the new
American City

City of North Charleston
Noisette Community Master Plan

DECEMBER 2003

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Acknowledgements

Master Plan Acknowledgements

This Noisette Community Master Plan has been prepared under the direction of the Noisette Company of North Charleston, South Carolina with important contributions from many North Charleston citizens and government agencies, from professional organizations and non profit associations, and other interested parties.

Master Planning Team

The Master Planning team was led by Burt Hill Kosar Rittelmann Associates and BNIM Architects

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- McGuire Woods
- IBACOS
- EQA Landmark Communities

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- Thomas Balsley Associates
- Huff & Gooden
- Economics Research Associates
- Diana Permar
- Forsberg Engineering
- Blue Ion
- Palmetto Commercial Properties
- Pratt-Thomas Gumb
- ML Strategies
- Seamon, Whiteside & Associates

Other Contributing Organizations, Educational Institutions, and Government Agencies:

- The Sustainability Institute
- Old North Charleston Merchants Association
- Chamber of Commerce
- Navy Base Memorial Committee
- Lowcountry Open Land Trust
- Center for Carolina Living
- The Citadel
- University of Colorado
- Clemson University
- University of South Carolina Press
- College of Charleston
- BCD Council of Governments
- Charleston County Public Schools
- CARTA
- South Carolina Department of Health & Environmental Control
- South Carolina Department of Education
- South Carolina State Ports Authority
- U.S. Army Corps of Engineers
- Oak Ridge National Laboratories

City of North Charleston

The Master Planning team has received valuable information, insights, and reviews from many elected officials, agencies, neighborhood associations, and individuals from the City of North Charleston

- Office of the Mayor
- City Council Members
- Planning Commission
- City Planning Department
- Public Works Department
- Cultural Arts Department
- Parks and Recreation Department
- Fire Department
- Police Department
- Housing Authority

Neighborhood Association Presidents: Ben Washington, Johnita Anderson, Scott West, Gayle Frampton, John Pharis, Katrina Gortman, Phillip Hyman

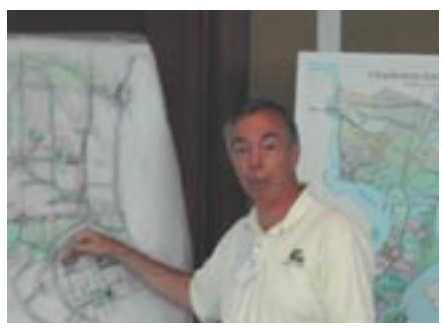
Residents of:

- Liberty Hill
- Cameron Terrace
- Oak Park
- Palmetto Gardens
- Northeast Park Circle
- Old North Charleston Neighborhood
- Whipper Barony
- SW Park Circle

Noisette Community Advisors Group: Randy Adkinson, Molly Baldwin, Chief Michael Baxley, Brother Ed Bergeron, Becky Dempsey, Margaret Greene, Nathaniel Mitchell, Palmer Olliff, Paul Pridgen, Esther Shaw, Eugenia Singleton

Noisette Urban Alliance:

- Andersen Corporation
- Carrier Corporation
- Hanson Building Materials America
- Hearth Technologies
- Herman Miller
- Interface
- Kohler Company
- Owens Corning
- Therma-Tru
- USG Corporation
- Universal Forest Products
- Whirlpool Corporation



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Introduction

"Make no little plans; they have no magic to stir men's blood and probably themselves will not be realized. Make big plans; aim high in hope and work remembering that a noble, logical diagram once recorded will never die, but long after we are gone will be a living thing, asserting itself with ever-growing consistency. Remember that our sons and grandsons are going to do things that would stagger us. Let your watchword be order and your beacon beauty."

— *Daniel H. Burnham, FAIA 1846-1912*

Dewees Island

Dewees Island is a 1200-acre barrier island near the Isle of Palms, SC. The philosophy of development at Dewees Island was to limit the impact on the native environment and the ecosystems. The sustainable master planning principles used at Dewees Island have made it one of the most successful communities in the US. It has been nationally recognized, and it received the 2001 Urban Land Institute Award for Excellence.

The Noisette Project and this resulting sustainable master plan are part of an odyssey that started in December of 1997, when North Charleston Council member Kurt Taylor asked if the vision we had for a "Dewees in the City" could be brought to North Charleston. Dewees Island has received numerous awards and is recognized internationally as one of the leading sustainable communities in the U.S. The expression of this vision was:

"*Redevelop an existing portion of a City to create a tangible example, a place that incorporates the Principles of Sustainability in residences, commercial buildings, and public areas to improve the economy, quality of community, and the environment.*"

In March of 1998, Kurt Taylor invited Jim Augustin and John Knott, Noisette co-founders, to meet with Mayor Summey to discuss our ideas for a sustainable urban redevelopment. The Mayor and Kurt Taylor shared the City's vision for a re-energized and revitalized North Charleston and the goals described in the City's 1996 Comprehensive Plan. As a result of this meeting, the Mayor invited us to continue investigating the potential of implementing a vision that integrated both objectives.

Over the next three years, the Noisette co-founders, along with our nationally recognized design team, evolved this project, at the City's request, from a 5 square block area to the present Noisette footprint of almost 3,000 acres. The City, recognizing the uniqueness of the Noisette team, announced in March 2001 the formation of an innovative partnership with the Noisette Company. Accompanying this announcement was a City Pledge by the Mayor and City Council describing what the City was committing to accomplish. The City also outlined its desire and commitment to become a model for sustainable city redevelopment. The desired outcomes expressed for the City were:

- Rebreathe life into the historic city center
- Synergize all Quality of Life efforts within the City
- Catalyze economic growth
- Build the City's financial Vitality
- Position North Charleston nationally as a sustainable urban center

Core Beliefs

The master planning work of the Noisette Company is grounded in the principles of historic preservation and community redevelopment that have grown and matured for three generations starting with the founding of the Knott tradition in 1908. Our approach is embodied in the eight beliefs listed below.

The Noisette Company's Beliefs

1. Respect is at the core of every successful human relationship and endeavor.
2. All endeavors are approached with a forensic process that starts with observation and enquiry versus a formula orientation.
3. Successful problem solving starts upstream with systems thinking.
4. Community Involvement is essential to great planning and places equal value on the wisdom of the culture and the talent of the of the planning and development professionals.
5. All decisions will be made to serve the long-term health of the economy, ecology and social fabric of the community being directly developed as well as the larger community in which it participates.
6. All planning and decision-making favors collaboration and is based on "Sustainable Partnering of Resources."
7. Successful City redevelopment requires a bold collaboration of Municipal leadership and Master Community Developers.
8. All resources are interdependent in natural as well as human communities.

Fundamentals of Socially Durable Communities

As a community developer, we recognize that socially durable communities have two core elements that are essential to their long-term social and fiscal health:

- Each member of the community understands the unique history and heritage of their social community and physical place.
- Each member of the community holds in common a vision for the future to which they help contribute.

The dysfunction that we find in our cities, businesses and other organizations can always be traced to these core elements. It is this understanding that causes us to commit significant time and resources to the inventory of historic, economic, ecological and culture resources of a community over the course of time. This process informs our team and the community about the unique heritage of the community we now call Noisette. Our community involvement process is organized to achieve the creation of a common vision and an ongoing process to evolve and mature that vision over time.

Sustainable Funding of Cities

In addition, the failure to build our communities and manage them around these core elements for socially durable communities means that our cities are faced with a mounting financial crisis. This crisis is driven by competition for limited resources, the failure to connect the beneficiaries with the responsibility of creation and maintenance, and the lack of reserve funding for infrastructure repair and maintenance, as well as developing a social capital reserve.

One of the key beliefs outlined above is Sustainable Partnering of Resources. It has become very clear that we have too many narrowly defined interests competing for too few resources both in the public and private sector. We believe that the issue is not a lack of money but how funds are allocated. We believe that all planning and resourcing should be guided by these principles:

- Eliminate silo thinking in funding of any community resource
- Increase the number of groups with a vested interest in any community resource as users and beneficiaries
- Leverage and combine the resources of Public, Private, and NGO entities in the creation of any community resource
- Align interests to build broader constituencies to support, long term, community resources
- Connect the capital and operating budgets when planning any investment
- Establish reserve fund mechanisms to handle future repair, maintenance, and replacement costs
- Design the community into the care and stewardship of each community resource

21st Century Architecture

The character of the great places in the world is represented in their architecture, cuisine, and their artistic expression. Man, when confronted with the unique natural resource base and climate conditions of each area, develops a unique response in forming the economy, architecture, land plan, and cuisine for each of these cultures. It is the fundamental reason that New England architecture is so different from the Low Country and Northern Italian cuisine is different from Southern Italian cuisine. The peninsula city of Charleston is one of those great places. It is the 18th and 19th century answer and response to climate and natural resource base.

The Noisette Company believes that the River Center at Noisette provides a unique opportunity to create a national center for architectural design that explores and develops the 21st century architectural equivalent of responding and respecting our unique climate and place.

Measurement and Research of Outcomes

The development industry is faced with two problems. One is that there is not readily available core research that studies a concept from its inception, scientifically treats all the hypotheses and develops good science to back up recommendations for future planning and growth. In addition, we are all so vertically trained with our own languages and values by individual professions, there is very little common ground for problem solving and great dialogue as we evolve how our cities will be redeveloped or newly grown.

In order to ensure that the community of Noisette and our industry learns from this process and can translate the experience to effective models for sustainable planning and development, we are planning the creation of a Sustainable Graduate Internship Center with 25–30 positions annually representing the physical and social sciences with no repetitive positions during the year. Any University participating must agree to a minimum 30- year research effort in the specific discipline. This would be a resident program for one year. This center would also oversee the measuring and monitoring of the principles and objectives set forth in the metrics of this plan as well as utilizing the Heinz Center for the Environment's Indicator System to measure the long term health and progress of the Noisette Community.

Introduction

Integrated Restoration

Renewal and restoration is an act of healing. This act is grounded in respect, which means "to see anew or to see again". Beginning with Henry A. Knott in 1908, the Knott tradition, passed down to the current generation by my father John L. Knott and introduced to Noisette in my capacity as CEO, has been formed by the understanding that we are in the human habitat business serving the five basic needs of the communities we affect. We are responsible to integrate and serve the economic, functional, aesthetic, social and spiritual needs of those we serve. These needs cut across all economic levels and uses, and are the connection between restorative enterprise and restorative justice, which form the foundation for integrated restoration.

Storm Cunningham, the author of "The Restoration Economy", has stated,

"The restorative development has become the fastest growing sector of our economy. Integrated Restoration is the next big thing. Currently, the eight industries of the restoration economy are largely Balkanized. The professionals restoring a bridge, a watershed, a historic district, or deserted/ exhausted farmland are generally unaware that they are parts of the same economic sector."

He goes on to say,

"Community and regional agencies must learn to assemble and manage the multidisciplinary teams necessary to effectively master-plan the restoration of the natural and built environment."

Additionally, Cunningham says that the Noisette project is the best current example of Integrated Restoration and has the potential to become a real-world laboratory of restorative development that will be followed for decades.

The core competency of our team and family, and the leading position of Noisette in the new Integrated Restoration economy is the key catalyst for forming this region as the Silicon Valley for the restoration economy. The best result of this master plan and the core principles and directions outlined are best described by a Green Village vision written by Jim Augustin the co-founder of the Noisette Company:

— John L. Knott, Jr.
CEO & Co-Founder of the Noisette Company

Green Village Vision

"We envision a re-invigorated area of the City:

Where people live, work, and learn...

That is inclusive of all the community's people...

Where the built environment embodies respect for
Individuals, community, and the natural environment...

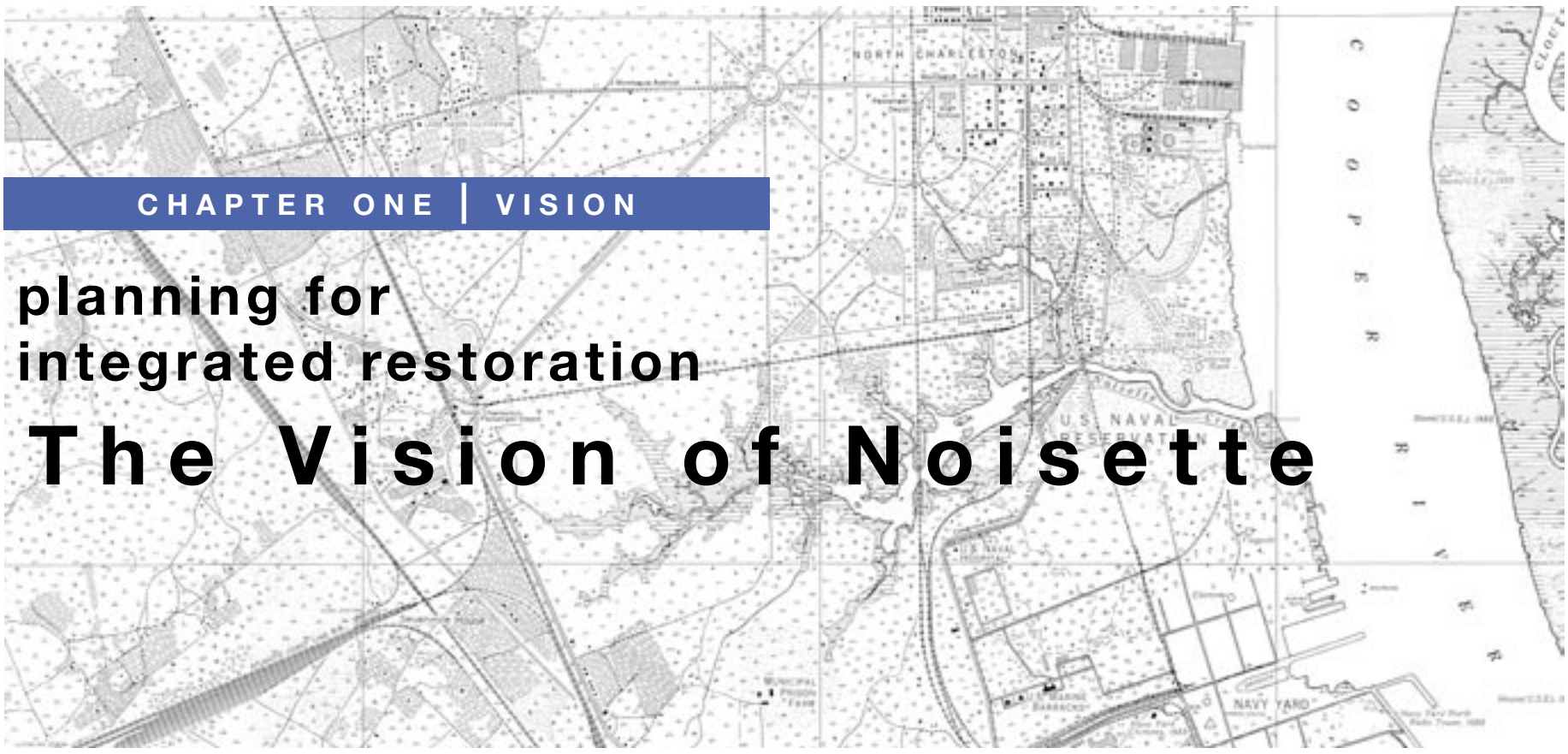
That understands its place in the fabric of the larger community,
And celebrates its connections with other City areas
And their shared culture and history...

That restores and enhances the environment while harnessing natural systems...

That values beauty, and provides opportunities for
Sanctuary, spiritual renewal, and inspiration...

That is a great place to GROW!!
To grow families, to grow knowledge,
To grow skills and jobs, to grow plants and trees,
To grow friendships, to grow old...

That leads to improvement throughout the City."



CHAPTER ONE | VISION

planning for
integrated restoration

The Vision of Noisette

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The New American City

The Noisette Community Master Plan creates a sustainable vision for the 3,000-acre historic center of the City of North Charleston, South Carolina. This land has a solid history of agriculture, industry, and commerce, and it includes about 350 acres of the former Charleston Naval Base, one of the nation's oldest military facilities. This vision is based on the Triple Bottom Line – a balance among people, planet, and prosperity – embodying the belief that sustainable cities must be equally responsive to social needs, environmental responsibility, and economic vitality.

Establishing a Shared Vision

A vibrant, healthy city embracing its heritage and celebrating its role as community, ecosystem and marketplace.

The New American City is built on a foundation of shared principles and values. Believing that no such endeavor can thrive unless those who seek to build it have a common vision, the City of North Charleston and the Noisette Company began by establishing the basis for their partnership.

The City of North Charleston set forth a pledge to its citizens, present and future, of what this community would become. The City's Pledge is a set of principles that underpins a future of prosperity, social harmony, educational excellence and ecological restoration, which respects the rich history of this place.

The Noisette Company, drawing on its founders' multi-generational history of community-building, brought forward the principles and values that form the basis for making great places. One key element is the Sanborn Principles, a set of goals which were established in 1994 by a diverse group of visionaries who described the attributes that would define sustainable communities of the future. These characteristics balance social, economic and environmental well-being, while recognizing the importance of beauty and the need for continuous evolution in a changing world.

A second fundamental component of this vision is the Values of Place, which is a set of statements embodying the essence of timeless design, human-centered building and personal responsibililty. Great places around the world have incorporated these values for millennia.

Taken together, the elements contributed by these two partners will establish the Noisette Community as a living, interpretive, sustainable urban center, equivalent to Charleston's position as a national center for Historic Preservation.

Sanborn Principles

Healthy Indoor Environment for Occupants

Ecologically Healthy

Socially Just

Culturally Creative

Beautiful

Physically and Economically Accessible

Evolutionary

Values of Place

Value of Diversity

Value of Beauty and Aesthetics

Value ofAccidental Meeting Places

Value of Surprise and Discovery

Value of Resource Efficiency

Value of Leaving Your Mark

Value of Human Form Emerging Naturally from Its Place

The City's Pledge

To raise the bar for North Charleston's quality of life

To give North Charleston residents the support and resources for sustainable neighborhoods

To extend affordable housing to our residents to grow home ownership

To offer new opportunities to its citizens for participating in its economic development programs

To demonstrate that neighborhoods and industry can work side by side and in harmony

To rediscover and celebrate the histories of North Charleston

To restore and protect the ecological systems in North Charleston

To provide access to the waters of Noisette & Filbin Creeks and the Cooper River

To practice "no tolerance" for gentrification

To revitalize the fiber of family life in North Charleston

To build educational facilities as "centers of the community" in North Charleston

To showcase the artists in North Charleston

To open new venues for recreation and entertainment in North Charleston

To honor and pay tribute to the military and civilian workers of the former Charleston Naval Complex

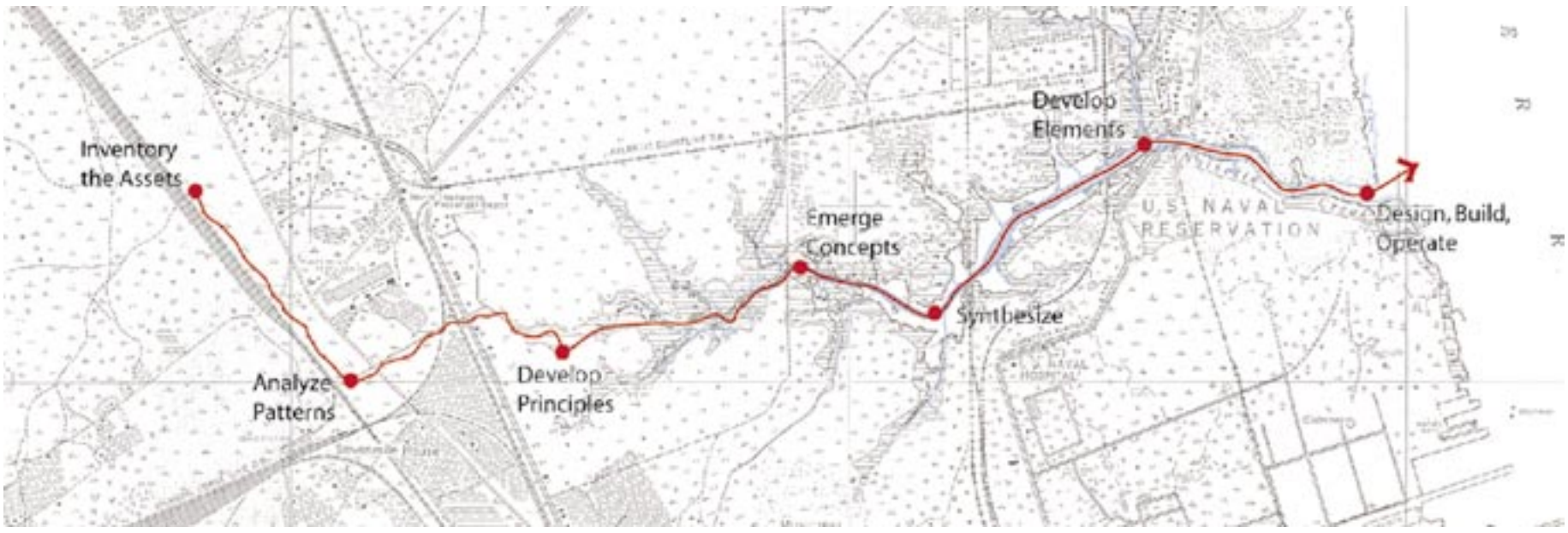
To make our North Charleston neighborhoods safe, healthy and prideful

Charting the Path to a Sustainable Future

A community-based master planning process takes a different path from that of conventional master planning. This process flows like a stream, seeking to find its roots in the past, to assimilate knowledge of the place, to understand the dreams of its citizens, and to synthesize concepts for the New American City.

"Consult the genius of the place..."

