Richmond, Virginia: An Assessment of Municipal Tree Utilization and the Urban Forestry Program

Prepared by: Dovetail Partners
With support from the U.S. Forest Service, Southern Region and the Virginia Department of Forestry

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Scope of Project and Background

This project examined both urban tree utilization in the Richmond metropolitan area, and the City of Richmond’s Urban Forestry program. Parts I and II of this report focus on urban tree utilization; Part III deals with Richmond’s urban forestry program. Part IV includes a case study (based on Parts I and II), an appendix (based on Part III), and references for both urban tree utilization and urban forestry.

The urban tree utilization assessment was informed by the following facts and perspectives. America’s urban forests provide diverse and essential benefits and services to communities. When trees are removed, the wood is most often mulched, composted, or sent to a landfill site. But urban forests offer the potential for enhanced utilization with estimates of annual availability ranging from over 16 to 38 million green tons.

Barriers to urban tree utilization include technical and logistical constraints, availability of processing facilities, and market considerations. Perhaps the most significant barrier to urban trees entering the wood processing stream may be the prevalent idea that urban trees are suitable only for low-value products. Many urban forestry programs, as well as urban residents, are not fully aware of the opportunities and benefits.

Across the U.S., urban forestry programs are typically located in either a Department/Division of Public Works or a Department/Division of Parks. In Richmond, the Public Works Department has responsibility for the management of the urban forest. The assessment of the Urban Forestry program included a review of the sustainability of the City’s processes for urban tree program planning and implementation. Specifically, the assessment was informed by a review of program materials; a site visit including staff interviews, City tour, and observation of on-the-ground program activities and outcomes; and a survey of stakeholders for the identification of program strengths and weaknesses.

The two assessments, urban tree utilization and urban forestry program, provide recommendations and action steps for the City. These project outcomes provide a pathway to enhance the utilization of urban trees through a strong and robust urban forestry program.

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August 2015 Urban Forestry Assessment – Richmond, VA
Executive Summary

From a national perspective, the number of trees, and hence the volume of wood, removed annually from urban and community forests is significant (the removal can be due to land conversion, insect and pest damage, storm events, hazard trees, etc.). Removal estimates range from 16 to 38 million green tons per year. Even the lower value of these estimates is comparable to total annual harvests from America’s National (U.S. Forest Service-managed) Forests (Bratkovich et al. 2008).

This project included an assessment of the urban tree utilization capacity and the urban forestry program for the City of Richmond, Virginia. The assessments included interviews and site visits focused on the urban tree utilization capacity in the Richmond area plus a review of the sustainability of the City’s processes for urban tree program planning and implementation. Both assessments provide recommendations to support continued enhancements.

The city of Richmond is located in Henrico County, about 100 miles south of Washington, DC. Richmond is the capital of the Commonwealth of Virginia, and during the Civil War served as the capitol of the Confederate States of America. In 2013, Richmond had a population of over 214,000 with a metro-area population of over 1.2 million (this includes the independent cities of Colonial Heights, Hopewell and Petersburg as well as the counties of Charles City, Chesterfield, Dinwiddie, Goochland, Hanover, Henrico, New Kent, Powhatan, and Prince George).¹

An overview of Richmond and sampling of its current tree utilization activities provides the following Summary of Urban Tree Utilization in the Richmond Area:

- **Innovative and entrepreneurial tree service firms (private arborists) exist in the Richmond area** – Log sawing, furniture-making, and custom millwork are a few of the products/services offered by some tree service firms.
- **A large percentage of tree take-downs (including limbs, brush, etc.) by tree service firms end up as mulch and/or are diverted from landfills** – It appears that mulch locations (drop-off sites for tree residue) serve as distribution yards (or potential distribution yards) for other markets such as pulp and paper, boiler fuel, etc.
- **Fuel expenses (related to transportation), equipment costs, labor costs, and disposal fees, along with storage space for tree materials, hinder enhanced urban tree utilization** – This is especially true among tree service firms. The “efficiencies” of enhanced urban and community tree utilization are critical to success.
- **Tree disposal costs are NOT necessarily the largest cost (financial burden) of organizations that remove urban trees** – As noted above, items such as labor, equipment and fuel can be very costly.

• **The mulch industry (wood residue recyclers) is large in the Richmond area** – Many of the larger tree service firms send the majority of their trees to the mulch industry. This observation fits with the pattern of a growing population base (more homes, businesses, etc.) that need/want mulch and related products. Understanding the mulch industry appears to be key in better understanding urban tree (wood) flow in the Richmond area.

• **Boiler fuel is a potential market for the Richmond area** – However, the direct costs of engaging in such a market are enormous (tub grinders, 18-wheelers, etc.). Partners (collaborators) are needed (likely) to tap into this market.

• **The City of Richmond is involved in innovative programs like Project WARM and the Convenience Site** - An understaffed Department of Public Works, Urban Forestry Division (2 arborists), however, hinders additional creative programs beyond day-to-day activities.

• **Historic preservation, renovation and the use of reclaimed lumber is significant in the Richmond area** – Many firms specialize in this industry niche including builders, lumber reclaimers, architects and more.

• **Niche businesses related to urban tree utilization exist in the Richmond area** – Included in these niche businesses are saw millers and tree material aggregators that deliver products to various end-users.

• **There is strong advocacy for urban forestry programs among Richmond area non-profits and governmental agencies** - These groups have also been in the forefront of pushing for enhanced urban tree utilization.

• **Enhanced coordination among key players is needed** – This includes not only identifying the key players but providing a forum for key players to explain their points-of-view, services and product offerings, identification of markets, etc. The upshot of this observation is that a “leader” is needed, especially one that can bridge the gap between private and public sectors.

• **Additional aggregators are needed** – Most organizations (private or public) are not in the business of a profit-centered urban tree utilization project. Consequently, there is a need for additional aggregators (and/or collection sites) of tree material (logs, limbs, brush, etc.). These aggregators, in turn, can sort and market the material(s).

The following Recommendations for Advancing Urban Tree Utilization Clustering in the Richmond Area are offered in no particular order. The recommendations are based on numerous personal interviews, site-visits, observations, past experiences in working with urban tree utilization clusters, and review of public documents.

• **Conduct a feasibility study** - This is the starting point for advancing the idea of business clustering as it relates to urban tree utilization. A feasibility study should include a comprehensive inventory of tree removals, including leaves, limbs and branches (tree pruning residue), and a categorization of these removals (saw log quality, pulp wood, firewood, etc.). The protocol used in southeast Michigan is a model worth adopting and/or adjusting for the Richmond area (MacFarlane 2007).
• **Evaluate the overall business climate in terms of economic conditions, existing infrastructure, labor resources and other factors** - This effort can be included in the feasibility study if time and resources permit; if not, a separate analysis should be conducted. Strategies that “make it pay” to better utilize urban trees should be carefully examined. Sometimes a “make it pay” or “make a buck” message is quickly dismissed when a producer contemplates the additional expenses that his/her firm might incur to better utilize trees. Another method of describing this issue is to talk in terms of “cost-avoidance.” All firms, big or small, urban tree utilizers or non-utilizers, can relate to the message of cost-avoidance.

A public education campaign (tied into recycling awareness and the *green* movement) and coupled with better markets for urban tree products is needed in the Richmond area. For example, recycling messages should include urban trees in a list of recyclable items such as aluminum cans, mixed paper, and newspapers. The same is true for the “buy local” movement – lumber and lumber products in addition to mulch, compost, and firewood – should be touted as a product that can be produced in the Richmond area. Tying urban tree utilization into the existing reclaimed lumber movement is a strategy that should be investigated.

Since “lack of space” and “transportation costs” were common themes under-mining innovative urban tree utilization, an idea is to locate tree drop-off points (yards with free or reduced tipping fees) around the Richmond area. These public/private yards could become utilization centers (hubs) for log sorting and sales, log sawing, etc. (a person with experience in operating a log yard should oversee this effort). Existing disposal locations, such as mulch sites, should be contacted first to discuss the pros and cons of such a strategy.

• **Collaborate with stakeholders from industry, government and supporting individuals and organizations** - The key is to get buy-in from various stakeholders and develop a vision for utilization of urban trees including next-steps and action items. It is important that stakeholders share key information with one another (without divulging company or organizational secrets). Storage space and transportation costs (as noted above), equipment, tipping fees, etc. are some of the issues that need to be “on the table” for meaningful collaboration to take place. Different stakeholders often have different “issues” so better communication is needed between the groups (for the betterment of everyone).

• **Select a leader to coordinate activities, facilitate development and gain policy support** - The leader or champion does not necessarily have to possess a utilization background but should strongly support the utilization effort and should have the ability (and time!) to use his or her position to “rally the troops.” A local and respected urban forestry leader could fill this role.
• **Secure funding** - Financial resources, both private and public, are important to support feasibility studies, technology development, workforce training, capital investment, applied research and other project components. Funding sources can include national, state, or local. Programs directed at wood utilization and urban forestry efforts are obvious avenues for obtaining funding but broad-based recycling grants, small business loans, and bio-based energy programs (as examples) can also provide direct financial support for urban tree utilization.

• **Focus on education and engagement of entrepreneurial thinking and innovation** - Support the creation of a position with the assigned duties of ‘urban wood utilization’ either for Richmond or in a statewide capacity (perhaps based in Charlottesville). A person in this capacity can efficiently focus on education and training opportunities for arborists, assist and encourage start-up urban wood businesses, conduct utilization-based feasibility studies, and become a focal point for technical/hands-on utilization activities.

• **Nurture supporting and complementary industries** - An important task of either the leader/champion, urban wood specialist, or key stakeholder(s) is to facilitate partnerships and relationships (formal or informal) between the numerous industries (and organizations) that are in the cluster (or beginning stages of a cluster). This effort should show cluster members how their businesses are inter-connected and dependent on one another from procurement of raw materials to production, marketing and distribution of end-products.

• **Recognize the differences in types of clusters and act accordingly** - One strategy for cluster development is to select or nurture one of four models as a starting point, or build upon what already exists. This can help focus efforts and provide a framework for collaborative work. Richmond (especially the private sector) appears to be in the early stages of a Marshallian cluster – one that is typically comprised of small and medium-sized companies that trade their products and services with other cluster members.

• **Develop a Richmond regional list of small saw mills, loggers, timber buyers, and forest product manufacturers** - A directory is needed for “small” timber users in the area. The mills, loggers, and others on a potential “small producer” list are often not included in a statewide directory of primary and secondary producers. The list should be specific to the Richmond area.

• **Work closely with the existing mulch industry** – Since mulch is a large and seemingly growing market in the Richmond area, innovators and entrepreneurs should explore ‘other’ products that could be manufactured from urban trees that fit with the mulch industry.
Included within the scope of the project was an assessment of the overall urban forestry program capacity and operations to identify and evaluate core strengths and opportunities. This assessment process was informed by several existing approaches to system evaluations and forestry assessments. The assessment process included the use of a survey tool to gather as much input as possible from external stakeholders and interest groups.

Based upon the input from the external survey, there are several common themes. There is clear respect and appreciation for the quality and efforts of current staff. There is concern about long-term capacity (staffing and funding levels). There is also concern about some of the policies that impact the urban forests in Richmond (e.g., ordinances, enforcement, etc.).

Overall, there is a high opinion and level of support for the urban forestry programs. Respondents generally agree that there is a need to increase the capacity of the programs with more staff, volunteers, and resources.

Opportunities for improvement identified within the results include:
- Fill vacant arborist position(s)
- Increase funding and financial resources for the program
- Strengthen volunteer programs and collaborations with diverse partners
- Identify and develop skillsets within department
- Complete inventory project
- Develop comprehensive strategic plan

From the entirety of the urban forestry management program assessment process – including the review of documents, on-site visits and interviews, and complete survey results – the following summary of programmatic strengths and opportunities is provided.

