

# **Building Lead-Safe Communities in Martindale-Brightwood and NearWest Neighborhoods of Indianapolis**

EPA Environmental Justice Small Grant  
Final Report  
April 1, 2011 – March 31, 2013

## **Summary, Conclusions and Recommendations**

In August 2011, Improving Kids' Environment was awarded a \$24,873 EPA Environmental Justice Small Grant to complement existing initiatives being done by both Improving Kids' Environment (IKE) and Indiana University-Purdue University Indianapolis (IUPUI) in the Martindale-Brightwood and NearWest (aka WESCO) neighborhoods.

Below you will find a final report outlining the grant objectives and their status, what was accomplished or changed in the goals and the technical results of the findings (Appendix A).

The following are a few of the highlights and recommendations:

- 1,148 soil samples were tested
- A series of air particulate transects were conducted in a portion of Indianapolis adjacent to Martindale-Brightwood
- Although results varied in homes and communities, many properties showed high levels of lead in soil, indicating potential health risks for gardeners and children
- The highest levels of lead concentrations were found at drip lines, next to houses and garages
- In Martindale-Brightwood, some households near to the EPA selected remediation of the abandoned National Lead Paint smelter plant have much higher than normal lead levels in the soil.
- Residents in the indicated high lead level areas must practice safe gardening techniques and avoid planting near buildings
- High levels of particulates are observed on the western border of Martindale-Brightwood, indicating that further monitoring of this issue is warranted to measure potential impacts of particulates on health in this area
- Communities must be better organized (beyond the scope of this grant) in order to become involved in these issues and create safe gardens and homes. We found that although a few felt this was an important topic, many more residents were more worried about jobs and feeding their family than finding lead in the soil.

## **A. Initial Background Information**

Previously, IUPUI conducted a detailed analysis of soil lead levels in the NearWest neighborhood (CDC 2010; Filippelli et al. 2005). In 2011, IUPUI began conducting atmospheric research in the Martindale-Brightwood neighborhood to identify hot-spots where airborne particulates may carry a lead poisoning risk. The core of this project was to (1) conduct a similarly detailed analysis of soil lead in the Martindale-Brightwood community, (2) identify and characterize similar airborne particulate hot-spots in the NearWest community, and (3) use the combined research results to educate members of both communities about safe urban gardening and protecting children from lead poisoning and airborne particulate pollution.

Given the presence of local lead - in the Martindale-Brightwood and NearWest communities, it was critical to assess the scale of the impact of these hotspots on community health and to combine our efforts in these communities to develop synergistic solutions. In order to identify these targets, IUPUI launched

two efforts: (1) to measure at the city block scale the lead concentration of soils, with a particular focus on current and potential urban garden sites, and (2) to measure the contribution of local emission sources of lead to neighborhoods, by utilizing air sampling and analysis techniques. These research efforts are linked scientifically, but not yet logistically, nor do they adequately incorporate community engagement and education.

The sampling and analysis of air particulates in Martindale-Brightwood was funded under a \$54,000 grant through the Indiana University Collaborative Research Fund. This EPA EJ grant allowed us to deploy equipment purchased under the IU grant into the NearWest neighborhood and also to compile soil lead data by collecting soil samples from urban gardens in both neighborhoods and additional soil samples in Martindale-Brightwood.

## **B. Program Objectives**

Under this grant, IUPUI originally proposed to:

- 1) Install particle instrumentation in three locations in Indianapolis to supplement the sampling of PM by the Indiana Department of Environmental Management (IDEM). IUPUI will purchase and deploy three Thermofisher: pDR1500 PM<sub>2.5</sub> instruments at the IDEM PM<sub>10</sub> measurement sites to increase the spatial coverage of PM concentrations, and quantify the relationships between PM<sub>10</sub> and PM<sub>2.5</sub> in Indianapolis.
- 2) Deploy three PM<sub>2.5</sub> personal exposure monitors and three PM10 personal exposure monitors (PEM model 2000 MSP corp., coupled with a Leland sample pump) at fixed IDEM monitoring stations to collect particle samples on a filter that can be analyzed for the chemical composition of the particles.
- 3) Deploy four PM<sub>2.5</sub> personal exposure monitors (PEM model 2000 MSP corp., coupled with a Leland sample pump) on students who will be asked to systematically traverse given routes within the city to examine ‘hot spots’ for PM and lead exposure. The PEM model 2000 MSP sampler is ideal for this purpose because they are light-weight and durable, and thus can be easily carried by students on bicycles.

Our initial efforts revealed some shortcomings with this approach for air particulate sampling, and thus we modified our objectives to focus on Item 3 above. Shortcomings included some access issues with the stationary sites, which were ultimately resolved but not in a time frame that allowed for a full suite of results. Additionally, particulate samples were of too low of a mass on the collection filters, so we were unable to subject these samples to detailed geochemical analysis. Ultimately this could have been used to examine in a rough sense spatial correlations between particulate lead chemistry and children’s blood lead levels, a laudable but still distant goal of this research. Continuing efforts are resolving this issue, but we have found that achieving objective 3 alone yielded very interesting results as to the distribution of particulates in the Martindale-Brightwood neighborhood in particular (*see attached Appendix A for technical data.*)

Improving Kids’ Environment proposed to develop education and outreach materials that would be used on a block-by-block level in both neighborhoods to advise residents on safe urban gardening practices, lead hazards inside and outside the home, and how to protect children from lead poisoning.

IKE’s education activities employed a 27-minute documentary video that was produced for IKE in 2010 by the local public television station, WFYI Productions, with financial support from the Marion County Health Department and Indiana State Department of Health. The documentary tells the stories of four

Indiana families who were affected by lead poisoning. IKE also used materials from U.S. EPA, Marion County Health Department, [www.leadfreekids.org](http://www.leadfreekids.org) and Indiana-specific outreach materials developed by IKE. IKE worked with both communities to identify schools, churches, childcare centers and other community organizations that interact with and served parents and caregivers of young children. We also trained home visitors in Martindale-Brightwood and the NearWest neighborhoods to understand the dangers of lead poisoning, recognize potential lead hazards and advise families on how to reduce the risk of lead poisoning in young children.

### C. Status of Project Timeline and Tasks

The specific tasks associated with the above objectives included the following and are completed, except in cases where otherwise rationalized and noted.

