INTRODUCTION

Sprawl proliferated since the 1920s, and its negative implications have spurred attempts to control its spread through various methodologies known generically as smart growth. The first wave of smart growth (herein "old-school smart growth") used the existing theory of land use controls to effectuate gradual change; the most current attempt (herein "new-school smart growth") re-conceptualizes the previously used Euclidean zoning theory, marking a drastic shift in the ways developments are planned and built, and finds codification in a model code: The SmartCode. While these smart growth attempts have had success in some respects, they fail to address critical housing concerns in others. A comparison of old-school, new-school, and SmartCode zoning laws shows a continuous improvement in limiting the factors that enable sprawl, but a comparison of old-school to new-school building codes shows the latter fails to adequately address the housing concerns created in smart growth developments. Additionally, smart growth should increase housing affordability in theory, but the empirical data available for old-school states proves exactly the opposite.

THE HISTORY OF SPRAWL

Sprawl can be defined as any development marked by low-density zoning, single-use zoning, a high level of car-dependency, and the presence of strip malls and shopping malls. These developments were enabled by a confluence of factors, including the proliferation of automobiles, shifts in zoning theory, and government subsidization of home mortgages.

Just as the popularity of modern electric vehicles is limited by the availability of

charging stations, the popularity of automobiles in the early 20th century was limited by the road infrastructure. The automobile industry began supporting the American Road Builders Association in 1903 to push forward a "national movement to have governments at all levels pay for roads and highways that could accommodate automobiles"[1]. As Hugh Chalmers said at the first American Roads Congress of 1911, "since the roads are for all the people, they should be built by all the people, or all the people should contribute to the building of them"[2]. With aggressive financial support from the automobile industry, auto-dependent infrastructure was planned and built, which enabled the construction of residential-only communities that would be populated after World War II.

Of course, these communities did not proliferate without careful land use controls. Such control had not been in place until 1916 when the New York City instituted the first comprehensive zoning law that categorized land uses and created districts[3]. After the law was challenged, and found to be a valid exercise of police power, other cities began adopting land use controls[4]. In 1924, the US Department of Commerce used NY's zoning ordinance to develop a model statute that could be used throughout the country, the Standard Zoning Enabling Act[5]. Section 1 empowered legislative bodies to regulate the location of uses under a state's general police powers; Section 2 allows local jurisdictions to divide the municipality into districts based on those uses; Section 3 provides the rationale for this system's importance[6].

Judicial approval of single-use zoning came shortly after in *Village of Euclid v.*

[1] Gonzalez, 60
[2] Gonzalez, 60
[3] Emerson, 20
[4] Emerson, 22
[5] Emerson, 23
[6] Emerson, 24

Ambler Realty Co[7]. The Village of Euclid was a 14 square mile suburb of Cleveland, Ohio with a population reaching 10,000[8]. Most of the land was either unimproved or farmland; it was dotted with detached suburban houses[9]. Fearing industrialization, the village implemented a comprehensive zoning code in 1922 that segregated unsanitary conditions into their own district[10], effectively creating an industrial sector away from a residential-only sector. Earlier in 1911, Ambler Realty Company acquired an undeveloped 68-acre site[11], presumably as a speculative investment intended for future industrial use. The new zoning code divided the site into three zones, and because of their configurations, development was difficult[12]. Ambler challenged, claiming the zoning deprived the property of value by placing restrictions that prevented Ambler from using the land for any non-residential purpose, thereby constituting a taking without just compensation or due process.

Although the district court decided in Ambler's favor (legislation based on aesthetics was not an appropriate exercise of police power), the US Supreme Court reversed, finding that the zoning ordinance was a reasonable extension of police power because it did not have the character of arbitrary fiat, and was grounded in a rational basis[13]. Up until this point, use control was a new and questionable concept, its detractors primarily concerned with the government's ability to restrict use of private property. Following *Euclid*,

[7] *Euclid v. Ambler Realty Co.*, 272 U.S. 365, 391 (U.S. 1926).
[8] Garvin, 442
[9] Id.
[10] Id.
[11] Id.
[12] Id.
[13] *Euclid*, 272 U.S. at 391.

municipalities across the nation began implementing exclusionary zoning[14]. This new zoning theory allowed these nascent communities born to the developing auto-infrastructure to be exclusively residential in use[15].

By the 1930s, with the supply of suburban housing rising, the government began to artificially inflate demand. The Federal Housing Administration, created in 1934, began subsidizing mortgage insurance for long-term mortgages, and allowed for lower down payments from 20 to 10 percent[16]. These subsidies allowed people who would have otherwise not been able to afford home ownership to buy a house in one of the newly formed sprawled communities[17]. Federal tax laws then allowed homeowners to deduct mortgage loan interest and property taxes[18], allowing people to afford larger homes, increasing the demand for larger houses on larger lots (eventually leading to the popularity of so called McMansions), further decreasing population densities. Besides directly subsidizing home ownership, the government kept gasoline taxes low[19] to keep the cost of fuel down. People could then afford to spend more money on gas, enabling more of them to live in sprawl developments further away from their established workplaces.