- Alexander Pope



The first step of this master planning process is to **inventory the assets**, seeking to understand the essence of what makes this place unique. Though the City of North Charleston has only been incorporated since 1972, it has been evolving over a much longer history. For centuries, Tidewater Indian tribes lived along the Etiwan (now the Cooper) River, thriving on the bounty of the low country. The arrival of the Europeans in 1670 marked the beginnings of an agricultural economy around Charles Town (later Charleston). By the time of the American Revolution, over 60 plantations were active in the North Charleston area. The port city of Charleston became an important trading and shipbuilding center for the South and depended on the natural resources from the "north area" between the Cooper and Ashley Rivers. The Cooper River emerged as a major economic force in the industry and the agriculture of the region. Through the middle of the nineteenth century, rice, lumber products, and valuable minerals such as phosphate from the North Charleston area provided the basis for growth in the low country. In 1871, Liberty Hill was established as an independent community of pre-Emancipation freedmen as well as former slaves. It is probably the oldest neighborhood in North Charleston and retains a special character that is important to preserve.

In 1896, the Olmsted Brothers designed a naturalistic recreational area, Chicora Park, making use of the varied topography around the Noisette Creek. Chicora Park provided a recreational escape from the City of Charleston, which had a public trolley linking the city and the park. Chicora Park was to be short-lived. In 1901, the US Government acquired almost 1,200 acres of the park and adjacent land and began the construction of the Charleston Navy Yard.

For the next century, this naval base had a profound effect on the natural systems, commerce, and growth patterns of North Charleston. Anticipating the need for an expanded city, in 1913 a group of Charleston business men developed plans for a new community north of the Noisette Creek. They hired W. B. Marquis, who was later associated with the Olmsted Brothers, to create a city plan based on the English Garden City movement, with Park Circle as its center. North Charleston developed a strong industrial base, many elements of which continue today. During World War II, the Navy Yard was a major shipbuilding center and spurred rapid growth in North Charleston. The majority of the commands at the base were slated for closure in 1993; final military operations ceased in 1996. Since that time, the base has undergone a transition from military to private uses over the ensuing years.

By **analyzing the patterns** of these developments, we can understand the significant changes that have transformed the land from an undisturbed ecosystem into an urban community. As with most cities that have developed in this same time period, many of the natural systems have been profoundly transformed, often with unintended consequences.

The Noisette Creek is a good example of this change. In the time when Indians lived on the land just south of the junction of the Creek and the Cooper River, it functioned as a tidal stream, rich in flora and fauna. The Marshlands and Turnbull plantations occupied this same land in the 18th and early 19th centuries, changing the land and the Creek to accommodate rice and indigo farming. The Olmsted Brothers further modified this land as part of their creation of Chicora Park, creating recreational facilities, a plant nursery, roads, and a substantial wharf.

The US Navy profoundly changed the land over the 20th century, dredging the river, filling much of the tidal marsh, and raising the lowlands to create more buildable land. Today, the creek is a channel for stormwater and wastes from the City. It is much less ecologically diverse, and less able to buffer storm events, increasing flooding potential. Intriguingly, in the few years since the Navy stopped maintaining the land around the Creek, the natural tidal forces have begun to reclaim the land, beginning the process of returning it to its natural condition, but much more work will be needed to complete this task.

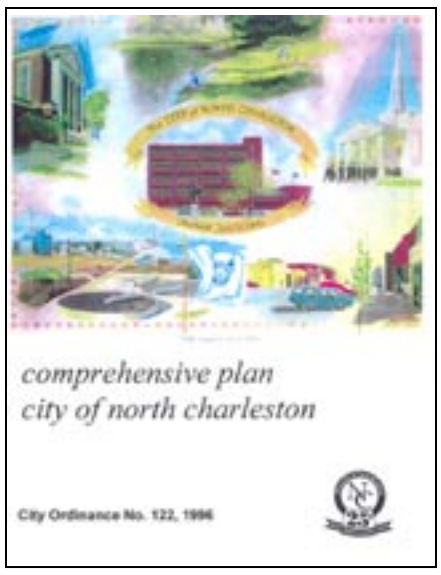
Tributary of Noisette Creek near Quarterman Lake

Noisette Creek with the Cooper River in the distance

Noisette Creek near Spruill Avenue

Pier Alpha at the junction of Noisette Creek and the Cooper River

Vision



Neighborhood planning meeting at the Felix Pinckney Center in Liberty Hill

Community planning meeting at the North Charleston High School

The master plan was presented to the North Charleston community in November 2003.

After the main presentation, there were break-out discussions with residents, such as this one for the Liberty Hill neighborhood

Many attendees offered valuable feedback about the master plan at this community meeting.

The process of inventorying the assets and analyzing the patterns of prior land use, enables us to **develop the principles** that will guide future planning and development:

- Re-weave and strengthen the City tapestry
- Rekindle the City as a great place to grow
- Respect individuals, the community and the natural environment
- Restore and enhance the environment
- Rediscover opportunities for sanctuary, spiritual renewal, and inspiration
- Regenerate places for people to live, work, and learn

The initial planning **concepts emerge** from these principles and from the prior planning efforts of the City, County, and State. In particular, the City of North Charleston adopted a *Comprehensive Plan for the City of North Charleston* (City Ordinance No. 122, 1996), which sets forth specific goals for population, housing, economic development, natural resources, cultural resources, community facilities, annexation, and land use. These goals have formed a solid base for the concepts included in this master plan. This master plan is not intended to replace the Comprehensive Plan but rather to propose specific initiatives and guidelines for a "renewed sustainability center," the implementation of which would accomplish the City's goal of becoming a leader in sustainable redevelopment of an urban environment.

This community-based planning process has benefited from the insights and aspirations of the residents of the Noisette area of North Charleston, which were sought out through hundreds of community meetings and newsletter communications. Thousands of citizens described a strong, vibrant community but also identified needed improvements in their neighborhoods and the City as a whole. The North Charleston government officials provided invaluable guidance about the concepts that were the most viable and best synchronized with their planning objectives. These inputs led to the **synthesis** of the planning recommendations contained in this master plan. In some cases, these recommendations reinforce stable development patterns that exist throughout much of the planning area. In other cases, profound changes are needed to realize these goals.

Over time, the City of North Charleston and the Noisette Company will jointly **develop the elements** of this plan, beginning the process of transformation to the **New American City**. In many ways, this master planning process has already contributed to the revitalization of the City, as seen in rising property values and the emergence of new businesses.

The following chapters in this master plan provide detailed recommendations for:

- Regenerative Land Use (Chapter 2)
- Restoring Natural Systems (Chapter 3)
- Restoring the Connections (Chapter 4)
- Neighborhoods as Catalysts for Change (Chapter 5)
- River Center at Noisette—transforming the Naval Base (Chapter 6)

This master plan includes a phased **implementation strategy**, using tax increment financing (TIF) as a key element to improve public infrastructure, bolstered by private investments (see Chapter 8 for further discussion of TIF funds). It also proposes a **measurement methodology** to establish standards for sustainable residential, commercial, and open space development.

Summary of Responses from North Charleston Residents

	Liberty Hill	Old Village	Cameron Terrace	NE Park Circle	Palmetto Gardens
WHAT DO YOU LOVE ABOUT YOUR NEIGHBORHOOD?					
Community spirit	✔	✔	✔	✔	✔
Strong sense of community	✔	✔	✔	✔	✔
Small town feel	✔	✔	✔	✔	✔
Churches, faith-based	✔	✔	✔	✔	✔
Central location, good access	✔	✔	✔	✔	✔
People know their neighbors	✔		✔	✔	✔
Sense of security	✔		✔	✔	✔
Green space, open space	✔	✔	✔	✔	
Quiet		✔	✔	✔	✔
Parks and recreation		✔	✔	✔	✔
Important history	✔	✔		✔	✔
Lots of existing trees		✔	✔	✔	✔
Good housing stock, styles		✔	✔	✔	✔
Walkable		✔	✔	✔	
WHAT WOULD YOU CHANGE?					
End rail crossing traffic disruption	✔	✔	✔	✔	✔
Reduce truck traffic		✔	✔	✔	✔
Improve streetscape	✔	✔	✔	✔	✔
Improve schools		✔	✔	✔	✔
Improve city image		✔	✔	✔	✔
Reduce crime		✔	✔	✔	✔
More code enforcement		✔	✔	✔	✔
Improve public transportation	✔	✔	✔	✔	
Eliminate pulp mill smell	✔	✔		✔	
Increase home ownership		✔		✔	✔
WHAT'S MISSING FROM YOUR NEIGHBORHOOD?					
Basic retail services	✔	✔	✔	✔	✔
Convenient emergency care		✔	✔	✔	✔
Riverfront Park		✔	✔	✔	
Library		✔	✔	✔	
Recreation & entertainment opportunities for kids		✔	✔	✔	
Walking and bike paths		✔	✔	✔	
Job opportunities	✔	✔			
Tourist destination such as *The Hunley*		✔		✔	
Assisted living facility			✔	✔	
Nearby Wal-Mart			✔	✔	

Regenerative Land Use Strategy

Contents

Land Use Philosophy

- Create a mixed-use pattern that promotes a Live/Work/Play environment
- Increase density in redeveloped portions of the project area
- Equally distribute activity generators to enrich all neighborhoods
- Enhance the sense of neighborhood identity

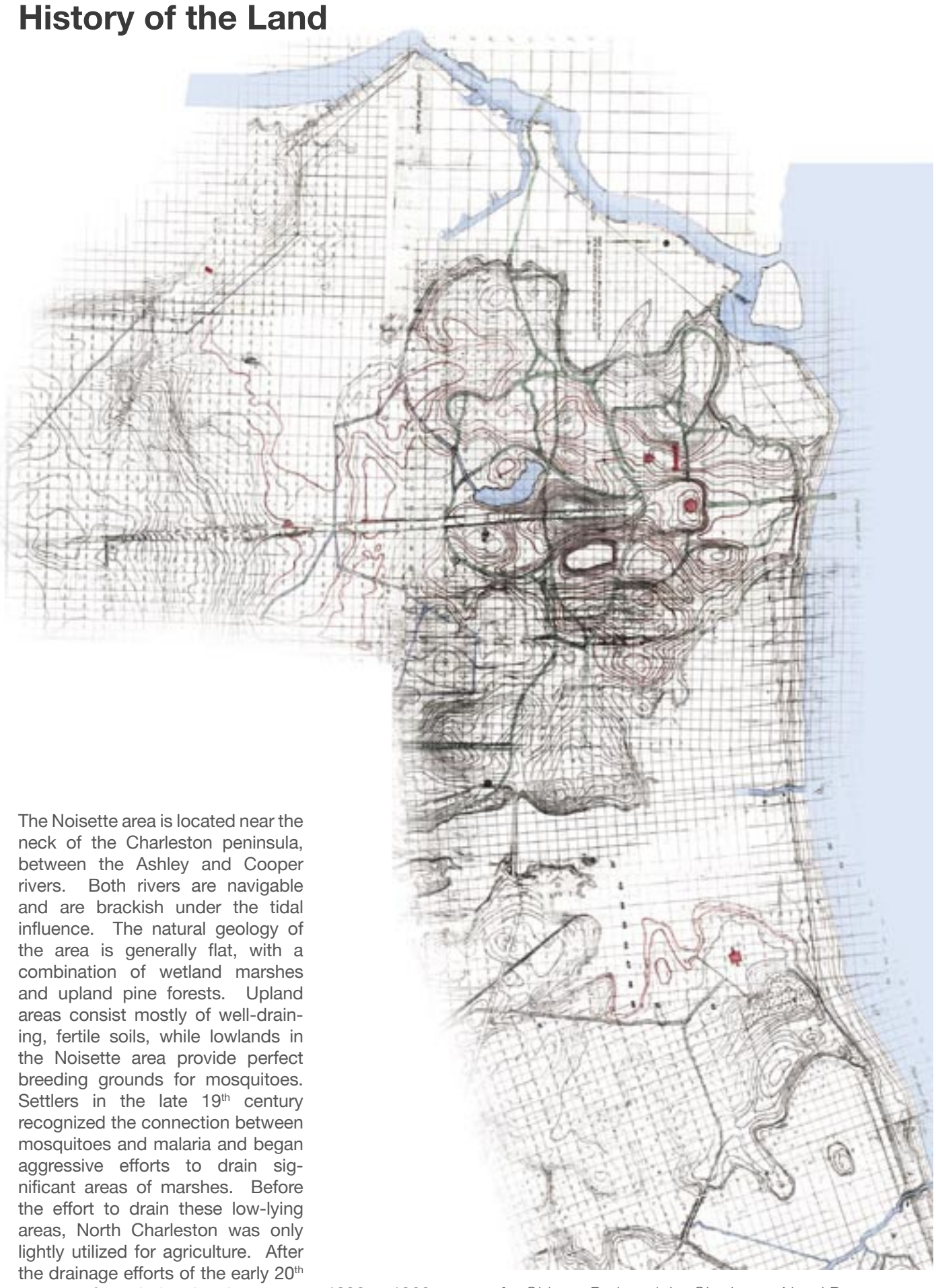
History of the Land

1842 Charleston region plantations

"North Charleston" plantations

"Liberty Homes" WWII housing

Charleston Naval Base dry dock



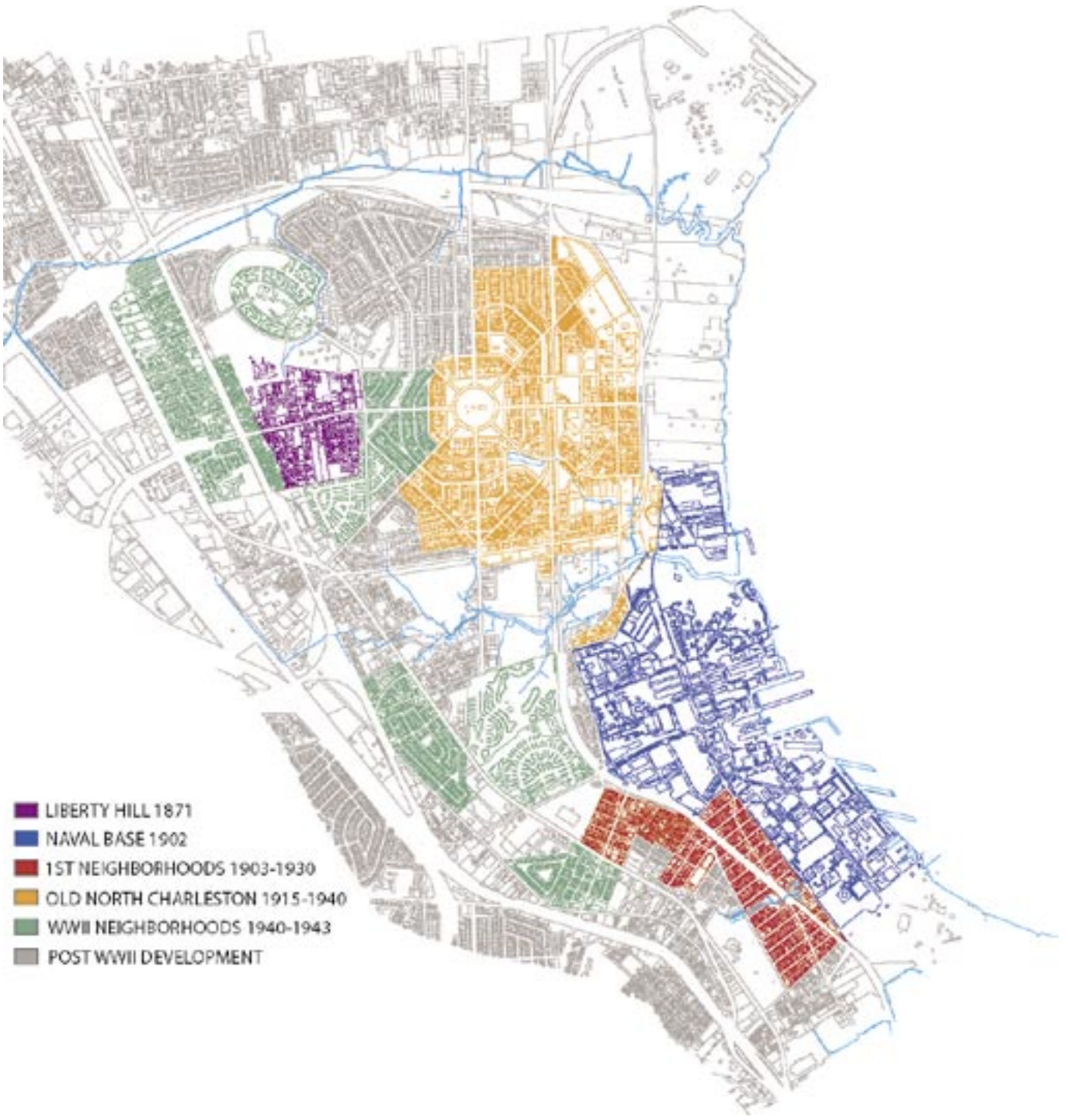
1892 to 1902 surveys for Chicora Park and the Charleston Naval Base

The Noisette area is located near the neck of the Charleston peninsula, between the Ashley and Cooper rivers. Both rivers are navigable and are brackish under the tidal influence. The natural geology of the area is generally flat, with a combination of wetland marshes and upland pine forests. Upland areas consist mostly of well-draining, fertile soils, while lowlands in the Noisette area provide perfect breeding grounds for mosquitoes. Settlers in the late 19th century recognized the connection between mosquitoes and malaria and began aggressive efforts to drain significant areas of marshes. Before the effort to drain these low-lying areas, North Charleston was only lightly utilized for agriculture. After the drainage efforts of the early 20th century, farm industries began to locate in the Noisette area, along with a number of various industries along the Cooper River.

The North Charleston climate is greatly affected by its proximity to the coast; summer breezes off the ocean help to cool the land and winter breezes warm the land. Summer weather is typically dominated by a maritime tropical air mass referred to as the Bermuda high. Temperatures range from a winter average low in the 50's to a summer average high in the low 70's. The climate is mild and humid year-round except at the height of the summer, when temperatures can be uncomfortably hot. Prevailing winds change direction with each season. Average annual rainfall is near 50 inches, but the Bermuda high can cause periods of drought. Snowfall occurs on average once every three years. The area is subject to tropical storms, tropical depressions, and hurricanes. The Noisette area is subject to flooding in several areas during storm events. Large areas of the Noisette footprint, consequently, lie within the 100-year floodplain.

North Charleston falls within the Middleton Place - Summerville Seismic Zone. Because of the nature of the soils in the area, the principal earthquake risk is liquefaction.

History of Noisette Area Land Use



It's thought that South Carolina was populated by Native Americans for more than twelve thousand years prior to the arrival of European colonists. North Charleston's first settlements were along the Cooper River- Native American settlements of the Wando, Etiwan, Kiawah, Sewee, Stono, and Kussoe tribes. Upon the arrival of the first English settlers, some of these tribes developed friendly relationships with the colonists. Others rebelled. As the settlement expanded north over the years, the influence of the Native American tribes was eventually wiped out.

Settlers began establishing small towns and plantations, becoming a center of trade with Native Americans, the West Indies, South America and Europe. While the first trade goods were lumber-based, the economy later shifted to ship-building. Rural settlers began experimenting with cash crops for export, including indigo and rice. Among a number of early estates in the Noisette area were the Oak Grove and the Retreat (Turnbull) Plantations, on opposite sides of Noisette Creek. The "Broad Path" connected the peninsula to the "back country" of the state, creating mercantile opportunities in North Charleston. Meeting Street, or "Plank" State Road, connected North Charleston settlements to Charleston and the harbor. Portions of Meeting Street have been modernized and remain in use today.

The Revolutionary War interrupted the agricultural development of North Charleston. One year of British occupation led to neglect of rice plantations, and independence led to an abandonment of the indigo industry. The rice plantations reverted to swamp land, giving North Charleston a reputation for "bad air," indicating the high risk for malaria. The plantations could not compete with other agriculture markets in the highlands and were reforested. Because of the low elevation, North Charleston was not a desirable location for the wealthy plantations of other surrounding areas.

As the state continued to develop, demand for goods reached a level that justified the introduction of the first rail line. Initiated by a cotton merchant, the first track was laid along the ridge of the peninsula neck, along the route of Meeting Street Road. It ran seven miles north and was eventually connected to the Savannah River. Rail service expanded throughout the years for transportation of goods and passengers. Historic lines later became parts of the Southern and Atlantic Coast Line Railways.

Train service was interrupted by the Civil War, which began in the Charleston Harbor in 1861. With the peninsula's vulnerability lying in its coastal exposure, the rail lines became primary means of evacuation when the Union Army occupied Charleston in 1865. There is no evidence that any battles took place in North Charleston. The war obliterated the Charleston and North Charleston economies. The phosphate industry, railroads, timber, and some agriculture helped the recovery in North Charleston. Most settlements occurred near the Meeting Street Road and train depots. Former slaves established independent villages, working as wage earners in the phosphate industry and lumber mills.

As there were no more slaves to support the former agricultural economy, the plantations lost economic viability. The Retreat Plantation and part of Oak Grove were bought by the city of Charleston for the development of a substantial public park. Nearly six hundred acres were purchased for a price of $11,209. Surveys and plans were completed between 1895 and 1902. The Park Board retained the Olmsted Brothers to design the park. Clearing was underway by 1896, and a trolley connection was established in 1897. The park was accessed the following year by a paved boulevard- Carner Avenue, sometimes called Chicora Parkway- the beginning of the present-day Rivers Avenue. Though the park was popular, incentives to attract the US Navy's relocation of the Port Royal, South Carolina, base encouraged the park's sacrifice.

