ECO-CITY ALEXANDRIA
environment | economy | community

Transportation, Land Use, and Housing

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1 Introduction

This policy brief, prepared for the Alexandria Environmental Policy Commission (EPC), covers the sustainability topics of transportation, land use, and housing. It reviews the language from Alexandria's *Eco-City Charter* and *Environmental Action Plan* pertaining to these topics, and gives an overview of some of the planning actions taken by Alexandria to achieve the sustainability goals laid out in these documents. The brief provides a synopsis of each topic's relationship to sustainability and highlights some of the interrelationships between transportation, land use, and housing that should be considered in sustainability planning. Finally, three primary policy/program recommendations for the EPC's consideration are outlined for each of the sustainability topics. The recommendations include: 1.) implementing a demand-responsive parking management program, 2.) adopting a transit-oriented development (TOD) overlay for use along the future "Corridor B" (see Figure 1), and 3.) adopting a housing principle within the EAP.

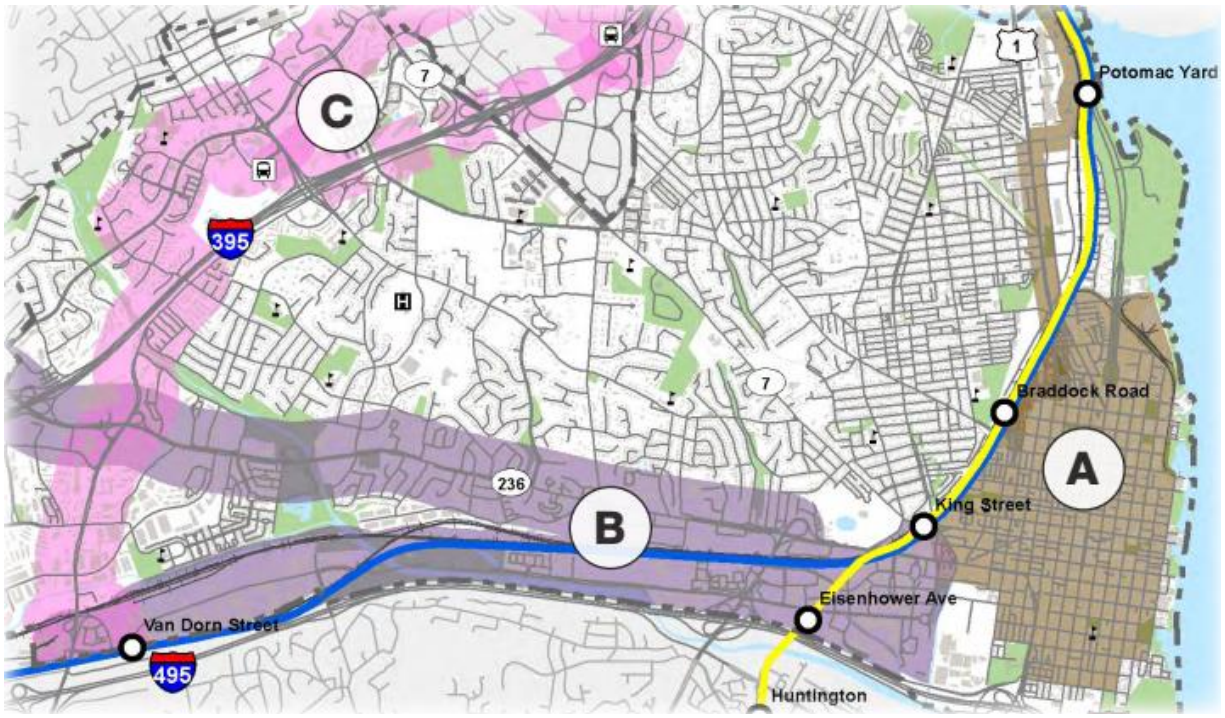

Figure 1: Transportation Plan Corridors
Source: City of Alexandria Transitway Corridors

While these policies and programs are endorsed in their entirety, they also represent an amalgamation of concepts that could be (individually) extracted and applied in other ways or in different combinations, as the EPC and the City of Alexandria (City) see fit. For example, a TOD overlay zone combines the ideas of higher density, mixed-use development with pedestrian friendly design and affordable housing close to transit. While these elements work together to improve sustainability, a TOD overlay is not the only tool that applies all of these concepts; the EPC may find alternative policies or programs that apply the same or similar concepts in a different fashion (i.e. form-based codes). Hopefully, this brief provides the

EPC with a sufficient understanding of some of the general sustainability concepts and synergies relevant to transportation, land use, and housing, so that members can apply them as they see fit.

2 Background

Transportation, land use, and housing are all central to the idea of city sustainability. Each area can individually affect sustainability outcomes; however, at its best, sustainability planning considers the collective impacts and interrelationships of all three areas. For instance, vehicle emissions often account for a large portion of a city's CO_2 emissions.[1] Encouraging households to drive less or buy greener cars may help ameliorate air pollution, yet this solution only targets one piece of a larger problem. Large-scale, single family zones encourage sprawl and limit households' access to basic services – increasing the need for driving. Land use policies encouraging greater housing density, connectivity, and mix of uses can better support public and active modes of transportation. Transportation, land use, and housing are closely linked, and together shape the ways in which people move, consume energy, and contribute to air and water pollution. While it is still appropriate to consider each of these elements individually, there are efficiencies to be gained by aligning all three.