IMPLICATIONS OF SPRAWL

[14] In the context of this paper, exclusionary zoning shall refer to zoning practices that exclude a use-type (as opposed to its alternative meaning, zoning practices that exclude minority races).
[15] Garvin, 442
[16] Squires, 9
[17] Those who could not have afforded private mortgage insurance could have afforded the FHA mortgage insurance. Further, lenders were encouraged to extend loans to riskier, borderline borrowers by knowing the government was insuring that loan.
[18] Squires, 9
[19] The federal government keeps the gasoline tax "far below the rate of other industrialized countries". Squires, 9.

Sprawl comes with many implications that fueled a search for a workable solution. The environmental effects of sprawl are numerous and obvious: car dependency increases carbon dioxide release[20] and general air pollution[21]; impervious surfaces from extensive road infrastructures create water control issues[22]; destruction of biodiversity[23] and the introduction of artificial conditions[24]. Less obvious are the social burdens placed on racial minorities and low-income families. There is debate about the cause/effect relationship between central-city decline and sprawl: did a decline in central-city quality of life cause the middle class to flee to suburbs, or did a middle class exodus reduce the central-cities' tax bases, thereby causing the decline[25]? Similarly intertwined are the relationships between racial minorities and poverty: because the black poverty rates are more than three times higher than non-Hispanic white poverty rates[26], any racially-discriminatory policy necessarily concentrates poverty and vice versa. Perhaps the starkest example demonstrating the relationship between race and poverty concentration is Detroit. In 1970, only 11.3% of blacks lived in high-poverty areas, but that figure increased to 53.9% in 1990[27].

FHA redlining is the most explicit example of racial exclusion in sprawl suburbs, but other factors contribute. These communities, built by private developers, are profit oriented, and will naturally exclude low-income housing, tend towards larger houses on

[20] Frumkin, 68
[21] Frumkin, 68-69
[22] Frumkin, 127-35
[23] Soule, 248
[24] Squires, 34
[25] Squires, 39
[26] Squires, 43
[27] Other examples are New York City (+27%), Chicago (+21.4%), and Pittsburgh (+21.7%). Squires, 43.

larger lots, and favor home ownership over rental housing. With redlining aside and the homeownership subsidies factored in, only a small part of racial minorities would be able to afford houses that were designed to maximize profit. Even if developers wanted to include lower-income housing or increase density, many municipalities zoned land to require minimum lot sizes and house sizes. Being car-dependent, car, insurance, and gas add to the costs of suburban living.

The concentration of poverty in central-city areas foments higher levels of substance abuse, detachment from the mainstream workforce, and violence[28]. When compared to cities, the suburbs had a higher concentration of "good" workers. Companies begin moving corporate headquarters into the suburbs, albeit with one caveat: instead of building these headquarters within a development's center, these corporate centers are built on the fringes[29], detached from walking-accessibility or public transportation, further ingraining the car dependency. As jobs move into the suburb, those left in the central-city lose employment[30], and both factors reduce the tax base within the city. A reduction in tax base lowers the quality of inner-city schools, creating a feedback loop[31].

THE SMART GROWTH SOLUTION

Smart growth is the generic name for a shaping of development patterns towards a desirable end. Most smart growth programs have five primary goals: 1) the promotion of compact development; 2) the protection of natural resources and 3) environmental quality;

[28] Squires, 60-61
[29] Squires, 62
[30] Squires, 62
[31] Squires, 65

4) the provision of transportation options; 5) maintaining a positive fiscal impact[32]. Some smart growth plans also try to provide affordable housing. Smart growth involves a reevaluation of single-use exclusionary zoning and a strengthening of a state's ability to implement an overall development plan. For the purposes of examining the efficacy of smart growth, three studies will be compared: the SmartCode (a model code developed by Duany Plater-Zyberk & Co. and now published by the Center for Applied Transect Studies), New Jersey (an "old school" smart growth state), and Virginia (a non-smart growth state). Virginia has not yet implemented any smart growth plans nor updated any laws, and so it is ideal to compare to smart growth states. New Jersey's smart growth strategy evolved over several decades[33], and it did not dispose of Euclidean zoning, and so can be compared as an old-school state.

CURRENT ZONING CODES AND SMART GROWTH DEVELOPMENT

Since *Euclid* was decided on 22 Nov, 1926, Euclidean zoning has become the most prevalent form of land-use control in place[34]. Euclidean zoning uses exclusion to separate incompatible uses (such as industrial and residential), and then further defines the dimensional standards within each use (such as height limits, floor-area ratios, minimum lot sizes, etc.)[35]. The regulation of these dimensional standards provides little control over the overall developmental scheme; traditional Euclidean zoning focuses on the micro-scale, regulating the use of an individual building lot and its dimensions without considering the larger scale form. An alternative is form-based codes, which replace zoning and focus on

[32] Ingram, 11
[33] See http://www.nj.gov/state/planning/chronology.html
[34] Emerson, 30
[35] Soule, 28

shaping the form of a development[36]. The focus on use is reduced, as the form will necessarily dictate the respective usages. The most comprehensively developed model form-based code in the US is the SmartCode. Because neither New Jersey nor Virginia has a state-wide zoning ordinance, their capitals (Trenton and Richmond, respectively) shall be used to compare how their respective zoning codes compare to the model code's treatment of residential buildings. A study of how these codes deal with use and mandate densities speaks to the first goal of smart growth, compact development.