Strengths:
- Well-trained, credentialed, professional staff and volunteer partners
- Detailed inventory information being developed to provide assessment of urban forest
- Innovation and urban forestry activity within partnerships and private sector
- Well-structured city program – reporting, record keeping, tracking, and inventory

Opportunities:
- Complete inventory development and leverage results to inform resource allocations and program planning
- Complete Master Plan/Comprehensive Management Plan
NEXT STEPS

There are four “next steps” that Richmond can undertake as a “leader” in urban tree utilization and urban forestry.

1. Develop a strategic plan for the urban forestry program. The recommendations and opportunities from this report can be used as a basis for the plan.
2. Establish a structure for measuring progress for the urban forestry program. This includes clearly defining the roles and responsibilities of staff members as well as a schedule of review milestones.
3. Develop a directory of small mills, dry kilns, loggers, furniture makers, etc., that operate in the Richmond metropolitan area. Individuals and businesses in this directory should have a desire to work with urban trees. The City of Richmond could “appoint” someone to do this task (or look for a volunteer). The City, however, should take the lead on this directory, even if the actual work is accomplished by a third-party (intern or work-study student from a local college, tree-related volunteer, governmental employee from the DOF or other state agency, etc.). The important step is for the City to “get the ball rolling.”
4. Hold regular meetings of stakeholders involved with urban tree utilization (or assign/ask someone to hold these meetings since City staff time is limited). These meetings should include area arborists, urban foresters, small sawmill and dryer operators, loggers, mulch yard owners, state regulators, municipal managers, small wood-based business owners, and so forth. Ideally, the meetings would be held at a “neutral” location to encourage maximum participation.

Conclusions

The City of Richmond has a strong history and well established urban forestry program. The private tree care industry in Richmond also provides capacity to support a healthy urban forest. The full potential of the City’s urban forestry program is currently limited by capacity concerns. To improve the program, it is likely necessary to increase the number of arborists to a level that is sufficient to maintain and care for the extensive urban forest, especially where private tree care services are not a reasonable alternative.

The Richmond metropolitan area is home to over 1.2 million people, and growing. East central Virginia (which includes the capital city of Richmond) supports a strong forestry and forest products industry. Historic preservation and renovation are important businesses in the Richmond area, due in part to the proximity of Williamsburg.

Richmond, and the surrounding area, is home to “under the radar” firms currently utilizing urban trees beyond the traditional products of mulch and firewood. Evidence of an emerging urban tree business cluster can be found in the private sector, but a leader is needed to move the momentum forward. An urban tree utilization leader can mobilize both private and public sectors to collaborate on issues that impact both groups.
A leader could also provide the spark for a much-needed feasibility analysis in Richmond that estimates tree removals and potential products.

There are four action items that Richmond can take to move them to next level of urban forestry and urban tree utilization. Action items directly relating to the urban forestry program include a strategic plan and establishing a structure for measuring progress. To enhance the utilization effort, a Richmond area directory is needed as well as regular meetings of key stakeholders.
Utilizing Municipal Trees in the Richmond, Virginia, Metropolitan Area

Part I.

Introduction

There are an estimated 4 billion urban trees\(^2\) in the U.S., with another 70 billion or so growing in metropolitan areas.\(^3\) In fact, 30 percent of all forestland in the U.S. is in a metropolitan area. Between 1997 and 2002, there was a 5 percent increase (more than 5 million acres) in forests in ‘major’ metropolitan areas as developed lands in the U.S. expanded. Also, estimates from the U.S. Census Bureau show a 130-percent increase in census-defined urban area between 1960 and 2000 (Alig et al. 2010).

Urban land in the U.S. is projected to grow from about 3-percent in 2000 to over 8-percent in 2050, an area larger than the state of Montana. Focusing on just forestland, the amount subsumed by urbanization between 2000 and 2050 is projected to be over 29 million acres, an area approximately the size of Pennsylvania (Nowak and Walton 2005). According to the Natural Resources Conservation Service (NRCS), the largest increases in U.S. developed area between 1982 and 1997 were in the South.

From a national perspective, the number of trees, and hence the volume of wood, removed annually from urban and community forests is significant (the removal can be due to land conversion, insect and pest damage, storm events, hazard trees, etc.). Removal estimates range from 16 to 38 million green tons per year. Even the lower value of these estimates is comparable to total annual harvests from America’s National (U.S. Forest Service-managed) Forests (Bratkovich et al. 2008).

Richmond Background

The city of Richmond is located in Henrico County, about 100 miles south of Washington, DC. Richmond is the capital of the Commonwealth of Virginia, and during the Civil War served as the capitol of the Confederate States of America. In 2013, Richmond had a population of over 214,000, with a metro-area population of over 1.2 million (this includes the independent cities of Colonial Heights, Hopewell and Petersburg as well as the counties of Charles City,

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\(^2\) Urban areas as defined by the Census Bureau include (1) urbanized areas with a population of 50,000 or more and a minimum density of 1,000 people/sq. mi., (2) places that contain some urbanized areas within their boundaries, and (3) places with at least 2,500 people and located outside of urbanized areas. Also, areas totally surrounded by urbanized areas but not within an urbanized area are considered to be an urban area (Nowak et al. 2001).

\(^3\) Metropolitan areas as defined by the Office of Management and Budget defines metropolitan areas by county, not places (except in the six New England states). Metropolitan areas have one or more large core populations that are socially and economically linked to adjacent counties. For example, the New York metro area—the largest in the country—covers 36 counties in New York, Connecticut, New Jersey and Pennsylvania (Sherrill 2003).
Chesterfield, Dinwiddie, Goochland, Hanover, Henrico, New Kent, Powhatan, and Prince George). Richmond is located at the intersections of Interstate 95 and Interstate 64. Interstate 295 forms an outer ring around the city.

As State Capitol, Richmond is home to dozens of State Offices including the Science Museum, Supreme Court, and Departments of Education, Environmental Quality, and Game and Inland Fisheries. Richmond is also home to the Secretary of Natural Resources, the Secretary of Agriculture and Forestry, and The Library of Virginia.

Richmond is headquarters to two Fortune 500 companies – Dominion Resources and MeadWestvaco – with other ‘500’ companies in the metropolitan area. The city is home to both the U.S. Court of Appeals for the Fourth Circuit and the Federal Reserve Bank of Richmond.

Richmond is home to the University of Richmond and Virginia Commonwealth University (VCU), with VCU including a medical center. The Richmond region offers undergraduate, graduate and professional degree programs at more than 10 colleges and universities.

In the U.S. Southeast, the area from Richmond to Atlanta (sometimes called the urban Piedmont Crescent), has witnessed a concentration of development. The urban areas of the Piedmont are expected to witness the fastest growth (Alig et al. 2010). According to a University of Utah study (Ewing and Hamidi 2014), Richmond is among a group of large metro areas that ranks near the bottom of the “sprawl spectrum” (the most sprawling large region is Atlanta).


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Richmond Urban Tree Utilization Activities

There are a number of urban/municipal tree utilization activities occurring in the Richmond metropolitan area. The following section summarizes some of these activities.

Tree Service Firms/Private Arborists

TrueTimber Tree Service (http://www.truetimber.net/) is a full service tree care provider based in Richmond. Tree removal, stump removal, tree pruning, and cabling and bracing are services provided by TrueTimber. The firm employs 20+ individuals (four crews) and includes a plant health division.

Peter Giradi, arborist and vice-president of TrueTimber, said, “Our chips go to two main sources, Yardworks and Mulch Unlimited. We produce firewood, donate our better logs to an independent hauler so as to save clients money by reducing labor to haul logs out of their yard, and provide unique pieces to local woodworkers.” Peter noted that TrueTimber’s disposal fee for one year (approximately $26,000 annually) is much less than fuel and equipment fees for the year (approximately $10,000 per month). Peter also stated, “There is not a good nearby fuel market.”

TrueTimber’s crews (in the field) typically make the final decision on whether to make “logs” (from better trees) for the independent hauler. (The independent hauler charges TrueTimber a fee per site; the hauler picks up logs from other tree service firms, and then sells saw logs and pulpwood to an independent mill). TrueTimber occasionally uses a horse logger.

Jamie Swenson Tree Service (http://www.jamieswensontreeservice.com/) offers the typical services one might expect for a tree service firm: tree removal and take-downs, pruning, stump grinding, cabling, etc. What sets this tree service apart from so many other services is that custom millwork, milled lumber, custom furniture, and custom built log cabins are also offered.

Swenson estimates that 60% of the hardwood trees removed by his 4-person firm can be converted to a value-added product. Swenson has family members and friends with sawmills and dry kilns which eases the investment burden on his firm. Swenson also owns an Alaska chainsaw with a six foot bar for sawing slabs such as for table tops.
Swenson said that tree/log sawing is a service he offers to customers. His firm can often turn downed trees into products like tables and other value-added items. One of his favorite stories is about a homeowner that bought a house largely because of the red oak in the front yard. Unfortunately, a storm brought the tree down but thanks to Swenson the tree lives on. Swenson said, “We made a swing set from the tree.”

Humanitree (http://humanitreeservice.com) also offers the customary tree services but includes links on their website to urban harvesting, and the sawmill project. The website notes, “The idea behind our sawmill project is that we needed a more efficient way to turn removed trees into a unique, local Richmond building material. The wood that we harvest can be made into part of someone’s home, a garden shed, or a prized family heirloom. It also may be donated to high school wood shop classes, habitat for humanity, or any other non-profit.”

Arbor Care Professional Tree Service in Hanover County employs Joel Koci as an arborist. Joel currently works part-time with Virginia State University Extension (urban forestry) in Petersburg. Joel noted that most homeowners are fixed on price so utilization is not a big deal to them. He said, “Most folks go with the low bidder.”

Joel said that there are an abundance of portable mills in his geographic area but not many traditional sawmills. There are two portable mills (both Wood-Mizers) that take logs from Joel’s jobs; one mill owner makes furniture. He noted that most mills have “passed the stage” of concern over hardware in the logs.
Joel maintains a list of folks who want chips for their garden or other uses. He never dumps wood at a landfill, including the Richmond “convenience center” (see below). Joel also keeps a list of people who take firewood. He noted, “A lot of wood from ‘take-downs’ goes into firewood.”

In many cases, Joel gives away the wood from tree removals. This results in a better price for homeowners and a good deal for portable mill owners. Joel said, “This saves time for me, creates less mess, and makes clean-up easier on the property.” He also noted that cutting trees into long lengths was preferable to bucking into smaller pieces.

Bartlett Tree Experts was founded in 1907 and has nearly 100 offices worldwide. The Richmond office is managed by Ethan Crockett (http://www.bartlett.com/locations/Richmond-VA.cfm).

Ethan said, “Probably 75 to 80 percent of our material goes to local mulch companies that operate a tub grinder. The other 20 percent or so is left on site for homeowners to use in firepits for example or just left in the woods since many of our jobs take place on a property that is connected to a forest.” Ethan noted that all solid wood (logs) incur a tipping fee (at the mulch site) but chips (and other non-solid wood) incur a tipping fee “sometimes” depending on quality of material, mulch supplies, etc.

Ethan stressed that “efficiencies” need to be built into utilization efforts (for saw logs, for ex.). He said that labor is Bartlett’s biggest cost in the Richmond office so driving around with a log or two needs to be economically effective. Ethan noted that if transportation (Bartlett-provided) were involved, he would likely need to be paid for logs; if someone came on-site to pick up logs, then the material could possibly be donated.

The Davey Tree Expert Company is managed by Mark Bennett in Richmond (Virginia branch) (http://www.davey.com/local-offices/richmond-tree-service/). Mark said that approximately 95% of Davey’s wood goes to a mulch site where anyone, large or small operators, can dump. He noted that no Davey wood goes to a landfill.

Mark stressed that wood is a disposal issue and that sawing logs is not on his “radar.” Also, he said, “Safety is a big concern when removing a tree so sawmill spec’s such as log length are not a consideration for us.”