Alexandria's *Eco-City Charter* (Charter)[2] explicitly addresses land use and transportation as guiding principles. Regarding land use and open space, the Charter states, "Policies must harmonize [the City's] built and natural environments to ensure that growth does not jeopardize environmental sustainability and preserves Alexandria's character." The Charter also discusses population and economic growth, stating "The City's land use policies will accommodate increases in people and jobs through green development." In terms of transportation, the Charter encourages modes of transportation that will "reduce dependence upon the private automobile by promoting mass transit and pedestrian and bike-friendly transportation networks." The Charter further affirms that Alexandria "will integrate transportation options with land use decisions in order to ensure a healthy environment while continuing economic growth." In addition to this general guiding language, the Charter lists several sub-goals to be pursued within the realm of land use and transportation.

In contrast to the overt discussion of land use and transportation, the Charter discusses green building, but contains no language on housing or affordable housing. Adopting language on affordable housing is recommended so that the Charter (or similar documents) will better reflect the importance of social equity in sustainability. Future policies should also discuss integrating affordable housing with green building practices, thereby encouraging both socially and environmentally sustainable housing.

Alexandria's *Environmental Action Plan* (EAP)[3] largely adopted the Charter's language regarding transportation and land use, and established both topics as key principles. The EAP does not discuss housing as a principal. Affordable housing is mentioned only once under the Land Use and Open Space Principle (Goal 4), which states that the city shall "continue to identify opportunities for affordable housing and mixed income housing in Small Area Plans throughout the city."

Since Alexandria adopted the Charter and the EAP, in 2008 and 2009 respectively, the City has completed many projects aligned with sustainable transportation, land use, and housing. The City

introduced and later expanded the number of Capital Bikeshare stations, adopted a Complete Streets Policy, added bike lanes on King Street, North Chambliss Street, and Stultz Road, and completed a citywide cyclist and pedestrian wayfinding program. The City also completed the first phase of the Potomac Yard Metroway, introduced hybrid electric DASH and trolley buses, and began providing a free one-year Zipcar membership under the Carshare Alexandria program. The City completed the Beauregard Corridor Plan, which will introduce mixed-use, walkable development, as well as 800 committed affordable housing units. The City also updated its *Master Housing Plan (HMP)*, which establishes a ten-year goal of developing or preserving 2,000 affordable housing units, and encourages assisting low-income persons with housing maintenance through a new energy efficiency improvement loan.

In addition, Alexandria is currently working on a number of transportation, land use, and housing projects. Many of these initiatives are closely associated with the principles of the Charter and EAP including:

- The Potomac Yards Metrorail Station plan (Draft Environmental Impact Statement completed).
- The *Pedestrian and Bicycle Master Plan* update (under network/implementation development).
- A Complete Streets Design Guidelines Manual (under development).
- The West End Transitway bus rapid transit (BRT) project (evaluating alternatives and environmental assessment).
- *Parking Standards for New Development* study to reduce base parking ratios (draft zoning text amendment for residential completed; new commercial developments will be covered in phase two).
- *The Old Town Area Parking Study* (reconvened).
- The Waterfront Redevelopment.
- *Eisenhower West Small Area Plan* and transportation studies (scheduled for adoption in late 2015).
- The *Landmark Mall Redevelopment* and *Landmark/VanDorn Corridor Plan* (site plan amendment to be presented).

The objective of this policy brief is to provide relevant examples of best practices, principles, and/or policies adopted in other cities' sustainability plans that the EPC could employ in the EAP update or recommend to City staff for further consideration. The Charter and EAP, along with current City plans and projects, were reviewed to determine areas of opportunity for the EPC. A broad array of sources, including but not limited to other cities' plans, sustainability institution policy guides, and academic articles and books were scanned for relevant policies matching the opportunity areas. A "relevant" policy or practice is defined as one that satisfies at least one of several criteria. These criteria include:

being aligned with the Charter or EAP goals and principles, being encouraged by EPC members or City staff, having not been previously completed or attempted in Alexandria, having been successfully implemented in another city of similar size, being relatively feasible (in terms of cost, staffing, and other resources), and/or being generally considered a best practice by a smart growth or sustainability institution, or planning academic.

The next section of this report will provide a brief overview of each sustainability topic – transportation, land use, and housing – and offer a list of resources for further reading. Each sustainability topic overview will also include an explanation of the elements' interrelationships (i.e. the effect of land use on transportation, and vise versa). The third section of this report will provide more detailed information on the specific policies and programs recommended for Alexandria. The recommendations will be categorized by topic. Several of the recommended policies are crosscutting, and the topic areas should not be considered mutually exclusive. Indeed, considering the interrelationships of transportation, land use, and housing decisions is a hallmark of good sustainability planning. Finally, the last section of this report provides a concluding summary of the findings and recommendations for the EPC.