In 1901 the US Navy purchased most of Chicora Park and much of the Marshlands Plantation for the development of the Charleston Navy Base. The park caretaker's cottage became Quarters F. Construction on the dry docks began in the same year. Construction continued steadily over the next decade. It was during this time that P.J. Berckmans Company was consulted to draw a plat for the community of North Charleston. Employment opportunities at the base made the surrounding area attractive for development. It is important to recognize that historic North Charleston was platted in 1913, before the era of the automobile and while a mass-transit link was in place to connect it to Charleston. With the onset of the First World War, employment on the base included over 5,500 civilian jobs. Commuters from Charleston overwhelmed the trolley line and freight lines added passenger cars. At the end of the war, employment declined rapidly. The trolley line was eventually discontinued. In the years leading up to the Second World War, employment was scaled back and portions of the base were demobilized.

The Second World War brought a boom to North Charleston. By 1941, ten thousand civilians were employed at the base. The base expanded across Noisette Creek, and villages sprang up to meet the housing needs. In 1939, it was estimated that 200 families were arriving each month. During this time, Ben Tillman Homes, Palmetto Gardens, Dorchester Terrace, and Nafair were developed. The base continued to influence the City of North Charleston with its war time/peace time fluctuations up to its closure in 1993 - 1996. Other subdivisions abandoned the historic plat for more suburban and car oriented development patterns. Most of the neighborhoods were fully developed by the 1960s, creating the North Charleston of today.

View of train blocking Rivers Avenue traffic

Retail businesses on Rivers Avenue

Post-WWII housing

Original GARCO worker housing

Old Village businesses

Central Business District on Montague Ave.

Character of Noisette Area Land Use

Because of its suburban pattern of growth, the land uses in North Charleston are primarily segregated and poorly integrated. Very little mixing of uses occurs within the Noisette boundary. This pattern contributes to the development of sprawl, as demonstrated by the development that has occurred north of the Noisette area in North Charleston. The lack of integration results in more traffic as people are forced to drive to get basic services. This pattern has created an undesirable pedestrian experience that is scaled for the automobile. It diminishes the identity of North Charleston as a "place." The weakened identity causes the Noisette area to suffer in competition with Charleston, Mt. Pleasant, development to the north, and other regional municipalities.

Some institutional uses are mixed into the residential zones within the Noisette area. Many churches are located in the area. Six schools are located in the Noisette area, with four more in the vicinity. Some municipal services are provided in the Noisette area, but most are in inconspicuous locations in buildings that do not convey a sense of community pride or value.

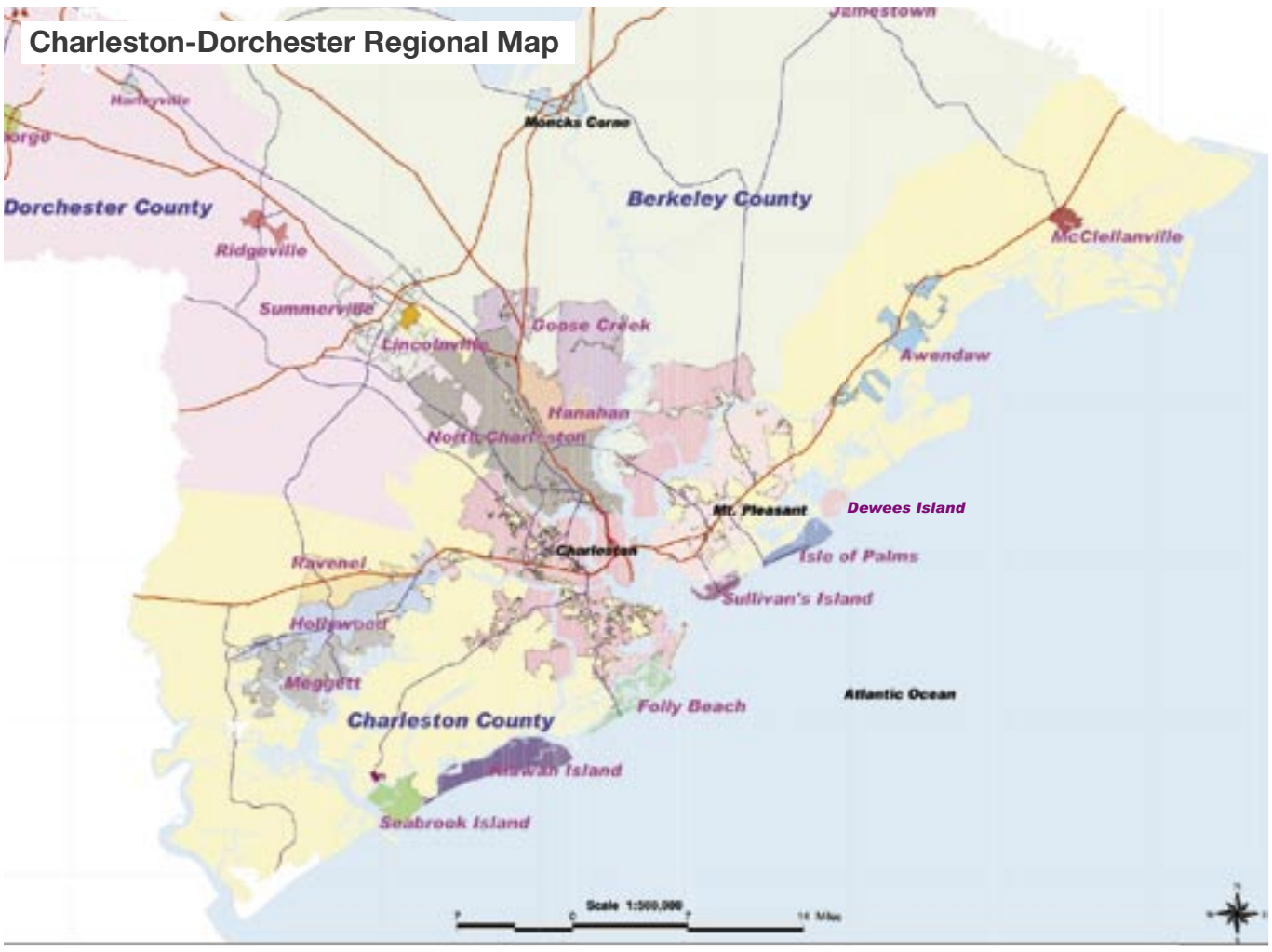
The housing stock within the Noisette boundary is primarily homogenous with very little mixing of types. Most of the housing is single-family detached at low densities. A small amount of multi-family housing is accommodated along with scattered mobile home lots. The existing pattern does not provide choice to the residents of North Charleston. The pattern targets a demographic that is shrinking not only in North Charleston, but nationally. There is a higher demand for multi-family housing, smaller units for smaller families, and diversity that will cross economic strata. Homes need to be more flexible in today's world. One quarter of American households consist of persons living alone. Over 55 million Americans work out of their residence.

Very few viable retail and commercial uses are located within the Noisette boundary. Lack of success can be contributed to economic conditions, but is surely influenced by the perceived undesirable location. Contributing to the downfall of Noisette area businesses is the lack of vitality that is presented in the physical impression of the business areas. Perhaps the most viable area currently is the Montague Avenue "Old North Charleston" business district, which has a traditional Main Street character. This district also suffers from a distorted scale — the building density is too low to attract a significant amount of business traffic that would cause the business to obtain the benefits of a "location." Several of the storefronts are empty, though proof of a slow resurgence is evident over improvements made in the last year. The Montague Avenue street improvements planned by the city will help, but the building patterns are inconsistent. The area would benefit from a more comprehensive development program to infill businesses on empty lots, improve buildings that are in good condition, and replace buildings that are marginal.

The development along Rivers Avenue reflects the character of early suburban strip development. Rivers Avenue is far too wide, focused only on the automobile and very insensitive to pedestrian use. Rivers Avenue creates the opportunity to include scaled-down box type retail that would compete with development on Rivers Avenue north of the Noisette area, providing room for convenience discount stores and specialty retailers that are now missing from the area. These uses are desirable based on the charrettes conducted with Noisette area residents.

The Noisette area also suffers from a lack of employment opportunities. The area was hit hard by the closure of the Naval Base. Businesses lost the traffic that was generated by the naval base employees. Little diversity exists in the Noisette area in terms of employment opportunities. The area provides mostly blue collar and minimum wage jobs. Few professional businesses operate in the area, which in turn means that Noisette residents must drive to other locations for health care, legal counsel, insurance, and similar services. Very few corporations are located in the Noisette area, with the exception of the light industry businesses on the former naval base. The area could be attractive to corporations, given it's proximity to the North Charleston Airport and Interstate 26.

The Noisette area has been physically cut off from the Cooper River by the industrial development along Cooper. The land use may be appropriate in its adjacency to other land uses, but some connection should be re-established so that residents can reclaim the river as part of the public realm.



Regional Impact

Areas outside of the project area that will impact the Noisette development:

- Charleston
- Westvaco
- Clouter Island
- Mt. Pleasant
- South Carolina Ports Authority
- Development on the south part of the former Charleston Naval Base
- Container Facility
- Second-Tier Suburbs

Charleston, South Carolina
Charleston is the second largest city in South Carolina, but its population exceeds North Charleston's by about sixteen thousand persons. Together, as an MSA (metropolitan statistical area), the two cities ranked 191st among world economies, based on Standard and Poor's 1999 DRI study. The city is a considerable tourism draw for the region, boasts a number of prestigious learning institutions, is significant as a port of trade, and has been campaigning to attract businesses in the technology industry. Charleston occupies almost one-hundred square miles at the tip of the peninsula, locking it between the Ashley and Cooper Rivers and the City of North Charleston. Because of the physical limitations to its growth, the historic nature of the downtown fabric, and the concentration of commerce in the city, Charleston has become an exclusive area where the majority cannot afford the price of residential property.

In 1937, **Westvaco** (now Mead Westvaco) continued its expansion from its West Virginia roots with the construction of an unbleached paperboard mill in the Noisette area. This mill is still in use today, and as of November 2002 Westvaco's operation in North Charleston is the largest paperboard mill in the country.

Clouter Island
Clouter Island is used as a spoil collection area for material dredged from the Cooper River. This spoil has a pudding-like consistency covered by a two- to three-inch thick crust.

Mt. Pleasant is a neighboring town with a population approaching 50,000 residents. It is one of the premier bedroom communities in the state, in part due to its low property taxes, low crime rate and good schools.

One of the major issues in the town right now is how to manage its annual growth rate, which has been as high as 8% in recent years. In 2002, Mount Pleasant adopted a seven-year Residential Building Permit Allocation Program with a goal of reining in the average rate of growth to 3%, and one year later the town was exploring the possibilities of extending that time frame and lowering the target growth rate. The biggest negative consequences of their rapid growth have been traffic related.

The **South Carolina Ports Authority** was established in 1942, and it oversees a number of shipping facilities in the Charleston region, including a terminal in North Charleston. In 2002, the Ports Authority and the North Charleston reached an agreement on the expansion of the port on the **southern portion of the former Navy Base**. The agreement identifies a 600+ acre site that is expected to increase the activity at the terminal and provide the area with better, higher-paying jobs in the process.

The North Charleston Terminal is a modern **container facility** with access to rail and interstate transport systems. There are three container berths and one dedicated grain elevator berth, along with support machinery, storing and staging space, all of which contribute to make it the nation's fourth busiest container port. With the Ports Authority's commitment to short-term capital improvements, Charleston will possess some of the deepest shipping channels on the Atlantic and Gulf coasts, a fact that will add to its appeal as a domestic and international shipping terminal. The expansion of this port into the Navy Base is expected to include a three-berth, 250-acre container terminal in the first phase of expansion.

In 2003, the Port expanded both domestic and international business, the former with a distribution agreement for Wal-Mart. In the international shipping arena, a booming US-Asian trade economy has led to the expansion of US shipping routes along the East Coast. With the latest agreements, the terminal will receive an additional 78 calls to port, and the total of Asia services in Charleston rises to seven.

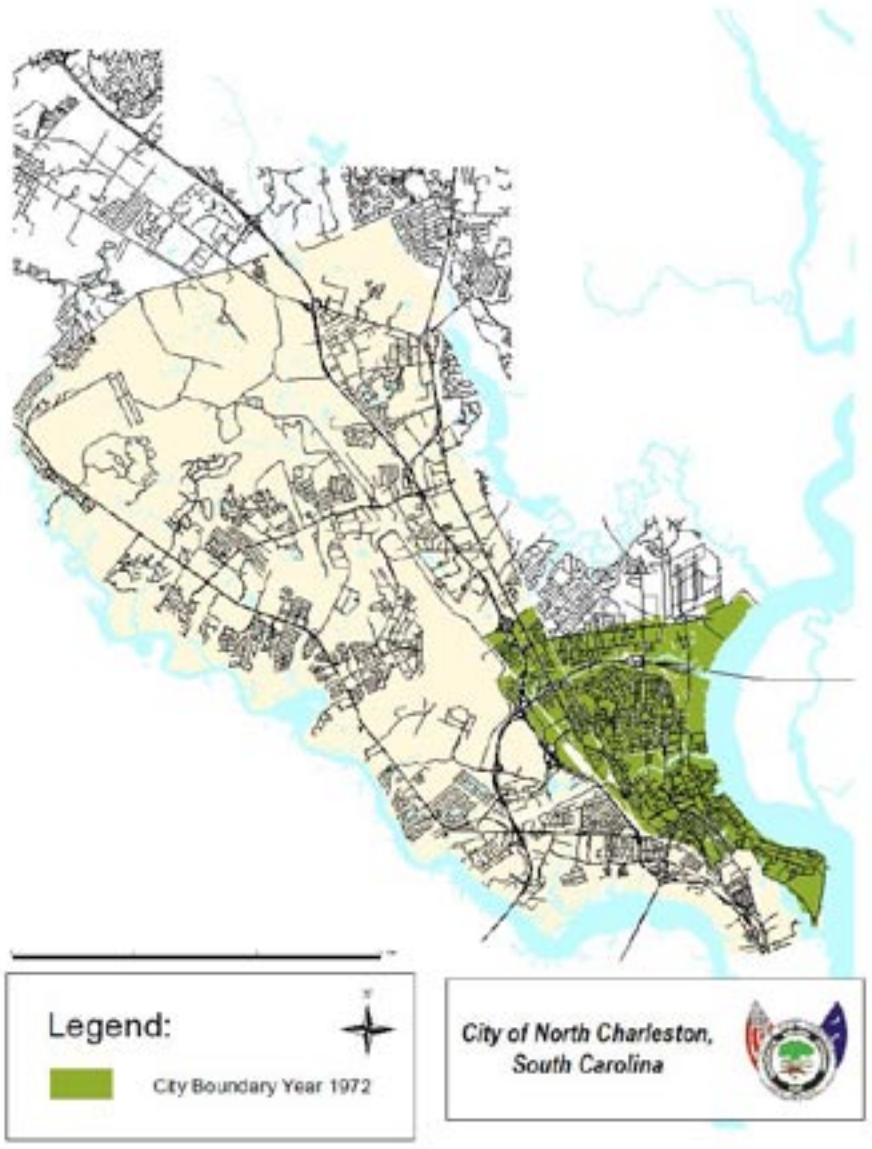
The Second-Tier Suburbs
North Charleston is Charleston's first-tier suburb- a community that grew outside of a city during the WWII era. Furthermore, North Charleston has seen patterns of disinvestment consistent with those that are challenging many of the nation's first-tier suburbs. Communities outside of downtown Charleston have seen significant growth in the region over the last decade, with much of the emphasis on single-family dwelling units. These areas of housing tend to be supported by suburban corridors of sprawling commercial and retail development, such as Highway 17, Rivers Avenue, and Maybank Highway; these areas simply do not have the cohesive town-centers that make communities great places to live.

Goods passing through the North Charleston Terminal include cars, food and beverages, furniture, textiles and clothing.

Satellite image of Charleston region

Planning and Zoning for the New American City

"The greatest flaw in city zoning is that it permits monotony. Perhaps the next greatest flaw is that it ignores scale of use, where this is an important consideration, or confuses it with kind of use, and this leads, on the one hand, to visual (and sometimes functional) disintegrations of streets, or on the other hand to indiscriminate attempts to sort out and segregate kinds of uses no matter what their size or empiric effect. Diversity itself is thus unnecessarily suppressed..."
-Jane Jacobs
The Death and Life of Great American Cities



1913 plat of North Charleston by P.J. Berckmans Company

Though lifestyles have changed significantly in the last century, basic planning laws have changed very little. Most cities still operate under zoning principles that were developed in the early part of the twentieth century.

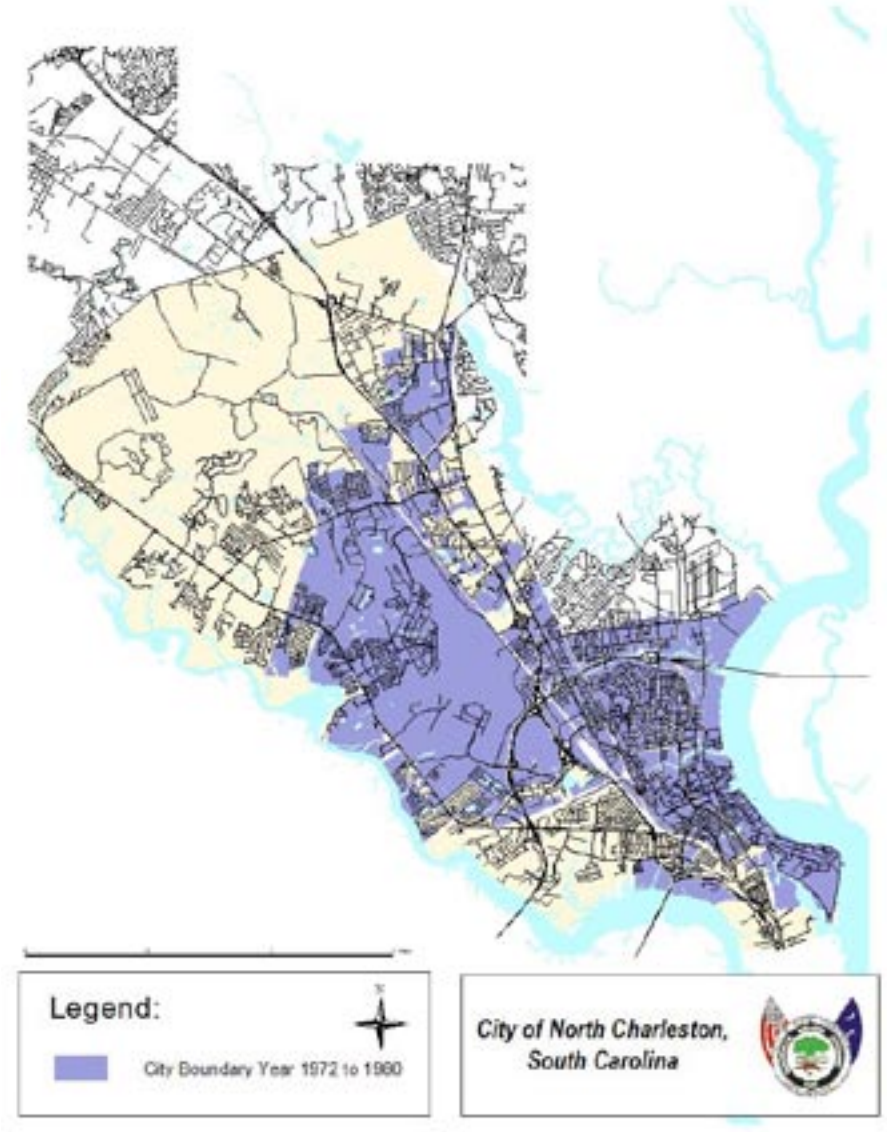
The framework of the P.J. Berckmans Company's garden city plan is still woven into the pattern of Noisette's neighborhoods. In the plan for North Charleston, residential areas were located around Park Circle, influenced by the City Beautiful movement's ideals about central open spaces. Inherent in the planning was the idea that people could walk between their homes, businesses and services and to natural areas for recreation. Though the street patterns changed over time, the neighborhoods grew from the Berckmans plan as activity at the Charleston Naval Base expanded. Much of the growth developed from tract housing projects as subdivisions were created and home lots were sold. This development occurred almost entirely without the influence of a zoning code or a comprehensive plan. It was the beginning of a traditional community with many of the characteristics that home buyers seek today.