*For technical reference, please see Appendix A for methodology, results, tables and maps, and Appendix B for educational materials, flyers and general community outreach information.*

- Develop Quality Assurance Project Plan
  - Proposed start date:** August 1, 2011
  - Proposed completion:** September 1, 2011
  - Status:** **COMPLETED**
  - Comments:** Revisions to our original QAPP were submitted on October 26, 2011 and were approved on December 26, 2011.
- Soil sampling in Martindale-Brightwood and additional garden sampling in NearWest
  - Proposed start date:** October 1, 2011
  - Proposed completion:** January 31, 2012 (changed to September 2012)
  - Status:** **COMPLETED**
  - Comments:** Soil sampling was postponed until spring of 2012 due to the QAPP not being approved until the end of December, and the difficulty of winter and frozen ground. As of the writing of this final report, a total of 677 soil samples from 187 households in NearWest, and 471 soil samples from 137 households in Martindale-Brightwood have been collected. These include 5 Near West garden sites. *(See Tables 1, 2 in Appendix A)*
  - These samples were submitted directly from homeowners, collected by neighborhood groups, IKE volunteers and by concerned citizens of the neighborhood. Over 100 ‘Soil Sampling Kits’ were distributed for free throughout the community to generate interest in the project and make it simpler for members of the community to participate.
  - In addition, as part of a school project at Arsenal Technical High School organized by an IKE volunteer, several soil samples (about 20 addresses) in Martindale Brightwood were taken from abandoned houses near the American Lead clean-up site. The soil sampling plan was designed to initiate sampling at the furthest points away from the American Lead cleanup sites and finish in the areas of the cleanup. Tech AP students assisted in the soil sampling within the parameter areas of both 2005 U.S. EPA lead cleanup zones.
- Soil and garden samples analyzed for lead content, including QA/QC
  - Proposed start date:** January 1, 2012
  - Proposed completion:** February 28, 2012 (September 30, 2012 new end date)
  - Status:** **COMPLETED**
  - Comments:** The final analysis of the soil samples was delayed due to technical laboratory issues at IUPUI in the fall of 2012 but thanks to the grant extension, IUPUI has now completed all of the samples and the overall analysis.

When soil and garden samples were submitted, samples were recorded by address and all samples were logged. They were analyzed in the Geochemistry Lab at IUPUI for lead and a suite of other metals (Cadmium, Copper, Zinc, Barium, Chromium, and Manganese). After the analyses' were completed, for those addresses where the houses were occupied, the results were mailed to the homeowner with an easy chart and explanation. If levels of lead were found to be at unsafe levels, remediation suggestions were also attached for the homeowner. Inspection of this data confirms there are areas of elevated lead concentrations in Martindale-Brightwood with soils ranging from acceptable values of below 200 ppm to values as high as 3000 ppm. The patterns of elevated lead in soil are confirmed as being along driplines of homes, sometimes in areas near the house likely to be used for gardens and in alleys. Near West did not generally exhibit levels as high as those found in Martindale-Brightwood.  
**Please see the MAPS in Appendix A for levels in both neighborhoods.**

- Neighborhood meetings and workshops on urban gardening  
**Proposed start date:** December 1, 2011  
**Proposed completion:** March 30, 2012 (January 2013)  
**Status:** *COMPLETED*  
**Comments:** The first urban gardening workshop was held on May 12, 2012 at the Oasis of Hope Baptist Church in Martindale-Brightwood from 9:00 am – 2:00 pm. The focus of the workshop was on the following: (1) Gardening in urban areas; (2) How to start a garden project in your neighborhood; (3) Soil test results for lead in a few areas of Martindale-Brightwood; (4) Growing vegetables safely in contaminated soil; and (5) Update on Martindale-Brightwood quality of life plan.  
The workshop attracted about 70 community members and hosted several speakers, including Dr. Gabriel Filippelli. Materials were provided to the community and the “Garden Safe, Garden Well” urban gardening guide was given to community members (printed by IUPUI from their grant monies). In addition, materials from IKEA and the Marion County health Department on lead hazards were available as well.  
A second meeting on safe gardening (and lead poisoning prevention) was done as a training-of-trainers workshop for the home health visitors (see below).
- Analysis of soil and garden samples completed, recommendations  
**Proposed start date:** March 1, 2012  
**Proposed completion:** May 1, 2012 (Finished in September, 2012)  
**Status:** *COMPLETED*  
**Comments:** Some of the soil test results for lead in Martindale-Brightwood gardening areas were shared at the “Community Gardening Workshop” on May 12, 2012 and recommendations offered as to growing vegetables safely in contaminated soil (see Appendix B).
- Information on general lead distribution patterns in Martindale-Brightwood and NearWest shared with communities.  
**Proposed start date:** March 1, 2012  
**Proposed completion:** May 1, 2012 (January, 2013)  
**Status:** *COMPLETED*  
**Comments:** Two community meetings/gatherings were conducted in Martindale-Brightwood (January 18) and Near West (January 15). At these meetings mapping of the areas with the highest lead concentrations was presented and discussed, and a forum for community questions and involvement was created. Additional materials about safe gardening, lead poisoning in children and other lead-related health concerns were available. Tables with the lead levels of the addresses where soils samples were taken were given to community leaders (the CDC in

Martindale-Brightwood and Hawthorne Center in Near West). A large poster size map of the lead accumulations in the areas were also produced and given to the above organizations.

- Training on lead poisoning prevention for neighborhood-based healthy homes visitors.

**Proposed start date:** March 1, 2012

**Proposed completion:** May 1, 2012 (completed August, 2012)

**Status:** *COMPLETED*

**Comments:** After passing a limited criminal history background check through the Indiana State Police, four home visitors were selected to serve the Near West community in April. These home visitors participated in four hours of training on March 12, 2012. This training included information on neighborhood engagement, community infrastructure, soil sampling and lead testing. Since then, the NearWest home visitors collected over 100 garden soil samples.

In Martindale-Brightwood, 4 home health visitors were identified in July (also passed a limited criminal history background check through the Indiana State Police), so they were not involved in the soil testing. Volunteers did the soil test gathering in this neighborhood. On August 3<sup>rd</sup> a 4 hour training-of-trainers was held for *all eight home health visitors*, and other community participants from the Martindale-Brightwood Environmental Justice Committee (MBEJC). The training consisted of analysis to date of lead levels in soil, how to do safe gardening, interaction with other community members and how to approach a family about the topics.