3 Sustainability Topic Overviews

3.1 Transportation

Transportation is closely linked to sustainability. Perhaps the single greatest threat to achieving sustainable results in the United States comes from America's addiction to the automobile.[4] Some of the negative impacts of heavy car usage include increased air and storm water pollution, traffic congestion, fossil fuel consumption, crash rates, road expenditures, and urban sprawl; all of which can influence economic, social, health, and environmental outcomes in a city.[5,6] In order to counter this problem and make transportation more sustainable, cities have undertaken a broad range of efforts to reduce car use and increase the active and public transport mode split. Indeed, Alexandria already has taken notice of the issues surrounding automobile dependency, and is trying to directly address the need to reduce daily vehicle miles traveled (VMT) in both the Charter and EAP, and in the *Transportation Master Plan* (TMP) and other Small Area Plans (SAPs).

Transportation and land use are highly intertwined, and are best addressed through policies and programs that seek to harmonize these facets. For example, allowing for a greater density and mix of uses in land use planning and zoning can foster development that better supports public transit and walking. Conversely, land use plans and zoning codes that require large lots, single uses, and free on-site parking can discourage public transit use and increase reliance on private vehicles. Auto-oriented transportation policies consume large amounts of green space and increase impervious surface area, as roads are expanded to accommodate increased traffic. For a comprehensive overview of the linkages between land use and transportation, please see Todd Litman's 2015 report: *Land Use Impacts on Transport: How Land Use Factors Affect Travel Behavior*.

Transportation and housing sustainability are also closely linked. For instance, the installation of a new light rail line may grow public transit ridership and encourage economic development along a corridor. However, a resulting increase in land values may displace the households most in need of transit access if measures aren't taken to preserve or construct affordable housing ahead of or in synchrony with transportation planning. Similarly, new research suggests that increasing job-worker balance and income matching by providing affordable housing close to job centers can encourage shorter work commute trips and possibly reduce spatial mismatch.[7]

In addition to some of the resources cited above, there are many other publications for further reading that elaborate on the characteristics of sustainable transportation and provide policy and program recommendations. Some examples include:

- Virginia Tech's *Compendium of Model Sustainability Practices: Air Quality & Transportation* http://ecocity.ncr.vt.edu/docs/Compendium_ModelSustPractices_Air&Transportation.pdf
- *TCRP Report 93: Travel Matters: Mitigating Climate Change with Sustainable Surface Transportation* http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_93.pdf
- Victoria Transport Policy Institute's *Are Vehicle Travel Reduction Targets Justified? Evaluating Mobility Management Policy Objectives Such As Targets To Reduce VMT And Increase Use Of Alternative Modes* http://www.vtpi.org/vmt_red.pdf
- U.S. FHWA's *The Role of Transportation Systems Management & Operations in Supporting Livability and Sustainability: A Primer* http://www.ops.fhwa.dot.gov/publications/fhwahop12004/fhwahop12004.pdf
- Dr. John Pucher and Dr. Ralph Buehler's (presentation on) *Promoting Cycling and Walking for Sustainable Cities: Lessons from Europe and North America* http://www.gsd.harvard.edu/#/media/promoting-cycling-and-walking-for-sustainable-cities-lessons.html

3.2 Land Use

Land use policies are another broad set of tools that can promote positive or negative outcomes across all sustainability dimensions. Local governments can use zoning to guide infill development, reduce sprawl, create transit-oriented neighborhoods and corridors, and protect historic and environmentally sensitive areas. Smart growth, a major urban planning paradigm, promotes many land use principles that encourage mixed uses, curb auto-oriented development, protect green space, encourage increases in active and public transport use, and a number of other outcomes associated with sustainability. The discussion of land use in this report will refer primarily to regulatory tools and programs as they relate to transportation and housing, since sustainability standards for urban greening, open space, small area plans (such as EcoDistricts), and green buildings will be covered in separate documents (see Urban Greening, Green Building, and LEED-ND and EcoDistricts policy briefs).

As previously mentioned, land use and transportation have a symbiotic relationship, and the Charter acknowledges this directly. Transit-Oriented Development (TOD) is a land use tool centered on influencing transportation mode choice (and housing stock, too). TODs ideally include a mixture of housing, office, retail and other amenities integrated into a walkable neighborhood and located within a half-mile of public transit.[8] The sustainable benefits of TOD can include increased transit ridership, economic development, affordable housing, and reduced traffic congestion – which in turn leads to reduced air pollution and fuel consumption.[9] Land use policies that encourage greater density may also influence transportation related air pollution. A 2015 Organization for Economic Co-operation and Development (OECD) report notes a strong, inverse relationship between per capita CO_2 emissions from ground transportation and population density in the largest OECD cities.[10] The implication is that persons living in denser areas have diverse transit options inclusive of walking, cycling and mass transit allowing them to not rely solely on driving.

Land use policies also affect housing. Zoning is perhaps the most obvious example of this relationship. Local zoning ordinances can dictate housing type (single family or multifamily), housing density (units per structure), household makeup (number of non-related persons), and minimum lot size (acreage). Many planners, researchers, and advocates view large-lot, single-family homes and districts (which abound in the US[11]) as less sustainable for a variety of reasons. Single-family zones with large minimum lot sizes often exclude low-income households, a practice known as "exclusionary zoning." Moreover, suburban households tend to consume greater amounts of energy and have higher per capita carbon dioxide emissions than urban households.[12] Alternatively, mixed-use zoning overlays and form-based codes can foster a greater mix of housing, jobs, and amenities, allowing households to travel shorter distances for work and shopping. These regulations work by either overriding the underlying single use zone (mixed use overlay), or by regulating the size, style, and shape (form-based code) of development (instead of land use). Finally, zoning can be used to regulate residential landscaping. Cities such as San Francisco, Chicago, and Boston, have adopted "green landscaping" ordinances that require additional plant coverage and the use of permeable paving to reduce storm water runoff.[13]