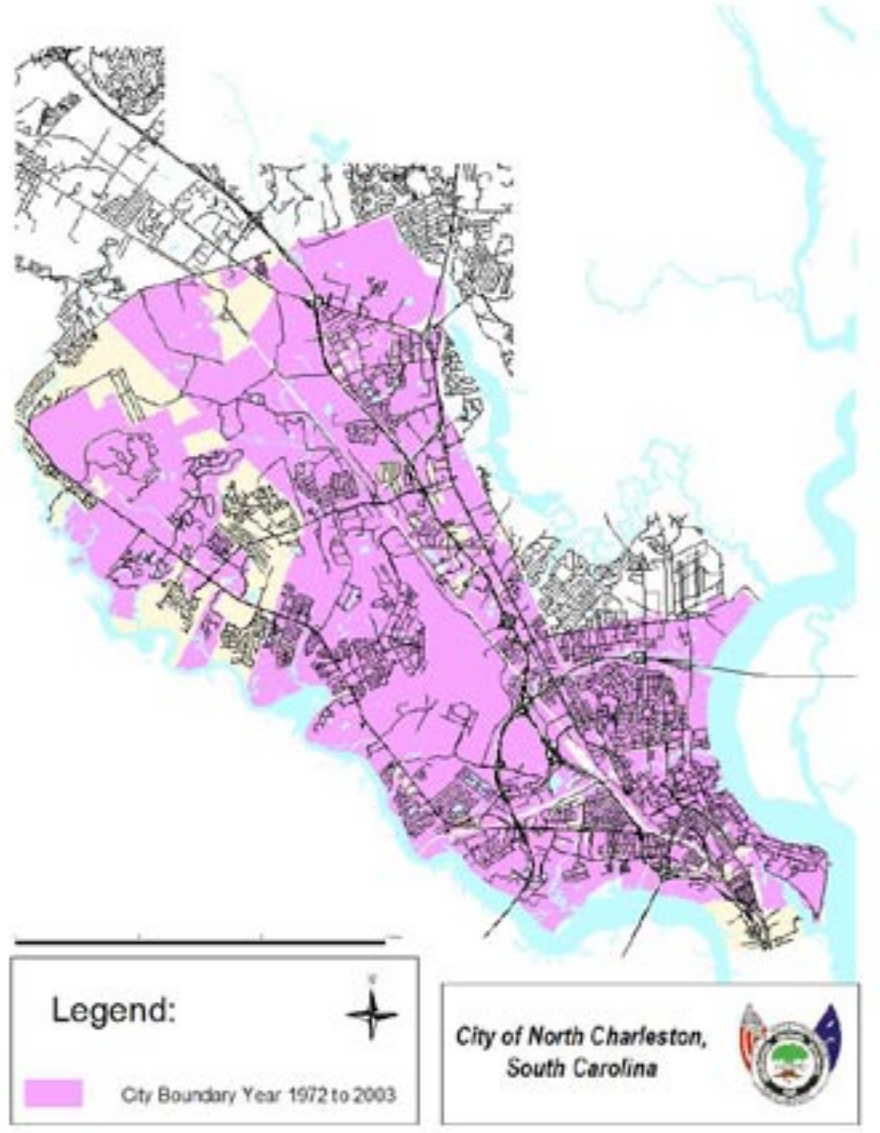
Over the years, other forces have also impacted the City of North Charleston. Like many American cities, development in the Charleston Metropolitan region has consumed land at a faster rate than population growth. According to the Strom Thurmond Institute, the Charleston Metropolitan region's population increased by 41% between 1974 and 1993, but the urbanized land area of the region grew by 255%. Growth has pushed farther north, sprawling out Rivers Avenue and spreading the City's economic resources thinner and thinner.

As a consequence, North Charleston has not developed an urban, retail core. Infill, reuse and densification, the signs of a healthy urban region, have been slow or absent. The lack of downtown redevelopment has meant that the housing stock has failed to keep pace with other national trends such as the demands of an aging population, the decrease in household size, the rise of small entrepreneurs and the increase in desire for recreational spaces that can be quickly accessed. Although North Charleston's ordinances and plans have not precluded such development, they have not been able to lead the community to overcome the normal impediments of urban areas – perceptions of crime and education issues and a development community trained in the efficient delivery of suburban, car-oriented development. The ironic good news is that, like Charleston, Savannah, and North Beach (San Francisco, CA), bad "redevelopment" has left in place the strong bones of North Charleston's early development, bones on which the muscles, ligaments and skin of a vibrant downtown can be grown.

The Master Plan outlines the process by which Noisette will grow in the coming years. The plan outlines three different levels of approach– comprehensive planning, the tools for creating great neighborhoods and examples of application or potential application.

As part of the master planning, the "transect" and certain sustainable design principles organize and guide the use of the tools. The transect is a tool for analyzing and organizing the urban environment. It does not drive form as much as it demands rigor in the creation of identifiable place that serves the desired role. Ultimately, it helps land uses find the proper form for their location so that sprawling parking lots do not gut the urban core and inappropriate high rises do not disrupt the more suburban edges. In its essence, the transect helps determine what the tools should be doing to establish urban





character.

In a similar fashion, this plan describes a set of sustainable design principles that not only provide unique character for Noisette through the integration, preservation and remediation of natural systems but can also create an attractive quality of life that contributes to urban prosperity. These principles also guide the use of the tools as well by helping to define both how these tools should be used and what should be accomplished with them.

When compared with conventional comprehensive planning, this approach is distinct in:

- de-emphasizing the separation of uses,
- emphasizing the use of the form of buildings and public spaces to create vibrant, successful place, where uses can change without great costs or disruption, and
- focus on connections within natural systems that avoid the need for substantial capital improvements, achieve better performance of desired functions and create a distinctive setting for urban residents.

Together the two sets of organizing principles generate a dynamic tension between creating great human habitat through the creation of coherent pedestrian- oriented urban space and the creation of great human habitat through the introduction of and integration of sustainable design elements.

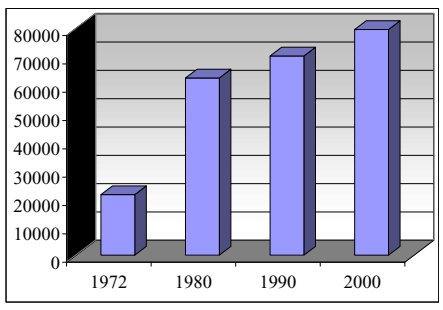
Many different tools can be used to implement these guiding principles. Euclidian zoning categories with appropriate breadth, such as the PUD, B-2, clustering and corridor overlays can be used. Some adjustment may be necessary to calibrate these with the operating principles. In order to encourage development it will be important to increase the predictability of the outcomes of the use of these tools by both increasing the guidance to developers regarding the details of the community vision but also decreasing the number of unanticipated new issues that can be raised after a developer has begun the process.

Form-based coding can be incorporated into overlays for specific areas such as corridors or adopted as a wholesale ordinance for the entire core. Additionally, specific changes can be made to street palettes to introduce connecting sustainable elements and adjust those components of local ordinances that interfere with sustainability or urban design.

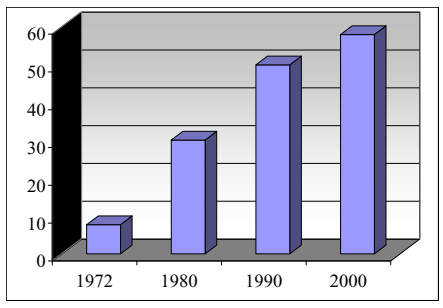
Performance zoning is another tool that can be used to achieve specific policy goals such as high performance buildings or affordable housing. This tool and others are described in more detail in this plan.

Finally, it is difficult to understand how operating principles and tools might come together without some examples of their application. Examples of the application of the urban principles abound. In the face of all of the normal forces arrayed against the recovery of urban areas, neighborhoods such as Uptown (Dallas, Texas) have been created and places like East Beach (Norfolk, Virginia) and Glenwood Park (Atlanta, Georgia) are under construction today. This plan outlines some specific examples of how the application of this approach would impact some specific areas of North Charleston, as well.

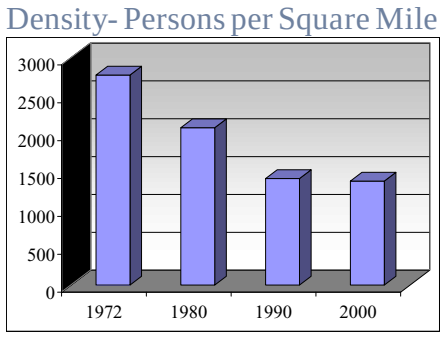
North Charleston Population



North Charleston Land Area



Density- Persons per Square Mile



While the population of North Charleston has quadrupled since its incorporation, the land area consumption has increased to seven times its original border.

This narrow street in Charleston is oriented for the pedestrian, with buildings private frontage still addressing the public realm. It is human scaled, and cars are of secondary importance.

What, then, are the characteristics that are missing from the patterns in the Noisette area? In addition to controlling the uses, what features should zoning tools address in guiding future growth and development? This plan proposes that changes in the planning and zoning in North Charleston should address the issues of SCALE, STREETSCAPE, and DENSITY.

Modify the code to regulate SCALE in addition to USE

Historically, neighborhoods that have high property values, attract people, and are economically stable are the ones that have a mix of uses, a coherent pattern of massing and building scale, and a strong relationship with the pedestrian over the automobile. Among these are Savannah, Raleigh's City Market area, and Washington DC's Georgetown. Even historic Charleston has some of these characteristics. The Noisette area is poised to shape development in a way that will make such a vibrant community attainable. Instead of utilizing the zoning only to separate uses, a more ideal code would describe the relationship of buildings with their physical surroundings and how the public spaces connect them. Such an approach will grant more flexibility to changes over time that are reflections of the dynamic economy or population trends.

The existing code does this to some extent, but the pattern that is currently defined fosters a lower density pattern of building that is more suburban in nature. The scale is increased due to the larger lot sizes that are prescribed by the code. The open and low density pattern reduces walkability and requires more infrastructure to link neighborhoods.

Key to regulating the scale of the built environment are better definitions of the relationship of buildings to the street, appropriate street width, and streetscape features. An example of how the code could be improved is to note the placement of a retail establishment at the corner of Montague and Mixon. Whereas the building now sits at the rear of the site and presents an empty parking lot to the street, it could have been constructed like the pharmacy shown here in Georgetown — with a pedestrian-oriented storefront and a rear access parking lot.

Washington DC's Georgetown

Trees, awnings and street furniture enhance the pleasure of walking through Raleigh, NC's historic, mixed use City Market area.

Retail on Montague Avenue with emphasis given to cars.

Historic homes in Savannah, Georgia, front on the sidewalk and welcome visitors.

Retail on Wisconsin Avenue in Georgetown, with emphasis given to the pedestrian.

Develop guidelines for STREETS and STREETSCAPES instead of SETBACKS and LOT SIZE MINIMUMS

The existing zoning code includes physical requirements for each zone, usually dictating a minimum lot size, desired setbacks from streets and adjacent lots, and maximum building heights. These requirements result in a fairly low-density pattern of development. The Euclidian zoning philosophy often ignores that streets are public places, and, more importantly, that streets and their edges should be designed for pedestrians as much as they are designed for transportation, if not more. Typically, the zoning code does not help to create a streetscape; it dictates a way that buildings should sit in space instead of using buildings to shape space — or create place. Building relationships for zones other than residential are only described in terms barely beyond minimum setbacks. This allows for the front area of a lot to be dedicated to cars. As the street is taken over by the automobile, it becomes abandoned, unpleasant, and unsafe.

Instead, buildings should be placed to define stronger street edges, thus creating more lively sidewalks and zones where activity can take place. Areas for cars should be located behind or at the sides of buildings. The relationship of buildings to the streets and the physical character of the street should be defined. Public uses should occur at the street level, setting more eyes on the street, attracting people, and generating social intercourse. This type of public zone is most successful if its physical width does not exceed the buildings' heights. The opportunities for happenstance encounters should be maximized by encouraging multiple entrances and regular crossings of other streets and pedestrian paths. Scattered among the buildings must be other spaces for activity, pocket parks or other public spaces, offering a variety of protected or projected activity edges.

Encourage DENSITY instead of promoting suburban patterns of development

Conventional zoning has traditionally set maximum density standards. As previously discussed, many have argued that this approach has favored low density development that extends infrastructure, tax resources, and perpetuates sprawl. In Performance Zoning, minimum lot sizes, regulations that define density, and regulations that prohibit certain uses should be prohibited. North Charleston's *Comprehensive Plan* has recognized that the city would benefit from the development of a new "City Center," with higher-density, mixed use development. Increasing density in areas that are underdeveloped will help the city achieve another goal in the Master Plan — growth without burdening or compromising the city's current residents and property owners.

Northeast Park Circle
4.5 units per acre

Cameron Terrace
3 units per acre

Century Oaks
8.75 units per acre

Liberty Hill
6.75 units per acre; 12.75 potential units per acre

The current zoning ordinance would preclude residential development similar to that found in some of North Charleston's historic neighborhoods.

LAND USE GOALS from 1996 North Charleston Comprehensive Plan

- Provide a framework for land utilization and development to ensure an orderly, efficient, equitable and compatible arrangement and distribution of the city's physical resources.
- Enhance the physical image of the community.
- Optimize development opportunities for use of the city's natural, cultural, scenic, architectural, and historic resources.
- Strengthen the economic vitality and enhance the position of the city's commercial community to compete successfully in a regional economy.
- Protect and enhance the character of existing quality residential areas.
- Revitalize marginal neighborhoods and areas characterized by vacancies, deterioration and crime.
- Meet the needs of new development and annexed areas without burdening or compromising services to city residents and property owners.
- Create high density mixed use development nodes with enough population and business activity to make transit service viable.
- Improve the environment.
- Provide a full range of housing types, equitably distributed throughout the community to meet the needs of a diversified population.
- Make North Charleston a more "Liveable Community."

Tools to Guide Growth: Performance-based Zoning

The arguments for more flexible zoning do not mandate that the current Euclidian system must be abandoned. It is an efficient, simple, defendable, and economic approach to planning, and it can be modified to encourage a different growth pattern than is currently supported. Other municipalities and entire states have successfully instituted "Smart Growth" policies that utilize various tools in conjunction with more conventional zoning strategies in an effort to create more vital, pedestrian friendly, higher density communities. It is tools like these that the City of North Charleston must explore to generate more positive and sustainable growth.

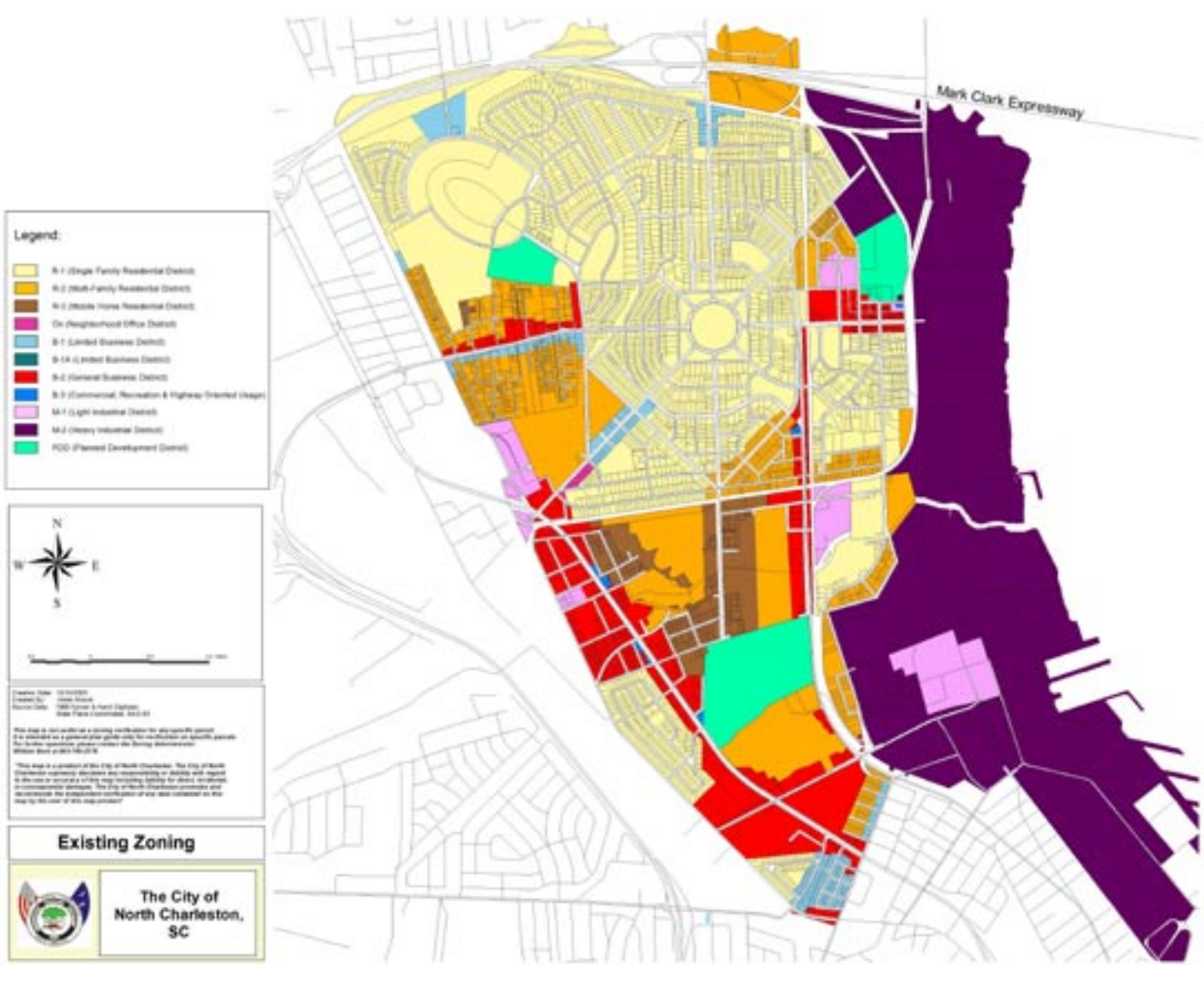
North Charleston has modified the Zoning Ordinance to begin to incorporate alternative approaches to strict Euclidian zoning, such as the "PD" or Planned Development District areas designated by the city to provide flexibility for developing land for its most appropriate use. This approach allows mixed use of an area, while encouraging a variety of building type, height, setbacks, and style. The disadvantage to this approach is that it requires an intensive review and approval process. Some lenders will avoid financing developments that require potentially lengthy review periods. The current process allows for the perception of higher risk- considerable financial investments could be made to still face the possibility that the project can be denied in the final phase at the city council's discretion. Although this is not an issue in North Charleston, zoning administrators in some municipalities use their discretionary power in a manner that discourages unique or innovative economic development rather than facilitating it.

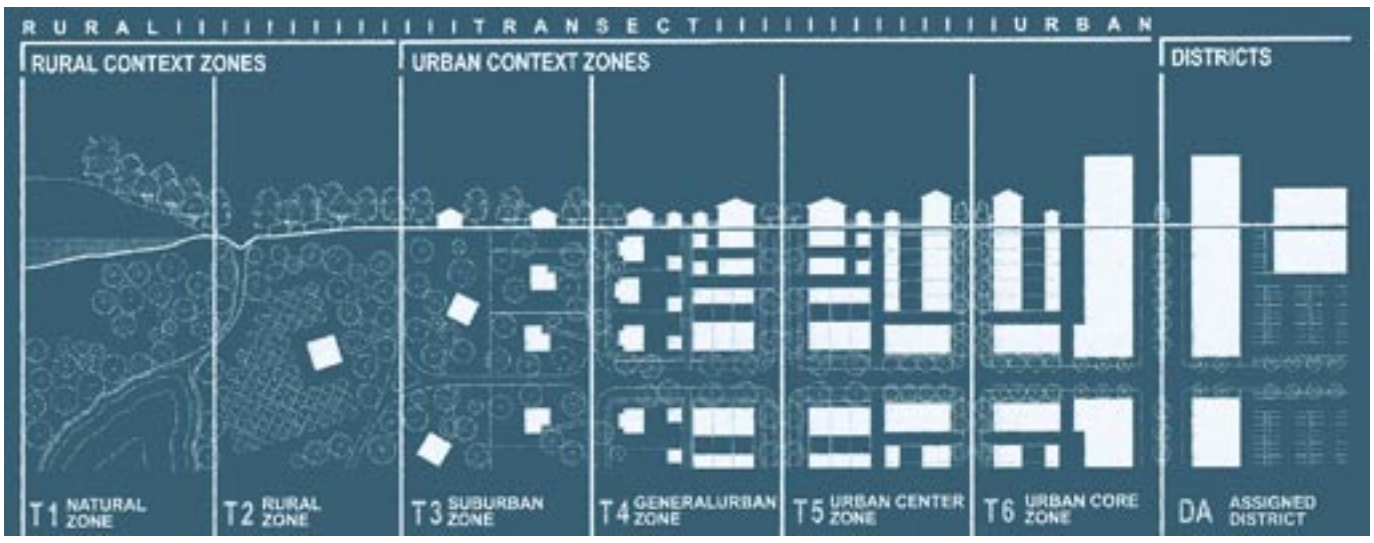
Zoning is a very important tool for directing growth in a community. The first goal listed in the city's Comprehensive Plan's chapter on Land Use is as follows:

Provide a framework for land utilization, annexation and development, to ensure the orderly, efficient, equitable and compatible arrangement and distribution of the city's physical resources.

Perhaps the Zoning Ordinance needs to be tuned to more effectively address the goals that are stated in the Comprehensive Plan. In a survey of planning issues in North Charleston, Planning areas One (the Noisette area), Two, and Four, listed "Land Use Compatibility" as high priority land use issues. As the Comprehensive Plan suggests in Part VIII, most of the concerns that are linked with land use compatibility have something to do with development that "lowers property values, heightens traffic congestion, emits pollutants, alters accepted environmental conditions, scars the landscape, ***or is just plain ugly*** [emphasis added]." This Master Plan suggests that these undesirable features might have more to do with poor design, monotony, or the absence of a sense of place than they have to do with compatibility of uses. It is important to acknowledge that beauty is a fundamental need. What takes place in a building may have less of an impact than the image that is conveyed by the physical presence of a building.

There are a few strategies that have been employed within the conventional zoning and land use structure that can address some of the problems that are associated with strict Euclidian Zoning. Performance Zoning, Form-based Zoning, and Overlay Zoning are three techniques that provide a framework that might be more in alignment with the goals of the Comprehensive Plan. Performance zoning can be very simple or very complex, depending upon the jurisdiction and the depth of guidelines that they wish to develop. North Charleston has some performance based guidelines in the current zoning ordinance. Form-based zoning is not a new concept. Early zoning ordinances sometimes included regulations that impacted building design that extended beyond the regulation of building height and bulk. New York City had these types of regulations for development of the early skyscrapers in an effort to maintain daylight penetration at the street level. Recognizing that this approach does not always produce





The Transect Zoning Model

Calhoun Homes typical housing stock

Residential setbacks

the desired effect, many cities in the US are now exploring form-based approaches in their zoning codes. Quite often, these new approaches are being combined with the traditional Euclidian zoning. Cities such as Boston, Chicago, and San Diego are experimenting with new approaches while streamlining the old ordinances.