IKE & IUPUI developed 2 hand-outs for the home health visitors – one to be given to the homeowner with tips about how to prevent bringing contaminated soil into the home (by children, pets, etc.) and other lead related problems. The second consisted of talking points and lead levels by zip codes for the use of the home health visitor. Each home health visitor was given a bag of materials for each visit consisting of the Safe Gardening Guide, IKE materials and information for Marion County Health Department about lead poisoning and testing information.

- Air sampling and air hotspot identification performed in NearWest

**Proposed start date:** September 1, 2011

**Proposed completion:** August 1, 2012 (December, 2012)

**Status:** *CHANGED*

**Comments:** IUPUI used a transect that ended just at the east border of the Near West community instead of within the community. This site was chosen to confirm if particulates were blowing from the Near West community. As there were few particulates, and the stationary IDEM site within the NearWest community also showed relatively low values, it was decided in June, 2012 that there was no justification to do the complete analysis in Near West.

- Air sampling and air hotspot identification performed in Martindale-Brightwood

**Proposed start date:** April 1, 2011

**Proposed completion:** August 1, 2012 (December 2012)

**Status:** *COMPLETED*

**Comments:** Air sampling was actually started in November of 2011 at three stationary sites and data from this sampling has been analyzed. Data from IDEM sites were used as well. Dr Filippelli as well as other IUPUI students rodebikes with the PM 2.5 and PM10 monitors in specific routes within the areas to determine any “hotspots”. In particular, a consistent transect was carried out through the heart of the Martindale-Brightwood community and west toward the NearWest community. This transect was repeated twice per month, with a southward run occurring in the morning and a northward run in the afternoon. Results of these transects are included in this final report, and plans are underway to distribute a version of these results back to the community leaders in the neighborhood for distribution to the community as appropriate.

- Air sampling results disseminated to NearWest and Martindale-Brightwood  
**Proposed start date:** July 1, 2012  
**Proposed completion:** September 30, 2012  
**Status:** *IN PROGRESS*  
**Comments:**  
 Although distribution of air sampling was not part of the objectives, IUPUI is preparing to distribute these results to the communities in early April.
- Educational and outreach materials developed and distributed  
**Proposed start date:** July 1, 2012  
**Proposed completion:** August 1, 2012 (to December, 2012)  
**Status:** *COMPLETED*  
**Comments:** The safe gardening guide was used as a handout for the meetings and the home health visitors.  
 In addition, IKE & IUPUI developed 2 hand-outs for the home health visitors – one to be given to the homeowner with tips about how to prevent bringing contaminated soil into the home (by children, pets, etc.) and other lead related problems. The second consisted of talking points and lead levels by zip codes for the use of the home health visitor. (see Appendix B). Each home health visitor was given a bag of materials for each visit consisting of the safe gardening guide, IKE materials and information for Marion County Health Department about lead poisoning and testing information.  
 IKE also assisted in the printing of additional Garden Guides, as well as a Spanish version of the gardening guide to be used for residents in the Near West neighborhood.
- Additional gardening workshops performed  
**Proposed start date:** August 1, 2012  
**Proposed completion:** September 30, 2012 (January, 2012)  
**Status:** *COMPLETED – see above comments*
- Home visits conducted  
**Proposed start date:** July 1, 2012  
**Proposed completion:** September 30, 2012  
**Status:** *COMPLETED*  
**Comments:** Eight home health visitors were trained (see above) on August 3<sup>rd</sup>. They were each assigned 20 homes to visit and talk about lead in soil and give out information on gardening and lead poisoning. A total of 160 homes were visited. In Near West, the homes were visited where soil samples were taken. In Martindale-Brightwood, homes were chosen at random according to 4 zip code areas. This was due to the fact that the home health visitors were not found in the spring to do the soil test gathering and volunteers from IDEM and IUPUI tested some areas where there were vacant lots. However, the analysis is random enough to show the hotspots in Martindale-Brightwood and develop a pattern (see above under soil and garden samples analyzed).
- Additional community meetings and activities to disseminate information  
**Proposed start date:** July 1, 2012  
**Proposed completion:** September 30, 2012 (changed to January 2013)  
**Status:** *COMPLETED*  
**Comments:** See above for final workshops/meetings held in each community on January 15 & 18, 2013.

#### D. Financial Status

As of March 2013, the following is a breakdown of expenditures:

<b>Budget Category</b>	<b>Total Approved Allowable Costs</b>	<b>Incurred Costs</b>	<b>Remaining Balance (Shift Categories)<sup>1</sup></b>
Personnel	8,198.00	8,226.12	28.12
Travel	500.00	68.83	(431.17)
Supplies	700.00	406.01	(293.99)
Other	14,000.00	14,697.04	697.04
ID Costs	1,475.00	1,475.00	-
TOTAL	24,873.00	24,873.00	-

(1) Amount in remaining balance (shift categories) column is the costs shifted/received to/from another category. The total amount shifted was \$725.16, which is below the EPA allowable 10% shift amount of \$2,487. The shift in categories was done to accurately reflect the costs incurred during the grant period.

## APPENDIX A

### **Methodology**

The two main thrusts of our study were to (1) determine at high spatial resolution the distribution of Pb in surface soils of the Martindale-Brightwood and NearWest communities to determine risk potentials for Pb exposure at the neighborhood scale, and (2) measure ground-level particulate loading in these communities to target hotspots of particulates that might lead both to Pb exposure and to pulmonary disease. We implemented both of these efforts successfully.

Some modifications to our proposed research methodology were made during implementation to account for some on-the-ground realities. First, our community-based sampling approach was extremely effective at involving residents in citizen-science, but because of variable return rates of samples, the soil samples were not uniformly distributed across each neighborhood. We were able to overcome this shortcoming somewhat in the Martindale-Brightwood community by targeted additional sampling in areas where we encountered sampling gaps. For the NearWest community, we were fortunate to already have very comprehensive soil data coverage, and thus the less-systematic nature of sampling as part of this study was supplemented by extant data, resulting in excellent overall coverage of this area. We ultimately collected and analyzed a total of 677 soil samples from 187 households in NearWest, and 471 soil samples from 137 households in Martindale-Brightwood (Tables 1, 2).