In addition to some of the resources cited above, there are many other publications for further reading that elaborate on the characteristics of sustainable transportation and provide policy and program recommendations. Some examples include:

- Virginia Tech's *Compendium of Model Sustainability Practices: Land Use Planning and Design*: http://ecocity.ncr.vt.edu/docs/Compendium_ModelSustPractices_LandUsePlanning&Design.pdf
- Victoria Transport Policy Institute and London School of Economics's *Policies That Unintentionally Encourage Sprawl:* http://static.newclimateeconomy.report/wp-content/uploads/2015/03/public-policies-encourage-sprawl-nce-report.pdf
- US GAO's Report on TOD: http://www.gao.gov/assets/670/666992.pdf

- Transportation Research Board's *Effect of Smart Growth Policies on Travel Demand*: http://onlinepubs.trb.org/onlinepubs/shrp2/SHRP2_S2-C16-RR-1.pdf
- Sustainable Cities Institute's *Land Use and Planning Overview*: http://www.sustainablecitiesinstitute.org/Documents/SCI/Topic_Overviews/Land%20Use%20-%20Full%20OverviewNew_NLC.pdf
- EPA's Smart Growth and Affordable Housing webpage: http://www2.epa.gov/smart-growth/smart-growth-and-affordable-housing
- US Council of Mayors *Brownfields Redevelopment: A Compendium of Best Practices*: http://www.usmayors.org/brownfields/documents/2010-bestpractices-brownfields.pdf

3.3 Housing

Affordable housing is closely linked to sustainability as many cities across the country are recognizing this connection in their sustainability plans. New York City is perhaps the premier example of this trend. In late April 2015, Mayor Bill de Blasio announced he was overhauling the city's sustainability plan to refocus on income inequality and housing. Notably, the plan was rebranded from *PlaNYC* to *OneNYC*, and includes the goals of creating up to an additional 300,000 affordable units by 2040 and connecting workers and jobs via public transportation.[14] In Richmond, Virginia, efforts were also undertaken to acknowledge the connection between housing and sustainability. The city's sustainability plan, *A Roadmap to Sustainability*, includes an objective to encourage more "Sustainable and affordable housing options throughout the city," under its Open Space and Land Use focus area.[15]

Alexandria's Charter and EAP both recognize the importance of social equity in sustainability planning, and the EAP (Land Use Principle, Goal 4) calls for ensuring that land use decisions "Not create or perpetuate social injustice." Similarly, Alexandria's *Housing Master Plan* (HMP) discusses the linkage between affordable housing and economic sustainability in numerous portions of the document. For example, Chapter 4 of the HMP states as a Guiding Principle that "Affordable housing is an important component of Alexandria's economic sustainability." Moreover, it notes that "Few investments make as big an impact on how a community is shaped as the preservation or production of sustainable affordable housing because that determines what human capital is available."

Creating and preserving workforce and affordable housing is crucial for sustaining low-income households and families who are often comprised of racial and ethnic minorities, and/or elderly or disabled persons.[16] As a population grows and land values rise, low-income households are typically forced to either move out of an area, or shoulder a greater housing cost burden – thereby reducing their budget for food, transportation, and other essential goods and services. Such financial pressure can reduce household spending and displace workers, impacting the local economy, and make it difficult for households to maintain or renovate their dwellings. Housing is among the most basic of human needs, and cities seeking to achieve comprehensive sustainability must incorporate affordable housing needs into their planning calculus.

As previously discussed, housing is very much interconnected with land use and transportation. Land use regulations largely dictate the quantity and type of housing in a given area, and one's housing choice is often based on transportation preferences and requirements. For example, single-family homes designed to support cars with infrastructure such as driveways and garages are typically located further from commercial areas (due to large-scale single use residential zoning), and those living in such homes may choose to do so in order to accommodate their preference for driving. Likewise, research has shown that people who prefer transit deliberately chose to live in dwellings near transit stations, which are often townhomes or units in multifamily buildings.[17]

In terms of sustainability planning, there has been a large focus on ensuring that affordable housing is built or preserved near transit stations. Low-income households in urban areas are generally reliant on public transportation, as car ownership may be unaffordable, but face a higher risk of displacement as land values rise near new transit lines. In addition, there has been a movement to ensure that affordable housing is constructed using "green" principles and energy efficient appliances. Some researchers have argued that the presence of a green affordable/low-income housing program is an indicator of serious sustainability planning.[18] Since most low-income housing projects are at least partially financed using public funds, such a program allows a local government to lead by example and ensure that its public housing stock is durable and environmentally friendly.

