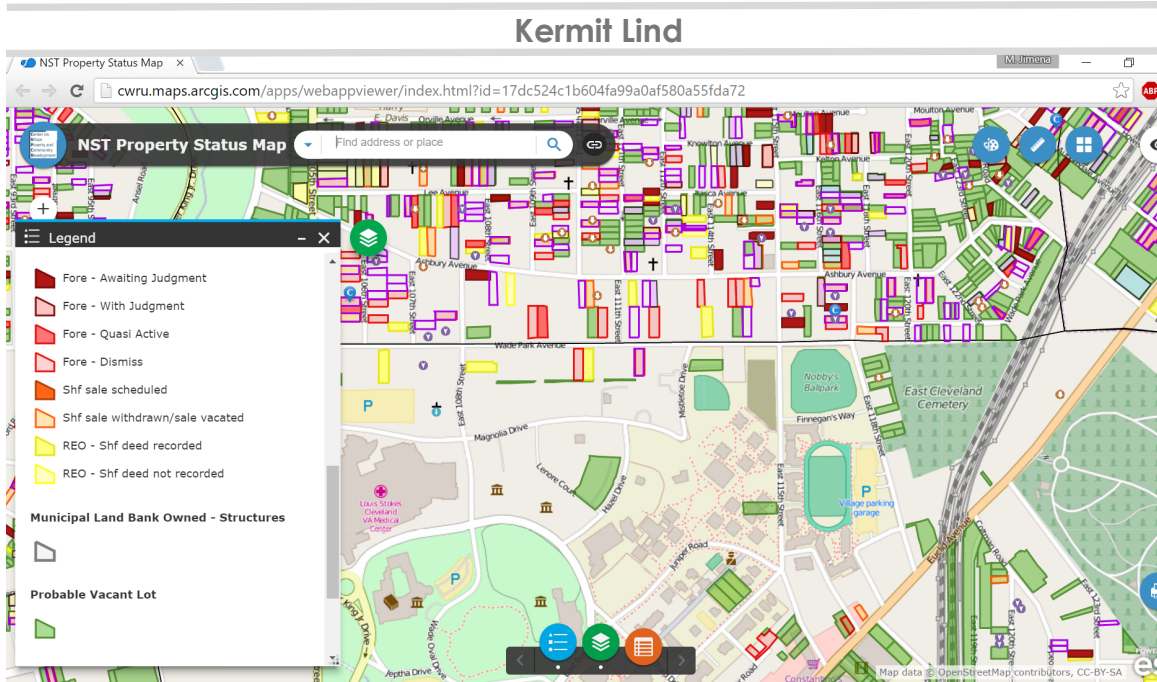# DATA-DRIVEN SYSTEMS

Model Practices & Policies for Strategic Code Enforcement

Kermit Lind

Snapshot from NST Property Status Map online tool   Image source: NEO CANDO, 2016

As more American cities launch citywide blight elimination campaigns, reform outdated policies, and rebuild dysfunctional nuisance abatement programs, they are literally counting on data. Working together, local governments and community -based organizations are sending residents and staff out into neighborhoods with mobile devices to conduct comprehensive inventories of property conditions and neighborhood characteristics.

With leadership from nonprofits, local foundations, and universities, a few pioneering cities —such as Cleveland and Detroit— have established robust real property information systems, essentially clearinghouses that merge real property condition data with local data on title, ownership interests and transfers, mortgage and tax foreclosures, code enforcement cases, water utility shutoffs, and undeliverable postal addresses. Taken together, these data serve as primary indicators for existing or future property vacancy or abandonment. Although more communities know more today about the existing number, location, and condition of vacant properties within their jurisdictions, many local governments still have significant capacity and technology gaps, especially within code enforcement agencies that uphold state laws and local ordinances related to property maintenance, unsafe structures, demolitions, and substandard housing.

This brief examines the latest strategies, tools, and techniques for using real property data to help communities facilitate neighborhood revitalization through a strategic, data-driven approach to code enforcement policies, programs, and tactics.

The Vacant Property Research Network's research and policy brief series bridges the traditional divide between research and practice by explaining the methods behind recent research along with the context and findings so that practitioners and community leaders can better understand what the research says, what the research does not say, and how it might be relevant to their respective vacant property initiatives.

By understanding how current research may or may not apply to local efforts, we believe practitioners and policymakers will be better equipped to make better decisions, improve policy and program implementation, and ultimately facilitate the regeneration of their communities.

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Scope of Translation Brief

Why is it important? How to use it?

As the first responders to blighted, vacant properties, municipal building and housing code officials confront increasingly more complex challenges. Community leaders and local government officials are asking code enforcement programs to do more with fewer resources. In the aftermath of the Great Recession and mortgage foreclosure crisis, code enforcement officials must resolve difficult cases often involving recalcitrant global financial institutions and unscrupulous property owners. Declining real estate markets and weak economic conditions undermine the stability and future of many city neighborhoods. Local residents and elected officials, anxious for immediate and positive results, often become frustrated when code enforcement agencies cannot quickly remove blighted, nuisance properties. Code enforcement programs, however, must operate within the legal confines of due process and respect private property rights. Plus, many municipal code enforcement programs exist within fragmented organizational structures that impede coordination and effective responses to vacant, abandoned, and problem properties.