Second, we were limited somewhat in our ability to obtain detailed ground-surface particulate data from transects by instrument calibration issues and safe access issues. We were able to collect systematic, monthly, calibrated transects through the entire downtown area of Indianapolis, including the west border of Martindale-Brightwood, via bicycle-based sampling. This provides an excellent picture of annual variations in air particulates (PM<sub>2.5</sub> and PM<sub>10</sub>) at the level at which people breathe. We had planned to supplement this with more detailed sampling in both of the communities, but had difficulties effectively geo-locating the particulate instruments with travel pathways used. We also had some safety and access concerns in both neighborhoods—although some efforts are being made to make these neighborhoods more “bike-friendly” neither currently is. Combined with some personal safety issues, we choose to restrict our particulate sampling to the more consistent and calibrated transect approach.

### ***Soil sampling and analysis***

Soil sampling was conducted largely by the individuals in the community, following guidelines prepared by the IUPUI team and distributed by IKE and the neighborhood partners on this project. The specifications were to take five samples, including one at the home dripline, one near the street, and three in various parts of the yard or garden. Approximately 75% of sample households (termed here sample sets) received complied with this format, with the remaining 25% of sample sets lacking some of the specified sample types (e.g., only including one yard sample) and/or having non-specific locators (e.g., A, B, C, etc.).

The soil samples collected by residents were placed into zip-seal bags as specified in the protocol and returned to the IUPUI laboratory. Samples were logged in, dried at 60 degrees C for two days, sieved to 250 micron mesh size to exclude stones, twigs, and leaves, and ashed at 550



degrees C for 2.5 hours to fully combust organic matter. Ashed samples were placed in 50 mL PE centrifuge tubes, digested in 2N trace metal grade HCl for 24 hours, and centrifuged at 10,000 rpm for 10 minutes. Supernatant from the digested samples was diluted with Milli-Q water and analyzed via a Perkin Elmer ICP-OES with a CCD spectrometer for Pb, Mn, Cu, Cr, Ba, and Zn.

Data from the analysis was compiled into individual reports that were distributed to the households (in the cases where we had a street address and a resident of that structure identified), along with our Garden Safe, Garden Well guide which guides residents and gardeners through a tiered decision matrix to determine best how to respond to the levels of Pb determined in the soil samples.

### *Air particulate sampling and analysis*

Air particulates were determined using two Thermo-Fisher pDR instruments operating simultaneously. One pDR was configured as a PM<sub>2.5</sub> detector, and the other as a PM<sub>10</sub> detector. These instruments sample 2 liters of air per minute. The pDR instruments were zeroed, and then clipped to a waist belt. We initially calibrated with both instruments configured either as PM<sub>2.5</sub> or as PM<sub>10</sub> to determine the degree of variability between duplicate measures on either side of the bicycle—the results were identical, within the range of variation of individual sample points, and thus we were confident that we could obtain robust results for dual PM<sub>2.5</sub> and PM<sub>10</sub> samplers.

The sampling transect runs regularly began at a personal residence located approximately 6 miles north of downtown. At the onset of the transect run, typically occurring between 9 and 10 am, the zeroed instruments were turned on, and sampled particulates at biking speed along the route of travel. The instruments were set to sample at 30-second intervals. The travel route was NS mostly along the Monon rail-trail corridor, and then EW roughly along 10<sup>th</sup> street. Four time and location check points were established, including the starting point at 49<sup>th</sup> and Park Avenue, a point at Monon Trail and 30<sup>th</sup> street, another point at Monon Trail and 10<sup>th</sup> street, and the end point at the IUPUI campus. These locations were geocoded, and used to calibrate the sampling locations with respect to the sequential time-based data logs of the pDR instruments. The return transect was typically conducted between 4 and 6 pm. Some variations in the total number of 30 second samples occurred due to differences in travel speed—we typically recorded 60-64 samples, indicating a total travel duration of 30 to 32 minutes.

Sample data was downloaded, added to a spreadsheet that had the UTM locations for the check points included, and individual sample locations were determined by extrapolation between the check points. The actual location at each 30 second sample was likely within ~50 meters of the calculated location, given the relatively consistent travel speeds. No transects were conducted in wet weather (the instruments cannot function in rain), and all transect days were carefully chosen with respect to weather forecasts to ensure that both am and pm transects could be conducted on the same day.

## **Results**

### ***Soil lead***

We determined the concentration of Pb in soils in 1,148 total samples (Tables 1, 2). The concentration of Pb found in individual soils samples from each of the households varied in some predictable ways. For example, soils near home driplines typically had the highest Pb values, the result of accumulation of Pb-enriched dusts at the house barrier. This enrichment can come from both soil sources and proximal lead-based paints sources from the homes themselves. Soils near streets had values indistinguishable within the range of variation from the average concentrations of yard samples. This result is different from what we have seen in larger properties (such as parks and schools proximal to roadways) where higher Pb from past emissions of leaded gasoline is seen near the roadways. This difference in results is likely due to the very close proximity of yards to the streets in these neighborhoods; basically, both types of samples experienced about the same emission fall-out from gasoline sources.

Significant spatial variation can be seen in soil Pb concentrations in both of these neighborhoods (Figs. 1-4). Average values for each household reveals soil Pb concentrations that are almost always above the background values (10-30 ppm) for Pb in this soil type (Fig. 1). Maximum values at each household (typically from the dripline sample) also reveal some variability, but are mostly much higher than the background value (Figs. 2-4).

Many values found in this study exceed the safe gardening standard (200 ppm) and thus pose some risk for urban gardening. Additionally, many values exceed the children's playground (400 ppm) and residential (1,200 ppm) standards, particularly in the Martindale-Brightwood neighborhood (Fig. 3). Residents of these communities have voiced concerns about unsafe levels of Pb in residential soils—the results from this study validate these concerns and indicate that the human health burden of Pb exposure remains in these urban core neighborhoods, leading to an environmental justice issue.

### ***Air Particulates***

Transect analyses, conducted along a fixed route (Fig. 5), are reported for the individual runs for PM<sub>2.5</sub>, PM<sub>10</sub> (morning and afternoon), comparisons of each for the duration of the study, and averages of all values for PM<sub>2.5</sub> and PM<sub>10</sub> (morning and afternoon) (Appendix; Figs. 6-13).