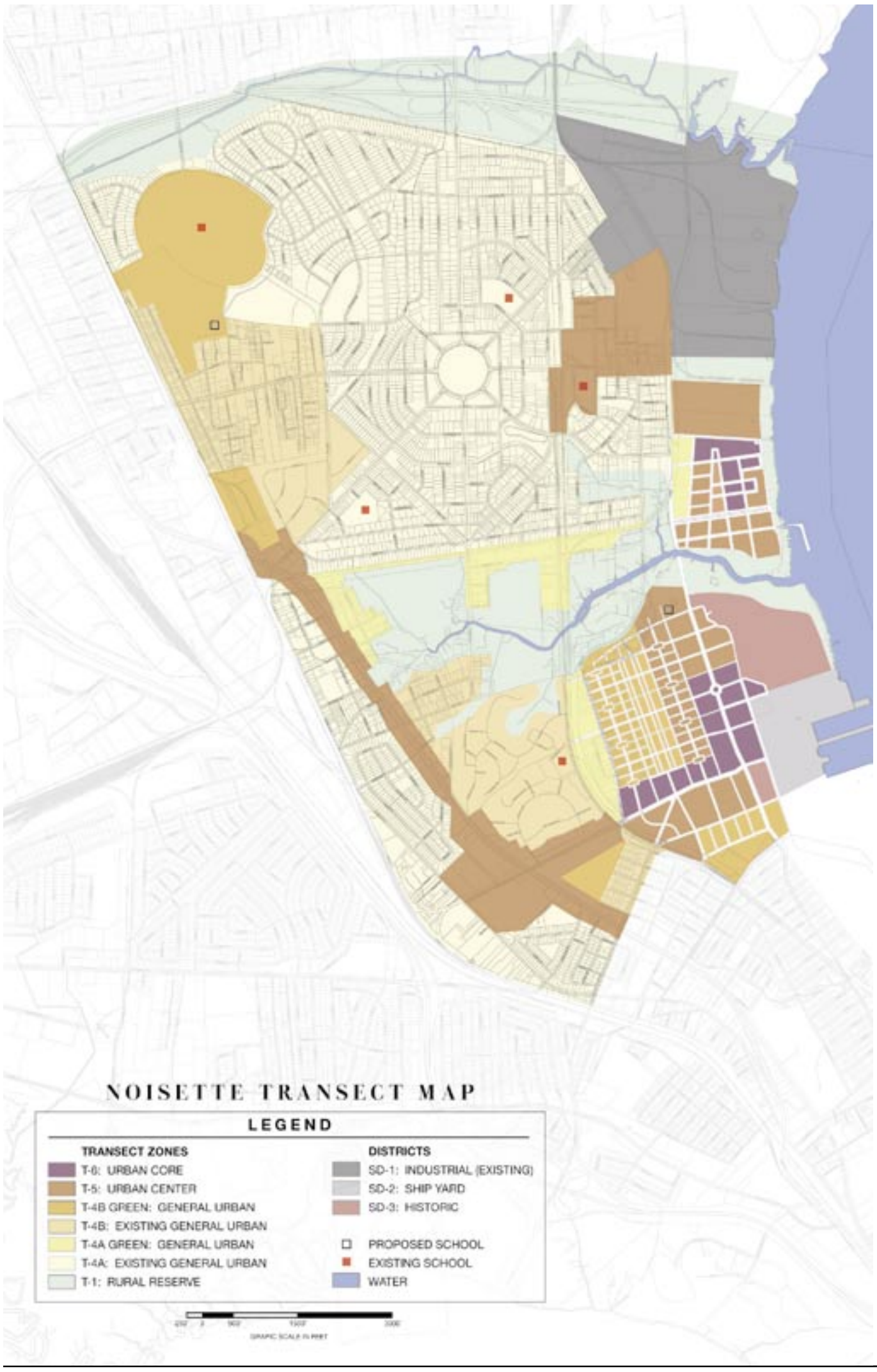
Form-based codes do not focus only on building use. Instead, they focus on the type of character that is desired, prohibit development approaches that produce the character they wish to avoid, and create zones that are organized by patterns.

Overlay Zoning is a strategy that has been utilized in North Charleston and was suggested as a strategy to create higher density, mixed use development in the Comprehensive Plan. Overlay Zoning is a second, supplemental layer of zoning that works with conventional zoning by accommodating variations from the standard regulations. Overlay zoning can modify various requirements, such as higher standards for storm-water management, environmental resource protection, viewshed protection, or limits on night time illumination. North Charleston has established some overlay zones in the current ordinance to control the characteristics or certain corridors. Some areas in the Noisette footprint should be included in overlay zones with various regulations. These zones should include environmental performance standards for building development and site development, as well as urban design standards for streetscape. Eventually, the entire area of the Noisette footprint could be included in an overlay district for environmental performance.

This plan strongly recommends an approach that is gaining popularity today- the Transect-Zoning approach, developed by Duany Plater Zyberk & Company, of the New Urbanism movement. Their research of walkable, mixed-use communities, including Charleston, led them to develop a code based on the characteristics of six context zones, which form a “transect,” or the spectrum of human habitation and development. The concept of the transect began in the 1900s as a technique for describing a series of natural habitats, such as the continuum from ocean to dune to maritime forest that is typical of North Charleston region barrier islands, like Dewees Island. This approach allows researchers to study each habitat and define its specific characteristics. This organizational approach has also proven to be a useful tool for describing human habitat. Typically, in human habitats, the transect is divided into six Context Zones, ranging from an undisturbed natural environment through an urban core. Within each zone, the characteristics of density, scale, open space and mix of uses can be described in a consistent manner, and across the range of context zones one finds distinct choices for people with different preferences. One additional zone is reserved for special uses and industry. Under the transect code, criteria are assigned for density, block sizes, public frontage, civic spaces, lot occupancy, setback, private frontage, building height, and basic guidelines for use; these criteria are detailed in each transect differently, to define the desired character. The zones are sometimes arranged in order of intensity, but it is entirely possible that an urban center or core could be juxtaposed to a rural or natural zone. Zones may even overlap. The code is a template, and is more graphic in content than verbal. This type of picture-book zoning forces a community to make decisions about the broad character that they desire for a community. Instead of asking them to prescribe uses, it asks them to prescribe whether they want to be a rural community, a suburb, a town, or a city.

In the June 2003 issue of *Governing*, Andres Duany described the purpose of the transect approach- “conventional zoning has failed to maintain the important distinctions between [the different types of human settlement.] Instead, it has made each of them resemble suburbia. When suburban building forms encroach on wilderness, the result is sprawl. When they encroach on urban areas, the result is lifeless downtowns.” It is the later of the two that has occurred in North Charleston. Transect Zoning is now available for municipal use and is marketed as “Smart Code.” The City should consider if this code would be useful in helping them achieve a more sustainable approach to managing land use and guiding development.

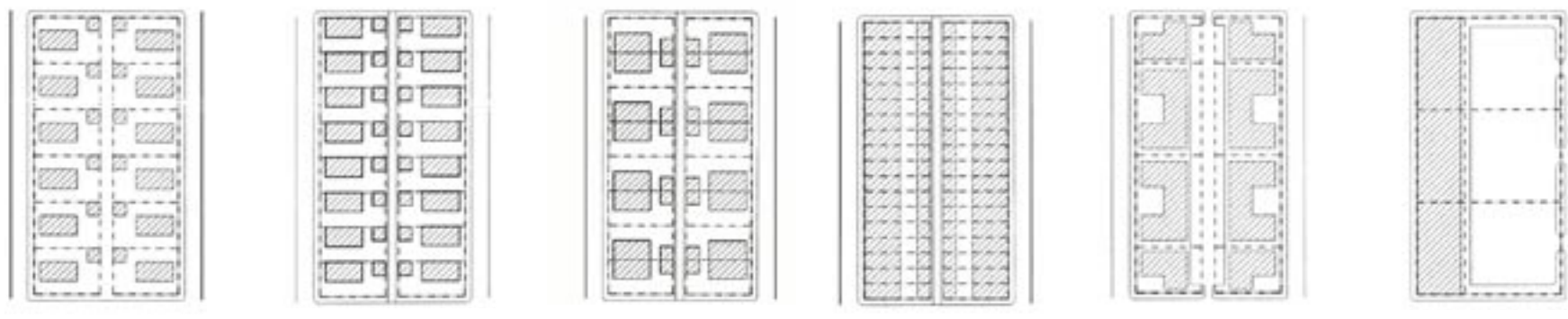
Land Use



APPLYING THE TRANSECT TO THE NOISETTE AREA

The general approach to the habitat transect has been calibrated to meet the existing and proposed conditions within the 3,000 acre Noisette Community. For example, the Noisette Creek and the proposed Noisette Preserve will be a natural zone (T1) that is protected from development. There are no T2 or T3 context zones within the Noisette Community, but these lower density zones can be found in more rural or suburban areas around North Charleston. The General Urban Zone, T4, which describes much of old North Charleston, is a recognizable urban fabric, with easy walking distances to schools, civic buildings, and other neighborhood centers. The T4 zone has been subdivided into two components, based on the density of existing and proposed residential neighborhoods. The Urban Center Zone (T5) is the equivalent of a Main street, and is descriptive of the Old Village portion of East Montague Avenue. It is also a zone that will describe much of the proposed development of the Noisette Center on the former Naval Base, which will include a diverse mix of merchants, offices, restaurants, as well as residential apartments. The Urban Core Zone (T6) is the busiest part of a region, with the tallest buildings and the greatest variety of building functions and cultural activities. There is no portion of the existing City of North Charleston that falls into this context zone, but the heart of the new Noisette Center will have these characteristics.

Examples of Development by Context Zone



Edgeyard House/Cottage	Sideyard Single-House	Sideyard Duplex	Rearyard Rowhouse	Edgeyard Courtyard Apartment Block	Rearyard Office Building
T4A (Typical Existing)	T4B Single Family	T4B Duplex	T4B Garden Townhouses	T5 Apartment Block	T6 Office Building

General Design Features

	General Urban Zone T4A	General Urban Zone T4B	Urban Center Zone T5	Urban Core Zone T6
General Characteristics	Predominantly single family detached residential, with some first floor offices & professional services, and corner retail or restaurant. Higher density permitted with sustainable building features.	Predominantly single family detached or attached (townhouse) residential; other functions similar to T4A. Higher density permitted with sustainable building features.	Mixed use blocks have primarily retail/office & parking at street level, with office or multifamily residential above. LEED certified basis of design required in all new commercial construction. (1)	Mixed use blocks, retail on street level, with primarily office above and some multifamily residential or hotels. LEED certified basis of design required in all new commercial construction. (1)
Housing By Right – Base Density	T4A - Existing residential – 4 units/acre gross (typical Park Circle neighborhoods)	T4B – Existing residential– 7 units/acre gross (typical Liberty Hill neighborhood)	10 units/acre gross	12 units/acre gross
Housing with Noisette Quality Home Performance Standard (1)	T4A Green – New residential with sustainable features – 8 units/acre gross	T4B Green – New residential with sustainable features – 15 units/acre gross	30 units/acre gross	96 units/acre gross
Other Functions (2)	20-30% typical		30-50% typical	50-70% typical
Public Frontage	Existing neighborhoods - residential road or street; New development - residential street and rear alley		Standard street or avenue/commercial street or avenue; rear alley required	Commercial street or avenue; rear alley required
Civic Space	Public greens, active recreation parks & playgrounds, community links		Squares, playgrounds, community links	Plazas & playgrounds
Lot Area	3,000 – 7,500 SF typical	2,000 – 4,000 SF typical	1,500 – 3,000 SF typical	No limit
Lot Coverage limit	40% main building, plus 10% accessory building	60% main building, plus 10% accessory building	80% main building	No limit
Building Setback - Front	15 ft minimum, 25 ft max, or established building line	0 ft minimum, 20 ft maximum	0 ft minimum, 10 ft maximum	0 ft minimum, 5 ft maximum
Bldg Setback - Side	10 ft total minimum	0 ft minimum, 20 ft maximum	0 ft min, 20 ft maximum	0 ft min, 20 ft maximum
Building Height	3 stories maximum	3 stories maximum	4 stories max, 2 minimum	18 stories maximum, 3 minimum
Parking	Alley or frontage access	Existing: Frontage access New: Alley access	Alley access, internal lots, parking garage, limited street parking	Alley access, internal lots, parking garage (street access with variance, limited street parking

Additional Sustainable Design Features

	General Urban Zone T4A	General Urban Zone T4B	Urban Center Zone T5	Urban Core Zone T6
Solar Access	New development solar access defined for passive heating & cooling		Solar access defined for daylighting	Solar access defined for daylighting
Landscaping	Native plants of varying species in natural or formal arrangement, turf limited to 25% of lot, permanent irrigation allowed with grey water or rain water collection systems, impervious paving limited to 10% of lot	Native plants of varying species in natural or formal arrangement, turf limited to 20% of lot, permanent irrigation allowed with grey water or rain water collection systems, impervious paving limited to 15% of lot	Native plants of grouped species in formal arrangement, turf limited to 10% of lot, permanent irrigation allowed with gray water or rain water collection systems.	Native plants of grouped species in structured planters, turf not permitted, permanent irrigation allowed with gray water or rain water collection systems.
Water Management	Water management is through surface percolation and detention on site. Individual rain gardens recommended.		Water management is through direction to water management swales, detention on site, and surface percolation.	Water management is through direction to swales and conveyance to off site detention and filtration.

Note 1: Noisette Quality Home Standards and LEED Green Building Standards are described in Chapter 9.
Note 2: Other Functions include commercial, educational, recreational, and civic uses, other than residential use.

Special Districts

In addition to the context zones described above, there will be some special districts, such as an eco-industrial park in the shipyard area of the former Naval Base and a Historic District where the most significant examples of the Officers' Housing will be found. These special districts have characteristics or functions unlike the other context zones, and need to be specifically defined.

The former Naval Yard shipyard will be a special district (SD2) that should function as an eco-industrial park, in which the businesses practice efficient consumption of natural resources and reduction of waste products. The SD2 district should have physical buffers adjacent to the non-industrial uses on the northern and western boundaries. The height of existing and any future proposed buildings should not be increased beyond the scale of the existing buildings and view corridors should be maintained from adjacent areas of the River Center at Noisette, through the SD2 to the Cooper River.

Definitions:

Residential Road – low to moderate speed and capacity; bioswales along one or both sides; walking path, but not sidewalk

Residential Street – low to moderate speed and capacity; bioswales along one or both sides (not necessarily curbs); narrow sidewalk adjacent to bioswale;

Standard Street – moderate speeds and capacity; some raised curbs directing water to bio-retention ponds; can have bioswale in center; sidewalk with intermittent or continuous planter; parking on one or both sides

Commercial Street – moderate speeds and capacity; raised curb directing water to bio-retention ponds; wide sidewalk with intermittent tree wells on both sides; parking on both sides

Public Greens – large scale open spaces, primarily for passive recreation, but can support impromptu active recreation such as field sports. (e.g. Riverfront Park)

Active Recreation Parks – shared or multiple use facilities accommodating multiple organized sports (e.g. Danny Jones Recreational Complex)

Playgrounds – open space designed and equipped for the recreation of children

Community Links – green spaces designed to be the connective tissue of the community, including greenways, bike trails, etc. Links may be lineal, following the trajectories of natural or manmade corridors, such as RR ROWs

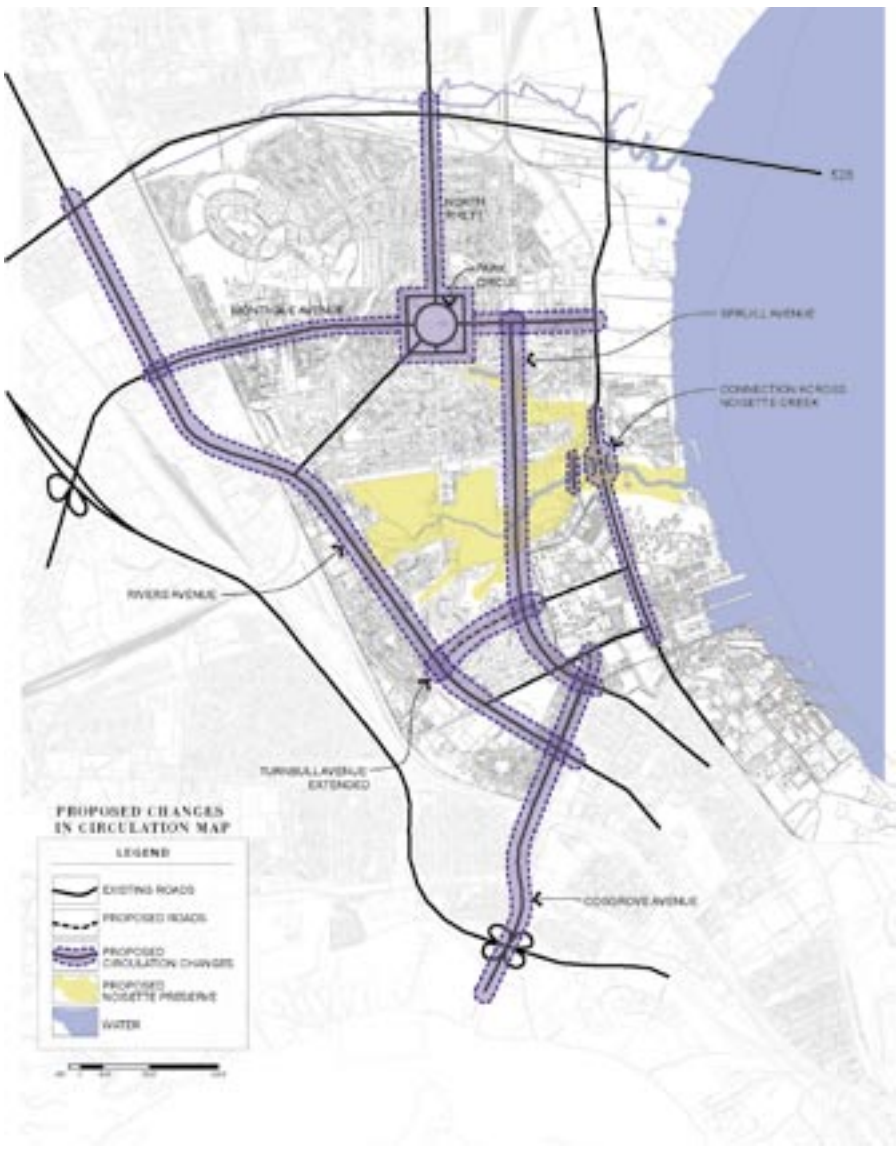
Squares – Open space designed for passive, unstructured recreation; typically defined by building frontages, with predominantly landscaped ground materials

Plazas – Open space available for civic purposes and commercial activities, defined by building frontages, with predominantly hardscaped pervious ground materials

Proposed Changes

This master plan presents strategies for evolving land use patterns, restoring natural systems, and integrating infrastructure elements, based on sustainable design and planning principles.

The following maps provide an overview of the changes to circulation, open space, and land use, that are being recommended in this master plan. These individual maps and the composite map serve as guides to the detailed presentation of these recommendations in Chapters 3, 4, 5, and 6.



Aerial view of the former Charleston Naval Base, the location of the proposed River Center at Noisette.

Recommended Changes in Circulation

The master plan recommends improvements in key vehicular circulation routes to provide traffic calming, integrate trees and storm water management, and support a mix of residential, commercial, retail, and recreational land uses. Among the specific recommendations presented in this master plan are the following:

- Montague Avenue should have a combination of center- and edge-planted areas, from Virginia Avenue through Liberty Hill. These changes should be coordinated with the street improvement activities presently being planned by the City on this road.
- The diameter of the traffic circle at Park Circle should be reduced, and the number of spokes coming to the circle should be fewer, to slow traffic and provide more open space.
- Rivers Avenue should be upgraded with center stormwater management swales or planted medians and trees. The configuration of the lanes should accommodate parking in some sections where mixed use development is proposed.
- Cosgrove Avenue should be upgraded from I-26 to the River Center at Noisette.
- Spruill Avenue should be upgraded with center planted medians and trees and should accommodate parking in some sections where mixed use development is proposed. The intersection of Spruill and Montague Avenues should be simplified.
- North Rhett Avenue should be upgraded with center planted medians and trees.
- Virginia Avenue should be extended as the main connection to the River Center at Noisette, with a new bridge across the Noisette Creek. The adjacent existing road and railroad bridges should be modified for other uses.
- Turnbull Avenue should be extended from the River Center at Noisette, across Spruill, through Horizon Village, to Rivers Avenue. The planning of Horizon Village has been based on making this connection.