A new breed of code enforcement agencies are now using a variety of real property data to foster collaboration and take more proactive and strategic actions. Shifting from the traditional reactive ways of doing code enforcement requires different approaches and capacity to gather, synthesize, and track property condition and ownership data over time. Code officials need new skills to understand what data are available, identify gaps, and know who can help gather, analyze, and disseminate data. Code enforcement managers and their teams must become more comfortable in applying data when making tactical decisions against individual cases, as well as in the broader context of supporting program management, resource allocation, and neighborhood revitalization policy goals. This policy and practice brief

- summarizes the many ways communities are gathering, tracking, and synthesizing data about blighted, vacant, and abandoned properties;
- explains why and how local governments are changing their reactive code enforcement programs to systems with new capacities for strategic targeting and developing integrated data systems to share real property data across multiple agencies, organizations, and entities;
- describes how local agencies and organizations can integrate the array of local real property data for convenient use, especially sources holding data on title interests in real property and property conditions; and
- offers policymakers and code enforcement managers a framework (with examples) for using integrated real property data to improve code compliance and enhance formal enforcement actions against violators.

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1.0 Overview

1.1 Data Collection & Analysis on Blighted, Vacant Properties

Never before have more data been available, collected, and accumulated in such large data sets, in such a wide variety of fields, nor at such a dramatic pace. Businesses and other private-sector industries are using data to drive smart decisions, and the public sector is beginning to do so as well. Under the rubric of "smart and sustainable cities," technology firms such as IBM and Siemens consult with local government officials to integrate new technologies that can synthesize big data sets. Armed with better data, these local governments can upgrade cumbersome systems for delivering city services as well as support more strategic policy making. Within local jurisdictions and geographies, communities are developing better data "infrastructures"— which includes technologies, but also skills, capacities, and leadership— to achieve various policy and program objectives. These developments are affecting the way we perceive things, including the way we see what is going on in the neighborhoods where we live.

Within the field of community development and neighborhood revitalization, a growing number of communities collect important data that can track the socio-economic trajectory of neighborhoods and their residents. In fact, several have developed elaborate neighborhood indicator programs in partnership with local universities, often supported by regional and national foundations.[1] Supported by the National Neighborhood Indicators Partnership(NNIP), community organizations and university centers in 30 cities have become the leaders in the collection and evaluation of data on neighborhood change covering a wide array of data sources and data points related to public health, housing, equity, education, poverty, mobility, mortgaging, and other topics related to community development. The network is working with several other cities interested in the NNIP model. Data collaboratives increasingly able to use local data available in digital form to measure and map the neighborhood conditions that harm or help residents.

Within the context of blighted, vacant, and abandoned properties, several cities and NNIP communities have developed robust mechanisms for gathering a broad assortment of specialized property data to support applied research and

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National Neighborhood Indicator Partnership

Since 1995, the National Neighborhood Indicators Partnership has worked to democratize access to data and encourage its direct use to improve conditions in neighborhoods. A collaboration of the Urban Institute, Case Western University, and 30 cities, NNIP has supported its members in building advanced systems with integrated and recurrently updated data on neighborhood conditions. NNIP has shown that such systems can be locally operational and self-sustaining. Their indicators cover topics such as births, deaths, crime, health status, educational performance, public assistance, and property conditions. Since its founding during the early days of open-access Internet, NNIP has been a significant force for democratizing municipal and regional information for direct, practical use by city and community leaders, all of whom have made it their primary purpose to build the capacities of institutions and residents in distressed urban neighborhoods. See more at
http://www.neighborhoodindicators.org/

stronger evidence-based policymaking. Perhaps none is more important than <u>Case Western Reserve University's NEO CANDO</u> in Cleveland (Northeast Ohio Community and Neighborhood Data for Organizing). For over ten years NEO CANDO's web-based data system has served as a data intermediary compiling data on vacant properties, court cases, and foreclosures to help community development organizations, land banks, and local governments better understand dynamic trends of property abandoned throughout Cleveland and Cuyahoga County. Additional information is presented in the following section.

The direct cost of blighted properties on communities can be staggering. Vacant properties impose direct costs on code enforcement units, police and fire departments, and other governmental agencies.[2] In addition, they impose indirect costs on property values and associated tax revenues. More communities, with support from nonprofits and foundations, are commissioning studies that estimate the direct and indirect costs that blighted, vacant properties have on property owners, neighborhoods and local governments. As part of its blight strategic planning process, Detroit estimated the scale and costs for removing more than 40,000 substantially blighted structures and over 6,000 blighted vacant lots at $850 million.[3] In 2010, the Philadelphia CDC Association and the city's redevelopment authority hired a local consulting firm to conduct a comprehensive impact analysis of vacant, blighted properties. The Econsult report calculated that Philadelphia spent over $20 million to maintain vacant properties, and lost $2 million in uncollected property taxes.[4] With support from

Neighborhoods & Community

How one defines a neighborhood often depends on who is defining it, and what their goals are. Local governments may define neighborhood according to policy or legal requirements for the allocation of resources. Planners and community groups may define the boundaries of neighborhood based on geographic characteristics, resident preferences, and history. In this brief, we use the term "neighborhood" to refer to a geographic *place* within a city or local jurisdiction. We use the term "community" to refer to the *people* connected by a common factor which may be where they live, or a shared interest, enterprise, or characteristic. For additional information, refer to VPRN Brief by Alan Mallach on *[Neighborhood Change](#)*.

the Center for Community Progress, a 2015 study estimated that the annual cost to maintain the 8,600 vacant properties in the city of Atlanta was over $728,000. This cost was for inspections only and thus, it does not include any costs to fix problems encountered during inspection. In addition, the study estimated that the Atlanta Police Department spent between $689,000 and $808,000 in vacant property-related police incidents while the fire department spent $389,000 and $436,000 servicing building fires.[5]

To learn more about blight and its impacts, refer to the *[Blight brief](#)* and *[literature review](#)*, available in the Vacant Property Research Network website: *http://vacantpropertyresearch.com/*

1.2 Program Snapshots & Model Practices in Gathering and Using Vacant Property Data

Over the past decade or more, several localities have become leaders in the development and successful use of data in code enforcement and vacant properties. The practices and policies of these leaders have gained sophistication over time. They are not at all uniform in design because they have grown up in circumstances that are not uniform. We see that code enforcement practices and policies are highly dependent on local context, principles, and practices, yet the underlying quality and approach to data use, as well as information technology, may be replicable.