A comparison of individual runs throughout the study period reveals variability in both the spatial patterns and in the temporal patterns throughout the study period. PM<sub>2.5</sub> tended to be higher in the spring runs (March, April, and May) compared to the other transects (Fig. 10). This is especially manifest in the morning runs—the afternoon runs displayed lower values in general (Fig. 10). Additionally, PM<sub>2.5</sub> tended to have higher values on the northern portion of the transect, and peaks in the middle of the transect runs (Fig. 10). This portion of the transect runs on the west side of Martindale-Brightwood, and indicates some source(s) of ground-level particulates in this area. PM<sub>10</sub> displays the same seasonal trends of higher spring values in the morning, and some peaks in the area of Martindale-Brightwood as well as south of this in the region of the interstates (Fig. 11). None of the peak values exceeded the 24-hour standards, a reasonable measure if those peaks are persistent day to day, for either particulate size class (65

microgram/m<sup>3</sup> for PM2.5 and 150 microgram/m<sup>3</sup> for PM10). No clear cause for the generally higher morning PM values can be discerned from the data. If all measurements are valid, this pattern might be partly explained by higher afternoon humidity levels, thus suppressing fine particulates. Alternatively, morning winds driven by rapid ground surface warming might generate higher ground level particulate concentrations; more stable afternoon air would be expected to reduce the particulate concentrations.

Average values for the transect runs ranged from 5 to 12 microgram/m<sup>3</sup> for PM2.5 (Fig. 12), and 5 to 17 microgram/m<sup>3</sup> for PM10 (Fig. 13). Average values for PM2.5 range were typically about 10 microgram/m<sup>3</sup>, and those for PM10 range from about 5 to 20 microgram/m<sup>3</sup>. These values can be compared to the annual standard established by the EPA as part of the National Ambient Air Quality Standards of 15 microgram/m<sup>3</sup> for PM2.5 and 50 microgram/m<sup>3</sup> for PM10. Thus, the average particulate matter concentration of all transect runs through the year did not exceed the exposure health standard for either of the particulate matter class sizes.

Individual transect runs reveal instantaneous measurements through time and space (Appendix). These transects indicate that ground-level exposures to particulate matters is much more richly textured than those captured in isolated air monitoring stations, which record regional averages at the 10 m level. Of course, for health burdens, we breathe air close to ground level, and thus the transect data from the pDRs is more indicative of the potential health impacts of particulates. But the temporal and spatial variability observed in this study, coupled with our limited understanding of the health impacts of instantaneous air quality measures, indicate that the air monitoring station data remains an important tool for assessing particulate matter burdens from a public health perspective.

**Table 1. Lead data for the NearWest neighborhood**

Address	Zip_Code	N	Pb mean (ppm)	Std Dev	Minimum	Maximum
North Rochester	46222	5	136	26	100	172
Goodlet	46222	2	135	55	96	174
North Goodlet	46222	2	153	109	76	230
North Mount	46222	5	208	53	140	282
N.Tremont St.	46222	5	162	111	5	295
N. Tremont St.	46222	4	179	120	27	318
North Centennial	46222	5	270	54	215	360
Tremont St.	46222	5	176	119	57	370
Pershing	46222	5	210	123	86	411
Tremont St.	46222	5	208	129	74	412
West Michigan	46222	4	239	164	65	457
N. Tremont St.	46222	5	380	191	148	574
North Goodlet	46222	5	335	165	229	616
North Goodlet Ave	46222	5	311	181	174	628
West New York	46222	5	388	149	239	637
Sheffield	46222	2	386	360	131	640
West Vermont	46222	5	404	195	203	678
North Mount	46222	5	494	205	152	698
N Pershing Ave	46222	4	460	227	248	739
N Pershing Ave	46222	5	547	271	238	833
Miley	46222	2	474	607	45	903
Haugh St	46222	3	492	395	211	944
N. Tremont St.	46222	5	576	359	213	1008
Holmes Ave	46222	3	585	429	198	1045
West Vermont	46222	5	396	379	164	1052
N Goodlet Ave	46222	2	741	555	349	1133
North Goodlet	46222	5	413	423	117	1152
Centennial	46222	2	706	634	258	1154
N Pershing Ave	46222	4	830	259	570	1166
North Moreland Ave	46222	5	406	460	159	1227
Ketcham	46222	2	717	859	110	1324
N. Pershing Ave	46222	5	679	435	308	1397
Haugh St	46222	2	811	880	189	1433
N Pershing Ave	46222	5	501	557	126	1478
Moreland Ave	46222	5	707	556	159	1616
N Pershing Ave	46222	5	759	585	220	1702
N Tremont St	46222	4	980	639	381	1706

Address	Zip_Code	N	Pb mean (ppm)	Std Dev	Minimum	Maximum
N Tremont St	46222	4	1134	461	750	1778
Goodlet Ave	46222	4	568	823	57	1796
North Belmont	46222	2	1097	1488	45	2150
West Michigan	46222	5	1341	855	238	2260
N Lynn St	46222	5	1285	843	571	2602
West Michigan	46222	5	1029	1045	187	2654
Holmes Ave	46222	5	1020	1199	315	3154
N. Tremont St	46222	4	1314	1998	64	4278
West	46222	5	664	455	109	1181
Will	46222	2	167	186	36	298
Walnut	46222	2	48	17	36	61
Arnolda	46222	5	258	364	55	906
Livingston	46222	6	173	153	66	463
E 9th	46202	6	747	444	255	1513
MacPherson Ave	46205	3	987	1375	87	2570
East 46th Street	46205	5	316	284	106	756
N Park Ave	46202	5	1164	1360	67	2752
E 51st St.	46205	5	1160	2147	121	5000
E 25th St	46218	1	372		372	372
North Dr. Andrew J f	46202	5	575	528	195	1507
North Dr. Andrew J f	46202	5	980	892	233	2341
Yandes	46202	5	1254	621	558	2227
North Arsenal	46218	5	707	457	20	1243
North Alvord	46202	5	372	151	208	597
North Talbott	46202	6	275	78	159	374
Hovey	46218	5	39	14	21	57
Hovey Street	46218	5	112	174	29	423
Winter Ave	46218	3	322	221	82	515
North Yandes	46202	5	1774	2645	398	6496
Olney Street	46218	5	240	129	131	404
North New Jersey	46202	6	3276	2653	507	6619
MacPherson Ave	46205	1	987		987	987
Columbia	46202	1	609		609	609
N. Columbia	46202	1	1218		1218	1218
N. Sheldon	46218	1	19		19	19
Langley Ave	46218	3	323	14	311	338
N. Arsenal	46218	1	11		11	11