HOW RICHMOND, TRENTON, AND THE SMARTCODE SEPARATE USE

A zoning code must be examined along with a zoning map; it is useless to look purely at the definition of districts without seeing how much land is appropriated to that use, and where they exist relative to other types. The relationship between code and plan is direct: a stronger plan will come with a stricter code, and a weaker plan comes with less-restrictive codes. This is because districts that are well-positioned allow for easy access to the uses present in adjacent non-residential districts, allowing for a stricter, more-restrictive code. If district positions are poorly planned, the residential districts must be less-restrictive to enable habitability. Further, use-inclusion may speak to residential densities because decreased densities increase travel distances, and may necessitate use-inclusion.

Richmond micromanages land use by creating 37 district types: 15 residential, 5 mixed use, 1 institutional, 9 business, 5 special use, and 2 industrial[37]. Of the residential

[36] http://en.wikipedia.org/wiki/Form-based_code
[37] Richmond, Va., The Code of Ordinances of the City of Richmond, Virginia, ch. 114, art. IV, div. 2-30 (2004) [hereinafter Richmond Zoning].

districts, 8 regulate single-family occupation, and comprise a majority of the residential use. These single-family uses comprise a majority of the land in Richmond. See Diagram 1, Richmond's land use map. Richmond allows a wide variety of civic service in the R-1 district[38], a result of its inefficiencies.

In comparison, Trenton only divides land use into 10 districts: 4 residential, 1 mixed use, 2 business, 1 pedestrian mall, and 2 industrial[39]. Only a small part of Trenton is R-A (compares to Richmond's R-1) single-family housing use-only; much of the land is R-B, which allows for an inclusion of light business into housing. Mixed-use is limited to its own district. See Diagram 2, Trenton's land use map. Trenton is extremely restrictive for permitted uses in R-A districts; the sole permitted principal use is detached single-family housing; conditionally allowed are churches and telecommunication facilities[40].

As a form-based code, the SmartCode is more concerned with the city's form rather than micro-managing uses into districts. Instead of using districts, the SmartCode analogizes the transition from rural-to-urban to that of from ocean-to-forest; discrete bands (transects) can be delineated within that transition. The theory is that a small-scale variation within that transect will not significantly impair the functioning of that transect as a whole. The SmartCode divides land into transects[41], and within each transect both

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[38] These uses include libraries, museums, schools, parks, churches, country clubs, crop cultivation areas, conservation areas, swimming pools, community center buildings, athletic fields, and telecommunication facilities. See Richmond Zoning, div. 2 § 114-402.1

[39] Trenton, N.J., City of Trenton Land Development Ordinance, ch. XIX, art. XIII-XXI (2010) [hereinafter Trenton Zoning].

[40] Trenton Zoning, art. XIII § 315-86.

[41] The SmartCode takes the largest geographic area and designates portions of it perpetually preserved as open space (SmartCode 9.2, § 2.2.1). Then reserved open sectors, land that should be, but is not yet protected from development, are assigned (SmartCode 9.2, § 2.2.2). Infill growth sectors are mapped (SmartCode 9.2, § 2.2.3), and then all remaining areas are assigned into a growth sector (SmartCode 9.2, § 2.2.4). Growth sectors

form and use are dictated by the code. See Table 12 in the SmartCode for a visual analysis of the allowance of residential use in transect zones. Within the T3 zone (the closest equal to R-1/R-A zones) civil services are well restricted, allowing for only childcare centers, fire stations, religious assembly, playgrounds, bus shelters and open-markets[42].

DENSITY WITHIN DETACHED SINGLE-FAMILY HOUSE DISTRICTS

One of the largest causes of the problems from sprawl is the low density in residential-only sectors. Although smart growth encourages higher density housing and mixed-use buildings, it does not prevent the construction of single-family detached houses; a comprehensive smart growth plan necessarily requires residential-only sectors for the mixed-use sectors to serve. However, the density of these sectors speak to the efficacy of the smart growth plan; when comparing a non-smart growth state to a smart growth state, one should expect the latter to have a higher density. While neither Richmond[43] nor Trenton[44] dictate residential density directly, both require a minimum lot size. One can calculate a theoretical maximum density given a minimum lot size; for this calculation, the space needed for roads, rights-of-way, etc. are disregarded, and the comparisons will be made within the most lenient sub-urban residential zoning types. Within Richmond's R-1 zone, the density is 2.18 units/acre. Within Trenton's R-A zone, the density is 7.26

permitting development are assigned a community unit type (Clustered Land Development, Traditional Neighborhood Development, or Regional Center Development) (id.). The unit type then determines the percent allocation of transect zones within the zone (SmartCode 9.2, Table 14). Transect zones (natural zone, rural zone, sub-urban zone, general urban zone, urban center zone, urban core zone, special district) determine the quality of the developed space.

[42] SmartCode 9.2, Table 12

[43] Richmond Zoning § 114-402.4.

[44] Trenton Zoning § 315-89.

units/acre.

While Richmond and Trenton specify a theoretical maximum density, the SmartCode specifies a minimum density. The SmartCode requires a base density of 2 units per acre by right (any proposal that complies without administrative hearing), but increases the base density to 6 units per acre for TDR[45] development. See Table A, highlighting the differences between codes that would have an effect on density.