There are many other publications for further reading that elaborate on the characteristics of sustainable transportation and provide policy and program recommendations. Some examples include:

- Enterprise Community Partner's *2015 Enterprise Green Communities Criteria*: http://www.enterprisecommunity.com/resources/ResourceDetails?ID=0100605
- Urban Land Institute's *Environmentally Sustainable Affordable Housing*: http://uli.org/wp-content/uploads/2012/07/Report-7-Environmentally-Sustainable-Affordable-Housing.ashx_.pdf
- NC State University Affordable Housing Sustainable Community's *Transit-Oriented Development and Affordable Housing*: http://design.ncsu.edu/ah+sc/?page_id=114
- EPA's *Creating Equitable, Healthy, and Sustainable Communities*: http://www.epa.gov/smartgrowth/pdf/equitable-dev/equitable-development-report-508-011713b.pdf
- Sustainable Cities Institute's affordable housing website: http://www.sustainablecitiesinstitute.org/topics/buildings-and-energy/affordable-and-multifamily-housing

4 Policy Recommendation Snapshots

4.1 Transportation

4.1.1 Demand-Responsive Parking Management (DRPM)

Location: Berkeley, CA (note: Washington, DC will begin a similar pilot in May 2015)

Department: Department of Public Works

Start Date: 2012 -2015 (pilot)

Description:

In 2015, the City of Berkeley completed a three-year pilot program oriented towards reducing local traffic congestion, and improving air quality, parking efficiency and the pedestrian/cycling environment. The basic premise was to reduce parking search time by adjusting parking parameters according to driver demand. This project touches on both the environmental and economic dimensions of sustainability: reducing air pollution and energy consumption by lowering traffic congestion, and promoting economic sustainability by making it easier for residents to find available parking near businesses. The parking management scheme was part of the larger *goBerkeley* pilot (which also included a transit demand management [TDM] element), and regulated parking demand by increasing or decreasing rates (to keep one to two free spaces available per block), extending time limits, and providing better information through signage and websites to increase public awareness of parking options. The City altered the parking parameters twice during the pilot to adjust for driver behavior and to increase parking efficiency. Although demand and enforcement data was collected manually during the trial period, the City simultaneously piloted a successful automated data collection and enforcement system using vehicle-mounted license plate recognition (LPR) technology for future use – since manual collection and enforcement is onerous.

In addition to having general congestion problems from circling traffic, several neighborhoods experienced a parking demand imbalance, and residents requested longer parking limits. The City identified three target areas to begin testing the management concept: Downtown Berkeley, Telegraph/Southside, and Elmwood. Within these areas, both on-street and garage parking prices and time limits were adjusted to encourage drivers to park in underutilized areas. Table 1 illustrates the *goBerkeley* changes for on-street parking in the Downtown area:

Table 1: Downtown Berkeley Parking Rate Changes

	Baseline	Launch (Fall 2013)	Adjustment (Spring 2014)
Parking Rates	$1.50/hr ($1.75/hr Premium)	Premium - $2.25/hr Value - $1.25/hr	Premium - $2.75/hr Value - $1.50/hr
Time Limits	30 min – 2 hr	Premium – 2 hr Value – 4 hr	Premium – 2 hr Value – 8 hr

The *goBerkeley* pilot was largely successful in reducing congestion, and subsequently, improving air quality. According to a Berkeley City Council report, the pilot reduced VMT by 1,649 miles per day. One caveat is that this reduction is related not solely to the DRPM element, but rather the entire *goBerkeley* program (including its TDM element). Nevertheless, the DRPM undoubtedly contributed to the VMT reduction, as overall parking efficiency improved in the pilot areas. In terms of air quality, the City of Berkeley estimated that the cutback in VMT equated to the following reductions in daily air pollution and greenhouse gas emissions: (see Table 2).

Table 2: Reduction in Daily Air Pollution from Decreased VMT.

Pollutant	Reduction (grams/day)
Volatile Organic Compounds (VOC)	123
Nitrogen Oxides (NO_x):	279
Carbon Dioxide (CO_2):	3,002
Particulate Matter (PM_{10}):	78
Particulate Matter ($PM_{2.5}$):	33

Source: *goBerkeley* Pilot Results Report

In addition, the DRPM program was found to improve public perception of parking availability; which is probably reassuring for local businesses. The City noted that efficiencies could be improved further with sustained demand management and automated data collection and enforcement.

Alexandria Match:

The *goBerkeley* DRPM program aligns closely with the Charter and EAP principles encouraging VMT and air pollution reduction, but has not yet been planned for/tested in Alexandria. The program also corresponds with the City's TMP – notably Action P1, which calls for a study of parking demand/supply. The programs could be considered as a strategy for the ongoing *Old Town Area Parking Study* or for other areas with parking-related congestion problems. The 2010 Old Town study concluded that the City "did not have a parking supply problem," but rather a problem with parking demand management. The DRPM would complement many of the City's existing TDM (*Local Motion*) programs.

The EPC could begin perusing a DRPM program by encouraging city staff and other, relevant planning committees to investigate demand pricing schemes for high priority parking areas (i.e. Old Town). City staff may want to reach out to the City of Berkeley for further information on funding and implementation procedures. Following in Berkeley's footsteps, Alexandria could implement DRPM in pilot areas, which, if successful, could encourage an expanded and permanent DRPM parking system.

City staff may also wish to study or observe similar pricing schemes in other cities, such as the one set to begin in Washington, DC in May 2015, in order to better understand the different program options and technologies.