Address	Zip_Code	N	Pb mean (ppm)	Std Dev	Minimum	Maximum
N. Columbia	46205	1	733		733	733
N. Wheeler	46218	6	226	84	112	350
Dearborn St.	46218	5	557	353	37	986
Parker St.	46218	5	159	134	77	397
N. Hovey	46218	1	3225		3225	3225
N. Sheldon	46218	1	1489		1489	1489
Dearborn St.	46218	5	531	807	62	1970
Wheeler St.	46218	5	187	123	35	374
LaSalle Street	46218	5	202	39	159	263
Columbia	46205	1	611		611	611
N. Rural St.	46218	5	219	144	88	387
North Arsenel	46218	5	530	229	268	835
N. Sheldon	46218	1	577		577	577
Parker St.	46218	5	267	89	183	407
N. Pennsylvania	46205	5	1715	3025	33	7102
N. Hovey	46218	1	1459		1459	1459
N. Columbia	46205	1	982		982	982
Station Street	46218	5	66	18	41	91
North Talbot Street	46205	5	112	38	53	156
LaSalle Street	46218	5	1190	1426	123	3348
East 25th Street	46218	5	298	132	150	422
Dearborn St.	46218	5	219	67	143	288
Sangster Ave	46218	5	275	161	139	538
N. Columbia	46205	1	325		325	325
Temple St	46218	4	167	55	90	208
Bellafontaine	46218	5	616	168	428	868
N. Columbia	46205	1	458		458	458
Gale Street	46218	5	253	100	80	339
Winthrop	46218	5	414	308	198	914
Sangster Ave	46218	10	233	96	84	352
Sherman Street	46218	5	310	256	166	762
Adams St.	46218	5	112	66	23	196
Guilford Ave	46205	2	729	878	108	1350
Station Street	46218	5	263	121	130	377
Winthrop Ave	46205	3	574	274	269	798
Winthrop Ave	46205	3	705	608	201	1380
Winthrop Ave	46205	3	347	79	265	423

Address	Zip_Code	N	Pb mean (ppm)	Std Dev	Minimum	Maximum
N. Columbia	46205	1	585		585	585
Winthrop Ave	46205	3	407	210	168	560
Winthrop Ave	46205	3	1130	911	544	2180
Guilford Ave	46205	3	667	343	324	1010
Winthrop Ave	46205	3	502	408	149	949
Olney Street	46218	5	205	72	105	295
Guilford Ave	46205	3	446	449	113	957
Wheeler St.	46218	5	80	14	66	96
Winthrop Ave	46205	3	428	275	189	728
Guilford Ave	46205	3	360	271	160	668
Guilford Ave	46205	3	299	213	75	498
Winthrop Ave	46205	3	897	613	334	1550
Guilford Ave	46205	3	246	21	228	269
Guilford Ave	46205	3	469	452	140	985
Guilford Ave	46205	3	393	219	241	644
Winthrop Ave	46205	3	437	186	299	648
Guilford Ave	46205	3	456	104	362	567
Guilford Ave	46205	3	481	244	228	715
Winthrop Ave	46205	3	521	37	498	563
Guilford Ave	46205	3	270	108	147	347
Guilford Ave	46205	3	206	9	200	216
Winthrop Ave	46205	3	168	104	49	242
Baltimore	46218	1	294		294	294
MacPherson Ave	46205	3	272	100	162	358
MacPherson Ave	46205	3	336	217	110	542
N. Columbia	46205	1	847		847	847
MacPherson Ave	46205	3	281	29	255	312
MacPherson Ave	46205	3	328	188	172	537
MacPherson Ave	46205	3	272	140	161	429
Gale Street	46218	5	426	469	123	1254
MacPherson Ave	46205	3	271	128	170	415
Olney Street	46218	4	162	48	91	199
Guilford	46218	5	1149	1046	572	3007
Adams St.	46218	5	245	128	113	451
Olney Street	46218	5	239	160	56	497
Ralston Ave.	46218	1	419		419	419
MacPherson Ave	46205	3	225	33	199	263

Address	Zip_Code	N	Pb mean (ppm)	Std Dev	Minimum	Maximum
MacPherson Ave	46205	3	462	190	248	612
Sherman Street	46218	5	937	1527	123	3662
Ralston Ave	46218	6	72	62	21	192
MacPherson Ave	46205	3	128	85	61	223
Brouse	46218	1	218		218	218
Sangster	46218	1	1720		1720	1720
Brouse	46218	1	240		240	240
Station Street	46218	5	180	134	47	406
Brouse	46218	1	171		171	171
Dr. Andrew J Brown Ave	46205	1	321		321	321
North Park Ave	46205	1	193		193	193
N. Wheeler	46218	5	145	60	73	230
Station Street	46218	5	170	38	122	223
Dearborn St.	46218	5	537	589	126	1510
LaSalle Street	46218	5	194	143	49	429
MacPherson Ave	46218	5	1427	1476	176	3895
Guilford	46218	5	1335	1734	215	4400
Gale Street	46218	5	260	132	105	435
North Central	46205	1	124		124	124
North Central	46205	1	64		64	64
North Central	46205	1	41		41	41
Nowland	46218	5	47	20	32	80
North Central	46205	1	78		78	78
North Central	46205	1	864		864	864
North Central	46205	1	276		276	276
North Central	46205	1	292		292	292
30th & Central Ave	46205	1	266		266	266
Tacoma Ave	46218	3	89	27	68	120
North Delaware	46205	5	1575	1592	236	3433
Guilford Ave	46205	5	1221	2121	155	5000
N. Park	46205	4	334	327	165	825
Central Avenue	46205	5	712	383	201	1121
E. Saint Clair Street	46202	4	372	142	206	542
E. Arch Street	46202	1	496		496	496
N. Senate Ave	46202	1	499		499	499
27th Street	46205	3	440	289	263	773
Broadway	46218	5	143	67	57	240
East 17th	46202	5	414	168	307	708