Density is an important metric because it is a direct way of measuring the compactness of a development, and compact growth is a critical smart growth goal. Further, even though Trenton's density is higher than Richmond's the fact that it still specifies those densities as a maximum speaks to how ingrained the Euclidean zoning theory is still. Only the SmartCode is willing to shift to a minimum density; areas that specify a maximum density will always have a limit to the compactness of its development.

MIXED-USE

Most of human history has been mixed use, but the pollution of the industrial revolution compelled use separation, and the *Euclid* decision allowed single-use zoning to thrive[46]. With pollution under control, mixed-use zoning has become the primary tool in achieving smart growth because the increased density and use-inclusion that accompany it are mutually exclusive to sprawl. Mixed-use zoning is not only use-inclusive, but also ensures that residents have walk-able access to civil services, places of employment, and

[45] TDR work on the theory that each acre of land can support a certain number of people; when shifting people from rural zones without decreasing the overall land size, densities can increase in urban areas. The SmartCode requires some land that could have been developed to be preserved as open space; TDR is the process of shifting that development rights for that now-preserved land into denser areas. See SmartCode 9.2, Table 14.
[46] See Emerson, 15-19.

retail spaces, and the density of such zones is high enough to make those non-residential uses viable. By combining uses, compact development is encouraged; mass-transit options are enabled; and tax bases are increased. The SmartCode is the most liberal in allowing mixed-use. The transect zones that would equal the entire urban sphere under an Euclidean scheme all allow for mixed-uses[47]. As to VA and NJ, the history of single-use zoning has relegated mixed-uses into their own districts. Richmond has two types of mixed-use: Residential/Office (RO-1,2,3)[48], and general Mixed-Use Business (B-6,7)[49]. Trenton has only one: general Mixed-Use (MU)[50]. For Richmond's, residential dwelling units are permitted within the urban-business centers, but not as standalone units (e.g. no dwelling unit may reside on the ground floor[51], resulting in only mid/high-rises being permitted).

CURRENT BUILDING CODES AND SMART GROWTH DEVELOPMENT

Uses are separated both at the zoning and building levels; when a mixed-use building is permitted within a mixed-use zone, the mixed-use building is regulated by use separation requirements outlined in the building code. These building codes[52] are designed to fit into an Euclidean zoning scheme, and have inadequacies in dealing with the implications of mixed-use developments. The most pervasive state-wide model code[53] is

[47] SmartCode 9.2, Table 12
[48] Richmond Zoning, ch. 114, art. IV, div. 13-15.
[49] Richmond Zoning, ch. 114, art. IV, div. 24-25.
[50] Trenton Zoning, art. XVI.
[51] Richmond Zoning § 114-444.2 (7).
[52] Building codes regulate health and safety within new and modified buildings.
[53] In the past, local municipalities exercised home rule to develop their own building codes, but the burden of keeping those codes up to date with developing technologies led most states to adopt state-wide model codes (http://en.wikipedia.org/wiki/Building_code)

the International Building Code ("IBC"), maintained by the International Code Council, which has a subset for residential use, the International Residential Code ("IRC"). The SmartCode does not even begin to address safety or quality of life, deferring to local building codes; for this analysis New Jersey's building codes will be analyzed to show how it fails in addressing smart growth concerns. New Jersey Building Code separates the IRC into its own subsection[54], but those provisions only apply to:

> the construction, alteration, repair or increase in size of detached one- or two-family dwellings, or single-family townhouses, of Group R-5 not more than three stories in height. For this purpose, a townhouse shall be as defined in Section 202 of the International Residential Code: 'A single-family dwelling unit constructed in a group of three or more attached units in which each unit extends from foundation to roof and with open space on at least two sides.'[55]

Therefore, the NJ IRC does not apply to mixed-use residential units built in the MU (nor business) zones; only the IBC applies. This is concerning because the IBC provisions for egress, fire separation, and exterior glazing are less stringent than those in the IRC. While not life threatening, such disparities end up increasing the cost of living and decreasing the quality of life for residents in mixed-use developments.

EGRESS

The IBC treats residential occupancy as just another use, and while it imposes stricter egress standards on residential use compared to other uses (except some institutional and high-hazard uses)[56], it ignores the implications of a substantial residential use (such as the need to extract an unconscious victim from a bedroom in the middle of a

[54] International Building Code - NJ ed., Preface at iii (2009) [hereinafter IBC].
[55] International Residential Code - NJ ed., Preface at iii (2009) [hereinafter IRC].
[56] E.g. IBC §§ 1004.1.1, 1005.1, 1015.1.

fire) which may be present in a mixed-use sector.

As an example of how a state can act to properly address that inadequacy, New Jersey adds Section 1029, which provides for emergency escape and rescue for Group R occupancies in mid-rise buildings. While it provides exceptions for designs that allow for easy fire rescue[57], it otherwise requires bedrooms to have an escape opening to the outside to allow a fire-rescue worker to enter. It defines the minimum dimensions of the opening, and maximum height of the opening from the floor[58]. NJ successfully addresses the unique challenges of residential fire rescue, and such requirements are not imposed for other uses in a mixed-use building. Having strict egress requirements lessens liability and makes development of mixed-use buildings significantly more attractive.