Arborscapes LLC (http://www.arborscapesllc.com/) also noted (as above) that 95% of their wood goes to a mulch site where it is sorted and either converted to mulch or shipped to a paper mill and/or used for boiler fuel (in other words, the mulch site sorts and sends material to other markets). A tipping fee is paid for logs at the mulch site but not for chips (Arborscapes chip brush and limbs whenever possible). The goal of Arborscapes is to dispose of wood as cheaply as possible (the firm was more “into” grade saw logs and such before the economy crashed). Logistics is a big issue with Arborscapes as well as space (storage area for material).
Wood Residue Recyclers (Mulch)

Gillies Creek Industrial Recycling (http://www.gilliescreek.com) in Richmond (East side) labels itself as a diversified company with products and services to meet the needs of the construction industry. At the firm's headquarters just off I-64, it accepts stumps/brush, concrete/asphalt, crates/pallets and waste dirt/topsoil. Mud and C&D (construction and demolition) debris are accepted at other sites. Gillies Creek has two primary production facilities – a wood grinding plant (mulch) and a concrete crushing plant.

Major products include landscape products (topsoil, shredded mulch, organic fines), crushed aggregates, and fill materials. The mulch is either double or triple shredded; Gillies also does mulch coloring.

Gillies Creek obtains a large volume of their raw material (wood) from land clearers, storm debris, etc. The majority of their sales are in bulk quantities (wholesale).

Gillies Creek is always looking for new markets for their products. Also, Gillies Creek is a member of the U.S. Green Building Council and participates in LEED-certified projects.

Yard Works (http://yardworksva.com/) was founded in 2001 when two manufacturing and recycling companies joined forces. Yard Works has a corporate office in Moseley plus four retail, and three recycling locations, all within the greater Richmond area.

Yard Works products include gravel and decorative stone, mulch (including bagged and playground material), sand, grass seed, straw bales, firewood, and more. Yard Works sells many products directly to the public (retail) as well as operating a wholesale division.

Yard Works also offers site clearing and logging. This includes tub and horizontal grinders that can be taken to a job site such as a golf course, highway, or subdivision.

Wood (Lumber) Reclaimers

Although the following firms do not use urban or municipal trees, their business is oriented towards reusing (reclaiming) wood (lumber).

E.T. Moore Manufacturing Inc. of Richmond, a family-owned business, was established in 1969 (http://etmoore.com/). Today, the firm proudly proclaims itself as the world’s largest producer of vintage pine products.
E.T. Moore’s specialty is salvaging and re-milling heart pine (longleaf pine) from old mills and factories. Products include flooring, lumber, mouldings and components, wood beams and mantels, custom home building, and more. Species offered by E.T. Moore include (in addition to heart pine) red cypress, spruce, hemlock, Douglas fir, and oak.

E.T. Moore has warehouse space of 250,000 square feet, and stores over 2.5 million board feet of lumber products. The warehouse and offices sit on a 30 acre tract of land.

Tektonics Design Group (http://www.tektonics.com/) is a full-service design and manufacturing firm offering industrial design, product development, machining, fabrication, and laser marking. Founded in 2003, Tektonics is comprised of industrial designers, artists, blacksmiths, machinists, sculptors, and tradesmen, dedicated to crafting unique design solutions.

Owner and architect Chris Hildebrand said, “Our focus now [in terms of wood] is on heart pine from salvaged buildings.” Chris sees himself as an urban tree hobbyist which he described, “I have the interest, but not the time.”

Chris noted that there is not much coordination between the key players in urban tree utilization such as the city, homeowners, private firms, hobbyists, etc. He said, “Key equipment is a big part of better utilization.” He also added that he would saw trees on site if he owned a tree service firm.

One of his recommendations is that the city (Richmond) needs to make boards. If boards were made, Chris said, “Then I’d look at them.”

Wellborn & Wright (http://www.wellbornwright.com/) specializes in reclaimed wood surfaces (antique) including flooring, beams, paneling, lumber, furniture, and barn wood. Species include oak, heart pine, chestnut, hickory, elm, cypress, redwood, Douglas fir and more. The majority of the company’s wood comes from agricultural structures, while timbers (beams) are typically salvaged from industrial factories.

Holland Rhoads, president of Wellborn & Wright, noted that urban tree salvage is done on occasion (walnut for ex.) after a lightning strike or blow-down. However, he pointed out liability issues when entering private property. He also said, “A kiln is needed to dry the wood, or we need to sell to folks who have a kiln.”
Eco Supply Center ([https://www.ecosupplycenter.com/](https://www.ecosupplycenter.com/)) distributes a variety of sustainable and high performance building materials for interior and exterior applications. The firm grew out of cabinetry and fine furniture shops which prioritized the use of sustainable materials in design and fabrication.

Eco Supply was one of the first cabinet shops to be FSC certified in the U.S., and Eco Supply’s distribution company is a FSC chain of custody certified. The firm has LEED AP’s and Passive House consultants on staff.

Anthony Braza, Eco Supply owner and furniture maker said, “We mostly salvage old barns for raw material.” Braza also noted that because of metal in city trees, “It’s hard to make money salvaging trees.”

Surface Architectural Supply ([http://www.surface-supply.com/](http://www.surface-supply.com/)) of Richmond is a family business founded by Hunter and Kirsten Webb. The firm specializes in sourcing reclaimed materials (wood) to produce custom flooring and other architectural components. Species include oak, pine, chestnut, walnut, and cherry. Much of the reclaimed wood comes from barns – hay storage, grain storage, horse, cattle, etc.

Hunter owns a Wood-Mizer portable mill. He said, “I have done some work for clients on tree products, but our focus now is on salvaging old buildings.”

Hunter stressed the importance of moving tree parts from one urban location to another. He said, “Transportation can be a big deal! And nails and other hardware can be a problem.” He also noted, “I don’t know who to call if I see a good tree marked for removal by the city.”

Niche Urban Tree-Based Businesses

New Earth, LLC ([http://newearthva.com](http://newearthva.com)) of Richmond, is owned and operated by Paul Iwashchenko. New Earth services include (1) contractor services – specializing in historic renovations – (2) real estate – buying and selling homes, and (3) additions and remodeling.

Manufactured (wood) products include custom woodworking and furniture, salt and pepper mills, and beams/boards. New Earth works with a host of species including ash, walnut, red and white oak, poplar, beech, birch and cherry. Landscaping boulders and rocks are also sold.

New Earth has about a dozen employees and has been involved in harvesting trees, cutting wood, making products, etc. for more than 8 years. New Earth has its own sawmill and produces products to fit the
needs of the customer (beams for example). Paul said, “I’ve gotten logs from the City and also from tree service guys.”

Citiwood is owned and operated by Ed Bath. Ed’s niche is making and marketing “tap handles” for breweries – Richmond to Texas to California. He uses fallen trees for his products which include tasting paddles and furniture. Ed uses all species of wood (although pine and walnut are NOT high on his list because of engraving issues). He sometimes works with arborists in obtaining logs for his projects but because of the small size of his raw material use, he is not dependent on them. Ed said, “The potential for using fallen urban trees in Richmond is exceptional.”

Ed has two dry kilns – a solar and a Nyle – two laser engravers, a Lucas portable mill, and a lathe. He also makes wooden plaques and other products but found that his niche was tap handles. In Richmond, Ed’s work can be seen at the Hardywood Park Craft Brewery (HPCB). He also partners with another local crafts person (user of fallen trees also) who makes furniture for local restaurants and who has the equipment to transport large logs.

HPCB recently purchased land in Goochland County and asked Citiwood to use recycled trees to help in construction of the brewery. In addition to tap handles, Citiwood will be supplying HPCB with beams, flooring, furniture, signs and more.

Richard O’Dell is a graduate of Virginia Tech in Blacksburg, VA. Richard has a Baker portable diesel mill equipped with hydraulics. He describes his operation as a “hobby business.” Richard has used urban logs in the past but notes that he is “picky” when it comes to sawing logs.

Richard states, “I never pay for urban logs since they often have foreign objects in them. Even a hand-held metal detector is not good enough for me since sometimes a log will have a nail buried more than six inches.

Occasionally, a tree service firm drops logs at/near Richard’s mill. This is a “no out-of-pocket expense” for both parties.

Jamison Henley has a small business that has found a niche in the Richmond area. Jamison has one log truck (approximate capacity of 18,000 lbs.) and one fork lift. He charges tree service firms ($150/site) to remove saw log and pulpwood-size material from their worksite. Jamison then trucks and resells the material to a third party.

Jamison said, “My logs go to the paper industry. Whatever species I deliver – oak, pine, maple, gum for instance – the paper mill takes it all.”
Power Plants/Paper Mills

The Hopewell Power Station is a 51MW biomass-fueled electric generation facility located about 25 miles from Richmond. Originally designed to use coal, Dominion Virginia Power converted the station to biomass in 2013. The fuel is primarily wood waste left behind in the forest by the logging process. Some urban wood (trees) are used as fuel (obtained from Richmond area private arborists).

According to Randy Fields at the Hopewell Station (https://www.dom.com/corporate/what-we-do/electricity/generation/biomass/hopewell-power-station) the first order of business (as far as selling material to the Hopewell plant) is to be set-up as a boiler fuel supplier. Second, a chipper or grinder (can be expensive!) is needed to convert trees into a useable form. Lastly, an 18-wheeler is needed to transport and dump the material (the Hopewell plant is set up to accept tractor trailer loads only). All tree species are accepted and the wood must be free of dirt, plastic and other contaminants. Pallets are NOT accepted. Current delivered price, as of April 2015, is about $22 - $23 per ton.

Bear Island Paper Company in Ashland, Virginia has a sporadic need for boiler fuel at different times of the year (contact Scott Ricketts at 804-393-1125). Chip size is 4 -5 inches maximum (a standard chipper should provide proper sizing). As noted with the Hopewell Station (above), trucks transporting chips are 18-wheelers. Trucks disconnect before unloading and the entire trailer is lifted and dumped; consequently, small trucks/vans cannot deliver to Bear Island.

City of Richmond/Community Projects

Richmond’s Urban Forestry Division is housed in the Department of Public Works. The City of Richmond has been a Tree City USA for over 20 consecutive years. The Urban Forestry Division has approximately eight maintenance personnel and two arborists (down from four arborists in the past). The lead arborist/city forester is Luke McCall. Tree “climbing” and many other maintenance functions are contracted to private firms due to staffing issues. Approximately $600,000 per year is paid to outside firms for tree maintenance work. The majority of City tree removals are ground for mulch.

Richmond’s Urban Forestry (UF) Division has four Prentiss loaders plus a fifth that has been modified to work in tandem with a stump grinder. As with many communities around the country, safety is a big issue in Richmond. After a storm event, opening streets, clearing power lines, etc., by the UF Division, takes precedence over traditional tree utilization (log sales for example). An estimate of 99% of the UF Division’s tree and brush removals is dumped (no tipping fee) at the City’s “Convenience Site” (operated by Richmond’s Solid Waste Division); the material is ground into mulch.
The City of Richmond participates in Project WARM (Wood Association of the Richmond Metropolitan Area). The Salvation Army and JC’s are also active in the project. Project WARM provides firewood to needy individuals (identified by the Salvation Army). The City bucks logs into firewood size and then volunteers split and deliver the wood. Although a worthwhile effort, Project WARM can be a drain on the UF Division’s time and resources. Also, in recent years, the City is not removing as many trees per year that qualify for this program.

Richmond’s Solid Waste (SW) Division operates a green waste dump, referred to as the “Convenience Site.” This site is free (no tipping fee) and is for the use of private citizens as well as the SW and UF Divisions. Once a year or more, the SW Division hires a tub grinder to convert the trees, limbs and so forth into a mulch-type product. The ground material is then trucked off-site.

During a recent storm that hit the Richmond area, the Convenience Site was designated by FEMA as a collection point for trees, limbs, etc. Other sites in the area—such as right-of-ways and open fields—were also deemed appropriate by FEMA as collection points.