Address	Zip_Code	N	Pb mean (ppm)	Std Dev	Minimum	Maximum
MacPherson Ave	46205	3	462	190	248	612
Sherman Street	46218	5	937	1527	123	3662
Ralston Ave	46218	6	72	62	21	192
MacPherson Ave	46205	3	128	85	61	223
Brouse	46218	1	218		218	218
Sangster	46218	1	1720		1720	1720
Brouse	46218	1	240		240	240
Station Street	46218	5	180	134	47	406
Brouse	46218	1	171		171	171
Dr. Andrew J Brown	46205	1	321		321	321
North Park Ave	46205	1	193		193	193
N. Wheeler	46218	5	145	60	73	230
Station Street	46218	5	170	38	122	223
Dearborn St.	46218	5	537	589	126	1510
LaSalle Street	46218	5	194	143	49	429
MacPherson Ave	46218	5	1427	1476	176	3895
Guilford	46218	5	1335	1734	215	4400
Gale Street	46218	5	260	132	105	435
North Central	46205	1	124		124	124
North Central	46205	1	64		64	64
North Central	46205	1	41		41	41
Nowland	46218	5	47	20	32	80
North Central	46205	1	78		78	78
North Central	46205	1	864		864	864
North Central	46205	1	276		276	276
North Central	46205	1	292		292	292
30th & Central Ave	46205	1	266		266	266
Tacoma Ave	46218	3	89	27	68	120
North Delaware	46205	5	1575	1592	236	3433
Guilford Ave	46205	5	1221	2121	155	5000
N. Park	46205	4	334	327	165	825
Central Avenue	46205	5	712	383	201	1121
E. Saint Clair Street	46202	4	372	142	206	542
E. Arch Street	46202	1	496		496	496
N. Senate Ave	46202	1	499		499	499
27th Street	46205	3	440	289	263	773
Broadway	46218	5	143	67	57	240
East 17th	46202	5	414	168	307	708

**Table 2. Lead data for the Martindale-Brightwood neighborhood**

Address	Zip_Code	N	Mean	Std Dev	Minimum	Maximum
E 9th	46202	6	747	444	255	1513
MacPherson Ave	46205	3	987	1375	87	2570
East 46th Street	46205	5	316	284	106	756
N Park Ave	46202	5	1164	1360	67	2752
E 51st St.	46205	5	1160	2147	121	5000
E 25th St	46218	1	372		372	372
North Dr. Andrew J Brown Ave	46202	5	575	528	195	1507
North Dr. Andrew J Brown Ave	46202	5	980	892	233	2341
Yandes	46202	5	1254	621	558	2227
North Arsenal	46218	5	707	457	20	1243
North Alvord	46202	5	372	151	208	597
North Talbott	46202	6	275	78	159	374
Hovey	46218	5	39	14	21	57
Hovey Street	46218	5	112	174	29	423
Winter Ave	46218	3	322	221	82	515
North Yandes	46202	5	1774	2645	398	6496
Olney Street	46218	5	240	129	131	404
North New Jersey	46202	6	3276	2653	507	6619
MacPherson Ave	46205	1	987		987	987
Columbia	46202	1	609		609	609
N. Columbia	46202	1	1218		1218	1218
N. Sheldon	46218	1	19		19	19
Langley Ave	46218	3	323	14	311	338
N. Arsenal	46218	1	11		11	11
N. Columbia	46205	1	733		733	733
N. Wheeler	46218	6	226	84	112	350
Dearborn St.	46218	5	557	353	37	986
Parker St.	46218	5	159	134	77	397
N. Hovey	46218	1	3225		3225	3225
N. Sheldon	46218	1	1489		1489	1489
Dearborn St.	46218	5	531	807	62	1970
Wheeler St.	46218	5	187	123	35	374
LaSalle Street	46218	5	202	39	159	263
Columbia	46205	1	611		611	611
N. Rural St.	46218	5	219	144	88	387
North Arsenel	46218	5	530	229	268	835
N. Sheldon	46218	1	577		577	577

Address	Zip_Code	N	Mean	Std Dev	Minimum	Maximum
E 9th	46202	6	747	444	255	1513
MacPherson Ave	46205	3	987	1375	87	2570
East 46th Street	46205	5	316	284	106	756
N Park Ave	46202	5	1164	1360	67	2752
E 51st St.	46205	5	1160	2147	121	5000
E 25th St	46218	1	372		372	372
North Dr. Andrew J Brow	46202	5	575	528	195	1507
North Dr. Andrew J Brow	46202	5	980	892	233	2341
Yandes	46202	5	1254	621	558	2227
North Arsenal	46218	5	707	457	20	1243
North Alvord	46202	5	372	151	208	597
North Talbott	46202	6	275	78	159	374
Hovey	46218	5	39	14	21	57
Hovey Street	46218	5	112	174	29	423
Winter Ave	46218	3	322	221	82	515
North Yandes	46202	5	1774	2645	398	6496
Olney Street	46218	5	240	129	131	404
North New Jersey	46202	6	3276	2653	507	6619
MacPherson Ave	46205	1	987		987	987
Columbia	46202	1	609		609	609
N. Columbia	46202	1	1218		1218	1218
N. Sheldon	46218	1	19		19	19
Langley Ave	46218	3	323	14	311	338
N. Arsenal	46218	1	11		11	11
N. Columbia	46205	1	733		733	733
N. Wheeler	46218	6	226	84	112	350
Dearborn St.	46218	5	557	353	37	986
Parker St.	46218	5	159	134	77	397
N. Hovey	46218	1	3225		3225	3225
N. Sheldon	46218	1	1489		1489	1489
Dearborn St.	46218	5	531	807	62	1970
Wheeler St.	46218	5	187	123	35	374
LaSalle Street	46218	5	202	39	159	263
Columbia	46205	1	611		611	611
N. Rural St.	46218	5	219	144	88	387
North Arsenel	46218	5	530	229	268	835
N. Sheldon	46218	1	577		577	577

Address	Zip_Code	N	Mean	Std Dev	Minimum	Maximum
Parker St.	46218	5	267	89	183	407
N. Pennsylvania	46205	5	1715	3025	33	7102
N. Hovey	46218	1	1459		1459	1459
N. Columbia	46205	1	982		982	982
Station Street	46218	5	66	18	41	91
North Talbot Street	46205	5	112	38	53	156
LaSalle Street	46218	5	1190	1426	123	3348
East 25th Street	46218	5	298	132	150	422
Dearborn St.	46218	5	219	67	143	288
Sangster Ave	46218	5	275	161	139	538
N. Columbia	46205	1	325		325	325
Temple St	46218	4	167	55	90	208
Bellafontaine	46218	5	616	168	428	868
N. Columbia	46205	1	458		458	458
Gale Street	46218	5	253	100	80	339
Winthrop	46218	5	414	308	198	914
Sangster Ave	46218	10	233	96	84	352
Sherman Street	46218	5	310	256	166	762
Adams St.	46218	5	112	66	23	196
Guilford Ave	46205	2	729	878	108	1350
Station Street	46218	5	263	121	130	377
Winthrop Ave	46205	3	574	274	269	798
Winthrop Ave	46205	3	705	608	201	1380
Winthrop Ave	46205	3	347	79	265	423
N. Columbia	46205	1	585		585	585
Winthrop Ave	46205	3	407	210	168	560
Winthrop Ave	46205	3	1130	911	544	2180
Guilford Ave	46205	3	667	343	324	1010
Winthrop Ave	46205	3	502	408	149	949
Olney Street	46218	5	205	72	105	295
Guilford Ave	46205	3	446	449	113	957
Wheeler St.	46218	5	80	14	66	96
Winthrop Ave	46205	3	428	275	189	728
Guilford Ave	46205	3	360	271	160	668
Guilford Ave	46205	3	299	213	75	498
Winthrop Ave	46205	3	897	613	334	1550
Guilford Ave	46205	3	246	21	228	269