Several leading examples illustrate the use of data-driven code enforcement: Baltimore, New Orleans, Detroit, St. Louis, and Cleveland.

Baltimore - Vacants to Value (V2V)[6]

Baltimore target housing code enforcement to foster redevelopment of vacant properties in areas where there is already private investment interest in the neighborhood. City departments facilitate redevelopment by streamlining city disposition processes to transfer distressed to properties to private redevelopers while also using data to focus code enforcement actions on other distressed, often vacant, properties in the same designated neighborhood. The city's innovation lies with the coordination between Baltimore's housing and code enforcement agency and the local housing rehabilitation community. This approach requires accurate, real-time assessments of the neighborhood housing conditions and market potential for each type of situation. Code enforcement is then tailored to match the neighborhood's market potential. V2V involves a neighborhood typology based on an in-depth

market-value analysis (MVA). Cleveland, St. Louis, and other cities have also applied or developed data-driven market value analyses to develop neighborhood typologies that can guide community development investments and code enforcement strategies.

New Orleans – Blight Status [7]

New Orleans created an easy-to-use, public web application that connects directly to internal government data systems to make information about the status of vacant or underutilized spaces publicly available in real-time. Residents and local organizations can search for a property on a map; learn about its ownership, inspection, and permitting history; and subscribe to real-time notifications about its progress. Residents can track progress on code enforcement procedures on individual properties, streets or neighborhoods. Blight Status was a result of a citywide effort of New Orleans' BlightSTAT Program to reduce blighted units.[8]

Detroit – Motor City Mapping[9]

Motor City Mapping (MCM) is a comprehensive effort to digitize Detroit's property information and create clear communication channels back and forth between the public, the government, and city service providers. Its development started in 2014 with a project to survey 375,147 parcels and upload information about conditions into a data system. Part of MCM is the Blexting mobile web application. Developed by Data Driven Detroit and Loveland Technologies, Blexting allows anyone to photograph, evaluate, and record information to be uploaded into the MCM system. There the information can be edited, corrected, and retrieved. Blexting is used to identify properties by location, type, condition, and other categories. Detroit is using the data to conduct surveys, respond to foreclosures, plan demolitions, and

much more. It is seen as a particularly powerful way to link resident volunteers to government and community members in an effort to combat blight.

St. Louis – Market Value Analysis for Strategic Public Investment[10]

The St. Louis Residential Market Value Analysis (MVA) is a statistical tool that maps data in the city's 360 census block groups The city used The Reinvestment Fund's proprietary template, with help from the Department of Housing and Urban Development, to launch its web accessible interactive tool in 2014.The MVA helps St. Louis officials, planners, developers, and others direct the investment of public funds strategically, so they can leverage public investments for maximum public benefit. This statistical tool uses housing market data from 2010 to 2013 to classify geographic areas and market types within St. Louis, and explore the unique needs of each neighborhood. Market types are designated according to clustering by similar characteristics, including housing sale prices, vacancy, percent non-residential, building permit activity, foreclosures, and subsidized rental stock. The MVA may be used to clarify where different market types exist, as well as what potential strategies are most successful in each area .

Cleveland - NEO CANDO[11]

NEO CANDO participated in a number of innovative partnerships with local CDC leaders that leveraged the systems data and web platform to help develop strategic interventions in particular neighborhoods. One of the most powerful tools is the web-based Neighborhood Stabilization Team (NST) application, developed first for CDC clients and jurisdictions with NSP2 funding.[12] NST links together parcel-level information from multiple sources. This allows

clients to access all publicly available parcel information at one web location. NST adds value through processing and refining the data, making the information easily searchable, filterable, and downloadable on spreadsheets, maps, charts, and graphs. Transactional and accumulating information is uploaded as often as weekly. The application can enable users to upload data unique to their use, including digital photos documenting conditions and exact locations. This is a major upgrade for all aspects of code enforcement from prevention to sustaining reuse of blighted properties, blocks and neighborhoods.

Using the web application for constant authorized communication extends the code enforcement department's knowledge, capacity, and efficiency. The NST's web application helped facilitate this partnership by providing critical data about the property owner, the types of cases and the respective actions taken by the city and CDC staff.

Other cities that have seen what an integrated data system and a web application are imitating this model and licensing the software developed at NEO CANDO. For more information about the history and evolution of NEO CANDO, see *Cleveland and Cuyahoga County, Ohio—A Resilient Region's Responses to Reclaiming Vacant Properties* (2014).

MVAs & The Reinvestment Fund (TRF)

The Reinvestment Fund is a community development financial institution that supports neighborhood revitalization through data, policy, and strategic investment. TRF pioneered the MVA approach to help localities make data-driven decisions about resource allocation and tailor intervention strategies. MVA uses cluster analysis and extensive validation to evaluate the state of the real estate., and considers surrounding areas. Indicators are obtained from data provided by each jurisdiction. [13]

2.0 Data for Code Enforcement

Intelligent use of data is essential for the health, safety, and welfare of people living in residential neighborhoods, especially in neighborhoods with diminishing resilience and resources. Whenever local government and intermediary data systems expand their capacity, they also improve the quality of local information about the costs and impacts that blighted, vacant properties impose, as well as their location, the profiles of property owners, and property conditions. This type of specialized knowledge can greatly enhance the effectiveness of local building and housing maintenance, and environmental codes, and their enforcement.