Non-Profits/Virginia Government Offices

The City of Richmond Urban Forestry Commission is a volunteer and advisory group chaired by Andrea Almond, a Landscape Architect with 3north. The city council and mayor appointed the Commission in 2010. One of the Commission’s roles is to serve as a liaison between private citizens and the Department of Public Works/Division of Urban Forestry. The Urban Forestry Commission has been a strong advocate for forestry and tree-related projects in Richmond. (See: http://www.richmondgov.com/commissionurbanforestry/index.aspx).

Richmond Tree Stewards (http://richmondtreestewards.org/about-us/) has been an active organization since 2007 when the dormant group was revived. The group works closely with the City of Richmond Urban Forestry Division to plan projects, events and classes consistent with the mission to care for the urban forest and provide education. Sample activities of the Tree Stewards include watering trees, pruning projects, mulching, and tree planting.

The Virginia Department of Forestry (DOF) http://www.dof.virginia.gov/ is headquartered in Charlottesville. Paul Revell leads the Urban Forestry program for Virginia. In addition to providing overall coordination and leadership for the Richmond project (this study), Paul has established an Urban Forest Strike Team program to document—following a major storm event—existing public property trees needed for FEMA reimbursement.

Charlie Becker is the Utilization & Marketing Forester for the DOF. Charlie, like Paul, has statewide responsibility for his area of expertise. Charlie is the “go-to guy” in Virginia regarding primary and secondary mills/wood producers (loggers, timber buyers, saw mills, pulp and paper mills, pellet plants, specialty wood mills, etc.). Charlie oversees a grant titled “Addressing
Opportunities and Issues to Develop Service Providers and Wood Products from Interface and Urban/Urbanizing Areas.” Charlie has contracted with Virginia Tech to do the survey and analysis of the barriers to utilization of interface and urban wood throughout Virginia (plus North Carolina and Georgia).

The Virginia Department of Transportation (DOT) is divided into nine districts across the Commonwealth. Each district has a Roadside Manager that oversees tree planting, tree removal, etc. in their jurisdiction (multiple counties). The Richmond Roadside Manager is Chris Terry who oversees 14 counties. Chris is an arborist by training and has two arborists that report to him.

The DOT contracts out their work to private firms for tree removal. The DOT doesn’t have any equipment (chippers for ex.) so their responsibilities include drafting contracts and monitoring work. Contracts are typically written so that any wood generated on the work site becomes the property of the contractor (often the contractor is a tree service firm). The contractor, in turn, is free to use the wood for any legal purpose. Sometimes a contract is written (site specific) so mulch (wood chips) must be delivered to the road-kill compost yard near New Kent, east of Richmond (the wood chips are mixed with road-kill animals to produce compost that is highly demanded for use as a soil amendment).

Related Businesses

Woodcraft of Richmond (http://www.woodcraft.com/stores/store.aspx?id=325) is dedicated to the woodworking hobbyist and contractor. Wood, finishing supplies, and tools and equipment are some of the products offered in the Glen Allen store. Also, the firm stocks 3,000 board feet of kiln dried lumber, provides meeting space for four wood turning groups, hosts numerous workshops including woodworking fundamentals and lathe turning, and has an upcycling and repurposing project area that focuses on reusing pallets, old doors, whiskey barrels and other lumber products.

Summary of Urban Tree Utilization in the Richmond Area

The above overview of Richmond and sampling of its current tree utilization activities lead to the following observations:

• **Innovative and entrepreneurial tree service firms (private arborists) exist in the Richmond area** – Log sawing, furniture-making, and custom millwork are a few of the products/services offered by some tree service firms.

• **A large percentage of tree take-downs (including limbs, brush, etc.) by tree service firms end up as mulch and/or are diverted from landfills** – It appears that mulch locations (drop-off sites for tree residue) serve as distribution yards (or potential distribution yards) for other markets such as pulp and paper, boiler fuel, etc.
• Fuel expenses (related to transportation), equipment costs, labor costs, and disposal fees, along with storage space for tree materials, hinder enhanced urban tree utilization – This is especially true among tree service firms. The “efficiencies” of enhanced urban and community tree utilization are critical to success.

• Tree disposal costs are NOT necessarily the largest cost (financial burden) of organizations that remove urban trees – As noted above, items such as labor, equipment and fuel can be very costly.

• The mulch industry (wood residue recyclers) is large in the Richmond area – Many of the larger tree service firms send the majority of their trees to the mulch industry. This observation fits with the pattern of a growing population base (more homes, businesses, etc.) that need/want mulch and related products. Understanding the mulch industry appears to be key in better understanding urban tree (wood) flow in the Richmond area.

• Boiler fuel is a potential market for the Richmond area – However, the direct costs of engaging in such a market are enormous (tub grinders, 18-wheelers, etc.). Partners (collaborators) are needed (likely) to tap into this market.

• The City of Richmond is involved in innovative programs like Project WARM and the Convenience Site - An understaffed Department of Public Works, Urban Forestry Division (2 arborists), however, hinders additional creative programs beyond day-to-day activities.

• Historic preservation, renovation and the use of reclaimed lumber is significant in the Richmond area – Many firms specialize in this industry niche including builders, lumber reclaimers, architects and more.

• Niche businesses related to urban tree utilization exist in the Richmond area – Included in these niche businesses are saw millers and tree material aggregators that deliver products to various end-users.

• There is strong advocacy for urban forestry programs among Richmond area non-profits and governmental agencies - These groups have also been in the forefront of pushing for enhanced urban tree utilization.

• Enhanced coordination among key players is needed – This includes not only identifying the key players but providing a forum for key players to explain their points-of-view, services and products offered, identification of markets, etc. The upshot of this observation is that a “leader” is needed, especially one that can bridge the gap between private and public sectors.

• Additional aggregators are needed – Most organizations (private or public) are not in the business of a profit-centered urban tree utilization project. Consequently, there is a need for additional aggregators (and/or collection sites) of tree material (logs, limbs, brush, etc.). These aggregators, in turn, can sort and market the material(s).
Part II

What is an Industry or Business Cluster?

This section of the report introduces the concept of industry clusters, outlines the research-based cluster ingredients for success, and describes the clustering components of urban tree utilization in the Richmond metropolitan area. Recommendations for starting or expanding urban tree utilization activities on a community-wide basis are offered.

From a definitional standpoint, industry clusters are groups of firms and/or organizations located within a defined geographic region who have developed cooperative links with one another through value and supply chains, labor, and use of similar inputs, technology, and complementary products. Another way of thinking about this concept, is that a cluster is any instance of closely located (i.e., geographic proximity) and closely aligned operations (i.e., high frequency or number of transactions, or closely related product lines). For a cluster to flourish, it is necessary that the parties involved receive a mutual benefit.

Clusters can be formally organized through trade associations, buyers groups, or cooperatives, or developed through an informal manner (e.g. via friends, families, or neighbors). Some clusters are developed intentionally through government intervention or actions by a development agency, while others evolve as a result of local entrepreneurs that discover, and seize, new market opportunities.

A benefit of clusters is that they often provide benefits of efficiency, enhanced productivity, and greater resilience to members due to the synergies and relationships they support. On the downside, clusters have been known to create conditions of co-dependence, which can limit any individual participant’s ability to innovate. Interdependence can also contribute to the quick demise of enterprises due to significant changes in economic, social, or environmental conditions.

Examples of well-known clusters throughout the U.S. include the high technology-oriented (computer) industry in Silicon Valley, California; the automotive industry in and around southern Michigan; the movie production industry in and around Hollywood; and the Research Triangle Park cluster in North Carolina. On a smaller scale, wood-based clusters include the Amish furniture industry in Holmes County, Ohio; the Forest Industry Park in Ladysmith, Wisconsin; and the wooden boat cluster in Port Townsend, Washington.

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9 The auto industry has been one of the most recognized industry clusters in the U.S. For decades, hundreds of firms clustered around this core industry to provide supporting services and product. Today, some of the shortcomings of clusters can be illustrated within this industry sector.
Ingredients for a Successful Cluster

In 2008, the U.S. Endowment for Forestry and Communities commissioned a study to examine the status of, and opportunities for, business clustering within the U.S. forest products sector and other closely aligned sectors. One of the outcomes of this study was a summary and description of ingredients for a successful industry cluster. The ingredients for success include:

- Feasibility analysis
- Education, technical and research support
- Supportive government actions including financial grants
- Supporting and complementary industries
- Entrepreneurship and innovation
- Access to raw materials, markets and transportation networks
- Leadership, commitment and collaboration
- Business climate

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11 Because clusters can initially form and grow in different ways (via entrepreneurship, government intervention, cooperatives, etc.) the elements or ingredients for success can vary from the above list and include other ingredients such as private financing (private investment), labor resources, and overall infrastructure including availability of utilities, buildings, building sites, work force, etc.
In any given cluster, certain ingredients will be more important or critical for success than others. For example, *entrepreneurship and innovation* might be the critical ingredient for a business person developing a new product in an untapped market which can lead to a wave of similar industries in a geographic region. Likewise, *leadership, commitment and collaboration* spearheaded by a champion (individual or group) are often vital to jump-start a cluster such as in the case of an industrial park development. Regardless of the critical key to success, most successful industry clusters will exhibit most, if not all, of the above *ingredients* during their development and initial expansion.

**The Cluster Model Applied to the Richmond Metropolitan Area Urban Tree Utilization**

The following section highlights the above *ingredients for success* with a brief explanation of the ingredient (element) adapted from the U.S. Endowment report (*in italics*). This explanation is followed by a description of activities related to the city of Richmond (and greater metropolitan area) urban tree utilization.

**Feasibility Analysis**

*A feasibility analysis serves as a starting point for activities leading to the development of new, or expansion of existing, business clusters. To capture market potential, the analysis should include assessment of a region’s economic conditions, raw material supply, labor resources, existing infrastructure, potential markets and development opportunities—including types of new industries that would complement existing firms.*

There exist a number of statewide assessments or feasibility analyses that include urban and community forestry. One example is the Virginia Statewide Assessment of Forest Resources ([www.dof.virginia.gov/print/aboutus/2010-State-Assessment.pdf](http://www.dof.virginia.gov/print/aboutus/2010-State-Assessment.pdf)). Other examples include urban and community forestry studies conducted for Roanoke, Radford, and Fairfax County (see references at end of report). A street tree assessment for Richmond (and a host of other communities) was conducted by Virginia Tech using the i-Tree Streets model developed by the USDA Forest Service ([http://urbanforestry.frec.vt.edu/STREETS/reports.html](http://urbanforestry.frec.vt.edu/STREETS/reports.html)). None of these studies however, investigated urban and community tree utilization.
Education, Technical and Research Support

*Education, technical and research support is important for the growth of a business cluster. The role of public and private universities, community and technical colleges, public agency outreach programs, and training activities sponsored by trade organizations are vital.*

As noted earlier in this report, the Richmond area is home to 10 colleges and universities. Many of these post-secondary schools have outreach programs and/or serve non-traditional (older) students. There is also a mix of private, public, community and technical schools among Richmond’s colleges and universities.

Woodcraft of Richmond, as one example, is a private firm that teaches woodworking and related skills to a variety of audiences. Providing meeting space and serving as host to established groups (woodturners) are other services offered.

Expo Richmond (East Coast Logging and Equipment Exposition) is a bi-annual event that attracts exhibitors and visitors from around the nation ([http://www.exporichmond.com/index.html](http://www.exporichmond.com/index.html)). The exposition includes firms specializing in logging equipment, saw mills, saw blades, chain saws, conveyors and log splitters, shredding machinery and debarkers, forestry tools, trucks and trailers, lumber dryers, insurance, and more. Education/technical sessions are also offered during the event.

Nearby, Charlottesville is headquarters for the Virginia Department of Forestry, Urban & Community Forestry program ([http://www.dof.virginia.gov/forestry/community/index.htm](http://www.dof.virginia.gov/forestry/community/index.htm)), the Virginia Natural Resources Leadership Institute ([http://www.virginia.edu/iem/vnrli/](http://www.virginia.edu/iem/vnrli/)), and the Green Infrastructure Center ([http://www.gicinc.org/index.htm](http://www.gicinc.org/index.htm)). The latter has developed a GIS-based map of Richmond’s empty city lots (possible sites for log yards).
Supportive Government Actions including Grants

Government—local, regional, or federal—often plays a key role in cluster development and/or expansion. In some instances, public dollars or human resources are needed to jump start a cluster initiative. In others, government can contribute by assisting struggling clusters regain lost momentum and direction.