Recommended Changes in Land Use

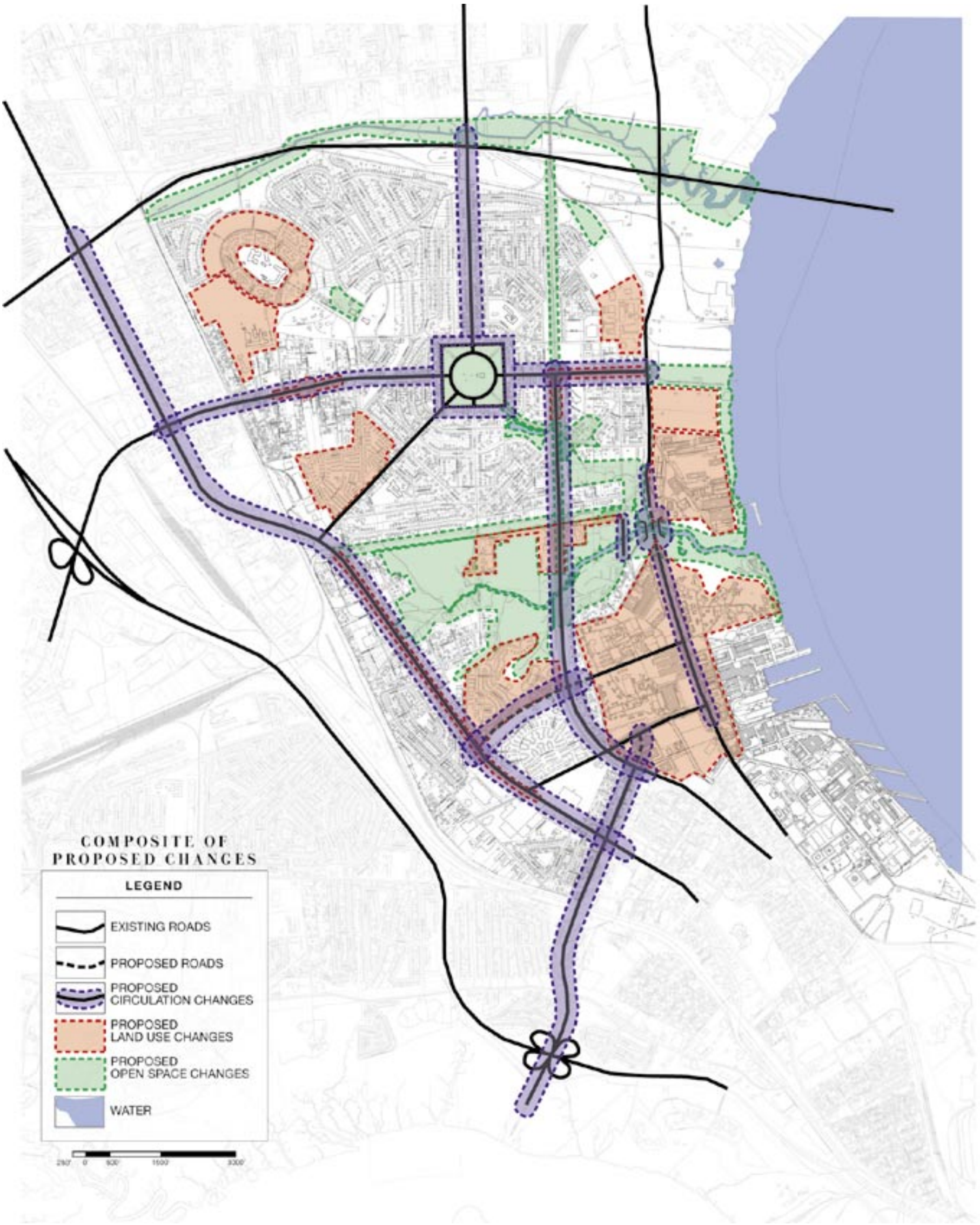
The master plan recommends changes in the nature and mix of land use in key areas, while maintaining the pattern of strong stable neighborhoods that exists in much of the Noisette area. There are several important land use changes presently underway within the Noisette planning areas and these are noted below. Among the specific recommendations presented in this master plan are the following:

- The former Charleston Naval Base should be redeveloped as a mixed use urban center, called the River Center at Noisette. Due to lease obligations on some of this property, this will be phased over several years.
- Retail and business use in the Old Village portion of Montague Avenue and the portion of Spruill south of the intersection of Montague Avenue should be expanded and vacant properties should have compatible infill development.
- The portion of the existing industrial zone south of Montague Avenue and east of Virginia Avenue should be converted to mixed residential, commercial, and retail use, over the long term, as changes in adjacent properties make this land more valuable.
- The redevelopment of the former Garco Site north of Montague Avenue should accommodate office and flex space compatible with the adjacent uses. Planning for this is underway independent of this master plan.
- The former Century Oaks housing should be redeveloped by the City for a mix of residential housing types. The school in the center of this community should continue to function.
- The Bonds Wilson educational property should be redeveloped for primarily residential uses, and should be connected to the adjacent neighborhoods by linkage of the street grids. A neighborhood school should be part of this redevelopment.
- A commercial and retail center should be developed along Montague Avenue in the Liberty Hill neighborhood.
- The Calhoun Homes housing should be upgraded for a mix of residential housing types and supporting retail.
- The land south of the proposed Michaux Promenade at the intersection of South Rhett and Spruill Avenues should be redeveloped for residential and commercial uses that are compatible with the proposed Noisette Preserve.
- Rivers Avenue should be redeveloped as a mixed use residential, commercial, retail corridor between Durant Avenue and McMillan Avenue.
- The former North Park Village residential property is being upgraded under a HUD HOPE VI grant to become Horizon Village.
- Throughout the area, schools should become centers of their community, serving the needs of all generations.

Recommended Changes in Open Space

The master plan recommends changes in the character and extent of open space within the Noisette area to increase the recreational alternatives available to the citizens and restore degraded elements of some natural features. Among the specific recommendations presented in this master plan are the following

- The Noisette Creek should be ecologically restored and some public properties should be contributed to create the Noisette Preserve as a major green area within the City.
- The tributary of the Noisette Creek extending to Quarterman Lake should become part of the Noisette Preserve.
- The railroad line that runs from Rivers to Virginia Avenues, south of Park Circle, should become the Michaux Promenade, a hiking and biking venue along the northern edge of the Noisette Preserve.
- The railroad line that runs along Spruill Avenue from Cosgrove Avenue north to just below the Filbin Creek should be converted to a hiking and biking trail, with possible future use for light rail.
- The Riverfront Park should be created along the Cooper River in the vicinity of the Noisette Creek, and should be extended over time.
- The Danny Jones complex should be upgraded to serve the diverse multigenerational needs of the community.
- The Filbin Creek should be restored to its original ecological condition.



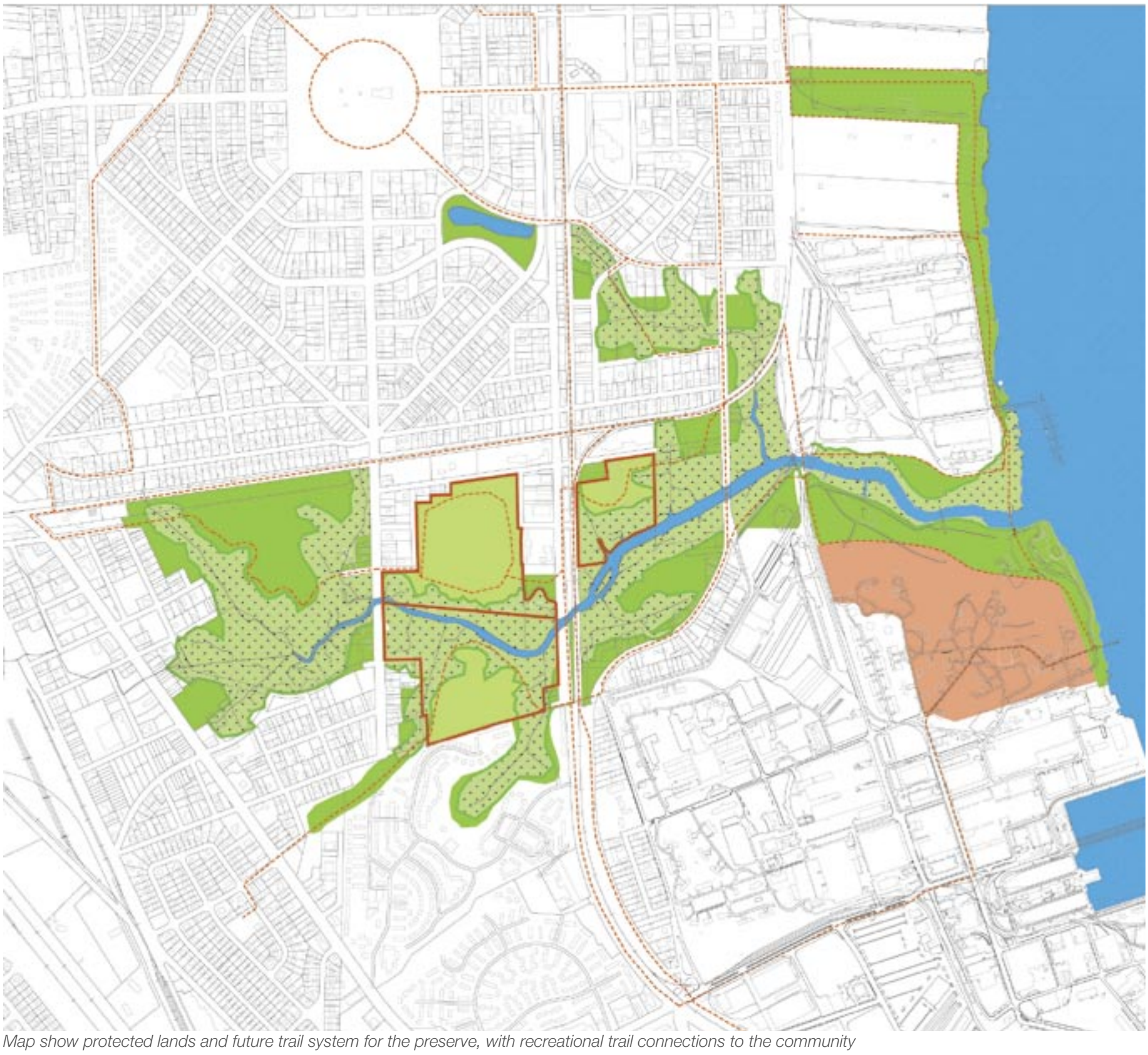
Composite of Recommended Changes

The recommended changes in circulation, open space, and land use represent a major transformation of those elements that are under-utilized or that do not contribute to a vibrant urban environment. The master plan recommends significant increases in the activity of some areas, such as the River Center at Noisette, and the environmental restoration and preservation of key ecological assets such as the Noisette Preserve. The plan also proposes important improvements to the roads and adjacent land uses along key corridors such as Rivers or Montague Avenues. Perhaps most importantly, the plan creates connections between revitalized neighborhoods and stable existing ones, connections of people to the natural assets of their community, and connection of the historic spirit of the City with its future role as The New American City.

CHAPTER THREE | ENVIRONMENT

Restoring Natural Systems

Contents



Map show protected lands and future trail system for the preserve, with recreational trail connections to the community

Introduction

Example of a nature walk / boardwalk at a tidal wetland located at Bald Head Island, NC

Naval Base portions that could become restored tidal marsh.

The ecological systems that exist in the Noisette project site are to be restored, enhanced, and in many locations they will be enlarged and expanded. Natural systems will serve to distinguish Noisette specifically because they will be integrated and integral to the functions, aesthetics, and serve as a centerpiece for all to see, celebrate and learn from. Natural systems are the living breathing organs, the heart of the community. The development has been designed to emphasize nature and a healthy environment, encouraging and fostering healthy humans and a healthy community. We will know success when everyone in Noisette realizes that healthy estuarine waters, marshes and wildlife start with the way we design and manage the upland environments, in each and everyone's own yard, park, and along roadways. We want everyone to understand that they are stewards of their own environment, that they are linked to their own humanity and health, the health of their neighbors, neighborhoods, community, and the region. Our future depends on this renewed relationship with the earth, and our responsibility in each and every thing we do. Noisette will restore natural systems and create a special place where people partner with nature!

This master plan focuses on key ecological elements and opportunities for integrating healthier ecological systems in the Noisette project. These ecological elements are central organizing features of the plan, providing habitat, stormwater management functions, and corridors for recreation and scenic vistas. The health of these systems affects the costs for their management, aesthetics, land values, and the economic benefits of the developments. Ecological features include wild lands, such as salt marshes and remnant coastal live-oak communities, found mostly in the Noisette Preserve, and created and restored areas that transition from the Preserve into neighborhoods and commercial and mixed-use development areas.

LEGEND

Existing Tidal Marsh

Regulatory Lines and Setbacks: Critical lines that delineate extent of tidal marsh and 25' wide buffer areas are regulated by South Carolina, Department of Health and Environmental Control, Ocean and Coastal Resource Management and the U.S. Army Corps of Engineers

City of North Charleston properties: City lands that would become part of the Noisette Preserve

Protected Areas: Areas include vegetated buffers, woodlands, easements for recreational trails, and areas adjacent to the Noisette Preserve, such as the Riverfront Park and future greenways along the Cooper River

Potential Tidal Marsh Restoration Areas: Approximate, pending further review of feasibility and extent

Potential Recreational Trails: Trail alignments are approximate and include bicycle lanes on roadways, paths along railroad rights-of-way, and multi-use recreational trails

Historic Residential Area: This area includes the historic Naval homes on the Naval Base. It is anticipated that this area may include selected existing structures for reuse along with new structures for new uses.

One generation plants the trees; Another gets the shade.

Chinese proverb

Aerial View of Noisette Creek today.

Aerial view of Noisette Creek in 1949, showing areas of woodlands that have since been developed.

Existing Ecological Conditions

Planning of the Noisette Preserve plan began with a reconnaissance level ecological inventory, review of site hydrology and drainage infrastructure, observation of wildlife use, and the development of an understanding of upstream off-site future land developments (and other land-use changes) that may occur and their potential influence on the Noisette project. The following summarizes the findings of this investigation and provides the ecological restoration concept for this master plan.

Early maps show the Noisette area of North Charleston as a mosaic of tidal salt water marshes along the Cooper River, with freshwater or brackish wetlands, amidst live oaks along the lowland margins and oak/pine forest and savannah in the upland areas, surrounded by freshwater wetlands. Another perspective on the historic landscape is provided in the text that appears on Olmsted's General Plan for Chicora Park, dated April 18,1899: "The topography of the park includes upland covered with a thin growth of pines and post oak and almost destitute of undergrowth, owing to fires; upland covered with live oak, water oak, evergreen magnolia and deciduous trees; upland recently under cultivation; much low ground, mostly salt marsh, but partly fresh water swamp, shallow salt water creeks; strips of bottom land along the three brooks and a beach along the broad tidal Cooper River."

Field surveys of the Noisette area revealed mostly degraded ecological settings. Most if not all settings were declining or have been lost from historic agricultural land-uses, grazing, and other changes. With urbanization, natural watersheds that once absorbed more than 85% of rainfall to support aquifers and stream flow have now been cleared, developed and paved. Stormwater runoff, conveyed by pipes and ditches, causes flooding downstream, degrades water quality and aquatic habitats, and drastically alters the seasonal watertable levels which can adversely stress ecosystem health.

Fragmentation of the landscape with urbanization has also led to degradation of all existing habitats. Open upland systems are now dominated by nonnative agronomic grasses, legumes and weedy plant species. In the existing neighborhoods, ornamental and native canopy trees are present and form a near continuous canopy in some locations, with underlying conventional lawns and ornamental lawnscapes around most houses. Remnant brushy forested areas (20 to 50 years old) and older forest fragments (70 to over

Remnant native grasses along rail lines hold the potential to become healthy meadows.

Existing Tidal Marsh.

Environment

Remnant woodlands west of South Rhett Avenue.

Image shows a channelized section of Filbin Creek, choked with aquatic weeds. Stormwater quality elements, including wetlands and native vegetated open areas could reduce the nutrient loading which contribute to the excessive weed growth.

This abandoned rail line along Spruill Avenue that could become a recreational trail.

Former golf course along Noisette Creek.

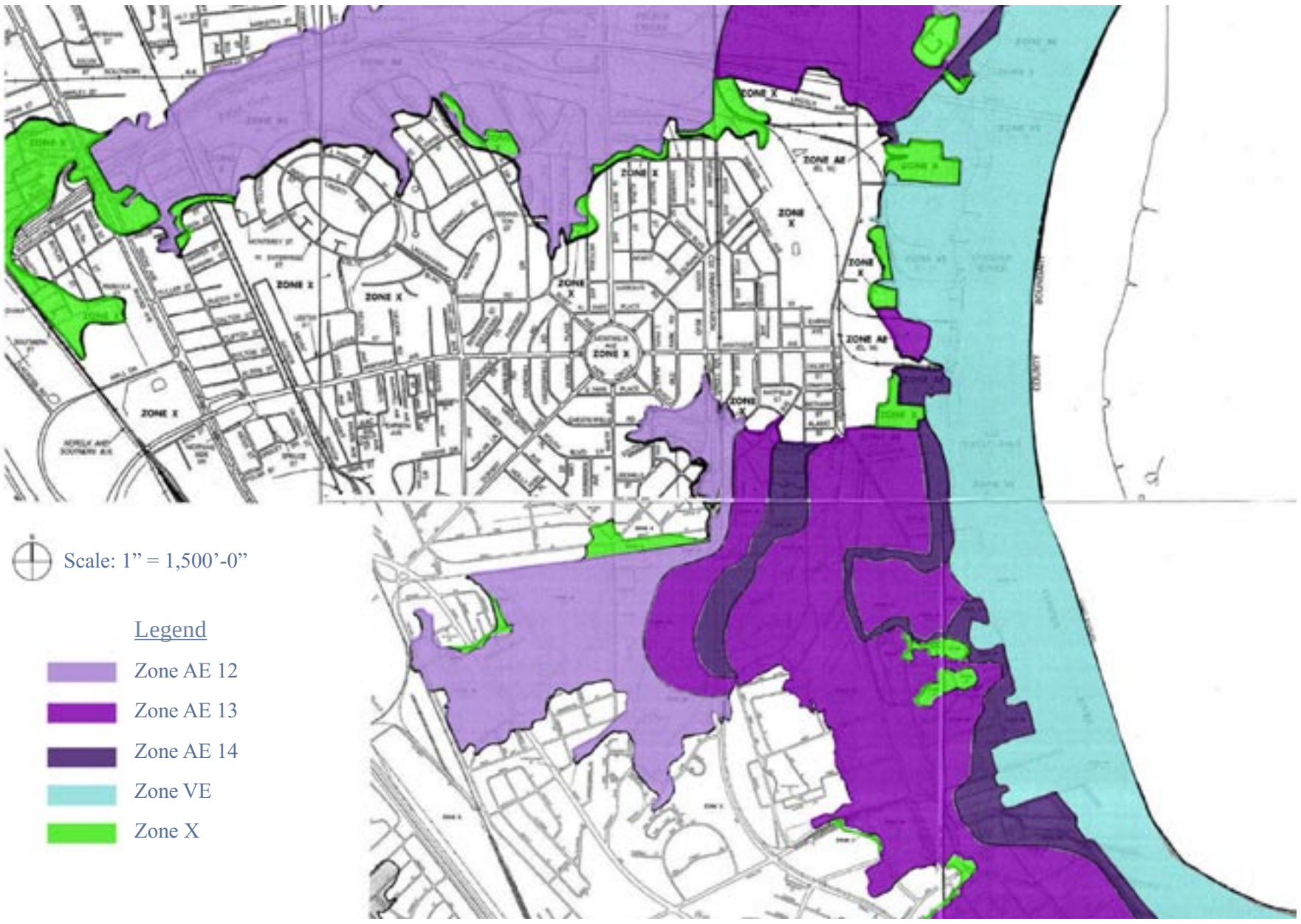
Tidal Marsh near O'Hear Avenue.

Woodlands along edge of marsh, west of South Rhett Avenue.

100 years old) consist of a few old live oaks, with young Loblolly pine, ash, maple, sassafras, and magnolia, with an understory of exotic shrubs such as privet and Japanese honeysuckle, native shrubs, and little to no oak regeneration. Small isolated historic wetlands in the uplands are degraded and dominated by lawns or exotic weedy plant species. Stream courses are ditch-like with steep eroding banks. With the channelization of Filbin Creek in the 1960s (US Army Corps of Engineers and South Carolina Department of Transportation), the entire tidal marsh and riparian floodplain ecosystem has been lost, turning the creek into a 90-acre highly degraded freshwater marsh, choked with aquatic weeds along its straightened channel. The tidal marshes along Noisette Creek have been filled and developed over the years, leaving a remnant system of marshes that are highly stressed by urban runoff, sedimentation, and adjacent disturbance from development, filling and clearing.

Future activities in the Noisette will be designed and implemented to achieve healthy ecological systems. Sustainable systems are achieved through an integration of the biological integrity of ecosystems and the needs and values of humans that use them. The following are indicators of healthy ecological systems:

1. Stable soils
2. Diverse plant and animal communities
3. Predominance of sustainable populations of native plants
4. Water quality, at appropriate rates and volumes
5. Ecological components in appropriate compositions and locations to reflect the local evolutionary ecological history between plants, animals, hydrology, soils and other factors
6. Capacity to change and adapt to disturbance, climatic swings, etc.



Floodplain map for the North Charleston Area

Ecological Restoration

Restoring natural systems, or “ecological restoration” is defined by the Society for Ecological Restoration as “the process of intentionally altering a site to establish a defined, indigenous, historic (presettlement-like) ecosystem. The goal of this ecosystem is to emulate the structure, function, diversity and dynamics of the specified ecosystem. In other words, the intent is to repair or re-establish entire functioning ecosystems meeting the above characteristics of healthy functioning ecological systems. Ecological Restoration also encompasses management practices that are intended to maintain ecological integrity.

The Noisette project provides an unprecedented opportunity to foster and contribute to ecological restoration and conservation benefits at a regional and local scale for the following reasons:

- This project could become a model of how degraded natural resources can be transformed into sustainable ecosystems.
- Restoration will have increased appeal to wildlife and people.
- This project provides cooperative partnering for educational and research institutions to help others learn about alternative developments.
- Rebuild stormwater and infiltration capacity to avoid flooding.