While more code enforcement policy makers and administrators, as well as their constituents, understand the need for accurate and complete knowledge of property conditions and changes at the neighborhood level where they work, code enforcement agencies are often the least equipped to use and leverage such data. Typically, code enforcement agencies have fewer resources than other local government departments, and thus less access to the types of data they need to make strategic plans and tactical decisions about particular property and property owners. Given the general reactive nature of most code enforcement agencies, it becomes difficult for many directors/managers as well as front line inspectors to see the value of investing their scarce time and resources to expand data systems beyond the most pragmatic functions, such as tracking case load and inspector accountability. Most code enforcement agencies would see more ambitious uses of data—such as to evaluate

Data Sets of Blighted Properties Indicators

Code enforcement violations: Common indicators of blight are violations of real property, building, health, or housing codes.[14] Most local government have ordinances and processes that declare problem properties, often vacant and/or abandoned, as public nuisances; and concentrations of public nuisances as blighted areas.

Mortgage foreclosure: Other common indicators of blight are high foreclosure rates, inactive or abandoned foreclosures, foreclosure sale of defective homes, and disposition by mortgagees of defective homes taken in foreclosure.[15]

Tax foreclosure: Some tax-delinquent properties are seen as blighted by their communities.[16] Tax delinquency is often an indicator of abandonment and blight. One recent study showed that areas where there are high levels of city-owned properties and elevated rates of vacancies are more likely to experience housing abandonment.[17]

Vacant and abandoned lots, homes and buildings: Abandonment and vacancy are not the same. Vacancy, to which the research seems to give more attention than other blight indicators, describes property that is not occupied, but it could still be maintained. But vacancy without constant maintenance and security assures rapid deterioration and abuse. Abandonment occurs when a property no longer has a steward who is responsible for the basic responsibilities of property ownership.[18] The critical data reveal when, how, and why a vacant or abandoned building becomes a public nuisance—those problem properties that pose threats to public safety and neighborhood quality of life.[19]

interventions or assess the benefits of code enforcement policies for neighborhoods and residents —as outside their scope and jurisdiction.

More code enforcement agencies and managers today see the benefits of using and sharing data, not only to assist with day-to-day operations but also to enable collaboration among data keepers across sectors and institutional boundaries. Ultimately, better data infrastructure and data discovery technology yield more and better information for influencing policy decisions, tactical case outcomes, and resource allocations. Clearly, those who fail to take advantage of new data technologies are at a great disadvantage in collaborating across organizational, institutional, and departmental boundaries. They will be handicapped in responding to the large challenges looming for localities where issues and environments are changing rapidly—often for worse, occasionally for better. This is surely true for the policy makers and policing officers who make and enforce housing and environmental conditions.

The number of first responders is plummeting in those communities where more are needed most [and] the antique organizational structures and methods they have inherited are simply no match for these new challenges.

Municipal code officers, the first responders to housing deterioration and destabilization of neighborhoods, are often overwhelmed by new challenges that destabilize residential neighborhoods.[20] They face a surge of economic and demographic upheavals, deteriorating housing, and neighborhoods pummeled by abusive mortgage financing and debt collection practices along with new absentee investor homeowners whose business practices include evading local code enforcement. Deterioration of economically weakened neighborhoods is increasing while municipal governments are seeing their federal and state revenue for policing and property protection services reduced, along with the local property tax revenue. As a result, the number of first responders is plummeting in those communities where more are needed most. In addition, the antique organizational structures and methods they have inherited are simply no match for these new challenges.[21]

These new challenges to ordinary neighborhoods—more and faster deterioration of housing stock, rising maintenance costs, permanently lost equity, unmarketable houses, abandoned vacant structures, contagious blight, new unconventional land uses—are reasons why localities require more and better capacity to adapt and respond.

Learn more by reviewing the *Code Enforcement policy brief* available in the Vacant Property Research Network Website: *http://vacantpropertyresearch.com/*

3.0 Systematically Aligning Data for Strategic Code Enforcement

As previously discussed, it becomes critical these days for any local code enforcement agency to have more complete information and better data access about a wide range of neighborhood indicators and property characteristics. Beyond the data and the systems themselves, local code enforcement agencies must also rethink how they operate, investigate properties, select, and monitor intervention so they can take full advantage of their data to support a more proactive, systematic approach to code enforcement. Few local code enforcement agencies have made the complete transformation to a strategic operation, but many are moving in that direction.

A critical step in becoming a strategic code enforcement program is systematically aligning institutions and data. A *systematic* (vs. programmatic) approach and a *strategic* (vs. episodic) use of knowledge from data about *real* property in a dynamic mode can aid in effectively policing the human health, safety, and well-being of human habitats, the most basic function communities require of government. Let's consider this in more detail.

A **systematic approach** to enforcement, in contrast to a programmatic approach, perceives all the actors and actions that relate to the process of achieving compliance with regulations required by the community. Not just one program or department, but all of them: health, fire, maintenance, construction, and repair of structures and neighborhoods. Not just one office

or institution, but all of them: administrative enforcers, prosecutors, courts, agencies and community groups providing compliance assistance. Not only the administrative and judicial branches of government, but the legislative too.

Data integration can in fact be a catalyst for aligning fragmented code enforcement operations into a more collaborative system. Relationships and interactions among the various working groups—departments, institutions, agencies and community constituents—are essential for the success of their individual efforts. Because dysfunction by one can diminish the effectiveness of all, the parts of the whole system at least avoid clashing with each other and become collaborators for better results. Complaint-driven code enforcement programs, for example, often waste resources with a whack-a-mole approach to getting compliance. As a result, several enforcement departments may find themselves trying to prosecute the same defendant for different infractions at the same time in different tribunals. No one of them alone can achieve a fully compliant result. When management perceives the various operating components as a system in relation to the ultimate goal of safe, secure residency, it can reduce redundancy of effort as well as well as coordinate efforts for better results.