EXTERIOR GLAZING

Separate from any exterior egress requirements, buildings have minimum exterior glazing requirements that permit fresh air and sunlight to enter; the IRC requires "an aggregate glazing area of not less than 8 percent of the floor area"[59]. However, the IRC does not apply to R-2 units in a mixed-use building. The IBC has similar requirements[60], but only if the developer wishes to rely on natural ventilation and lighting. If the developer provides mechanical ventilation and electric lights, those exterior glazing requirements no longer

[57] For example, if a first-floor bedroom opens directly into a public way or yard (IBC § 1029.1 E6), if a bedroom has access to fire-rated corridors with access to two remote exits in opposite directions (IBC § 1029.1 E2) or if the building is equipped with an automatic sprinkler system that effectively reduces the risk of fire (IBC § 1029.1 E1).
[58] IBC §§ 1029.2, 1029.3.
[59] IRC § R303.1. Basically, one 24"x36" window for every 75 sqft of room.
[60] IBC § 1205.2.

apply[61].

Permitting development without exterior windows serving non-bedroom spaces is a dangerous decision. Many studies have established a relationship between physical/mental health and access to sunlight and fresh air[62]. This has further implications in municipalities that mandate affordable housing units; those units could be designed to provide only the minimum in glazing access, which may decrease the quality of life for those residents. If the municipality fails to require parity in design between normal and affordable units, this disparity creates a second-class tier of housing. See Diagram 3 as an example how.

FIRE SEPARATION

Fire separation in a detached single-family house is managed by front, rear, and side yard setbacks, but in a mixed-use building it is impossible to achieve that distance-separation within units. Instead, individual units within a use-group and the barrier between separate use groups are built with fire-rated construction. A 1-hour fire rated construction means that one side of the wall assembly will be able to resist a 140°C for one hour before failing[63]. The use separation used by NJ specify a 3-hour separation between R-2 use and any other type of use[64]. The separation required between individual units[65] (walls) and from floor-to-floor[66] for the same use is 1 hour.

This type of performance based fire code has been very successful at containing fire

[61] Id.
[62] E.g. Frumkin, 138-39.
[63] http://en.wikipedia.org/wiki/Passive_fire_protection
[64] Except if that other use is hazardous, in which case it is 4 hours, but hazardous use is unlikely to be permitted in a mixed-use building. IBC §705.4.
[65] IBC § 419.2 referencing IBC § 708.
[66] IBC § 419.3 referencing IBC § 711.

spread and ensuring the safety of occupants, so it is difficult to openly criticize the need for strict fire separation requirements. However, it should be noted that because of the higher costs of fire-rated construction[67], developers will tend to group and stratify uses within a mixed-use building, creating the familiar system of a retail first floor with residential on top. This is relevant because the cost effectiveness of building a fire-barrier is increased with the size of each use; it is less cost effective to separate one floor of retail from one floor of residential than it would be to separate a floor of retail from five of residential. This economic reality acts as a disincentive from mixed-use construction, especially when many buildings are height restricted[68]. The costs of living in a shorter mixed-use building will be higher than living in a taller building, so even if a developer buildings a low-rise mixed-use building, its affordability will be low due to its higher construction cost.

SMART GROWTH INADEQUACIES IN ADDRESSING AFFORDABILITY

Smart growth strategies are macro-scale schemes that focus on grand schemes of urban/suburban planning, and in so doing have the unintended consequence of ignoring an important housing issue: affordability. The assumption is that a better civil design necessarily results in lower costs of living. In fact, with respect to affordability, the empirical evidence shows that smart growth cities have significantly higher housing costs and higher cost of living indices; Table B compares the efficiency of a state's smart growth policies with the affordability for that state's residents.

[67] For a drywall rated wall only, at a height of 8' each linear foot would be $13.70/ln-ft for a 0-hr rated wall, $16.80/ln-ft for a 1-hr rated wall, and $47.80/ln-ft for a 3-hr rated wall. (RSMeans, Reed Construction Data)

[68] For example, in the T4 General Urban transect of the SmartCode, buildings are limited to 3 stories. See SmartCode, Table 14.

SMART GROWTH THEORIES ON INCREASING AFFORDABILITY

At first glance, smart growth should theoretically decrease housing costs and related expenses. By providing a higher housing density in mixed-use buildings, the cost-per-unit for housing should decrease as construction costs become more efficient and as overall housing supply increases[69]. A well-laid urban design allows for the efficient distribution of services and utilities, decreasing their respective construction, maintenance, and operational costs[70]. The inclusion of mass transit options will reduce the average resident's cost of living; residents able to use mass transit might choose not to buy a car, nor have to pay for its insurance and maintenance[71]. Providing opportunities for employment near one's residence decreases travel distance and time[72]. Increasing the tax base should provide more funding for affordable housing subsidies or other such programs. Indirect benefits might derive from a better air and water quality as automobile usage declines, decreasing health-related expenses. The preservation of open space contributes to overall greater health.

These theories are all logically sound, and in actuality might have a slight effect in increasing affordability, but the conditions that come with smart growth outweigh any such benefit.

