land use fail to comply with the requirements of this Ordinance or the standards and limitations established by this Section.

SECTION 3. Section 14, subsection (c) of the above entitled ordinance is hereby amended to read as follows:

SECTION 14 (c). REQUIREMENTS WITHIN BUSINESS ZONES.

No business building shall be erected within any Business Zone unless it complies with the following front yard requirements:

(1) Within any Class A Business Zone or Class B Business Zone, there shall be a front yard of not less than 50 feet.

(2) Within any Class BB Business Zone there shall be a front yard of not less than 25 feet.

(3) Within any Class C Business Zone there shall be a front yard of not less than 10 feet.

SECTION 4. Section 16, subsection 1, paragraph (e) of the above entitled ordinance is hereby repealed, the present paragraph "f" of said subsection 1 becoming a new paragraph "e", the present paragraph "g" becoming a new paragraph "f", and the present paragraph "h" becoming a new paragraph "g".

SECTION 5. All ordinances or parts of ordinances inconsistent with this ordinance are hereby repealed.

SECTION 6. This Ordinance shall take effect immediately upon adoption and publication as provided by Law.

NOTICE

NOTICE IS HEREBY GIVEN that the foregoing Ordinance was submitted in writing at a special meeting of the Township Committee of the Township of Parsippany-Troy Hills in the County of Morris, State of New Jersey, held on September 28th, 1953, introduced and read in full and passed on first reading and that the said governing body will further consider the same for second reading and final passage thereof at a special meeting to be held on the 13th day of October, 1953, at eight o'clock in the evening, prevailing time, at the meeting place of the said Township Committee at New Jersey U. S. Route No. 46 and Pump House Road, Parsippany, in said Township, at which time and place a public hearing will be held thereon by the governing body and all persons and citizens in interest shall have an opportunity to be heard concerning same.

DOROTHY COOK, Clerk,
Township of Parsippany-Troy Hills
in the County of Morris and State
of New Jersey.

Dated: September 28, 1953.

P.F. $95.64 (797) **The Citizen 8:40**

SOUTHFIELD TOWNSHIP, MICHIGAN

Article VII
Performance Standard Requirements

In all zoning districts the following requirements shall apply:

Section 701. Performance Standards: No use shall be permitted within Southfield Township which does not conform to the following standards of use, occupancy and operation, which standards are hereby established as the minimum requirements to be maintained within said Township.

.....

h. Electromagnetic Radiation: The following standards shall apply:

1. General: It shall be unlawful for any person, firm or corporation to operate, or cause to be operated, any planned or intentional source of electromagnetic radiation for such purposes as communication, experimentation, entertainment, broadcasting, heating, navigation, therapy, vehicle velocity measurement, weather survey, aircraft detection, topographical survey, personal pleasure, or any other use directly or indirectly associated with these purposes which does not comply with the current regulations of the Federal Communications Commission regulations regarding such sources of electromagnetic radiation. Further, said operation in compliance with the Federal Communications Commission regulations shall be unlawful if such radiation causes an abnormal degradation in performance of other electromagnetic radiators or electromagnetic receptors of quality and proper design because of proximity, primary field, blanketing, spurious re-radiation conducted energy in power or telephone systems or harmonic content.

   The determination of "abnormal degradation in performance" and "of quality and proper design" shall be made in accordance with good engineering practices as defined in the latest principles and standards of the American Institute of Electrical Engineers, the Institute of Radio Engineers, and the Radio Manufacturers Association. In case of any conflict between the latest standards and principles of the above groups, the following precedence in the interpretation of the standards and principles shall apply: (1) American Institute of Electrical Engineers, (2) Institute of Radio Engineers, and (3) Radio Manufacturers Association.

Recognizing the special nature of many of the operations which will be conducted because of the research and educational activities, it shall be unlawful for any person, firm or corporation to operate or cause to be operated, to maintain or cause to be maintained any planned or intentional source of electromagnetic energy, the radiated power from which exceeds 1000 watts, without the express approval of the Southfield Township Zoning and Planning Commission.

2. Electromagnetic interference: For purpose of these regulations, electromagnetic interference shall be defined as electromagnetic disturbances which are generated by the use of electrical equipment other than planned and intentional sources of electromagnetic energy which interfere with the proper operation of electromagnetic receptors of quality and proper design.