The Virginia Urban Forest Council (Trees Virginia) is a State and Federal 501©(3) non-profit organization based in Charlottesville (http://www.treesvirginia.org/). The mission of the Council/Trees Virginia is to enhance the quality of life through stewardship of Virginia’s urban and community trees. Founded in 1990, and incorporated in 1991, the organization received seed funds from the USDA Forest Service, and is supported by the Virginia Department of Forestry.\(^{12}\)

One of the outreach efforts by the Urban Forest Council/Trees Virginia is the Tree Stewards program. Tree Stewards (nine groups statewide) are trained community volunteers who provide classes, educational programs, and projects in their communities. The city of Richmond has an active Tree Stewards program( http://richmondtreestewards.org/).

The Urban Forestry Commission was established by the Richmond City Council to help improve the City’s urban forestry resources through policy, development, fundraising, advice, and education (http://www.richmondgov.com/commissionurbanforestry/index.aspx). The Commission meets monthly to achieve these goals, and serves as an advisory body to the Department of Public Works and the Richmond City Council.

Supporting and Complementary Industries

Business clusters often provide benefits of efficiency, enhanced productivity, and greater resiliency to members due to the synergies and relationships they support.

There are various industries (large and small) that either directly or indirectly support one another regarding urban tree utilization in the Richmond area. One example are tree service firms that pay an independent contractor to remove wood from their work site; the contractor then resells the material to a traditional forest products industry for pulp wood and/or saw logs. Another example is where a tree service firm dumps material at a mulch site; the material (logs, limbs, brush, etc.) is separated into various product categories and then either converted to mulch or sent to other markets. A third example is where tree service firms deliver logs to an individual who crafts the log into (say) a furniture piece. All of these activities are examples of supporting and complementary industries. This connection is key to cluster development and success.

\(^{12}\) Support is also received from the Mid-Atlantic Chapter of the International Society of Arboriculture, and the American Grove.
Entrepreneurship and Innovation

*Entrepreneurial thinking by the leadership of cluster businesses, governments and supporting organizations is crucial to success. Entrepreneurship is instrumental in helping identify niche markets, stimulating innovativeness, and in developing competitive advantage.*

Entrepreneurship and innovation can develop in many sizes and forms. In fact, the different methods and approaches employed by entrepreneurs and innovators is a strength of this business cluster key ingredient. The following examples illustrate this key ingredient.

As noted earlier in this report, some Richmond area tree service firms offer products and services that set them apart from typical tree service firms. Offerings include log sawing (milled lumber), custom millwork, custom cabinets, Habitat for Humanity lumber, shed construction, and more.

Historical Woods of America (HWA) ([http://humanitreeservice.com](http://humanitreeservice.com)), although not based in Richmond, has turned Richmond trees into reclaimed products above and beyond firewood and mulch. HWA, based in Woodford, VA, south of Fredericksburg, uses downed trees or timbers from historic sites and reclaims them as writing instruments, furniture, artwork, sculpture, historical memorabilia, flooring, architectural moldings and raw timber.

Historic preservation and renovation (using reclaimed lumber) is especially strong in Richmond, due in part to its close to proximity to Williamsburg. As mentioned above, many Richmond firms are engaged in this business venture (examples include E.T. Moore, Tektonics, Wellborn & Wright, Eco Supply, Surface Architectural Supply, and New Earth).

All of the above examples illustrate that entrepreneurship and innovation is alive and well in the Richmond area.

Access to Raw Materials, Markets and Transportation Needs

*Access to raw materials (inputs) and markets is crucial to cluster development and long-term viability. A dependable flow of raw materials and stable markets for products and services are key to sustainable clusters. An adequate transportation infrastructure is needed to ensure access to raw materials and markets.*

One tree service in Richmond estimated that the area is likely home to 100 or more tree service firms. The City of Richmond removes approximately 1,000 -1,200 trees per year. Richmond is also a sprawling community, gobbling up chunks of tree-covered land for new homes, industrial sites, and roads. All of these factors guarantee a constant supply of raw material (trees).

The expanding population of the Richmond area bodes well for markets as the potential customer base grows. Consequently, markets for landscape materials such as mulch and
compost, lumber, specialty wood products, etc., should remain strong. Producers of urban wood products can advertise, sell, and distribute their items to a large and growing population.

Richmond is at the crossroads of two interstate highways (I-64 and I-95) which assist in moving raw materials and products to market in a relatively efficient manner. Also, an international airport is conveniently located in Richmond.

Leadership, Commitment and Collaboration

*Leadership by a third party (industry, non-profit organization, public entity, etc.) is often needed to coordinate activities of stakeholders involved in developing a business cluster. An umbrella organization can help cluster businesses and organizations identify niche markets, assist with workforce training and development, seek financial resources, improve networking among cluster members, educate businesses about the benefits of clustering, and gain political support for the cluster. It is important that cluster stakeholders, representing industry, government, and supporting organizations work together to create a long-term vision for the cluster and use strategies and policies that support cluster development.*

Two groups stand out as providing leadership for enhanced utilization options for Richmond area urban trees. First, the Urban &Community Forestry program within the Virginia Department of Forestry has provided leadership to not only Richmond, but to the entire state in the form of financial grants, co-sponsoring of events, and other forms of support. Second, the local group in Richmond that has spearheaded efforts relating to urban tree utilization (specifically, this grant) is the Urban Forestry Commission (UFC). The UFC is an interdisciplinary group comprised of nine voting members, three members appointed by the mayor and six appointed by the City Council.

The VA DOF Urban &Community Forestry program and the Urban Forestry Commission work in a collaborative fashion with many entities to accomplish their goals. Also, both groups are very committed to the ideals of a strong urban forestry program in Richmond.

Business Climate

*A supportive business environment is crucial to the development and strength of business clusters.*

Urban tree utilization is essentially a *recycling* activity since tree removals are diverted from the waste stream into useful products. Since recycling is typically considered a *green* activity, the utilization of discarded urban trees is recognized as a green behavior. The City of Richmond hosts a number of green activities on an annual basis (see: [http://www.visitrichmondva.com/events/greenevents/](http://www.visitrichmondva.com/events/greenevents/)).

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13 Interstate 85 also ‘funnels’ into Richmond on the south side of the City.
The City of Richmond offers curbside recycling. Recyclable items such as newspapers, mixed paper, aluminum cans, etc. can be mixed together in a homeowner’s recycling bin. Four drop-off recycling centers in the City can be used by apartment complexes and businesses.

The Sustainability Park near Chester (south of Richmond) is an example of forward thinking relating to the environment (http://www.thesustainabilitypark.com/index.htm). Founded in 2006, the eco-industrial park is a collection of manufacturers providing green jobs and new technologies including renewable energy. Tenants’ services include LEED certification, biomass production, logistics, warehousing, C&D (construction and demolition) processing, retail and community outreach.

As the above examples demonstrate, the business climate in the Richmond area supports green activities. Therefore, urban tree utilization will benefit from this on-going behavior.

Recommendations for Advancing Urban Tree Utilization Clustering in the Richmond Area

The following recommendations are offered in no particular order. However, the recommendations are based on numerous personal interviews, site-visits, observations, past experiences in working with urban tree utilization clusters, and review of public documents.

• **Conduct a feasibility study** - This is the starting point for advancing the idea of business clustering as it relates to urban tree utilization. A feasibility study should include a comprehensive inventory of tree removals, including leaves, limbs and branches (tree pruning residue), and a categorization of these removals (saw log quality, pulp wood, firewood, etc.). The protocol used in southeast Michigan is a model worth adopting and/or adjusting for the Richmond area (MacFarlane 2007).

• **Evaluate the overall business climate in terms of economic conditions, existing infrastructure, labor resources and other factors** - This effort can be included in the feasibility study if time and resources permit; if not, a separate analysis should be conducted. Strategies that “make it pay” to better utilize urban trees should be carefully examined. Sometimes a “make it pay” or “make a buck” message is quickly dismissed when a producer (say, a tree service business) contemplates the additional expenses that his/her firm might incur to better utilize trees (bigger/longer trucks, portable mill, drying capabilities, etc.). Another method of describing this issue is to talk in terms of “cost-avoidance.” All firms, big or small, urban tree utilizers or non-utilizers, can relate to the message of cost-avoidance. Since tree service firms (as an example) are not in the business of making wood products or salvaging tree parts, the concept of “cost-avoidance” might be an easier sell than scenarios describing a profit-center from tree utilization.
A public education campaign (tied into recycling awareness and the *green* movement) and coupled with better markets for urban tree products is needed in the Richmond area. For example, recycling messages (whether in suburban newspapers, bill boards, radio or television ads, etc.) should include urban trees in a list of recyclable items such as aluminum cans, mixed paper, and newspapers. The same is true for the “buy local” movement – lumber and lumber products in addition to mulch, compost, and firewood should be touted as a product that can be produced in the Richmond area. Tying urban tree utilization into the existing reclaimed lumber movement is a strategy that should be investigated.

Since “lack of space” and “transportation costs” were common themes undermining innovative urban tree utilization, an idea is to locate tree drop-off points (yards with free or reduced tipping fees) around the Richmond area. These public/private yards could become utilization centers (hubs) for log sorting and sales, log sawing, etc. (a person with experience in operating a log yard should oversee this effort). Existing disposal locations, such as mulch sites, should be contacted first to discuss the pros and cons of such a strategy. Also, sites within the city of Richmond (Green Infrastructure Center study) and EPA brownfield sites should be considered as possible locations for log yards.

- **Collaborate with stakeholders from industry, government and supporting individuals and organizations** - The key is to get buy-in from various stakeholders and develop a vision for utilization of urban trees including next-steps and action items. It is important that stakeholders share key information with one another (without divulging company or organizational secrets). Storage space and transportation costs (as noted above), equipment, tipping fees, etc. are some of the issues that need to be “on the table” for meaningful collaboration to take place. Different stakeholders often have different “issues” so better communication is needed between the groups (for the betterment of everyone).

- **Select a leader to coordinate activities, facilitate development and gain policy support** - The leader or champion does not necessarily have to possess a utilization background but should strongly support the utilization effort and should have the ability (and time!) to use his or her position to “rally the troops.” A local and respected urban forestry leader could fill this role.

- **Secure funding** - Financial resources, both private and public, are important to support feasibility studies, technology development, workforce training, capital investment, applied research and other project components. Funding sources can include national, state, or local. Programs directed at wood utilization and urban forestry efforts are obvious avenues for obtaining funding but broad-based recycling grants, small business loans, and bio-based energy programs (as examples) can also provide direct financial support for urban tree utilization.
• **Focus on education and engagement of entrepreneurial thinking and innovation** - Support the creation of a position with the assigned duties of ‘urban wood utilization’ either for Richmond or in a statewide capacity (perhaps based in Charlottesville). A person in this capacity can efficiently focus on education and training opportunities for arborists (log manufacturing, grading, transport, etc.), assist and encourage start-up urban wood businesses, conduct utilization-based feasibility studies (see above), and become a focal point for technical/hands-on utilization activities.

• **Nurture supporting and complementary industries** - An important task of either the leader/champion, urban wood specialist, or key stakeholder(s) is to facilitate partnerships and relationships (formal or informal) between the numerous industries (and organizations) that are in the cluster (or beginning stages of a cluster). This effort should show cluster members how their businesses are interconnected and dependent on one another from procurement of raw materials (such as a boulevard tree) to production, marketing and distribution of end-products (such as mulch, firewood, lumber or furniture).