Address	Zip_Code	N	Mean	Std Dev	Minimum	Maximum
Parker St.	46218	5	267	89	183	407
N. Pennsylvania	46205	5	1715	3025	33	7102
N. Hovey	46218	1	1459		1459	1459
N. Columbia	46205	1	982		982	982
Station Street	46218	5	66	18	41	91
North Talbot Street	46205	5	112	38	53	156
LaSalle Street	46218	5	1190	1426	123	3348
East 25th Street	46218	5	298	132	150	422
Dearborn St.	46218	5	219	67	143	288
Sangster Ave	46218	5	275	161	139	538
N. Columbia	46205	1	325		325	325
Temple St	46218	4	167	55	90	208
Bellafontaine	46218	5	616	168	428	868
N. Columbia	46205	1	458		458	458
Gale Street	46218	5	253	100	80	339
Winthrop	46218	5	414	308	198	914
Sangster Ave	46218	10	233	96	84	352
Sherman Street	46218	5	310	256	166	762
Adams St.	46218	5	112	66	23	196
Guilford Ave	46205	2	729	878	108	1350
Station Street	46218	5	263	121	130	377
Winthrop Ave	46205	3	574	274	269	798
Winthrop Ave	46205	3	705	608	201	1380
Winthrop Ave	46205	3	347	79	265	423
N. Columbia	46205	1	585		585	585
Winthrop Ave	46205	3	407	210	168	560
Winthrop Ave	46205	3	1130	911	544	2180
Guilford Ave	46205	3	667	343	324	1010
Winthrop Ave	46205	3	502	408	149	949
Olney Street	46218	5	205	72	105	295
Guilford Ave	46205	3	446	449	113	957
Wheeler St.	46218	5	80	14	66	96
Winthrop Ave	46205	3	428	275	189	728
Guilford Ave	46205	3	360	271	160	668
Guilford Ave	46205	3	299	213	75	498
Winthrop Ave	46205	3	897	613	334	1550
Guilford Ave	46205	3	246	21	228	269

Address	Zip_Code	N	Mean	Std Dev	Minimum	Maximum
Guilford Ave	46205	3	469	452	140	985
Guilford Ave	46205	3	393	219	241	644
Winthrop Ave	46205	3	437	186	299	648
Guilford Ave	46205	3	456	104	362	567
Guilford Ave	46205	3	481	244	228	715
Winthrop Ave	46205	3	521	37	498	563
Guilford Ave	46205	3	270	108	147	347
Guilford Ave	46205	3	206	9	200	216
Winthrop Ave	46205	3	168	104	49	242
Baltimore	46218	1	294		294	294
MacPherson Ave	46205	3	272	100	162	358
MacPherson Ave	46205	3	336	217	110	542
N. Columbia	46205	1	847		847	847
MacPherson Ave	46205	3	281	29	255	312
MacPherson Ave	46205	3	328	188	172	537
MacPherson Ave	46205	3	272	140	161	429
Gale Street	46218	5	426	469	123	1254
MacPherson Ave	46205	3	271	128	170	415
Olney Street	46218	4	162	48	91	199
Guilford	46218	5	1149	1046	572	3007
Adams St.	46218	5	245	128	113	451
Olney Street	46218	5	239	160	56	497
Ralston Ave.	46218	1	419		419	419
MacPherson Ave	46205	3	225	33	199	263
MacPherson Ave	46205	3	462	190	248	612
Sherman Street	46218	5	937	1527	123	3662
Ralston Ave	46218	6	72	62	21	192
MacPherson Ave	46205	3	128	85	61	223
Brouse	46218	1	218		218	218
Sangster	46218	1	1720		1720	1720
Brouse	46218	1	240		240	240
Station Street	46218	5	180	134	47	406
Brouse	46218	1	171		171	171
Dr. Andrew J Brown Ave	46205	1	321		321	321
North Park Ave	46205	1	193		193	193
N. Wheeler	46218	5	145	60	73	230
Station Street	46218	5	170	38	122	223

Address	Zip_Code	N	Mean	Std Dev	Minimum	Maximum
[REDACTED] Dearborn St.	46218	5	537	589	126	1510
[REDACTED] LaSalle Street	46218	5	194	143	49	429
[REDACTED] MacPherson Ave	46218	5	1427	1476	176	3895
[REDACTED] Guilford	46218	5	1335	1734	215	4400
[REDACTED] Gale Street	46218	5	260	132	105	435
[REDACTED] North Central	46205	1	124		124	124
[REDACTED] North Central	46205	1	64		64	64
[REDACTED] North Central	46205	1	41		41	41
[REDACTED] Nowland	46218	5	47	20	32	80
[REDACTED] North Central	46205	1	78		78	78
[REDACTED] North Central	46205	1	864		864	864
[REDACTED] North Central	46205	1	276		276	276
[REDACTED] North Central	46205	1	292		292	292
[REDACTED] 30th & Central Ave	46205	1	266		266	266
[REDACTED] Tacoma Ave	46218	3	89	27	68	120
[REDACTED] North Delaware	46205	5	1575	1592	236	3433
[REDACTED] Guilford Ave	46205	5	1221	2121	155	5000
[REDACTED] N. Park	46205	4	334	327	165	825
[REDACTED] Central Avenue	46205	5	712	383	201	1121
[REDACTED] E. Saint Clair Street	46202	4	372	142	206	542
[REDACTED] E. Arch Street	46202	1	496		496	496
[REDACTED] N. Senate Ave	46202	1	499		499	499
[REDACTED] 27th Street	46205	3	440	289	263	773
[REDACTED] Broadway	46218	5	143	67	57	240
[REDACTED] East 17th	46202	5	414	168	307	708