Strategic code enforcement refers to the organization of critical assets, resources, and activities into a dynamic, adaptive, and interactive system with clearly identified goals, principles, and procedures. Strategic code enforcement prioritizes problems and operates proactively when it addresses individual properties not in compliance with codes and facilitates neighborhood revitalizations policy goals and objectives.[22]All elements in the system—personnel, agencies,

institutions, policies, procedures—have a common purpose in which each plays a contributing part. Resources and skills must be focused on what is essential to getting intended results. This approach does not necessarily presume to be comprehensive, nor does it fail to do what is possible because of its imperfection or incompleteness. Strategic code enforcement not only aligns short-term actions to achieve long-term goals, but also aligns the various functions and resources available to achieve long-term benefits for neighborhoods and the people who live in them.

To be strategically effective, a housing and neighborhood environmental code enforcement system needs all of its parts to be fueled with knowledge of the real estate over which local police powers extend. That necessary knowledge includes property condition and the identity and claims of all persons with a legal interest in the premises. Multiple government agencies hold public information about real property: for example, deeds of conveyance, tax assessments, tax payments, mortgages and other liens, pending legal disputes involving claims, permits for building and uses, citations for maintaining unlawful conditions, just to mention the most obvious.

In order to effectively transform code enforcement into a more systematic, proactive operation, a local government must also integrate data into a real property information system. Such a systematic approach will integrate data from multiple relevant actors and actions on a regular basis, as opposed to a one-time, topically focused data collection effort. Each government agency may have its own record-keeping system for its own functions. Data must be extracted from multiple places to gain a complete and current account of the use and condition of properties, their title records, and the identities of the persons legally connected to them. Fortunately, new electronic information management technology has the capacity to integrate across otherwise "siloed" data systems through application program interfaces (APIs) and other methods.

In ideal circumstances, **integrating real property** data systematically should also be done in a way that facilitates showing a snapshot of real property conditions or title status at a moment in time, as well as showing trends and change over time. For instance, cities want to know the number and location of vacant houses, but they also need to know how relationships and dynamics in the housing markets and neighborhoods are changing in order to make strategic choices about deploying programs and resources. Longitudinal integration of records—that is, integration over time—also enables the community to answer important questions about the effectiveness and impacts of programs and strategies on property values and community well-being .

What is Real Property?

Real property is land and structures that are immobile. Each real properties each have a unique identification in its legal description which geographically locates the exact position of each parcel of land. Each parcel of land also has its own permanent identification number or code, assigned by the jurisdiction that holds records of titles and deeds. Thus, the data essential for code compliance actions should use parcel identifiers, frequently called Permanent Parcel Numbers, to identify real property. Many cities identify real properties through their respective local mailing addresses, however integrated data systems typically link parcel identification data with address data which then increases the overall effectiveness of code enforcement inspections and actions.

4.0 Building an Integrated Data System for Code Enforcement

Information collected and stored either on paper or digitally by code enforcement officers in a municipal department is organized usually for the exclusive use of department members for that particular department's mission. Data harvested by housing maintenance inspectors, for example, would not necessarily be available to inspectors for fire code compliance, health code, or building construction. Nor would the data be accessible to social services departments for the aged, children, or others serving people with special needs. Consequently, single-department information systems, even those operating with high-speed digital technology, miss out on the possibilities of broader access to coordinate and collaborate within local government. They typically do not even connect with the work done by those to whom their work product is transferred.

For code enforcement purposes, integrating data from sources that use a common locational identifier [i.e. APN] is a critical step.

Enforcement officers are connected to prosecutors or to courts enforcing their police work only on a case-by-case basis. Wasteful duplication occurs, for instance, when more than one department must locate and give formal written notices to the same owners or parties for different actions in the same tribunal. In such circumstances, getting sustained compliance with all relevant standards for the health, safety, and welfare of residents is costly and time-consuming.

Integrating data enables analysis and use well beyond what is possible in one system alone. Bringing together all relevant data from all available sources, and updating it regularly in one place, produces important new and useful knowledge.

For code enforcement purposes, integrating data from sources that use a common locational identifier is a critical step. That locational identifier is the Assessor's Parcel Number (APN). A real property integrated data system into which data from a number of sources can be made accessible in new relationships is a relatively new and very valuable tool for code enforcement. On one hand, it opens up new resources for individual departments, programs, and users to use for improved performance and results. On the other hand, it opens a larger and more complete perspective on the array of conditions, actions, and

Assessor's Parcel Number (APN)

The APN is known by various names in different places — Permanent Parcel Number, Property Identification Number, Assessor's Identification Number—for example. This identifier is assigned by the local property tax assessor to each parcel of land in the local real property taxing jurisdiction. Ideally, all information in public records about a parcel of real property within the property recorder's jurisdiction uses the same identifier. By integrating data from the different sources within a recording jurisdiction using the APN, data from very small units, a single parcel of land, can be assembled into a single data system. Where those APN identified sets of data can be regularly associated with another or deposited into an integrated system, changes and trends affecting parcels (singly or in various groupings) can yield a moving picture of changes and trends.

trends, reaching from the level of a single parcel to that of all the land and parcels within a local jurisdiction. It exposes the evidence of flawed and failed policies and practices, and enables the design of protective and remedial policies and practices. It provides a connecting point for cooperation and collaboration among institutions, agencies, and organizations, both public and private.