In the Noisette project area, mesic forests, coastal scrub-pine savannas, pine forests, riparian forest systems, wetlands (including wet native grasslands, freshwater emergent wetlands and low and high salt marsh communities), native wildflower and grass meadows, drainage ways and stormwater management detention areas, floodplains, swales, and ephemeral wetlands will be restored. Native landscapes will be planted, using locally adapted and sourced native plant species. “Stormwater (management) Treatment Trains” are specialized plantings of native vegetation species adapted to local moist and dry periods, occupying drainageways, contributing to their stability, and also filtering water to increase its quality. The “trains” are ecologically designed and engineered to discharge clean water, hold soils in banks, beds and channel against erosion, and to stabilize sediments that might enter from upstream areas beyond the Noisette site.

The existing vegetation systems will be enhanced through active management (e.g., degraded wetlands, forests, etc.) or existing degraded vegetation (e.g., invasive exotic species) will be completely replaced with native plant species. Restoration will encourage plant communities primarily dominated by regionally genetically adapted native plant species that resemble the original plant ecology. Eventually, the Noisette Perserve will achieve the structure and spatial patterns and some resemblance to the diversity of ecological systems that occupied this land before recent agricultural land-uses began. Other goals are to stabilize soils, hold nutrients on the land, and manage stormwater runoff from the existing degraded site and future development lands as an important asset and resource. The restored vegetation systems will attract and encourage use by wildlife and provide the backdrop for passive recreation opportunities, including an internal and a local and perhaps regional greenway trail network.

The restoration plan for Noisette could be comprised of two phases. The first, remedial phase involves major tasks such as removing exotic species from the forests and salt marsh margins, replanting native grasslands, and reforestation, including planting trees and shrubs. Additional restoration projects would be undertaken in concert with stormwater management system improvements. This phase usually lasts 3 to 5 years, after restoration begins. The second, or maintenance period of this restoration program includes tasks done annually to maintain and enhance the ecological systems, such as landscape management, noxious weed management, silt removal, and supplemental plantings, to achieve sustainable ecosystem. The maintenance phase would also include monitoring of the landscape to determine changes and refinements in the overall management of the restoration.

This is a graphic representation of what could replace the open ditch at Rivers Avenue. By using vegetated swales, with trees, grasses and sedges, surface runoff can be retained and cleansed before discharged into Filbin Creek.

This channelized section of Filbin Creek was purposely incised and disconnected from its floodplain to enhance stormwater conveyance. Our understanding of stream functions have since changed. The result of channelizing channels around the world is an unstable stream with eroded slopes and increased downstream sediment loads. Establishment of natural stream geometry and re-connection to the floodplain would help to restore this ditch to a healthy stream system.

Example of an existing small-scale vegetated bioswale. As the swale gets larger, it would turn into a forested corridor swale, with an engineered system of pools and riffles in the channel, vegetatively reinforced side slopes, and an appropriate upland buffer.

The Image of the Noisette Creek at the former naval base golf course which is returning to its original wetland ecology

Image of Noisette Preserve near Spruill Avenue

Image of Noisette Preserve near Avenue D

Noisette Preserve

The Noisette Preserve will be an ecological preserve, eco-tourism/ recreation area, and outdoor education center for the citizens of the City and region. This preserve will primarily consist of property identified as parcels bordering on Noisette Creek that are owned by the City. Such acreage will subsequently be subject to a conservation easement that is acceptable to the City and deeded to an acceptable conservation group. Additional acreage will include portions of the former Naval Base golf course that could potentially be restored to tidal marsh and the waterfront park area along the Cooper River.

A detailed master plan for the Noisette Preserve will be developed to manage and restore the preserve. The Noisette Creek drainage basin is a fully developed urban watershed of approximately 1,400 acres. The present fragment of remaining highly stressed tidal marsh comprises about 140 acres, and is surrounded by 14 acres of open water (Noisette Creek proper), development or degraded woodland and shrubland vegetation. Based on historical maps reviewed by the US Army Corps of Engineers, the US Navy filled in approximately 72 acres of tidal marsh on Noisette Creek. Additional areas of filled marshland also occurred in the developed areas of the community, outside the Naval Base. The US Army Corps is currently in the planning phase of a Section 206 (Water Resources Development Act of 1996) Preliminary Restoration Plan for the old golf course on the Naval Base, which would turn this former filled marsh into a new 44-acre tidal marsh with a mix of high and low marsh with scattered areas of high ground (i.e., hummocks) and a 300-foot wide riparian zone buffer along approximately 2,200 feet of stream. The Noisette Preserve Master Plan will also likely suggest further areas of tidal marsh restoration, in concert with the overall Conservation Program for the area.

As the stormwater management system for the entire Noisette area is developed, and drainageways are restored to wooded corridors, with detention areas and expanded floodplains, additional conservation easements may be developed for their management and protection, along with trail easements that will link the Preserve trails to trails within the community.

The Conservation Program for the complex of private and public lands that are coming together for this project will need to be determined, phased and customized through the life of the project. As the restoration of the ecological preserve is understood over time through monitoring, additional restoration efforts may be implemented in new areas. Given that the preserve is within two miles of 14 schools in the community, students could potentially grow native plants, restore the marshes, monitor water quality, and promote stewardship throughout the watershed. Planning and design of specific preserve improvements would be funded through the Michaux Conservancy & Land Trust.

This is a good example of a healthy waterfront.

This stone-filled open ditch at Rivers Avenue near the headwaters of Filbin Creek could be augmented with detention areas, vegetated swales, and live oaks along the banks.

Image shows a formerly industrial area landscaped with native grasses and flowering forbes to form a landscaped boulevard.

Native grasses and flowering herbs can add excitement to the landscape, and at the same time, make it less maintenance intensive and much more beneficial to the natural environment.

This is a community rain garden, installed on open space between houses. Rain water from neighboring streets and housing lots runs into this rain garden to be retained and cleansed before being discharged into the greater stormwater system. This is one of the first steps of the Stormwater Treatment Train and an attempt to capture runoff at the source.

Landscaping

Beyond the community based stewardship of natural areas and drainageways, landscaping in Noisette should include a mix of native vegetation plantings for residential lawns, formal park landscapes, and public streetscapes. Industrial partners should be engaged to implement immediate landscape changes. Yards, rights-of-way, parks, streets, and other landscape features will be planted to provide lower maintenance, aesthetic benefits, and diverse habitats. For example, a “rain garden” installed in private residential yards could absorb storm flows from roof and driveway, provide a rich wetland habitat, and improve water quality in the watershed.

Native landscapes will be utilized for their low maintenance, wildlife habitat and aesthetic benefits and appeal. Streetscapes will emphasize both native plant materials that are locally adapted and durable under the Noisette climatic conditions, more resistant to disease and insect damage than most ornamental plant species, and familiar locally proven introduced species. These plant species will be those species that will not represent an invasion threat to the native landscapes or restored natural areas included in the Noisette area, thus not degrading their ecological health.

In short, the goal of landscaping at Noisette is to produce attractive, ecologically relevant, low maintenance and easily maintained vegetation systems.

Individual Rain Gardens provide excellent source management opportunities to infiltrate and treat stormwater, enhance groundwater supplies and reduce storm flows downstream.

Image of a green roof installation

The Noisette Preserve

"A land ethic for tomorrow should be as honest as Thoreau's Walden, and as comprehensive as the sensitive science of ecology. It should stress the oneness of our resources and the live-and-help-live logic of the great chain of life. If, in our haste to 'progress,' the economics of ecology are disregarded by citizens and policy makers alike, the result will be an ugly America."

Stewart Lee Udall

Conservation Program

The Noisette project has been designed to protect and steward land and important natural resources forever. The restoration program will get the enhancement and restoration job done, but the Conservation Program provides the legal structure to ensure that open space and natural resource areas are protected in perpetuity, and that stewardship does in fact get accomplished successfully forever.

The Conservation Program for Noisette has four elements described briefly as follows:

1. Conservation easements on all common open space including the Preserve

Conservation easements provide a legal status offering protection and remedy to ensure land and natural resources are not deleteriously violated and that stewardship of the land continues successfully forever.

Future efforts will coordinate the conservation easements with "Restoration and Management Plans", "Stewardship Plans and Agreements", and the financial plans for successful and perpetual implementation of said plans. The conservation easement plans shall reference "Remedial Restoration Plans" as necessary to guarantee successful restoration occurs in Noisette.

2. Deed Restrictions and Restrictive Covenants over Private Lands

Noisette intends to not only protect and steward public open spaces created and restored, but also some selected areas included in newly created private lots. In these locations, as with any deed restriction and negative declarations on uses of parts of, or entire areas of privately sold parcels can be considered to offer protection and the same land stewardship requirements as provided under a Conservation Easement. In these locations, such as rear yard areas abutting the Noisette Preserve, the restrictions shall ensure that publicly valuable benefits provided by this included on private lots can continue to provide such benefits.

Native species inhabit the Noisette Preserve

3. Drainage Easements and Buffers

Noisette intends wherever possible to use surface drainage strategies to manage stormwater. This reduces the need for high maintenance, below ground storm sewers, and requires a design that makes drainage ways an integral part of the open space system. As a result, these areas will require ongoing vegetation and sediment management, requiring maintenance access, occasional replanting and other needs. In these locations, which may include private yards, parks, and other areas, drainage easements with linked upland buffer plantings to protect and stabilize banks and biologically filter stormwater runoff will be installed. Some may be incorporated in the larger conservation easements, but most are anticipated to extend beyond these easements into and through neighborhoods.

In areas adjacent to the critical line that defines tidal marshes, a Noisette Preserve Buffer could be defined and enforced using the restoration plan, future developer's agreements and an ordinance or covenants package with the City. The preserve buffer could be a minimum depth of 50 feet, or a greater depth when it is combined with a trail easement. The buffer would be managed in accord with the restoration plan.

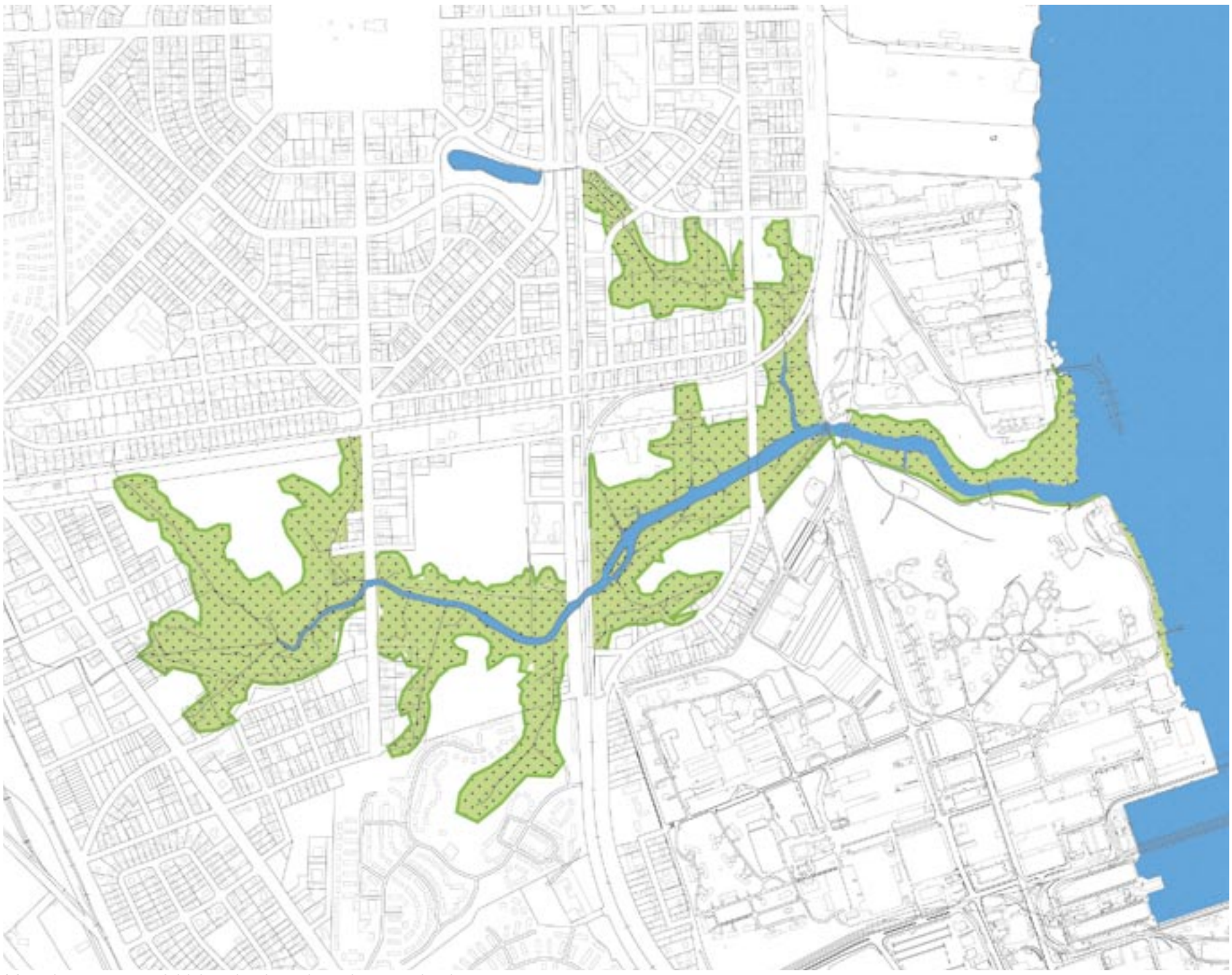
4. Michaux Conservancy & Land Trust

Noisette has initiated the start-up of a non-profit foundation to oversee the conservation program in the Noisette project area. This foundation will be a 501(c)(3) registered public charitable foundation, designed to oversee the management of the Noisette Preserve, the environmental stewardship endowment funds, conservation easements, deed restrictions and restrictive covenants, and drainage easements and buffer easements. The Michaux Conservancy & Land Trust shall be administered by a third party, established explicitly to represent the interests of the environmental resources, education about these resources, ecological stewardship and management training and oversight, and to provide leadership in the region and watershed to promote and extend the philosophy and program in the Noisette Preserve and larger project area.

With the appropriate revegetation and stormwater management program, areas like these along the Filbin Creek can become assets for the community, instead of eyesores and public hazards

"Planning is to conceive of a desired future, as well as a practical means of getting there"

Roy Ackoff, A Concept of Strategic Planning, 1970



Map shows extent of tidal wetlands and regulatory setbacks

Legend
- Existing Tidal Marsh
- Regulatory Lines and Setbacks
- City of North Charleston properties
- Protected Areas
- Potential Tidal Marsh Restoration Areas
- Potential Recreaional Trails

Ecological Enterprise

This is a good example of a nursery specializing in the production and distribution of native plant and seeds.

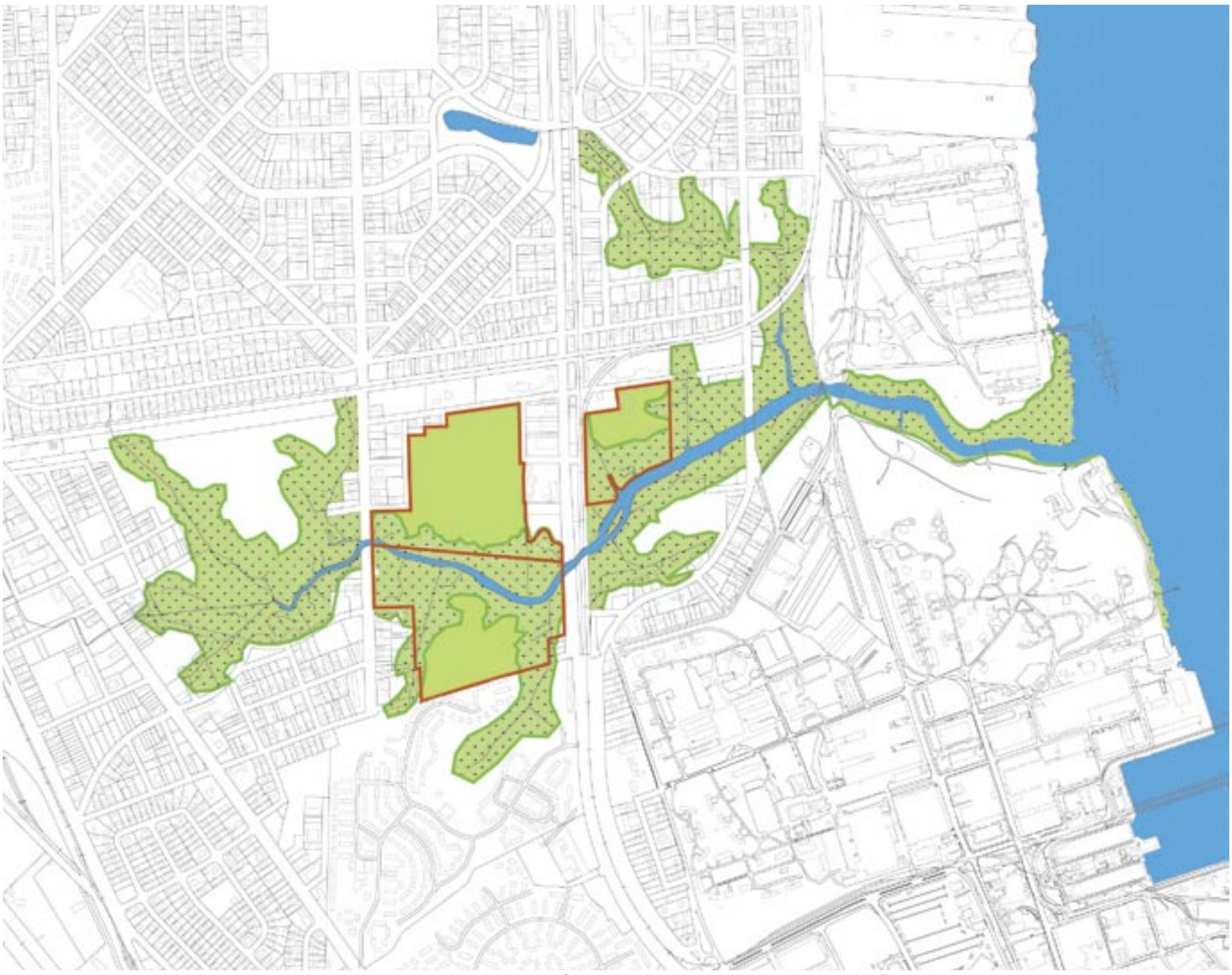
The work at a native plant nursery can be very labor intensive, allowing for the opportunity to create many jobs within the community.

Another project goal is to foster the establishment of an economy based on providing ecological benefits and services. During the master planning process many ideas were generated, and two are outlined here. It is intended that these enterprises would provide jobs, create local ecologically inspired and meaningful opportunities for community members to directly contribute to a healthy ecological environment, and begin a process where the community realizes their direct control and influence over the special Noisette setting.

1. Native Plant Nursery

Native plant nurseries would be established to grow native grasses, wildflowers, trees and shrubs to use in the restoration of Noisette's landscapes and to serve as a profit center for environmental enterprise partners. Tasks will include the following:

- Harvest and propagate local genetic sourced seeds.
- Create sufficient quantity and quality of native seed stocks and plant stocks for use in restorations, native landscaping projects, and to establish the nursery.
- Grow native wildflowers and grasses for use in roadside meadow plantings and native landscapes.
- Hundreds of native plant species are available for use to add color, texture, shape and stature, appeal and allure, to streetscapes, yards, parks, drainage corridors and infrastructure.
- Start an on-site native plant nursery system, to cultivate currently unavailable native plants of the region, using local labor, creating jobs, and starting an ecological enterprise that will not only benefit ecological restoration but also protect local genetic resources found in these wild plants.
- Use the native plant nursery system to contribute to environmental stewardship, training children in this natural environment.



Map shows extent of tidal wetlands and regulatory setbacks, along with City lands that would become part of the Preserve.

Wetland/meadow restoration projects can be enjoyed by North Charleston residents.

2. Aquaculture

Noisette is in a unique coastal location where old warehouses could be used for under-roof aquaculture production of fin and shellfish. The goal is to create fish for replenishment of the local coastal environment, associated with a desirable stocking program, and for bait and food fish use and consumption. Aquaculture is intended to focus production on filter feeding and herbivore fin and shellfish, rather than predaceous species, which are typically fed, pellet by-catch food made from marine fishing enterprises. By only producing herbivores and filter feeders, we will not support indiscriminate marine fishing enterprises by others which are killing high quantities of non-target fish species annually from the seas.

Aquaculture, as with the native plant nursery, are anticipated key elements of the environmental enterprise investments at the Noisette project. Aquaculture is targeted to also provide community environmental awareness opportunities, educational benefits, create local environmental jobs and careers, and to also generate revenue.

Environmental Endowment

Noisette endeavors to create an environmental endowment comprised of two elements, money and education. The endowment should be initiated by the development, wherein each land transaction will contribute a small percentage of the transaction value into an endowment fund that will be held in trust for the management, stewardship, and education of the natural resource areas in Noisette. Other strategies will also be used to generate money to be held in the endowment fund.

The endowment fund will be managed professionally to best ensure maintenance of the principle value. This will enable the generation of annual interest dollars for education, environmental stewardship, land protection, ecological and community research, and in training.

"Long-range planning does not deal with future decisions, but with the future of present decisions."

Peter Drucker

This stream in the Century Oaks area was turned into a drainage ditch to provide conveyance by incising its channel and disconnecting it from the floodplain. The result is unstable eroded slopes and increased downstream sediment loads. Establishment of natural stream geometry and connection to a floodplain would help restore this ditch to a stream.

Water Management

The absence of source management has resulted in this channel conveying considerable water during a relatively minor storm event.