• **Recognize the differences in types of clusters and act accordingly** - One strategy for cluster development is to select or nurture one of four models as a starting point, or build upon what already exists (see earlier description of cluster types). This can help focus efforts and provide a framework for collaborative work. Richmond (especially the private sector) appears to be in the early stages of a Marshallian cluster – one that is typically comprised of small and medium-sized companies that trade their products and services with other cluster members.

• **Develop a Richmond regional list of small saw mills, loggers, timber buyers, and forest product manufacturers** - A directory is needed for “small” timber users in the area. The mills, loggers, and others on a potential “small producer” list are often not included in a statewide directory of primary and secondary producers. The list should be specific to the Richmond area. Minnesota (Twin Cities), Michigan (Detroit) and Illinois (Chicago) have produced a list for specific metropolitan areas.

• **Work closely with the existing mulch industry** – Since mulch is a large and seemingly growing market in the Richmond area, innovators and entrepreneurs should explore ‘other’ products that could be manufactured from urban trees that fit with the mulch industry. Landscape timbers and rustic fencing are two possible products that could be produced, and sold with, more traditional mulch products.
Bottom Line

The Richmond metropolitan area is home to over 1.2 million people, and growing. East central Virginia (which includes the capital city of Richmond) supports a strong forestry and forest products industry. Historic preservation and renovation are important businesses in the Richmond area, due in part to the proximity of Williamsburg.

Richmond, and the surrounding area, is home to “under the radar” firms currently utilizing urban trees beyond the traditional products of mulch and firewood. Evidence of an emerging urban tree business cluster can be found in the private sector, but a leader is needed to move the momentum forward. An urban tree utilization leader can mobilize both private and public sectors to collaborate on issues that impact both groups. A leader could also provide the spark for a much-needed feasibility analysis in Richmond that estimates tree removals and potential products.

A step the City could take immediately, without an outlay of money, is to provide leadership for a directory of “small” timber users in the Richmond area. The mills, loggers, and others on a potential “small producer” list are often not included in a statewide directory of primary and secondary producers. The directory could be compiled by a third-party. However, the City should take the step to get the ball rolling.

Part III.

Urban Forestry Program Assessment

Included within the scope of the project was an assessment of the overall urban forestry program capacity and operations to identify and evaluate core strengths and opportunities. This assessment process was informed by several existing approaches to system evaluations and forestry assessments.

Description of Assessment Design

Urban forest assessments typically address the inventory and evaluation of the urban forest, including street tree inspections and records. However, in this project with the city of Richmond, the objective was to evaluate the urban forestry program itself. To do this, three activities were undertaken:

1) a review of program materials (e.g., policies, accomplishment reports, communications, and other documents);
2) a site visit to interview staff, tour the city, and observe program activities and outcomes on the ground; and
3) a survey of external stakeholders to gather their input into the identification of program strengths and opportunities.
The assessment design was informed by the facilitation and planning process used by Dovetail Partners, including application of the Mobius Model described below. The assessment design was also informed by experience with third-party forest certification systems. To date, third-party forest certification systems (including the programs of the Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC)) have generally been applied to rural forestry systems, including commercial forest management. However, a review of some of the standards for these programs (Table 1) illustrates that they have broad applicability to the practice of forestry more generally.

Table 1. Principles for the FSC and SFI certification programs

<table>
<thead>
<tr>
<th>FSC Principles</th>
<th>SFI Principles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Compliance with Laws and FSC Principles</td>
<td>1. Sustainable Forestry</td>
</tr>
<tr>
<td>2. Tenure and Use Rights and Responsibilities</td>
<td>2. Forest Productivity and Health</td>
</tr>
<tr>
<td>4. Community Relations and Workers’ Rights</td>
<td>4. Protection of Biological Diversity</td>
</tr>
<tr>
<td>5. Benefits from the Forest</td>
<td>5. Aesthetics and Recreation</td>
</tr>
<tr>
<td>8. Monitoring and Assessment</td>
<td>8. Legal Compliance</td>
</tr>
<tr>
<td>10. Plantation Management</td>
<td>10. Training and Education</td>
</tr>
<tr>
<td></td>
<td>11. Community Involvement and Social Responsibility</td>
</tr>
<tr>
<td></td>
<td>12. Transparency</td>
</tr>
<tr>
<td></td>
<td>13. Continual Improvement</td>
</tr>
<tr>
<td></td>
<td>14. Avoidance of Controversial Sources including Illegal Logging and Offshore Fiber Sourcing</td>
</tr>
</tbody>
</table>

In addition to the various forest certification programs, there are other certification and recognition programs that are directly applicable to urban forests and urban forest products. These include:

- *Tree City USA, Arbor Day Foundation and the National Association of State Foresters*
  Richmond has been a recognized Tree City for over 20 consecutive years. The program requires that the city have a Tree Board or Department; A Tree Care Ordinance; A Community Forestry Program with an annual budget of at least $2 per capita; and an Arbor Day observance and proclamation. More information is available at: [http://www.arborday.org/](http://www.arborday.org/)

- *Urban Forest Sustainability & Management Assessment, USDA Forest Service Centers for Urban and Interface Forestry*
  This is a new program that can help urban forest programs benchmark their resources and program capacity. The results can provide direction for urban forest management programs and plans. The program has been tested in Georgia and the program developers are interested in working with additional beta testing sites. The audit process can be completed internally or
with external auditor assistance and oversight. The program is compatible and complementary to Tree City designations.14

- **SCS Salvaged Wood & Fiber Standard, SCS Global Services**

This program is currently under development and is being designed to define the responsible recovery of wood (and other biomaterials), including salvaged and reused materials. The proposed standard specifically defines and includes Urban Wood as an eligible material. Urban Wood is defined to include trees along streets, parks and green spaces, and from other urban areas. The standard provides a tracking process (chain of custody) and audit oversight that assures customers the product can be traced back to a salvaged source. Verified products can carry the SCS ecolabel. More information, including the current status of the proposed standard, is available by contacting SCS Global Services at: [http://www.scsglobalservices.com/](http://www.scsglobalservices.com/)

Dovetail Partners has been involved in forest certification standard setting, auditing, and evaluations for many years. This experience was applied in the development of the urban forestry program assessment for this project and may help demonstrate the broader applicability of third-party forest certification systems to urban forestry situations.

There are a variety of formal collaborative processes. Regardless of which one is used, the concept of a good formal collaborative process has at its heart the old adage “measure twice, cut once.” Dovetail Partners has adopted a collaborative group process based on the work of William S. Stockton, Ph.D, Patrick O’Brien, and the Mobius Model™ (Figure 6). The approach has been applied for over twenty-five years and extensive research was used to develop it. The structure of the Mobius Model provides a guideline for the development of multi-group collaboration. Sometimes this approach is represented as a wheel (Figure 6). The process includes six steps that are followed in a positive direction (clockwise), beginning with the assessment step, identified as Well-Being in Figure 6.

There are six basic steps to the collaborative process.

1) Assessment of the situation for mutual understanding (Well-Being),
2) Identification of possibilities (Possibility),

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3) Group commitment to certain possibilities (Commitment),
4) Development of a plan (Ability),
5) Selection of champions (Responsibility), and
6) Evaluation of progress and/or success (Recognition).

Although this process may seem similar to other models, the devil is in the details. The emphasis in collaborative processes is less on the plan portion (steps 4-6) and more on the incorporation of diverse opinions into the assessment, idea creation, and commitment stages (steps 1-3). An emphasis on the first three steps is used to ensure inclusion of differing perspectives in the final plan. By spending additional time coming to a mutual, shared understanding of the broader needs of the varying groups, new possibilities arise that would not otherwise show up, including the potential to gain commitment from diverse participants, trust and respect for the process and greater happiness with the end result.

The urban forestry assessment project in Richmond focused on the first two steps of the collaborative process. The assessment process included the use of a survey tool to gather as much input as possible from external stakeholders and interest groups.

In addition to the collaborative process that was used to inform the assessment design, third-party forest certification was also referenced. The basic principles for the Forest Stewardship Council (FSC) and Sustainable Forestry Initiative (SFI) certification programs are shown in Table 1. Although forest certification has generally been applied to traditional, rural forestry, basic principles like legal compliance, protection of water resources, management planning, and training and education also have applicability to urban forest management. The review of documents and on-site evaluations that were conducted as part of the project were designed to explore considerations and approaches that would be similar in scope and content to a third-party forest certification audit.

Assessment Findings: On-site Visit and Document Review

The assessment included a preliminary visit in December 2013 and an additional on-site visit to meet with staff and tour operations in late-April and early-May 2014. Staff and Management were engaged in meetings during the site visit, and operations were also visited and observed throughout the city (e.g., tree removal, material management, etc.).

The City of Richmond, Department of Public Works, has responsibility for the management of the urban forest. The Department includes two arborists on staff and approximately 120,000 trees are managed by the City and about 2,000 trees are planted per year. Approximately 1,000-1,200 trees are removed annually. The City is limited to 7-8 tree maintenance specialists and have three crews when at full capacity. Consultants (e.g., Davey Tree) provide contracted services (e.g., climbing, etc.). The City of Richmond has maintained Tree City status for more than 20 years as a result of demonstrated commitment to caring for and maintaining the city’s trees. The City has a comprehensive inventory system which provides tree location, species,
diameter, condition and additional detailed information. The Department of Public Works is accredited through the American Public Works Association (APWA).

The Department has a number of systems in place to ensure legal compliance as well as effective citizen engagement, communication, and service. Notification letters, inspections, and posted notices are used to ensure the public is aware of tree management needs and operations. Legal council is also used as necessary to ensure the city is operating appropriately. The Department has demonstrated a commitment to best practices in urban forestry through activities ranging from inventory and assessment processes, to maintenance, removal, and replanting. Relationships with consultants and private sector businesses enhance the City’s capacities. Collaborations with stakeholders (e.g., Tree Stewards, Trees Virginia, etc) also support the urban forestry program.

As part of the assessment, site visits were made to the green waste site, to view storm clean up crews, and meet with external stakeholders. Visits were also made to private tree care companies and to view tree removal activities.

As discussed in other sections of this report, the City benefits from a wide range of supporting resources in the area, including public and private organizations engaged in forestry, land management, and forest products and research institutions. The City has good relationships and effective communication with the regional resources to allow for collaboration and partnerships to occur.

**Assessment Findings: Survey Results**

Online surveys were developed to gather input to the assessment from external stakeholders to the city’s urban forestry program.

The external survey (Appendix 1) was directed to citizens that were engaged in the forestry program in some way (e.g., Tree Stewards) and would have a reasonable level of knowledge about the programs and activities undertaken by the Department. The external survey included questions to address perceived strengths, weaknesses, opportunities and threats (SWOT analysis) to the urban forestry program.
A total of 21 responses were received for the External Survey. Table 2 provides demographic information about the respondents.

Table 2. Demographic Information about Respondents

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>External Survey (N=21)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>37 %</td>
</tr>
<tr>
<td>Female</td>
<td>63 %</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>0 %</td>
</tr>
<tr>
<td>25-34</td>
<td>11 %</td>
</tr>
<tr>
<td>35-44</td>
<td>11 %</td>
</tr>
<tr>
<td>45-54</td>
<td>26 %</td>
</tr>
<tr>
<td>55-64</td>
<td>31 %</td>
</tr>
<tr>
<td>65-74</td>
<td>16 %</td>
</tr>
<tr>
<td>75 or older</td>
<td>5 %</td>
</tr>
<tr>
<td><strong>Do you work in forestry, forest products, or a related natural resource field?</strong></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37 %</td>
</tr>
<tr>
<td>No</td>
<td>63 %</td>
</tr>
<tr>
<td><strong>What is your relationship with the city’s urban forestry programs?</strong> (select all that apply)</td>
<td></td>
</tr>
<tr>
<td>Current or past city staff or employee</td>
<td>6 %</td>
</tr>
<tr>
<td>Current or past city contractor</td>
<td>0 %</td>
</tr>
<tr>
<td>Member of Citizen advisory group</td>
<td>22 %</td>
</tr>
<tr>
<td>City resident</td>
<td>56 %</td>
</tr>
<tr>
<td>Business owner</td>
<td>6 %</td>
</tr>
<tr>
<td>Elected official</td>
<td>0 %</td>
</tr>
<tr>
<td>Other</td>
<td>44 % (Environmental non-profit employee, Past member of advisory group(s), Educator, Volunteer, Work in the city.)</td>
</tr>
</tbody>
</table>

The following information was provided from the survey responses (emphasis added to highlight key words and phrases).