Budget and Staffing:

The City of Berkeley received $3.9 million in grants to support the entire *goBerkeley* initiative, including $1.8 million from FHWA's Value Pricing Pilot Program (VPPP). According to public documents, roughly 90 percent of the grant money was allocated towards the DRPM element of the *goBerkeley* program. The City contributed $119,340 in matching funds over the three-year period. Although VPPP funding is no longer available, EPC Members of Alexandria staff could reach out to FHWA's Office of Innovative Program Delivery for guidance on arranging a pilot.

POCs: Willa Ng wng@ci.berkeley.ca.us; goberkeley@cityofberkeley.info

References:

- *goBerkeley* Pilot Results Report: http://www.cityofberkeley.info/Clerk/City_Council/2014/12_Dec/Documents/2014-12-16_Item_38_goBerkeley_Pilot_Program.aspx
- *goBerkeley* Website: http://www.goberkeley.info/
- FHWA's VPPP Website: http://www.ops.fhwa.dot.gov/congestionpricing/value_pricing/projects/not_involving_tolls/parking_pricing/ca_goberkeley.htm

4.2 Land Use

4.2.1 Transit-Oriented Development (TOD) Overlay

Location: Phoenix, AZ

Department: Planning Department

Start Date: 2004

Description:

Phoenix adopted an award-winning TOD zoning overlay in 2004 in order to encourage mixed-use, higher density development supportive of its Metro Light Rail and active transportation initiatives. A TOD overlay is a regulatory tool that better enables a locality to plan infill development that increases transit ridership, encourages walking and cycling, increases economic/joint-development opportunities, and provides retail amenities for pedestrians, workers and residents. The secondary purpose of the overlay is to decrease auto-dependency, and to mitigate the effects of congestion and pollution. This TOD

overlay can be seen as a strategy for efficiently integrating transportation, land use, and housing planning to yield a more sustainable outcome.

The Phoenix TOD overlay was implemented in several station areas along the light rail corridor, and overrides any underlying zoning district standards, thus making it more feasible to develop mixed-use structures with pedestrian-oriented design that might otherwise be prohibited. It also limits uses that are incompatible with a transit/pedestrian-oriented environment, such as drive-thru restaurants, car washes, dealerships, and large surface parking lots.

Researchers have not yet explored the direct affect of the TOD overlay on ridership since the Metro Light Rail opened in 2008; however, initial ridership was higher than projected and increased every year for the first five years. According to the Phoenix Mayor Greg Stanton, since the Light Rail first opened, there's been $5 billion worth of capital investment within a quarter mile of the tracks in Phoenix alone (not including areas in the surrounding jurisdictions).

While the Phoenix TOD overlay is a good base ordinance, it should be tailored to Alexandria needs. The overlay is somewhat lacking in language encouraging open space and mixed-income housing along the rail line. Adding sections that stipulate the preservation and creation of affordable housing and green space in the overlay zones is highly encouraged.

Alternatively, the EPC should consider the Form Based Code (FBC) overlays used by Arlington County along Columbia Pike. While this is a slightly different approach, (in this case) the intent of the FBC overlay is very similar to that of the TOD overlay – encouraging walkable, transit-oriented development along a major transportation corridor.

Alexandria Match:

In the next few years Alexandria is slated to develop its transportation "Corridor B," probably along Duke Street. Corridor B is included in the MWCOG TPB's *Constrained Long Range Plan* and is a "priority corridor" for WMATA – meaning it is recognized as a regional priority. Corridor B is an opportunity to create a walkable, transit-oriented corridor while replacing the auto-oriented corridor that exists today.

A TOD overlay could provide a single regulatory framework for unifying the areas along the Corridor B route that are currently covered in several different (and overlapping) small area plans, and better ensure that the transit system implemented along Duke Street (possibly BRT) attracts strong ridership. Although each small area plan covering the Corridor B route may call for transit-oriented development, the underlying zoning of certain areas may not permit mixed-use, compact development (or similar elements), thus making it difficult for the City to achieve a truly *transit-oriented* corridor (as opposed to a *transit-adjacent* corridor). A TOD overlay is one possible tool for simplifying zoning and better assuring that transit-oriented goals are met. It also aligns completely with the Alexandria *Transportation Master Plan* and EAP/Charter principles promoting active and public transport options.

For the EPC, implementation of such an overlay would begin by working with city staff to review the underlying plans and zoning codes along the Corridor B route to determine if a TOD overlay is a beneficial tool. After this, EPC members would meet with transportation staff and committee members to encourage the adoption of a TOD overlay, and to identify areas (likely around planned transit stops) to be covered in such an overlay, as the route analyses are carried out. In addition, EPC members could conduct public outreach at community meetings or events to help the public understand the benefits of adopting a TOD overlay ordinance.

POC: City of Phoenix Planning Department - (602) 262-7131

Resources:

- Phoenix TOD Overlay Ordinance: http://www.sustainablecitiesinstitute.org/Documents/SCI/Model_Policies_Legislation/Model%20Ordinance%20-%20City%20of%20Phoenix%20Arizona%20Transit%20Oriented%20Zone%20District%20Overlay.pdf
- Phoenix Overlay Zone Maps: https://www.phoenix.gov/pddsite/Pages/pzmapszoverlaymap.aspx
- Phoenix TOD Brochure: http://www.valleymetro.org/images/uploads/lightrail_publications/TOD_Brochure.pdf
- Phoenix Valley Metro Light Rail website: http://www.valleymetro.org
- Arizona State University Sustainable Cities TOD article: https://asunews.asu.edu/20141126-sustainable-cities-transportation
- TCRP 128: Effects of TOD on Housing, Parking, and Travel: http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_128.pdf

4.3 Housing

4.3.1 Housing/Affordable Housing Principle Adoption

Location: Multiple (Richmond, VA; Washington, DC; New York City, etc.)