   It shall be unlawful within the Township of Southfield for any person, firm or corporation to knowingly operate or to knowingly cause to be operated any source of Electromagnetic Interference, the radiation or transmission from which exceeds the minimum values tabulated below:

RADIATED

Section of Electromagnetic Spectrum (from-to)	Primary Intended Service	Maximum Field Strength at Edge of Property Containing Interference Source
10 Kilocycles-100 Kc.	Communications Services	500 microvolts/meter
100 Kc.-535 Kc.	Navigational Aids	300 microvolts/meter
535 Kc.-1605 Kc.	AM Broadcasting	200 microvolts/meter
1605 Kc.-44 Megacycles	Various Communications Services	200 microvolts/meter
44 Mc.-88 Mc.	VHF Television	150 microvolts/meter
88 Mc.-174 Mc.	FM Broadcasting Airport Control	200 microvolts/meter
174 Mc.-216 Mc. 216 Mc.-580 Mc.	VHF Television Navigational Aids Citizens Radio	150 microvolts/meter 250 microvolts/meter

Section of Electromagnetic Spectrum (from-to)	Primary Intended Service	Maximum Field Strength at Edge of Property Containing Interference Source
580 Mc.-920 Mc.	UHF Television	300 microvolts/meter
920 Mc.-30,000 Mc.	Various	2000 microvolts/meter

BY TRANSMISSION OR CONDUCTION

Section of Electromagnetic Spectrum (from-to)	Primary Intended Service	Maximum Voltage Measured Line to Line or Line to Ground Where Power or Telephone Lines Cross Edge of Property Containing Interference Source
10 Kilocycles-100 Kc.	Communications Services	2.5 Millivolts
100 Kc.-535 Kc.	Navigational Aids	1.5 Millivolts
535 Kc.-1605 Kc.	AM Broadcasting	1.0 Millivolts
1605 Kc.-44 Megacycles	Various Communications Services	0.5 Millivolts
44 Mc.-88 Mc.	VHF Television	0.25 Millivolts
88 Mc.-174 Mc.	FM Broadcasting Airport Control	1.5 Millivolts
174 Mc.-216 Mc.	VHF Television	0.5 Millivolts
216 Mc.-580 Mc.	Navigational Aids Citizens Radio	20.0 Millivolts
580 Mc.-920 Mc.	UHF Television	50.0 Millivolts
920 Mc.-30,000 Mc.	Various	600.0 Millivolts

Method of Measurement: For the purposes of determining the level of radiated Electromagnetic Interference, standard field strength measuring techniques shall be employed. The maximum value of the tabulation shall be considered as having been exceeded if at any frequency in the section of the spectrum being measured, the measured field strength exceeds the maximum value tabulated for this spectrum section.

For purposes of determining the level of Electromagnetic Interference transmitted or conducted by power or telephone lines, a suitable, tunable, peak reading, radio frequency voltmeter shall be used. This instrument shall by

means of appropriate isolation coupling, be alternately connected from line to line and from line to ground during the measurement. The maximum value of the tabulation shall be considered as having been exceeded if at any frequency in the section of the spectrum being measured, the measured peak voltage exceeds the maximum value tabulated for this spectrum section.

ARTICLE XIV
INDUSTRIAL DISTRICTS

Section 14.01 INDUSTRIAL CLASSIFICATION. Industry shall be classified as M-1, M-2, M-3 and M-4.

14.02 INDUSTRIAL STANDARDS. All uses not herein expressly prohibited shall comply with the following table of standards:

	M-1	M-2	M-3	M-4
(a) Front yards	8 ft.	50 ft.	150 ft.	200 ft.
	All building lines and front yards shall be established no closer to the street than the future street line as established by the Master Thorofare Plan of the Township of Warren.			
(b) Side yards and rear yard	None	20' each	60' each	100' each
(c) Greenbelt	None, except when a side yard abutts a zoning district other than industrial, then 8' wide.	Along all zoning district boundary lines which border on a more restrictive zoning district. Along all street property lines but may be omitted along the front yard when the front yard is landscaped. 8' wide	20' wide	20' wide
(d) Height of Buildings. See Article XVI for Height Exceptions	2 stories 30 Ft.	2 stories 30 Ft.	2 stories 40 Ft. (See Height Exceptions)	2 stories 40 Ft.
(e) Dwelling	Yes	No	No	No
(f) Commercial Business	Yes	Yes	No Except when incidental to the principal industrial use.	No
(g) Automatic Screw Machines	Yes	Yes	Yes	Yes
	When operated with noise silencers and when located not less than 200 ft. from any zoned residential district.			
(h) Stamping machines, punch presses, and press breaks.	All machines shall be placed on shock absorbing mountings and on a suitable reinforced concrete footing. No machine shall be loaded beyond the capacity as prescribed by the manufacturer.			
	Up to 10 ton, 18 gauge or less in thickness when located 200 ft from any zoned residential district.	Up to 50 ton when 250 ft. from residential district. Up to 100 ton when 300 ft. from residential district. Up to 150 ton when 500 feet from residential district.		
(i) Hot forgings, steam or board hammers.	No	No	Yes When located 1,000 ft. from any zoned residential district and when operations are located within a masonry building, on a suitable reinforced concrete mat or to solid rock and mounted on shock absorbers that reduce vibration to a reasonable minimum.	Yes
(j) Noise in decibels as measured at the street or property line.	60	65	70	75
	Shall be muffled so as to not become objectionable due to intermittance, beat frequency or shrillness. May equal but not exceed street traffic noise during a normal day shift work period.			
(k) Smoke, as measured by the Ringlemann Chart.	No. 2	No. 2	No. 2	No. 2
	For periods aggregating four (4) minutes in any thirty (30) minutes.			
		No. 3	No. 3	No. 3
		For periods aggregating three (3) minutes in any fifteen (15) minutes when starting a new fire.		
(l) Smoke, dust, dirt and fly ash.	Shall not exceed 0.3 grains per cubic foot of flue gas at stack temperature of 500 degrees Fahrenheit and not to exceed fifty (50) percent excess air and shall in no manner be unclean, destructive, unhealthful, hazardous nor shall visibility be impaired by the emission of a haze which unduly impedes vision within apparent opaqueness equivalent to No. 1 of the Ringlemann Chart.			
(m) Odor.	The emission of obnoxious odors of any kind shall not be permitted.			
(n) Gases.	No gas shall be emitted which is deleterious to the public health, safety or general welfare.			
(o) Glare and heat.	Glare and heat from arc welding, acetylene torch cutting or similar processes shall be performed so as not to be seen from any point beyond the outside of the property.			
(p) Fire and safety hazards (the stor-				