Q1: What do you think are the greatest **STRENGTHS** of the city's urban forestry programs? (e.g., what is working well, what are you most appreciative of, what would you like to see continue?)

- City **arborists** do an amazing job of attending tree related events. Especially, considering they are short staffed.
- **Aggressive plantings**
- The **Tree Stewards** program is a great asset to the city. It encourages volunteerism and helps develop a sense of ownership among citizens.
- So many people are willing to take the course. The courses for certification are good, and I like taking care of the trees. The city seems to be appreciative of whatever help they can get.
- There are a number of non-profit/volunteer organizations that augment what the city and its contractors are able to do.
- The dedication and work of the two current city arborists, outstanding.
- Current push to increase street tree planting is positive but perhaps overly ambitious.
- The river park system is a blessing.
- Able arborists who repeatedly demonstrate that they care about the urban forest. They are responsive to concerns raised by citizens; they volunteer their time to teach and inform, especially with neighborhood organizations and service organizations such as Tree Stewards.
- There has been many new tree plantings. I value that the city works with volunteer organizations such as the Richmond Tree Stewards. As a volunteer, I like that other government operations help, for example, when watering city trees the Fire Departments if available, will help fill our large water tank. That saves a lot of time and lets others know what it going on with the urban forest.
- The two arborists are terrific. Their attitudes about Urban Forestry are great! Plus, they seem to be everywhere, during the week, the weekends, with trucks, supplies. Do they ever sleep? It's a huge job for only two people.
- The volunteer Tree Stewards are so dedicated, well-trained and communicative. They are an exceptional group of informed helpers. They deserve a lot of recognition!
- Arborists are great. Program is good, just too small.
- In recent years, the city has been more responsible to the urban forest demonstrations by significant budget increases to effect replacement tree planting and new planting, both of street trees and park trees.
- Urban Forestry department needs more staff.
- The city is good at tree planting. Also, working with volunteers groups, such as the Richmond Tree Stewards is a strength. It is good to work with groups outside urban forestry such as how the fire departments will fill up our water tanks if we are watering park trees.
- The city has been planting more trees recently. I don’t think this was happening 10 or 15 years ago. It seems to have increased.
- The annual planting of trees on public land which began several years ago is a big plus, however care of those new trees is lacking apparently due to no funding for maintenance.
- The 2 arborists currently employed are very knowledgeable and dedicated, however they do not have the support needed to do their jobs well.
- More trees in the downtown area and wherever we can break up and beautify the concrete jungle.
- I don't see any real strengths from the city. There are real strengths from the private sector.
- Capital tree project is doing a great job, but the city’s urban forestry commission is getting no help from the city.
- City employees and volunteers work well together, with mutual respect and good coordination.
- Overall, the city has a quite respectable canopy coverage of approximately 42%.
- City government took a major step toward creating a comprehensive management plan with the 3-year contract with Davey Resources for an inventory. The second year has been completed.
- Tree Planting, early tree maintenance, hazard reduction, management programs, compiling an inventory of the tree asset, volunteerism.
- Knowledgeable Staff
- The strengths include support for the Richmond **Tree Stewards**, neighborhood replanting projects.
- Uses of **canopy map** to set priorities

Q2: What do you think are the greatest **WEAKNESSES** of the city's urban forestry programs? (e.g., what is NOT working well, what would you most like to see changed?)

- The City of Richmond is currently **understaffed** with only two arborists covering the entire city. This causes major delays in maintenance and tasks.
- A **complete urban forest assessment** in the City and strategic plan based on that assessment. Focusing on habitat hot beds and environmental hotspots including slopes, water bodies, and green corridors.
- **Lack of resources.** Planting 2,000 trees per year (a goal) without watering capability and a maintenance plan – beyond volunteers – is not a formula for long-term success. Having 2 or 3 arborists responsible for that number of plantings also creates a tremendous drain on their time.
- People should not be allowed to plant unless the City Arborists know and approve. If they plant, then they must be responsible for maintenance.
- There is a grove of inferior trees in Byrd Park, planted too close together, without the knowledge of the City Arborists. And no one is designated to maintain those trees.
- Give the City Arborists more control.
- **Give us more City Arborists and more Tree Stewards.**
- If the city department had **more staff**, it could more effectively care for deteriorating trees. Many **street trees are partially dead or dying**, and it would be ideal to manage them before they begin to drop branches.
- Need more people to do maintenance.
- That most of the trainees seem to quit or not be very involved in taking care of the city trees but I guess that is always an issue. I don’t think the volunteer requirements are overly rigorous that people can’t help in the pruning and maintenance. I wish there was more opportunity for weekly maintenance since weekend are not always available.
- **Lack of a tree ordinance.**
- No after-care strategy (water) whatsoever, resulting in **high mortality of newly planted trees.**
- **Lack of planning.**
- Some areas of the city are more attended and well cared for than others. For example, the street trees in the east end of the city, for example Mechanicsville Tpke and Oliver Hill Way are practically neglected, while trees in the fan are pruned and watered regularly.
- **Lack of cooperation between city department/agencies.**
- **Not having a city forester** to set policy, to advocate for the urban forestry division, and to review – or direct the reviewing – of plans for new construction, major renovations, and so on.
- **No city legal advocacy on behalf of trees** (no violations defined, no fines in place, nothing to enforce).
- **Lack of certified municipal arborists** – two is not enough.
- Urban forestry is **not a priority to city** government (lack of funding for urban forestry).
- No public awareness and no vision to change that via **public outreach and education.**
- Not enough **incentives for citizens** to plant or care for trees.
- Stupid rules about minimum size requirements for city tree plantings.
- Ability to provide maintenance to newly planted materials.
- Although the city plants many trees it does not seem like there are plans in place for their aftercare, watering, pruning, mulching, weeding. I feel that city government does not support **efforts to create and maintain a healthy urban forest**. I am concerned about the age of the tree population not being varied enough. There seem to be monocultures planted and no thought to the right plant in the right place, i.e., planting tall trees under power lines. What is the city’s policy on construction protection, vandalism fines, etc.
- Outside of those who work with trees, I feel the local government is not as supportive for urban forest. I see many tree plantings but it seems that once they are planted there is no thought for their after care and there is no thought for the **right tree in the right place**.
- Lack of an *up-to-date tree ordinance and policy* has become a chicken-and-egg issue. The policy draft is in limbo and the Commission members are dispirited.
- **City park maintenance** is appalling in many areas, a challenging environment for trees (vines, poor care generally) and a hotbed of invasive ailanthus infestations.
- The city is failing its responsibilities for “**end of life** care for street trees”. Many dead or failing trees are not removed, eroding public support for trees by creating dangerous and unsightly situations.
- Lack of cooperation between city departments and too much “red tape”. Recent cut in personnel. Other than near James River, a lack of vision of how trees fit into urban infrastructure.
- **Lack of enforcement** of root zone protection requirements during construction.
- **Insufficient maintenance** of street trees, especially newly planted ones.
- Be bold. Needs more funding. Set a goal, in five years, every single empty tree well should have a tree in it. If neighbors are unwilling to water them first year a non profit could sponsor it. Knock on doors and get support to water the new trees by having the mayor use his voice to encourage city residents to help the new trees.
- **Proactive tree maintenance** of mature trees, staffing levels, resource allocation
- The person in charge of urban forestry does not have the appropriate background.
- There is no *funded, long term plan* for managing the urban forest
- The greatest weakness is the **lack of a qualified urban forest manager** to oversee the division. We need an arborist in charge who can advocate and manage the program. The continued emphasis on removing living trees and doing absolutely no maintenance will continue to degrade our urban forest canopy. The **program needs adequate funding** to do its job so the Mayor needs to step up and fund it.
- **Not enough staff** to address aging trees
- **Not enough funds** to ensure adequate tree replacement considering the age of the city’s current canopy
- Not large enough or enough tree wells in downtown to support robust downtown canopy
- Really poor website related to city tree programs – little information there
- Two arborists cannot do the job. The **vacant arborist position** needs to be filled. Also they need additional support such as work crews who are property supervised.
- City officials apparently do not understand the importance of green infrastructure
- **Support from the city is needed.** The city only pays lip service to the urban forest.
- The Urban Forestry Commission has tried for several years now to revise the municipal tree policy and have been unable to make progress due to lack of communication and needed input from city officials.
Q3: What do you think are the greatest OPPORTUNITIES for the city’s urban forestry programs? (e.g., what should be done to support success?)

- I believe the city needs to **fill the remaining arborist position** and look into hiring additional help for the arborists crews.
- Acknowledgement of those who put in over the required hours? Should there be assigned teams at certain periods?
- **Increase citizen involvement** through volunteer efforts.
- **Increase funding** from the city or secure a corporate sponsor.
- After developing a **complete urban forest assessment**, work with area non-profits to implement the plan.
- **Education of the public** is important. So often newly planted trees are neglected by residents, who could so easily keep them watered during their early life, especially during the hot dry Richmond summers.
- Restore the third arborist!
- An alliance of professional and volunteer forces.
- **Educate the community** about the importance of using native trees & how to care for them.
- Encourage the community to acknowledge the importance of and embrace mass plantings of single species.
- Planting the **right tree in the right place**. Trees need width, depth, and height to grow. We should be planting only small trees in the spaces between sidewalks and streets.
- Education is key. There needs to be education throughout the different government departments as well as keeping citizens informed. Continuing to partner with volunteer groups is a great way to educate as well as get work done. Shrinking budgets are everywhere. Volunteers and sponsors can help ease the budget burden. They are also a way to spread the word about the urban forest and why we need a healthy one.
- **A forestry professional** is urgently needed to direct the Urban Forestry Department and advocate for the urban forest in the city administration.
- Richmond needs a **municipal tree ordinance** now. There must be legally enforceable policies in place to protect this resource, and we need to at least triple the present number of Certified Municipal Arborists.
- The money invested in the Davey Resources inventory may finally get some people’s attention and result in an effort to create a **comprehensive management plan**.
- **Recognition of the accomplishments** of the program and the benefits of the urban forest
- It needs funding, a **qualified trained urban forest manager**, and a maintenance program that could also be a training program for unemployed folks in the City of Richmond.
- Tons of empty tree wells begging for trees. It is understandable that arborists time is consumed with downed trees and scheduling removal but time must be spent on adding more. The ratio of new trees to those removed should be quadrupled.
- The city’s **Urban Forestry Commission** needs to be publicized so the population knows what is going on with the city’s urban forest.
- At present, the department works on a reactionary basis, putting out fires, no pun intended.
- The people there now have the desire to do a good job, but it is not possible under the current situation. **Leadership with an arborist background** is a must as well as someone who has the organizational skills to run the department efficiently.
- **Partners with nonprofits** to identify sites needing trees and provide technical assistance to make sure plantings are done right
- Though I believe the department is understaffed, I do not propose hiring many more people. A **small increase in workforce** would suffice if the department were well organized.
- More **public education** regarding tree benefits, care, etc. Exciting that Arbor Day will now be celebrated in Richmond in the fall. That’s a big opportunity to teach people that fall is great for planting.
- **Integration of green spaces** as part of infrastructure in new developments in the city.

Q4: What do you think are the greatest **THREATS** to the city's urban forestry programs? (e.g., what current or emerging issues need to be addressed?)