4.1 What is an Integrated System for Real Property Data?

As previously discussed, an integrated system for real-property data could be based inside or outside city government. The author believes there are substantial benefits to third-party involvement outside of government. The inherent connection between real property data systems in many different government offices in the ever-changing political realm, the need to connect data across public departments and into the nonprofit and community realms, and the additional benefits of stewarding data longitudinally (a potentially complicated endeavor) is unlikely to be sustained by government alone. Whether housed internally or by a third party, real property-based integrated data systems are best developed and driven by a dedicated local team of data-keepers and data-users over a long period of time.[23] Each local system is a **custom-made** set of data and must be developed relative to the local administrative process, actors, and institutions. It must also be sustained by its local team of users and sponsors. There are reasons why this is so.

Local Data Intermediary

The need to connect data across multiple parties often calls for a local data intermediary (i.e. a mediator between data and local stakeholders such as nonprofit organizations, governments, foundations, and residents). Examples of institutions that can work as data intermediaries include university centers, multipurpose nonprofits, community-based organizations focused on data, and planning agencies. Successful local intermediaries share some common characteristics. These include:

- capacity to work collaboratively with neighborhood and nonprofit organizations, local government, and other community leaders;

- reputation for objective and unbiased use of data;

- strong leadership;

- knowledge and technical skills on data management and visualization, geographic information systems, and web development,

- capacity to translate information to the public; and

- financial sustainability.

Examples of data intermediaries include Data Driven Detroit and The Data Center in New Orleans.[24]

An integrating data system dependent on its users will be more useful and more stable in the long run than an array of applications dependent on remote software

Real property record keeping is a local function originally intended for local use. Treating data sets collected from different locations as if they were all gathered and stored in a uniform way is an exercise in wishful thinking.[25] Most record-keeping regulations were not originally intended to be useful or relevant beyond the jurisdiction of the officials charged with the gathering and keeping of those records. Accordingly, integrating title and tax assessment data with building construction and maintenance data in Alaska's towns and cities will be different from integrating that data in Alabama, Arizona, and Arkansas. Creating a data integrating system that performs successfully in all situations is impossible, because it ignores the differences and nuances within each local data recording office. Data integrating processes should respond to the reality of disparate and even inconsistent record keeping and data gathering.

Persuading different official sources to provide records on a regular schedule is a political process that can take years. Not every elected official sees abandoned properties, neighborhood blight, or tax-base decay as a problem. Some are unwilling to do anything not specifically required of them by law, even if they have the legal discretion to be helpful. Some are unwilling to participate because their political peers are not yet on board; others are unwilling because their political adversaries are on board.

The laws and public policies of handling public information in bulk are not at all definite or uniform. Private sources of real property data— real estate listing services, utilities, and marketing information companies, for instance—usually regard their data as their private property, and do not share. Some proprietary data can be purchased. Data gathered by local organizations and community volunteers can be a very useful addition to an integrating system.

Almost inherent in building an integrating data set or system is building the technology to access and use the data. Human factors are critically important to technology and system design. Success depends on building the capacity of both the system's IT managers and its users as the system evolves. When those with the IT skills and those doing field work in code compliance, law enforcement, community development, and public policy work together regularly, the result is a mutual growth in capacity to acquire, manage, and use the data. This growth in capacity then gives direction and impetus to the evolution of the data system. An integrating data system dependent on its users will be more useful and more stable in the long run than an array of applications dependent on remote software vendors.

Almost inherent in building an integrating data set or system is building the technology to access and use the data. Human factors are critically important to technology and system design. Success depends on building the capacity of both the system's IT managers and its users as the system evolves.

4.2 The Power of Integrated Real Property Data

Residential code enforcers have encountered new and more complex policing challenges in the last several decades, most especially in traditional neighborhoods housing those adversely affected by the mortgage crisis. A **basic need of code enforcement** is detailed knowledge about these challenges and problems so that increasing threats to the public health, safety, and welfare can be met. Putting departmental data into a form that enforcement policy and program managers can systematically use is a crucial starting point.

Here are some examples of information managers need:

- trends in noncompliance over time by neighborhood, type of ownership, and type of problem;

- identity of violators and properties most frequently cited;

- costs of enforcement actions by location, type of ownership, type, and value of housing;

- analysis of the relation between property tax default and code violation;

- mortgage foreclosures and sales on houses with open code violation cases;

- performance of inspection personnel and the effectiveness of their procedures; and

- deployment of enforcement resources, with assessment of how equitably they provide protection of health, safety, and security to residents and neighborhood, including correlation of where protection is being provided and where it is most needed.

Using Data to Protect Equality

A 2015 decision of the U.S. Supreme Court (No. 13-1371) affirmed that a disparate impact burdening persons protected from discrimination by the Federal Fair Housing Law is unlawful. This decision may prompt the use of statistical measurements to determine that persons of color are provided substandard and discriminatory code enforcement protection for their health, safety and property values in violation of Fair Housing Laws and Constitutional Equal Protection of the Law. Fair housing lawsuits are already pending against large financial institutions alleging discriminatory servicing of both debt collection and property maintenance. In light of this decision, municipal code enforcement departments may want to make sure the data shows they did not discriminate unlawfully in policing of housing and neighborhood code compliance.[26]

Integrating **data from court dockets of code enforcement cases** can yield significant knowledge for code enforcement to

- identify types of violations that are successfully prosecuted for compliance, and those that do not result in compliance;

- examine cases to determine when fines or sanctions are effective or ineffective for achieving compliance;

- measure the length of time cases remain open on a court's docket due to repeated continuances; and

- monitor plea bargains for whether they help or hinder enforcement.