	age and handling of flammable liquids, liquified petroleum gases and explosives shall comply with State rules and regulations as established by Public Act. No. 207, P. A. 1941 as amended and in addition the following regulations shall apply):				
	Bulk storage of flammable liquids liquid petroleum, gases and explosives above ground.	No	Yes	Yes	Yes All tanks shall be located not less than one hundred fifty (150) feet from property lines.
	Bulk storage of flammable liquids below ground.	Yes	Yes	Yes	Yes All tanks shall be located not closer to the property line than the greatest depth to the bottom of the buried tank.
	Rags, waste, similar materials.	No	No	Yes	Yes The storage of rags, wastes, paper or similar materials shall be in an enclosed masonry building of four (4) hour construction, no part of which may be located closer than one hundred fifty (150) feet from any property line.
(q)	Sewage waste.	1. No wastes shall be discharged in the public sewer system which is dangerous to the public health and safety. 2. Acidity or alkalinity shall be neutralized to a pH of 7.0 as a daily average on a volumetric basis, with a temporary variation of pH 5.0 to 10.0 3. Wastes shall contain no Cyanides and no Halogens, and shall contain not more than 10 p.p.m. of the following gases: Hydrogen Sulphide, Sulphur Dioxide and Nitrous Oxide. 4. Wastes shall not contain any insoluable substances in excess of 10,000 p.p.m. or exceed a daily average of 500 p.p.m. or fail to pass a No. 8 Standard Sieve, or have a dimension greater than ½ inch. 5. Wastes shall not have a chlorine demand greater than 15 p.p.m. 6. Wastes shall not contain phenols in excess of .005 p.p.m. 7. Wastes shall not contain any grease or oil or any oily substance in excess of 100 p.p.m. or exceed a daily average of 25 p.p.m.			
(r)	Number of production work shifts including Sundays and Holidays.	1 day shift (This shall not prevent servicing building or equipment used in normal operations)	3	3	3
(s)	Open storage other than junk.	No	Yes	Yes	Yes All storage shall be located within an area not closer than one hundred fifty (150) feet from any street right-of-way line and shall be inclosed with a greenbelt planting strip not less than eight (8) feet in width, and not less than eight (8) feet in height, to normally screen view of stock piles from the street. The storage of lumber, coal or other combustible material shall not be less than twenty (20) feet from any interior lot line, and a roadway shall be provided, graded, surfaced and maintained from the street to the rear of the property to permit free access of fire trucks at any time.
(t)	Open storage for junk, auto wrecking yards and other waste products.	No.	No.	No.	Yes When inclosed within a tight unpierced fence not less than six (6) feet in height, when not less than one hundred fifty (150) feet from any street or right-of-way line, when not less than twenty (20) feet from any interior lot line,

					when surrounded with a greenbelt planting not less than twenty (20) feet in width and not less than eight (8) feet in height to completely screen yard from outside view; and when complying with Article 3.17.
(u)	Loading space as required in Article III, Section 3.28.	Yes	Yes	Yes	Yes
(v)	Off-street parking required in Article III, Section 3.29.	Yes	Yes	Yes	Yes
		Inclosed from street or adjacent property line by an eight (8) foot wide greenbelt planting strip.			

Section 14.03 **PROHIBITED USES.** In all industrial districts no building shall be erected or altered and no land shall be used for the carrying on of manufacturing activities of the character of or similar to tanneries, stock yards, glue factories, soap factories, oil refineries or other similar factories.