SMART GROWTH RESULTS THAT DECREASE AFFORDABILITY

Ingram at the Lincoln Institute of Land Policy[73] compiled and compared the

[69] Szold, 88
[70] Id.
[71] Squires, 155
[72] Squires, 156
[73] The Lincoln Institute is an international research organization that analyzes land use and taxation issues.

statistics for four smart growth states (Florida, Maryland, New Jersey, and Oregon) to four non-smart growth states (Colorado, Indiana, Texas, and Virginia) and tracked trends for a decade starting in 1989/1990[74]. As far as absolute values are concerned, median housing values increased in all eight states (anywhere from 4.2% to 118.3%) and tracked the national average increase of 42.4%[75]. Median gross rent as a percent of household income also tracked the national average of -3.4% (anywhere from 5.5% to -5.0%)[76]. These figures only measure costs on an absolute scale though. Homeowners and renters were then identified as cost-burdened if 30% or more of their income was used for housing. Within the smart growth states, the percent of cost-burdened owners increased from an average of 20.0% to 23.6% (a 3.6% change)[77] whereas in non-smart growth states it increased from 16.8% to 18.4% (a 1.6% change)[78].

The percentage of new rental housing units added were similar between the two groups (18.0% in smart growth states versus 18.3% in non-smart growth states)[79]. While rental units in smart growth states stayed at the same level of affordability (a slight decrease from 35.5% to 35.4% burdened, a -0.1% change)[80], the rental units in non-smart

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[74] Ingram, 76-77
[75] Ingram, 77
[76] Id.
[77] To be more accurate, New Jersey has the benefit of the Mt. Laurel doctrines to help control affordability. Accordingly, New Jersey's percent of cost-burdened owners increased only 1.9%, the lowest of all smart growth states, from 26.3% to 28.2%. That having been said, New Jersey by far still has the highest percent of cost-burdened owners of all the case study states. See Ingram, 78.
[78] Ingram, 78
[79] Id.
[80] As with the previous endnote discussing cost-burdened owners, New Jersey's affordable housing statutes helped drop the percent of cost-burdened renters from 39.1% to 37.5%, a -1.6% change, far more significant than the average change within smart-growth states of -0.1%. See Id.

growth states actually became more affordable (from 31.4% to 29.6%, a -1.8% change)[81]. A stratified regression was run to compare possible variables to determine which had the tightest relationship of change in share of cost-burdened renters. No statistically significant relationships were found among any of the variables in the smart growth states (that is, none of the variables one would expect to affect renter cost burden had a significant impact)[82]. In the non-smart growth states, two variables had significant relationships: the percent change in county per capita income, and the percent of county population aged 25+ with at least a bachelor's degree[83]. So if in smart growth states, none of the tested variables (per capita income, percent change in income, population, percent change in population, median housing value, population density, job density, and percent of populated aged 25+ with at least a bachelor's degree) were statistically significant in explaining the drop in affordability, what might be?

Gentrification (that is, the large-scale displacement of lower-income residents by those richer without the intent to create a mixed-income community) may be a factor. The largest cause of gentrification is a rapid growth of regional population or employment opportunities[84], both of which are present within a smart growth development. Wealthy investors, recognizing the potential future value property within a smart-growth area might achieve, compete amongst themselves for property ownership[85].

Another obvious possibility is the rise in demand for housing stock that follows the creation of jobs; as job-creating use exceeds residential-use in area, it would put market

[81] Id.
[82] Ingram, 83
[83] Id.
[84] Squires, 94
[85] Squires, 95

pressure on the extant housing stock. With demand consistently rising above supply, private developers have no reason to keep housing costs in check. New construction skews towards luxury housing as developers know the demand will be there to fill the vacancies.

CONCLUSION

In retrospect, sprawl development seems almost inevitable; industrialization proliferated the automobile, and with it came the desire to leave polluted cities and avoid industrial uses. Cheap home ownership costs, kept artificially low with subsidies from the government, helped to redefine the American ideal to include detached single-family home ownership. Profit-oriented developers never hesitated to supply that market, and local municipalities, craving the tax base, gladly enabled the desired single-use zoning. Only after decades of sprawl development are the social and environmental costs being realized, and solutions being developed. Even after acknowledging the need for a paradigm shift, we find our efforts constrained by the frameworks extant in building and zoning codes, either explicitly (e.g. capping residential densities) or implicitly (e.g. by affecting building design to discourage mixed-use, or create inequities). The smart growth models already in play are inadequate as well, stopping short of addressing important housing issues such as affordability. Certainly New Jersey's smart growth plan was an excellent first attempt, and the SmartCode builds on it as an improved second version, but conquering the ingrained inefficiencies of past policy and identifiable hesitancies to address current issues remain an unachieved goal.