Although code enforcement officials, prosecutors, and judges all exercise police powers in the public

interest, they are not always on the same page regarding priorities or procedures. Adverse relationships between policing departments are not uncommon. Community groups are often in the best position to use the official data to identify the challenges and problems in code enforcement cases. Public data from environmental and housing court dockets tell as much about the strengths and weaknesses of code enforcement as any other component of the enforcement system. However, court docket data sometimes are not digitized making data access difficult.

Code enforcers and local municipal legislators confronting high levels of **housing abandonment** can integrate data from several sources to produce an early warning program. This involves connecting municipal code enforcement data with other data sources for ownership transfer records, lien records, property tax collection records, foreclosures, sheriff sales, and (where it can be organized), community input from complaints, surveys, and direct observations. Knowledge of where abandonment is likely to occur not only enables intervention measures like foreclosure prevention counseling and targeted code enforcement, but also supports planning for mitigation of harm to vacant properties and neighboring houses. Residents in distress can often make better decisions and find solutions when timely assistance helps extend their occupancy or even prevent foreclosure altogether. Consider how data driven actions can help prevent abandonment or mitigate its harmful consequences by

Some localities have seen that sheriffs' deeds and deeds from mortgagees who purchase with their judgment lien at sheriff sales are not recorded by buyers so as to avoid receiving official notices from code enforcers or courts. This results in prior owners of foreclosed properties being hauled into court regarding properties taken in foreclosure months or years earlier. Foreclosure and sale proceedings have procedural flaws that can be exploited by unscrupulous or fraudulent business practices in a poorly regulated environment.

- identifying neighborhoods and owners with high risk factors such as underwater mortgages, foreclosures, property tax arrearages, utility shut-offs, code violation complaints, and old age, then target special services to keep residents in possession;

- deploying community organizers to develop and strengthen neighborhood resident organizations against scare tactics, abusive debt collection practices, and fraudulent scams that prey on people in vulnerable circumstances;

- monitoring foreclosure proceedings and sheriff sales in vulnerable neighborhoods to ensure that unscrupulous investors and speculators do not take advantage of the loopholes in the debt collection process;

- prioritizing and targeting extra scrutiny of houses that are vacated, collaborating where possible with property preservation servicers to enhance maintenance and security; and

- striving to put all significant code violations and nuisance abatement actions in the public record so that prospective buyers can be held accountable for taking title with notice and liability for compliance. Some municipalities have enacted laws ensuring that code violations served are attached to the title transferred to subsequent owners. This is in response to patterns of abusive evasion of code compliance by speculators who flip properties when they are cited.

Integrating data from many sources, official and unofficial, sheds light on situations where neighborhoods and their residents are easy victims of a malfunctioning housing market. Empty houses are subject to both unintended and intended neglect and crime. Empty houses in disrepair with little value quickly accumulate liabilities and turn former homes into abandoned solid waste. The causes and impact of this chronic disaster are most apparent when all the pertinent data are brought to bear. Timely and well-designed housing and neighborhood code enforcement is essential to preventing the spread of housing and neighborhood abandonment.

Code enforcement plays a critical role in **neighborhood recovery and rehabilitation**. The debt collection process of foreclosure, bankruptcy, and foreclosure sales produces a steady stream of distressed housing that requires substantial rehabilitation for reuse or condemnation and removal as solid waste. It is a crucial moment requiring strategically applied code enforcement. Code enforcement is especially essential for housing coming onto the market after foreclosure. Failure to apply and enforce laws at that point fuels weak housing markets with substandard and unsustainable structures. These are used by

unscrupulous flippers, speculators, and investors for abusive purposes. Data-driven policies and practices may be designed and targeted to break this spiral. Here are some examples:

- Combine data on foreclosure sale appraisals and pre-sale notice information with violation records to track the compliance with permitting for repairs necessary for residential occupancy. Local ordinances may be used to prohibit subsequent sale or occupancy until permits are issued and compliance secured on residences unfit for habitation.

- Maintain records of large-scale owners with open violations, unpaid fines, assessments, or taxes. Conditioning or barring those dangerous purchasers from foreclosure sales may require policies or procedures by municipalities, sheriffs or courts confirming sales—changes that data can support as necessary policing for public health, safety, and welfare.

- Use foreclosure sales records to monitor properties withdrawn from sale or which are not sold for lack of a sufficient bid is a way to identify properties either abandoned by the creditor or diverted into bankruptcy proceedings. Identifying and numbering those cases is an essential first step in holding responsible parties legally and financially accountable for maintenance.

- Field servicers of banks responsible for maintenance of properties in foreclosure or bank-owned may, without notice to code enforcers or anyone else, abandon their maintenance at any point in the foreclosure, resale and bank ownership process. This is particularly true during the weeks or months following a sale before paperwork is completed

and documents recorded. This period when no one is clearly responsible is when empty houses are most vulnerable to distress and destruction.

Effective local **legislation and public policies** to strengthen code enforcement have often been possible because of the persuasive impact of data. Information that indicates precisely where and how a change in public regulation will effect a public purpose in a given situation is more persuasive than hope or guesswork. Likewise, policies that do harm or simply push problems from one department to another can be found and fixed. Here are suggestions about the application of integrated data to code enforcement policy making and policy evaluation:

- Use data to develop legislation, administrative policies, and programs that zero in on the time, place, and action to be regulated, and that minimize burdens on both policing officials and the public.

- Use data to assess when a policy or program imposes burdens or problems on other programs or institutions, causing unintended collateral consequences.

- Use data to notice, eliminate, and avoid unlawful discrimination in the content of codes and the administration of code enforcement, and to substantiate the need for acting affirmatively to obtain equitable results.