- **Lack of funding.** Lack of education to the public. If the public does not understand how they can help the 2000 newly planted trees that go in every year, a distaste for trees will grow due to numerous dead trees. I also believe climate change will affect our city trees. Again, educating the public on the benefit of trees in combating the heat island effect is key.
- **Budget, lack of support by city leadership.**
- **Political attitudes, lack of public awareness/engagement.**
- **City politics**, and administration bent on creating a legacy with major development projects and lip service to “being green”.
- **There continue to be infestations that damage even healthy trees.** Some of these are organisms that are inadvertently introduced into the USA.
- **Cuts in funding and city personnel.**
- **There needs to be greater support for the arborists.** Monocultures are an issue especially with threats of invasive pests.
- **Not enough staff/volunteers** to take care of so many trees esp. during a drought.
- **People not being aware of how important the Tree Stewards are.**
- **Apathy.**
- **Natural disasters that divert funding**
- **New tree pests and diseases.**
- **Lack of political support and funding.** Collaboration with all potential partners.
- **Lack of political support from mayor.** Needs to be made an economic development and stormwater issue. Nobody wants to move to an area/locate a business in a place this hot unless there is shade. Bottom line.
- **Declining resources, conflicting interests**
- The city must balance its investment in new trees with a commitment to their lifelong care and eventual removal. Otherwise, residents will not support or love our trees.
- **Apathy, lack of funding, ignorance about the economic and health benefits of trees.**
- Obviously **more violent storms** that are becoming part of our environment are a challenge.
- **Disregard of the urban forest.** The notion that we can keep removing the urban forest without any negative consequences. Also, the city does not follow **ISA best management practices** for installation of new trees and for pruning, and in construction sites.
- We have 2 very well qualified and dedicated arborists. In the current situation we may lose them and with that, their expertise and working knowledge of this city.
- A **robust maintenance program**, enforcement of the tree ordinance with regard to any construction are old issues that have never been addressed.
- Funding is an issue for everyone and I fear that this department will not be a priority since the pay-off is long term.

Q5: If you could do ONE BIG THING to improve the city's urban forestry programs, what would it be?

- **Plant more trees** with the proper planting techniques knowing there is enough funding and manpower to care for them.
- **Increase the budget.**
- **Education of the general public.**
- Provide more financial support, more resources, and more recognition.
- Ensure all areas of the city receive equal resources in terms of plantings, watering & maintenance. Make sure we are taking care of all areas of the city not just the fan.
- An **overall assessment and strategic plan.**
- **Hire an urban forestry professional** to direct the Urban Forestry division.
- Increase intensity of tree maintenance and planting in public parks.
- Provide more staff and contract maintenance dollars
- **Hire more staff and give them more funds** for their own work plus mini-grants to community groups to plant and maintain trees
- Hire a qualified urban forest manager and fund the program
- **Assess, plan for, and deliver routine maintenance work** throughout the park and tree landscape. This has been accomplished successfully for many decades, and it's a mystery why the city leadership can't deliver any more.
- To **put in place a plan** that would outline planting and aftercare, species selection, varying the age of the tree population, policies for construction protection, permits, fines. The plan would also incorporate best management practices for trees and provide design specifications. It would also show the use of alternatives to standard sidewalks, making planting spaces larger.
- Unite all disparate groups into one with a unified goal.
- Fill every empty tree well. Analyze which blocks with no trees have adequate width to install more. Find a sponsor for each new tree and do it. There are enough rich generous people in Richmond to make this happen if some grit is applied and the mayor cared.
- Have the mayor and council and planning commission **listen to the urban forestry commission** that they set up due to popular demand.
- Hire a department manager with an appropriate background and experience.

Additional Comments:
- As a citizen I may not be aware of the politics within the City and the urban forestry department. I feel that the outreach the Stormwater Department has been making to the public through television commercial could be useful. Again, that deals with funding issues. Groups like the Richmond Tree Stewards has done great work in helping plant and protect trees with the arborists guidance.
- Let me know what I can do to help.
- Take care of what we have, advocate to fund the program, and continue to plant trees that will improve our lives.
- Let’s outlaw the sale of English Ivy in the city. We should also eliminate turf grass on all publicly owned property. Plant natives!
The citizens of Richmond are the driving force. They need to be aware of how their urban forest is being managed and how the management could be improved. There are many groups working to improve the urban forest and maybe if they came together as a large voice improvements may come about. Strength in numbers.

I think the program has made tremendous progress particularly during lean times and can make more progress with additional resources.

Thank you for this opportunity.

Based upon the input from the external survey, there are several common themes. There is clear respect and appreciation for the quality and efforts of current staff. There is concern about long-term capacity (staffing and funding levels). There is also concern about some of the policies that impact the urban forests in Richmond (e.g., ordinances, enforcement, etc). The urban forestry assessment project in Richmond focused on the first two steps of the collaborative process. The assessment process included the use of a survey tool to gather as much input as possible from external stakeholders and interest groups. Next steps in the process would include selecting and prioritizing opportunities for improvement in order to develop a strategic plan to address them.

Summary and Conclusions from Survey

Overall, there is a high opinion and level of support for the urban forestry programs. Respondents generally agree that there is a need to increase the capacity of the programs with more staff, volunteers, and resources.

Opportunities for improvement identified within the results include:
- Fill vacant arborist position(s)
- Increase funding and financial resources for the program
- Strengthen volunteer programs and collaborations with diverse partners
- Identify and develop skillsets within department
- Complete inventory project
- Develop comprehensive strategic plan

Conclusions and Recommendations

From the entirety of the urban forestry management program assessment process – including the review of documents, on-site visits and interviews, and complete survey results – the following summary to programmatic strengths and opportunities is provided.

Strengths:
- Well-trained, credentialed, professional staff and volunteer partners
- Detailed inventory information being developed to provide assessment of urban forest
- Innovation and urban forestry activity within partnerships and private sector
- Well-structured city program – reporting, record keeping, tracking, and inventory

Opportunities:

- Complete inventory development and leverage results to inform resource allocations and program planning
- Complete Master Plan/Comprehensive Management Plan

NEXT STEPS

There are four “next steps” that Richmond can undertake as a “leader” in urban tree utilization and urban forestry.

1. Develop a strategic plan for the urban forestry program. The recommendations and opportunities from this report can be used as a basis for the plan.
2. Establish a structure for measuring progress for the urban forestry program. This includes clearly defining the roles and responsibilities of staff members as well as a schedule of review milestones.
3. Develop a directory of small mills, dry kilns, loggers, furniture makers, etc., that operate in the Richmond metropolitan area. Individuals and businesses in this directory should have a desire to work with urban trees. The City of Richmond could “appoint” someone to do this task (or look for a volunteer). The City, however, should take the lead on this directory, even if the actual work is accomplished by a third-party (intern or work-study student from a local college, tree-related volunteer, governmental employee from the DOF or other state agency, etc.). The important step is for the City to “get the ball rolling.”
4. Hold regular meetings of stakeholders involved with urban tree utilization. These meetings should include area arborists, urban foresters, small sawmill and dryer operators, loggers, wood yard owners, LCID operators, state regulators, municipal managers, small wood-based business owners, and so forth. Ideally, the meetings would be held at a “neutral” location to encourage maximum participation.

Conclusions

The City of Richmond has a strong history and well established urban forestry program. The private tree care industry in Richmond also provides capacity to support a healthy urban forest. The full potential of the City's urban forestry program is currently limited by capacity concerns. To improve the program, it is likely necessary to increase the number of arborists to a level that is sufficient to maintain and care for the extensive urban forest, especially where private tree care services are not a reasonable alternative.

The Richmond metropolitan area is home to over 1.2 million people, and growing. East central Virginia (which includes the capital city of Richmond) supports a strong forestry and forest
products industry. Historic preservation and renovation are important businesses in the Richmond area, due in part to the proximity of Williamsburg.

Richmond, and the surrounding area, is home to “under the radar” firms currently utilizing urban trees beyond the traditional products of mulch and firewood. Evidence of an emerging urban tree business cluster can be found in the private sector, but a leader is needed to move the momentum forward. An urban tree utilization leader can mobilize both private and public sectors to collaborate on issues that impact both groups. A leader could also provide the spark for a much-needed feasibility analysis in Richmond that estimates tree removals and potential products.

Part IV.
Case Study

Hypothetical Tree Service (HTS)

A successful tree service firm that utilizes urban trees in the Richmond area must overcome many of the barriers or issues noted earlier in this report such as storage space, logistics, transportation, hardware in trees, etc. This case study will focus on a hypothetical tree service firm that developed intervention strategies or solutions to many of the common issues faced by Richmond area tree service companies. The hypothetical tree service firm in this case study will be referred to as HTS.

HTS has ample space at their place of business to store logs and tree parts. Tree tops, pruning material, branches, brush, etc. are chipped on-site and either delivered to a mulch producer, or sold directly to the public. Since HTS has space at their headquarters, some mulch is stockpiled, and sold at a later date.

Logs suitable for sawing are delivered to headquarters and sawn on a HTS thin-kerf portable band mill. Each log is screened for metal (hand-held metal detector) and other foreign objects, and attempts are made to cut-out or saw around potentially hazardous sites on the log. However, since blades cost around $30 (and repair is less), the economic hardship is slight when damaging a blade. Also, HTS has converted a tractor trailer into a dehumidification dry kiln. This practice has enabled HTS to sell kiln dried lumber directly to the public.

Over 50 percent of HTS tree removals (tree bole), according to their lead arborist, can be converted into value-added products. Since these trees need to be trucked off-site regardless of their final destination, HTS has decided to transport the reclaimable logs to their headquarters. This reduces the cost of both transportation and disposal.

In addition to sawing logs, and drying lumber at their headquarters, HTS has developed close ties with a local furniture maker. One of the services HTS provides to their customers, is a
product (table, chair, bench, etc.) fashioned from a tree that once stood by their client’s house or place of business. After tree removal, HTS mills the log(s) at their headquarters and dries the lumber before it is picked up by the craftsman and made into a beautiful product. This process – from log to finished product – has created a niche for HTS, enabling them to offer a service to their clients beyond the typical services provided by a tree service firm.

The business model of HTS has eliminated the need to “call around” to find someone, or somewhere, to (1) drop logs and/or tree parts, (2) saw logs, (3) dry lumber, and (4) make products.

HTS has the philosophy that “wood is good” and trees should be reclaimed for their highest and best use. Sometimes, mulch or firewood, is the highest and/or best use for urban trees. However, many HTS clients want a different fate for the tree in their backyard. HTS fills this void in the tree care industry by offering a service above and beyond tree removal, tree pruning, stump grinding, and the like. At the same time, many of the economic burdens shouldered by the typical tree care firm have been converted to either cost-reduction by HTS, or into a profit center.
Appendix 1. External Survey

Thank you for taking time to provide feedback to this Urban Forestry Assessment. This assessment includes 5 questions that address the Strengths, Weaknesses, Opportunities, and Threats related to the city’s urban forestry programs.

The questionnaire may take up to 15 minutes to complete. If you would prefer to receive the questions in another format or if you would like to provide input via a phone interview, please contact Dovetail Partners at 612-333-0430 or info@dovetailinc.org

Q1: What do you think are the greatest STRENGTHS of the city’s urban forestry programs? (e.g., what is working well, what are you most appreciative of, what would you like to see continue?)

Q2: What do you think are the greatest WEAKNESSES of the city’s urban forestry programs? (e.g., what is NOT working well, what would you most like to see changed?)

Q3: What do you think are the greatest OPPORTUNITIES for the city’s urban forestry programs? (e.g., what should be done to support success?)

Q4: What do you think are the greatest THREATS to the city’s urban forestry programs? (e.g., what current or emerging issues need to be addressed?)

Q5: If you could do ONE BIG THING to improve the city’s urban forestry programs, what would it be?

Demographic Information

Q22: What is your gender?
Q23: What is your age?
Q24: Do you work in forestry, forest products, or a related natural resource field?
Q25: What is your relationship with the city’s urban forestry programs? (Select all that apply)
   Current or past city staff or employee
   Current or past city contractor
   Member of Citizen advisory group
   City resident
   Business owner
   Elected official
   Other (please specify)
References


http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0102261


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