FIGURES AND DIAGRAMS

DIAGRAM 1: RICHMOND, VA LAND USE MAP

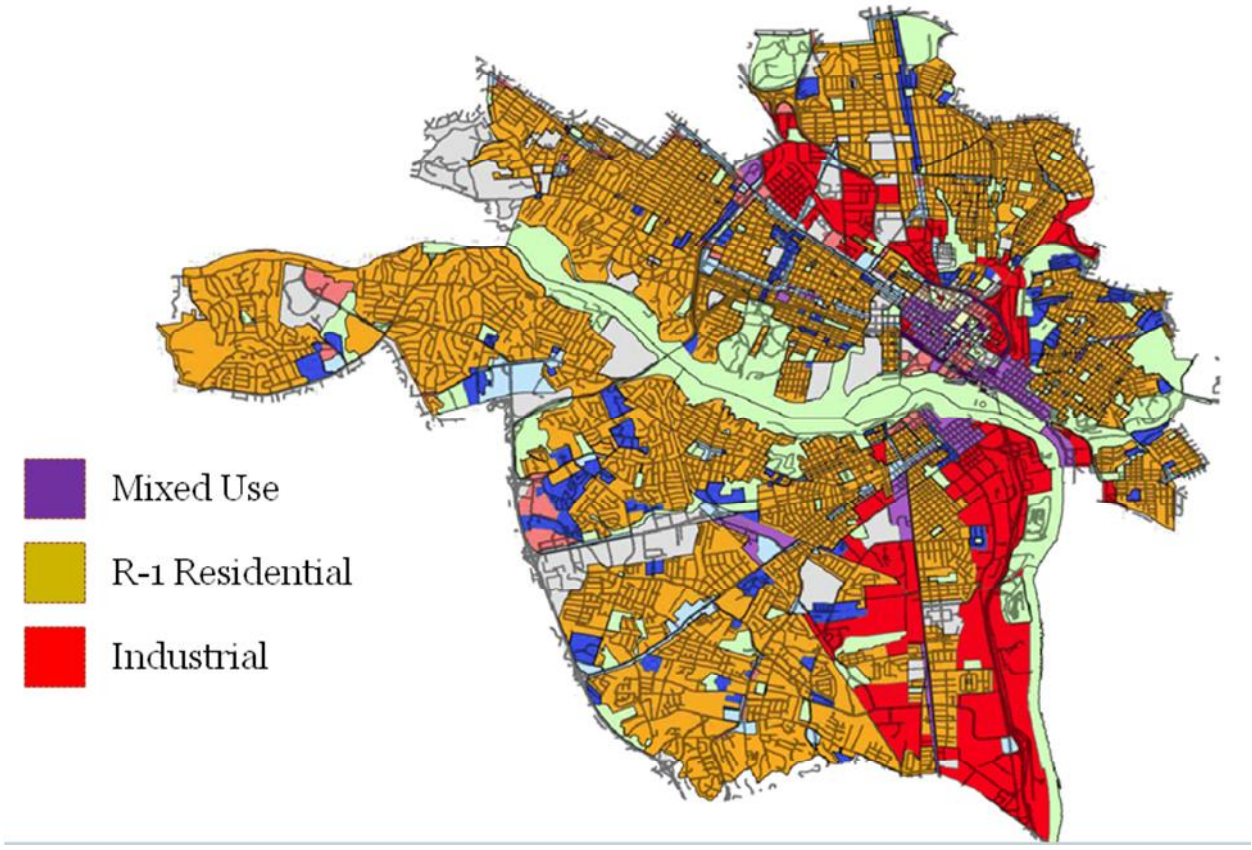


DIAGRAM 2: TRENTON, NJ LAND USE MAP

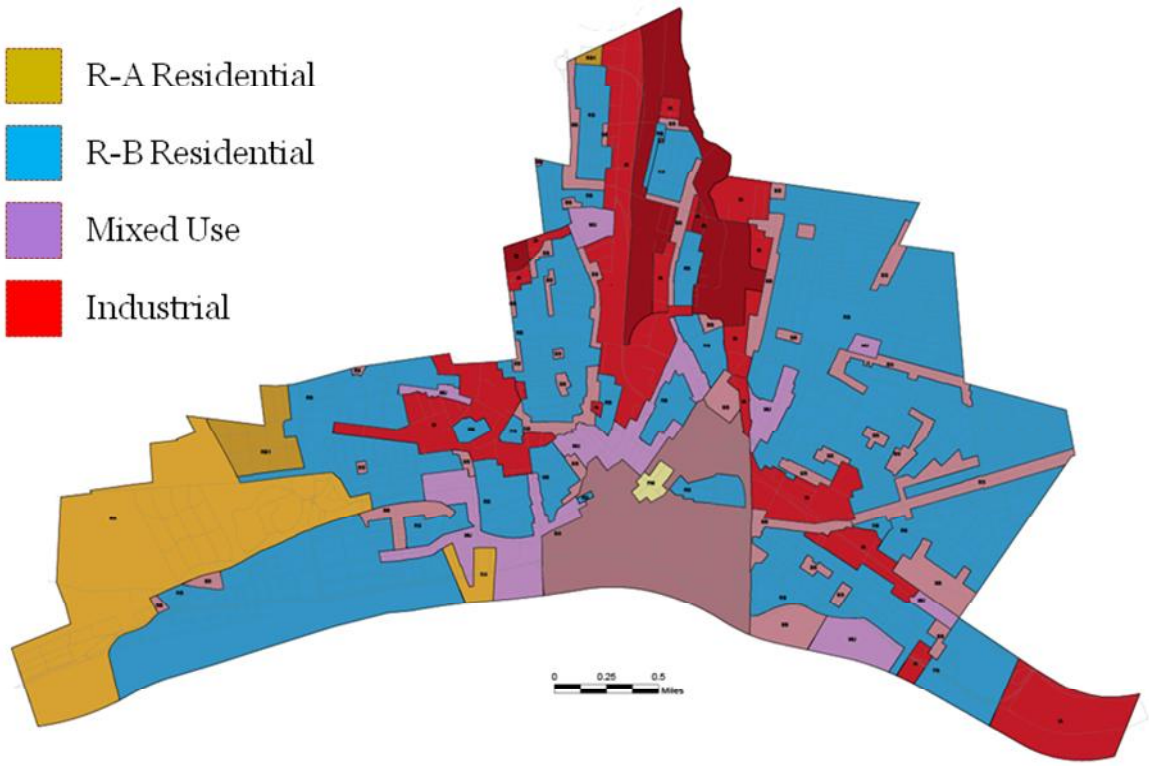
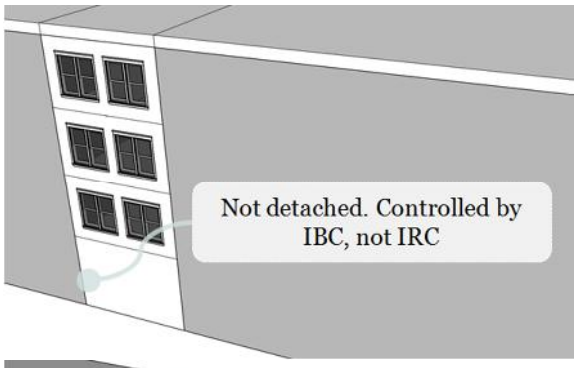
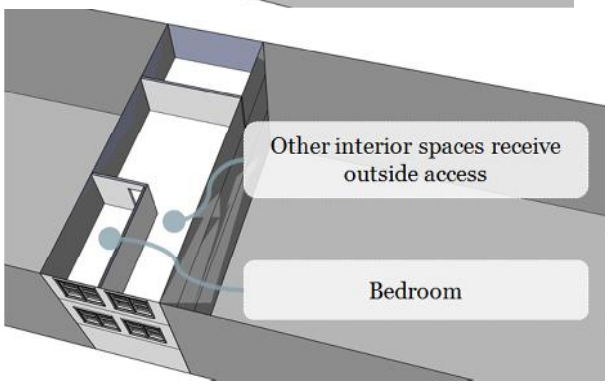


DIAGRAM 3: AN EXAMPLE OF POSSIBLE DISPARATE TREATMENT BETWEEN AFFORDABLE AND REGULAR UNITS



Assume an attached building, with floors of residential units (top); assume the provision of affordable units is mandated. Regular units can be designed to provide fresh air and light to non-bedroom spaces (left). Affordable units can be designed to exclude that "luxury", creating sub-standard yet still-legal units (right).



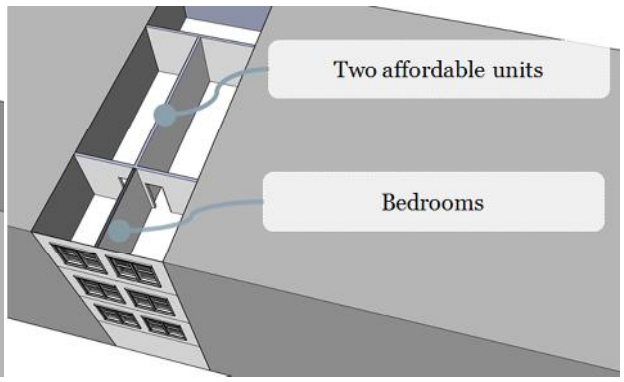


TABLE A: COMPARISON OF MOST LENIENT SUB-URBAN RESIDENTIAL ZONING TYPES

	Virginia (R-1)	New Jersey (R-A)	SmartCode (T3)
Minimum Lot Size	20,000 sqft	6,000 sqft	Not Specified
Residential Density	2.18 units/acre max (interpolated*)	7.26 units/acre max (interpolated*)	2 units/acre (by right) or 6 units/acre (by TDR) minimum
Minimum Lot Width	100'	50'	72'
Minimum Front Yard	35'	30'	24'
Minimum Side Yards	10'	6'	12'
Max Height	35'	35'	2 stories
Max Lot Coverage	20%	45%	60%
Data Source	Richmond Zoning § 32-410	Trenton Zoning § 315-88	SmartCode 9.2

*Interpolated residential density figures are calculated at minimum lot size without consideration for rights-of-way, actual achievable density will be significantly lower.

TABLE B: COMPARING SMART GROWTH RANKINGS, HOME AFFORDABILITY, AND COST OF LIVING INDICES FOR THE TOP THREE AND BOTTOM THREE SMART GROWTH-RANKED STATES

	Smart Growth Rating		Housing Affordability		Cost of Living Index	
State	Value	Rank	Value	Rank	Value	Rank
California	82	1	6.5	49	129.1	48
Maryland	77	2	4.6	42	106.5	41
New Jersey	75	3	5.1	45	125.6	47
West Virginia	13	48	2.5	2	70.3	1
Mississippi	12	49	2.7	8	80.8	4
Arkansas	2	50	2.7	10	78.2	2

Source: http://www.newgeography.com/content/001938-smart-growth-and-quality-life

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