Description:

Housing affordability is vital to the economic, social, and cultural sustainability of any locality. Affordable housing helps sustain community diversity and local working class jobs and businesses, and can ameliorate transportation problems related to spatial mismatch (i.e. increased congestion and VMT). Incorporating a housing principle within a sustainability plan is an important first step towards improving housing affordability, and acknowledging the criticality of housing to city sustainability. Examples of affordable housing language can be found in many cities' sustainability plans, such as

Richmond's *A Roadmap to Sustainability*, DC's *Sustainable DC Plan*, or in New York City's *OneNYC* (formerly *PlaNYC*).

A Roadmap to Sustainability's first objective under its Open Space and Land Use principle is to encourage additional sustainable and affordable housing. The plan recognizes affordable housing as "essential to becoming a sustainable community," and outlines three initiatives for reaching its housing goals: zoning changes to promote higher density and mixed use, adoption of an energy efficient housing policy, and establishment of an affordable housing requirement (i.e. inclusionary zoning ordinance). *Sustainable DC* explicitly calls for increasing the affordable housing stock as an action to address its goal of sustainably accommodating the projected population growth. *OneNYC* devotes an entire section to Housing, and explains how housing is linked to sustainable growth and how the government plans to address future housing needs. It sets lofty initiatives to preserve and create affordable units, locate housing near jobs and transit, and expand housing related services to vulnerable populations. Moreover, New York's previous sustainability plan, *PlaNYC*, also included strategies such as creating increased capacity through upzoning, locating affordable housing near transit, and preserving and upgrading the existing public housing stock. All of the plans discussed here mirror and/or complement the goals established in each city's respective housing, land use, and transportation plans.

Alexandria Match:

The importance of social and economic sustainability is discussed within both the Charter and EAP; however, affordable housing (or the subject of housing generally) is notably missing from the Charter, and is mentioned directly only once in the EAP, as a short term action under the Land Use and Open Space principle. As the City's premier sustainability plans, the Charter and EAP should be amended to add a Housing Principle. This principle should include additional language on affordable housing that would correspond with the *Housing Master Plan* (HMP) and better reflect the importance of creating and preserving affordable housing as a sustainability issue. At the time of writing, the Charter and EAP do not reflect the HMP's sustainability language, which clearly establishes a link between housing and economic sustainability. Updating the Charter and/EAP to include a more explicit focus on housing is perhaps the most basic step the EPC can take in recognizing the importance of housing to sustainability.

An updated Charter or EAP Principle might consolidate affordable housing issues with green building principles, thus creating a Built Environment Principle (or similar) that would address concerns for green affordable housing. This principle could also discuss housing generally, as it relates to managing future population growth. As the population grows and property values continue to rise across the DC metro region, the demand for additional affordable housing will increase as well. According to Alexandria's HMP, by 2030, demand for housing units priced for households at or below 60 percent AMI will exceed supply by 7,687 units. This is only one statistic among many that could be included in a new principle.

If adopting a new principle is not feasible, additional housing language could, alternatively, be rolled into the EAP's Land Use and Open Space Principle. As discussed, a similar approach was used in Richmond's sustainability plan, and this plan could be referred to for guidance. Following this approach, the EPC could update the language to better reflect the HMP goals and initiatives, to establish a clear linkage

between housing and sustainability, to encourage affordable housing near transit, and to discuss general objectives and measures for accommodating future population growth in lower income households.

References:

- Richmond's *A Roadmap to Sustainability*: http://www.richmondgov.com/Sustainability/documents/RVAGreen_ARoadmapToSustainability.pdf
- *Sustainable DC* 2012 (full plan): http://www.sustainabledc.org/wp-content/uploads/2012/10/SDC-Final-Plan_0.pdf
- *OneNYC* 2015 (full plan): http://www1.nyc.gov/html/onenyc/downloads/pdf/publications/OneNYC.pdf
- *PlaNYC* 2011 (full plan): http://www.nyc.gov/html/planyc/downloads/pdf/publications/planyc_2011_planyc_full_report.pdf
- Alexandria *Housing Master Plan* (full plan): http://alexandriava.gov/uploadedFiles/housing/info/Housing%20Master%20Plan%20Final.pdf

5 Conclusion

This policy brief covered the sustainability topics of transportation, land use, and housing, and their interactions. It reviewed the language from Alexandria's Charter and EAP pertaining to these topics, and gave an overview of some of the planning actions to be taken by Alexandria to achieve the sustainability goals laid out in these documents. The brief provided a synopsis of each topic's relationship to sustainability and highlights some of the interrelationships between transportation, land use, and housing that should be considered in sustainability planning. Finally, it provided three primary policy/program recommendations for the EPC's consideration, including implementing a DRPM program, adopting a TOD overlay zone for use along the future "Corridor B," and adopting a housing principle within the EAP. In addition, the appendix of this brief includes a matrix of supplementary plans and programs for the EPC's consideration.