4.2 The Need for Data on Reuse

Vacant property waiting for reutilization, sometimes for years, is a problem of crisis proportions for many municipalities with shrinking populations. Data are urgently needed for making and enforcing codes to deal with vacant property waiting for reuse. Reutilization will include changes that require policy and program changes in municipal code enforcement to protect the public health, safety and welfare in novel situations.

Many localities are turning to vacant property registration ordinances in order to capture and use data essential for maintaining housing and neighborhood laws while responsible parties are absent and difficult to reach. Data-designed and operated vacant property registration programs tailored to local conditions and capacities are an important new enforcement tool. Repurposing vacant side lots by adjacent homeowners for vegetable and flower gardens, pocket parks, art displays, or recreation may require new regulation of chemicals, protective fences, dealing with urban wildlife, control of noxious plants, animal husbandry, just to suggest a few issues.

Replacement of owner-occupied single family homes with large-scale investor–owned single family homes is an emerging change that poses new code enforcement challenges, a change that municipalities need to track in order to properly police. The combination of investors who flip substandard houses and absentee corporate owners of single-family rentals is certain to decrease neighborhood stability.

Land banking by private and public entities for future uses poses new issues for code enforcement. Mothballing standards for empty buildings or long-term vacant land management standards are examples of situations requiring new data capacities. The newest generation of land banks using well-developed integrated data systems demonstrates how critical automated and nimble data resources are for successful land banking.[27]

Learn more about urban greening by referring to the Urban Greening brief available in the Vacant Properties Research network website:

http://vacantpropertyresearch.com/

A few cities are also relying on their data intermediary and indicator partners to gather and track data related to the greening of vacant lots. For example, Detroit Future City developed the Field Guide to Working Lots shows how a data-driven, planning-oriented approach can open the door to more economic and innovative solutions. Drawing from previous experience, the tools guides communities to select and implement urban greening solutions from a diversity of options. The tool is available in print and electronic versions in the Detroit Future City website *http://detroitfuturecity.com/tools/a-field-guide//*

5.0 Conclusions & Recommendations

The successes reported by early adopters and users of property-based data systems for code enforcement are demonstrating the importance of harnessing new technology and data management to housing preservation and neighborhood code enforcement. Those with experience are demonstrating that sophisticated use of data is something that grows gradually. It also requires the development of user capacity along with the addition of advanced technology for more powerful functions. Even with limited capacity, coordination of existing data from collaborating partners can reduce fragmentation, duplication, and wasted efforts. The best results are coming from long-term collaborations using property data from all entities across local jurisdictions whose missions and operations relate to the well-being of people and neighborhoods.

This paper is based on a decade of experience of direct involvement with integrating property data programs and systems. It offers advice for those who may be just starting to use data to enhance the coordination and effectiveness of code enforcement. The advice offered is intended to take into account that no two places have the same circumstances and that building a successful data system will be more a matter of adaptation from models than duplication of them. Based on this experience, we offer a series of policy and program recommendations, some directed to code enforcement officials, others directed to policymakers, data experts, and information system managers.

1. Departments of a municipal government that conduct different code enforcement operations (e.g. zoning, housing, public health, building inspection, public works, litter control, police, fire, etc.) should all develop capacity to integrate and routinely share each other's data (e.g., case management, inspections, enforcement actions, etc.) on a regular basis. As a foundational step, city/county managers and chief information officers must understand the benefits (e.g., cost savings, increased efficiency, and public responsiveness) that come from providing IT resources for integrating data platforms across the agencies and divisions that address vacant and abandoned properties.

2. Municipal governments (e.g., directors, managers, information officers, and code enforcers, etc.) should collaborate with other public and private agencies (e.g., county assessors, land bank authorities, city and county courts, etc.) in sharing and integrating all public records that involve real properties through a single platform/website managed for mutual benefit.. As discussed throughout this brief, today's market complexities and neighborhood dynamics require that code enforcers have access to any and all information that touches upon the condition, status, and ownership of real property.

3. Long term access to such real property data demands the design, development and sustainability of an integrated system, often housed and managed by a third-party data intermediary. As illustrated by the success of NEO CANDO and other institutions, data intermediates are ideally situated to assemble, transfer, maintain, and disseminate real property data that can support the prevention,

abatement, and reuse of blighted, vacant properties. Such as comprehensive data intermediary should:

- Staff the integrating "real property" data system with people who have both IT skills and the ability to work alongside diverse data users in both public and community-based organizations.

- Commission and engage in coordinated and collaborative research studies using the full spectrum of information to increase knowledge of both facts and trends in housing and neighborhoods.

- Establish specialized data capacity that seeks and tracks underwater houses, zombie titles, foreclosures, changing market values, property tax assessments, and other matters affecting the property title in order to more effectively design and execute code compliance and to recover public expenses to maintain the condition of private property.

- Develop user-friendly, publicly-available data applications –such as NEO CANDO's NST app- that allow community members to be informed and be involved in code enforcement efforts.

Cities that do not have access to a full data intermediary should reach out to local universities or other research organizations for assistance.

The critical starting point is fostering collaboration among all those directly involved with the making and the enforcement of local land use regulations, collaboration that often starts with the sharing of information across city departments and eventually expands to other local government organizations involved with real property information. Our experience working with communities illustrates how this collaboration and the process of data sharing and integration begins and grows as context-specific uses can be fashioned out of the data available at any stage of development. From a small beginning, synergy between the data system and its users can quickly and easily drive its development consistent with communities needs and capacities and at a pace commensurate with the skills and capacities of users. We hope this policy brief can foster greater collaboration among code enforcement officials, their community development and neighborhood allies, and local foundations and leaders in the use and development of integrated real property systems for strategic code enforcement programs.

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Example of neighborhood data collection tool that local residents can use.   Image source: C. Harrell, 2016

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