As discussed in this brief, transportation, land use, and housing are highly intertwined, and there are efficiencies to be gained by addressing or considering all three topics when planning for sustainability. Of course, this should not preclude the EPC from pursuing programs, such as a DRPM scheme, that focus primarily on a single issue. However, when addressing or planning for a larger effort, such as a transportation corridor or neighborhood plan, it is ideal to consider how these three issues will impact each other and how each might be used to bring about a more holistically sustainable outcome.

Alexandria has achieved much in the years since the adoption of the Charter and EAP, and will no doubt continue to improve its sustainability efforts. Hopefully, this brief provides some clear concepts and policies for the EPC and City to consider as it continues on the quest to make Alexandria a more vibrant, healthy, and sustainable community.

TRANSPORTATION, LAND USE, AND HOUSING

APPENDIX

MATRIX OF SUPPLEMENTARY PLANS AND PROGRAMS FOR THE EPC'S CONSIDERATION.

Program/Policy Name	Locality	Description	References/Links
Permeable parking lots/ Green parking lots	San Francisco, CA; New York City, NY	Requirement for new/refurbished surface parking to use permeable cement/asphalt	http://www.sf-planning.org/ftp/files/publications_reports/Guide_to_sf_green_landscaping_ordinance.pdf; http://greencitiescalifornia.org/best-practices/urban-design/NYC_green-parking-lots.html
Green building standards (specifically) for affordable housing projects	Boston, MA	Development of green building and energy standards for new affordable housing projects	http://www.nyujlpp.org/wp-content/uploads/2012/10/Burke-Nelson-Rickerson-Bostons-Green-Affordable-Housing-Program.pdf
Update EAP to align with/set goals for forthcoming Complete Streets Design Guidelines	Alexandria, VA	Incorporate specific requirements and goals from Alexandria's forthcoming guideline manual	http://alexandriava.gov/localmotion/info/default.aspx?id=49868
Affordable dwelling unit ordinance/inclusionary zoning	Arlington, VA; Fairfax, VA	Petition the state government to allow for an affordable dwelling unit ordinance similar to those in Arlington and Fairfax	https://housing.arlingtonva.us/development/land-use-zoning-tools/; http://www.fairfaxcounty.gov/rha/adu/aduprogram.htm
Accessory dwelling unit ordinance	Lexington, MA; Fauquier County, VA; and elsewhere	Established a by-right or provisional ordinance for allowing multiple dwelling units in single family zones	http://www.huduser.org/portal/publications/adu.pdf
Brownfields inventory	Clarksburg, WV	An inventory program to document and revitalize contaminated sites	http://www.cityofclarksburgwv.com/departments/econ-dev-home/projectsandupdates/105-brownsfields-projects-information-for-the-city-of-clarksburg?showall=&limitstart=
Tactical urbanism projects	Multiple locations	Short-term, inexpensive projects to improve alternative transportation options, green space, pedestrian amenities. See the linked guidebooks for ideas	http://issuu.com/streetplanscollaborative/docs/tactical_urbanism_vol_2_final?e=4528751/2585800

ENDNOTES

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[4] Kent E. Portney, *Taking Sustainable Cities Seriously: Economic Development, the Evirinonment, and the Quality of Life in American Cities,* 2nd ed., (MIT Press: Cambridge, MA, 2013), 116.
[5] Peter Newman, and Jeffrey Kentworthy, *Sustainability and Cities: Overcoming Automobile Independence* (Island Press: Washington, DC, 1999).
[6] Todd Litman, "The Costs of Automobile Dependency and the Benefits of Balanced Transportation," Victoria Transport Policy Institute (2002). http://www.brocku.ca/tren/courses/tren3p18/Litman%202002%20-%20The%20Costs%20of%20Automobile%20Dependency.pdf
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[8] Reconnecting America. "What is TOD?" Accessed April16, 2015. http://reconnectingamerica.org/what-we-do/what-is-tod/
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[10] OECD. "The Metropolitan Century: Understanding Urbanisation and its Consequences" OECD Publishing: Paris (2015). http://www.keepeek.com/Digital-Asset-Management/oecd/urban-rural-and-regional-development/the-metropolitan-century_9789264228733-en#page1
[11] For a comparative discussion of America's unique housing and zoning disposition see: Sonia Hirt, *Zoned in the USA* (Cornell University Press: Ithaca, NY, 2014).
[12] Johnston, et al., *Guide to Greening Cities*, 7.
[13] For a guide to San Francisco's Green Landscaping Ordinance see: http://www.sf-planning.org/ftp/files/publications_reports/Guide_to_sf_green_landscaping_ordinance.pdf
[14] Matt Flegenheimer, "New York City's Environment Program Will Focus on Income Inequality," *The New York Times*, April 21, 2015. http://www.nytimes.com/2015/04/22/nyregion/new-york-citys-environment-program-to-focus-on-income-inequality.html?ref=nyregion&_r=1
[15] http://www.richmondgov.com/Sustainability/documents/RVAGreen_ARoadmapToSustainability.pdf
[16] Alex Schwartz, *Housing Policy in the United States*, 3rd ed. (Routledge: New York, NY, 2015).
[17] TCRP *Report 102*, 144.
[18] Portney, *Taking Sustainable Cities Seriously*, 73.