Flap gates near mouth of Filbin Creek prevents tidal flow upstream. While the flap gates may prevent upstream tidal flooding, they also eliminate estuarine intertidal wetlands – an alternative that allows active operation of the flap gates could potentially provide both functions.

Curbed streets and paved culverts flooded during a thunderstorm – source management of rainfall using rain gardens and alternative landscaping materials would reduce this flooding.

Flooding problems are commonplace in municipalities nationwide, including many in South Carolina. Communities are often faced with trying to alleviate existing localized flooding problems that have occurred as a result of under-planned stormwater management from previous developments and preventing potential larger-scale flooding problems from new developments. In many communities, problems occur quickly and seem to appear where problems may not have been previously identified. The simple addition of a larger parking lot or a new residential development in an area often results in a neighborhood flooding, where no flooding had previously occurred.

Noisette is located in an urban watershed that has largely been developed for many years. The area drains east into the Cooper River. The northern area drains first to Filbin Creek, the southern area drains first to Noisette Creek and the eastern area including the existing Naval Base area drains directly to the Cooper River. The Cooper River and the eastern area of Noisette Creek are tidal. Tidal influences on Filbin Creek are prevented by tidal gates on culverts under Virginia Avenue.

The development of impervious lands–buildings, parking lots, roads–within this watershed has increased both the total volume of water running off the land and accelerated the rate at which water runs from the land. Historically much of the water traveled slowly through this watershed moving through dense vegetation and soils, and much infiltrated into the ground. Roadway collection of stormwater and discharge into storm sewer piping systems eliminated the infiltration capacity of the stormwater conveyance system and accelerated runoff discharge into lower areas, increasing flooding and water quality problems documented in this and so many other regional watersheds. When a rainfall event occurs now, much of the precipitation, especially during heavier runoff events, is quickly conveyed to lower areas and flooding in these areas often occurs.

It is useful to understand that historically, prior to development of this watershed, water may have taken weeks to work its way through the drainage system. Historic vegetation, rather than the impervious landscapes of today, retained much of the precipitation. The rain did not run off the land; it infiltrated or evaporated. Now, infiltration occurs less and may not occur at all – certainly with impervious features, such as parking lots, homes, driveways, etc. – and because water rushes from the land so quickly during the storm event, little or no time exists for evaporative water loss to occur. The Noisette watershed, before urbanization, conveyed much less runoff water, and the runoff water was cooler and cleaner. Creek discharge was supported by a more consistent baseflow, rather than the irregular slugs of water that now leave the watershed.

The conceptual stormwater management system cannot attempt to reduce or undo the development or impervious lands in the watershed. Nor can it turn back the hands of time to recreate or restore the historic conditions of yesteryear in the watershed. Instead, the system seeks to recognize the causes for the changes in hydrology and flooding in the watershed within the context of how this watershed likely functioned historically. Using ecological planning principles and traditional and alternative stormwater management engineering approaches, the stormwater management system proposes to rethink how stormwater management can be successfully implemented in this watershed. Naturalized stormwater management elements, water quality improvement, and reduced rate and volume of runoff from the watershed will be incorporated into the planning.

The basic ecological and stormwater management planning principles used in developing the water management system are listed on page 3.13.

In watersheds where these principles have been applied to stormwater management plans, the process has often resulted in substantial improvements to reduce flooding, improve water quality of receiving waters and has also saved money. Using these principles for stormwater management design disperses water management potentially throughout the

Images along northeast Durant, near Park Circle.

This section illustrates how streets could be modified to use a vegetated swale within the right of way.

watershed rather than concentrating the management in a few locations, such as large detention ponds, resulting in smaller conveyance systems. Also, by slowing the rate at which water moves through the watershed, time for infiltration and evaporative water losses occur, thus reducing the total volume of surface water leaving the land and allowing natural processes time to remove contaminants from the water to improve water quality.

For Noisette, these stormwater management principles will involve alternative stormwater management, native landscaping and open space systems, in contrast to conventional approaches to stormwater management. We have started with the premise and understanding of the importance of avoiding flooding throughout the watershed and the negative impacts of water quality to important places within the tributary communities, including parks, water bodies, and other drainage features.

Water Management Objectives

Stormwater management is a critical concern in any developing watershed and is often problematic in developed watersheds. In the Nosiette development area, the plan proposes to integrate ecologically sensitive native and ornamental landscaping treatments, reflecting an engineering and ecological team strategy to effectively manage the volume rate and quality of water within the watershed. The stormwater management system to be employed will manage water as close to where it lands on the land as possible and focus on the use of open native vegetated swales for stormwater conveyance, instead of curb and gutter with piped conveyance, where feasible.

The alleviation of existing drainage problems will include restoration and naturalization of several creek reaches having failed and eroded banks and disconnections from the floodplain within the Noisette area.

Water Management Strategies

Noisette will emphasize four water management strategies. These include stormwater collection and reuse, reduced water volume runoff, reduced rate of runoff, and water quality enhancements. In addition, innovative green architecture strategies will be integrated for purposes of water management into the water management strategies.

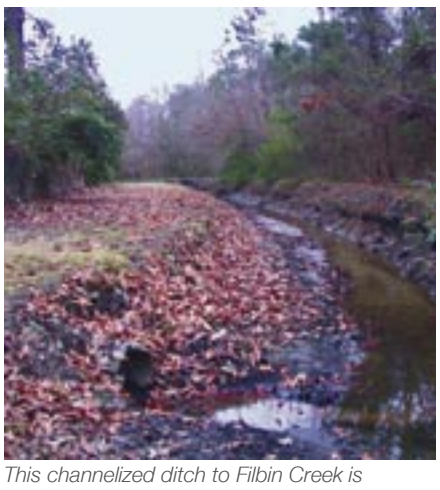
Many of the desired functional outcomes with a stormwater management program can be accomplished to some degree by the same strategies. Some strategies overlap and this overlap builds redundancy into the water management system. Natural systems manage stormwater effectively partly because of this intrinsic redundancy. Most conventional systems (stormwater pipes, detention ponds) offer minimal overlap into other functional outcomes and for this reason, are only efficient with one function (for example, pipes convey stormwater efficiently but do not manage water volume or quality).

1. Water Collection and Re-use

Collecting, storing, and beneficially re-using stormwater has been very useful in many developments. Today, one of our largest municipal and industrial costs is providing potable water for non-potable water uses. The water management strategies proposed for Noisette could use collected stormwater runoff for building and landscaping uses.

2. Reduced Water Runoff Volume

The stormwater collection strategies for Noisette will infiltrate or transpire runoff water to the extent practical. Additionally, planning and design strategies that reduce the footprint of impervious areas (roof tops, parking lots, street surfaces, etc.) will be employed. Reduced imperviousness implies increased infiltration opportunities for stormwater and reduced runoff. Using vegetation plantings that intercept rainfall and snow, utilize the water, or promote evaporation of the water back to the atmosphere, or facilitate higher infiltration rates back into the ground, can substantially reduce the volume of stormwater leaving the land. Also the decompacting



This channelized ditch to Filbin Creek is disconnected from floodplain and also has lost the pool/riffle elements necessary for stability and aquatic habitat.

Ecological Stormwater Management Principles

1. Manage stormwater as close to where it hits the ground as possible.
2. Manage stormwater throughout the watershed.
3. Give stormwater an opportunity to infiltrate and evaporate.
4. Manage the total volume, rate, and quality of stormwater in stormwater management projects.
5. Integrate stormwater management projects within open-space systems, parks, parking lots and streetscapes, and design them so they can become part of the human community, with aesthetic, place-making, and educational opportunities.
6. Provide stormwater management solutions and approaches that work at all scales, from large regional and watershed scale approaches, to small backyard projects, so everyone in a watershed can participate in stormwater management solutions.
7. Use low-maintenance and low-cost designs for stormwater management, including native landscaping, reduced engineering infrastructure – reduced pipes, curbs, gutters – to reduce initial and continuing costs for stormwater management projects and their impacts.
8. Retrofit stormwater management projects in problem tributary areas (flooded or eroded areas) where possible to reduce the stormwater contribution from such areas.

Environment

The specific objectives of the water management plan for Noisette are:

1. Meet or exceed requirements for volume and release rate management of stormwater.

2. Exceed the volume management requirements by greatly reducing the volume of stormwater running off the land.

3. Enhance the quality of stormwater leaving the property by reducing phosphorus, sediments, fertilizers, and other materials associated with developed land uses.

4. Use natural systems rather than engineered systems to manage stormwater.

5. Integrate the stormwater system into the plan, as habitat, passive recreational open space, etc.

Potential area for stormwater detention at Park Circle, before stormwater flows into the Quarterman Lake area – shallow excavation and berming of this area with replanting with native, deep-rooted vegetation would provide an attractive rain garden and reduce stormwater problems downstream.

and aerating of soils after completion of building and paving construction (deep chisel plowing to a 24-36 inch depth in the subsoils) and prior to planting provides increased water infiltration. Water volume runoff can be reduced by creation of development features that utilize stormwater runoff water.

3. Reduced Water Runoff Rate

Much of the present stormwater management system deficiency in the Noisette watershed is caused by lack of capacity for the runoff that the system is required to convey. Solutions are to either increase the capacity or reduce the runoff rate to that appropriate to the conveyance system. Strategies employed in the Noisette development will emphasize: (1) creation of additional dispersed detention/retention elements (including rain gardens) throughout the watershed where downstream conveyance deficiencies have been noted to detain runoff waters, allowing reduced runoff release rates and (2) the reduction of impervious areas in redevelopment projects to minimize the amount of precipitation which becomes runoff.

Stormwater outfall pipes at edge of marsh are laden with sediments, resulting from accelerated runoff rates.

Low-lying area, such as this one off Spruill Avenue, have the potential to serve as vegetated infiltration retention areas and eliminate considerable runoff volume, while trimming peak runoff discharge rates downstream.

4. Water Quality Enhancement

Water quality management strategies are most effective when starting at the runoff source – where rain hits the ground. Typically, sediment is the principal pollutant in runoff and many pollutants are associated (or attached) to sediment that is picked up and carried in stormwater runoff. Thus, the Noisette strategy will focus on effective erosion and sedimentation control, including a long-term commitment to management and maintenance of the applied techniques. The water quality management strategy will also emphasize reducing the source of pollutants (less polluting lawn fertilizers in favor of fertilizers that don't readily runoff the land). Where reducing source loads of contaminants is not possible, the strategy will focus on trapping or converting contaminants using ecological systems, such as vegetation plantings in uplands and created filter wetland plantings.

Water Quality Management Process

The contaminants which the Noisette stormwater management system will treat include nitrogen, phosphorous, BOD, suspended solids, and if present, some heavy metals. Nitrogen treatment requires both aerobic and anaerobic conditions to convert organic nitrogen to nitrogen gas using bacteria. Wetland systems provide both conditions and are ideally suited to provide the denitrification treatment of stormwater. Since phosphorous is a chemically conservative material, phosphorous removal from stormwater primarily involves a physical process, which binds phosphates onto soil constituents. Since the retention process requires aerobic soil conditions to ensure that the captured phosphorous does not re-mobilize, the well-aerated naturally vegetated swales are ideally suited to capture phosphorous. BOD removal is accomplished in both the aerobic vegetated swales and the shallow wetland areas, both of which have oxygen available to allow bacterial oxidation of the oxygen demanding substances in the stormwater runoff. Suspended solid removal is accomplished with a sedimentation process. Effective sedimentation systems provide lengthy travel paths for smaller sediment particles to settle out of the stormwater runoff. Larger sediment materials, including gravels and sands, will be easily settled in the swales, meadows or wetlands. These larger materials account for much of the suspended material in stormwater runoff. Silts and clays require extended times for settlement and are most effectively settled in shallower depth basins (with less time required for the sediment particle to reach the basin bottom), such as shallow wetlands with extensive vegetation.

The Noisette area will also extend the tidal waters into the stormwater management system. The extension of saltwater into the system provides a final treatment element, since the colloidal clays will be flocculated and settled very rapidly in the tidal salt water, resulting in a water quality not possible in completely freshwater systems.

Water Management System

The water management system will be accomplished as a series of integrated train of management elements each responsible for a specific treatment function. The Stormwater Treatment Train (STT) elements will include:

1. Minimal impervious areas
2. Reasonable street widths and parking area sizes
3. Shared/common parking areas
4. Minimal directly connected impervious areas
5. Roof downspouts disconnected from pipes
6. Buffers planted with native vegetation
7. Native vegetated conveyance swales
8. Infiltration elements (e.g., infiltration islands in parking lots and porous pavements)
9. Rain gardens
10. Wetlands (both freshwater and tidal)

The Noisette area stormwater runoff when treated by the proposed water management system will meet or exceed water quality standards set by NPDES Phase II requirements used by the City and the State of South Carolina.

CHAPTER FOUR | TRANSPORTATION

Restoring the Connections

Contents

Introduction

Restoring The Connections will begin with the restoration of the 4,700-acre Filbin watershed and the 1,400-acre Noisette watershed by developing a Green Infrastructure.

By developing the ecological stormwater management principles described in the Water Management section, along with the ecological restoration and conservation strategies described in the Restoring Natural Systems section, every citizen of Noisette will become a steward of the environment, within a community open-space system that connects one's backyard through community parks and preserves to the Cooper River. Additional linkages will include a multi-use recreational trail system connecting homes to schools, shops, workplaces, parks and the Cooper River. All of this will be integrated into a Green Infrastructure for Noisette.

“Do not go where the path may lead; go instead where there is no path and leave a trail.”

Ralph Waldo Emerson

Green Infrastructure

There have been many discussions of what it means to include ‘green infrastructure’ into the design of community or neighborhoods. Like many terms the word has multiple meanings and examples. The National Wildlife Federation defines Green Infrastructure as “the network of natural areas, open space, waterways, and ecologically-based design measures that protect native species and ecological processes, maintain clean air and water, reduce habitat fragmentation, pollution, and other threats to biodiversity, and improve the health and quality of life.”

For the New American City we take the definition further to include a more holistic view from a planning perspective. We believe that green infrastructure is the collective network of both natural and human derived systems that work together to safeguard and enhance the health and diversity of the environment on a local, regional, national and global level.

In general green infrastructure can be divided into two major categories:

- The Natural Structure
- The Artificial Structure

The Natural Structure

The natural structure refers to the green components of a community that play a functioning role in enhancing the health and diversity of the environment. It is critical to realize that green infrastructure does not apply to any and every ‘patch’ of greenery found in a community. The front lawns or manicured parks of a neighborhood that typically contain a single species of grass requiring large inputs of chemicals and water should not be considered part of this infrastructure. Indeed, the obsession with the American lawn is a large part of what needs to be abandoned and replaced with a true green infrastructure. ‘Open space’ does not necessarily mean green infrastructure.

The value of the natural structure of a community grows based on a variety of factors:

- The extent to which the area is undisturbed by human activity
- The size of the natural area –the larger the area the more complex and healthy the ecosystem can likely be
- The connectivity of the area to other natural structures, wildlife corridors etc.
- The proximity to water
- The extent to which the natural structure straddles two or more disimiliar ecosystems producing an ecotone (defined as a biologically diverse transition zone).
- The extent to which native species are thriving relative to invasive species.

It is recognized that most communities these days do not have the opportunity to have large undisturbed tracks of land within their boundaries. Green Infrastructure can still occur and have value on a small scale, recognizing that its value does grow as previously described.

Some examples of common green infrastructure that can usually be cultivated include the following:

- The adoption of a vigorous street tree program using indigenous tree species. Street trees have the capacity to reduce the heat island effect and help to improve local air quality.
- The preservation and restoration of local wetlands
- ‘Daylighting’ streams often buried under streets and channelized in culverts
- The restoration of waterways and their subsequent naturalization.
- The creation of ‘natural’ parks that require less maintenance and more biodiversity.
- The creation of greenways to provide corridors for the movement of wildlife.
- The protection of heavily sloped areas from soil erosion.

Some other issues that are important to define under natural areas include the separation of truly natural areas with urban uses through mechanisms such as the urban growth boundary pioneered by the City of Portland. With this philosophy, growth is kept within reasonable limits, protecting farmland and natural areas while encouraging density and the viability of more efficient transportation systems.

Natural Areas

Natural areas are sites that are largely undisturbed by humans, with native vegetation areas distributed in naturally occurring patterns across the landscape. These patterns change over time under the influence of drought, flooding, fires, and the interactions between plants and wildlife.

Among their benefits, natural areas provide a wild range of ecological services such as efficient nutrient cycling, soil enrichment and flood control; provide valuable habitat for fish, wildlife and plants; and increase environmental flexibility in the face of natural disasters such as fire, drought and flooding.

Open Space

Open space is undeveloped sites that don’t meet the criteria for natural areas because of human disturbance, but still provide habitat, scenery and other benefits. Open spaces can include areas such as farmland, recreational areas and utility corridors. Among its benefits, open space provides area for restoration to buffer natural areas; provide recreational areas and visual relief in urban areas; and creates a sense of community identity.

Landscape

Greenway with trail system

Trail system through a wetland/natural area

Bioswale in parking lot application

Greenways

Greenways are continuous or patchy areas of vegetation that provide corridors for movement of humans and wildlife. They often follow natural waterways or land features, and may connect natural areas and open space. Highest quality greenways provide habitat and allow for movement of wildlife, plants and water from one area to another. Greenways function as linkages and increase habitat connectivity and availability, provide alternative transportation options (walking and cycling), and stimulate business development focused around recreation and tourism.

By prioritizing the protection of critical habitat and ecosystems, green infrastructure provides a link between the concentration of development in settled areas and the protection of rural and undeveloped areas, which are the two main elements of smart growth. When green infrastructure considerations are included in land use and transportation planning, biodiversity is protected, undeveloped areas are preserved, and corridors between natural areas are established, thus increasing the habitat value of protected areas in and around developed areas.

Additionally, the increased natural vitality makes urban areas more attractive to residents, which is good for the economic health of communities. Homes near parks and open space generally sell for more than similar houses in neighborhoods without open space. Money Magazine declared Portland, Oregon as the best place to live in the United States, citing its smart growth policies. City bureau of planning director Gil Kelley explained it this way: "We're reinventing the very urban place by incorporating the natural environment, transportation, parks and neighborhoods."

Artificial Structures

A less understood part of 'green infrastructure' is that of the artificial structures that are designed to improve the health of the environment. Usually this infrastructure refers to man-made elements that reduce the production of greenhouse gases and particulates. The artificial structure can refer to the following types of infrastructure.

- Decentralized renewable energy generation such as local wind farms or photovoltaic arrays
- Natural waste treatment systems to replace conventional waste treatment
- Arrangement of homes and buildings to allow for adequate daylight and solar gain, known as solar envelope design. (See Mechanical and Electrical Equipment for Buildings, Stein & Reynolds)
- Decentralized methods of stormwater control such as greenroofs, raingardens and the like
- A functioning network of alternative transportation such as light rail, buses and seabuses.
- Alternative paving structures that reduce impervious coverage and allow groundwater recharging.

Over time, a community's artificial green infrastructure can extend to the flows of materials within a region allowing for the extensive re-use and recyclability of materials within the community's boundaries. A community's physical structure can be viewed as a resource base to be 'mined' instead of mining virgin materials off-site. Green infrastructure can include the careful design of our buildings so that they can be continually used in some form many times over. Storm Cunningham's book, *The Restoration Economy* outlines the growing demand and infrastructure that is occurring spontaneously around the country.

The New American City will include a large vibrant green infrasture through the careful design of its artificial structures and the stewardship of its natural structures.

Rain garden as sideyard

Rain Gardens
Landscaped areas planted of native vegetation to replace areas of a lawn that absorb rain water from the site (roofs, driveways and lawns). The gardens fill with a few inches of water and allow the water to slowly filter into the ground rather than run off to storm drains.

Rain garden

Basic Principles of Green Infrastructure:

- Protect, restore and maintain natural resources and ecosystem function, both in developed and undeveloped areas.
- Use best available science to assess natural resources and determine areas of environmental vitality as the first step to land use planning.
- Target for conservation areas of important ecological function, critical habitat, and corridors to connect such areas with already protected land.
- Reduce the need for expensive storm-water management, flood control and restoration projects by protecting water resources, flood plains, wetlands and other buffers.
- Limit the negative effects of development on habitat, air and water quality by ensuring decent vegetation cover and reducing paved surfaces.
- Enhance stewardship of open space and natural areas by increasing environmental educational opportunities.
- Engage citizens, organizations and agencies of the region to conserve biodiversity, and foster a sustainable relationship between society and nature in the region.
- Enrich the quality of life for the region's citizenry, and support tourism and natural resource-based industries through increased access to open space.
- Protect environmental quality by integrating green infrastructure with land use, transportation and water/sewer planning.
- Create wildlife-friendly and environmentally sensitive regulations and incentive programs.

Principles of Green Infrastructure

Green infrastructure adds a new set of tools and solutions to aid the fight against sprawl, including watershed management, the incorporation of biodiversity planning, and increasing public access to open spaces. Shown on the right are ten basic principles.

Another group working to develop Green Infrastructure in communities across the country is the Community Open Space Partnership in Wisconsin. Their successes in developing functioning green infrastructure can inform the efforts in North Charleston.

"We recognize green infrastructure as the network of open spaces in and around cities that enhances economic vitality, sustains natural systems, connects people to the natural world, and increases individual and community well being."

"Community open spaces exist and thrive side-by-side with homes, workplaces, schools and shops, and serve the social, cultural, economic, recreational, spiritual, and environmental needs of the community. They support the economy by maintaining or increasing nearby home values and offering business opportunities relating to the uses of open spaces. They address significant environmental issues such as storm water, water quality, and wildlife habitat. They are meeting places where citizens connect and engage with other citizens, and where citizens can express and celebrate their cultural identity. They are places of refuge and spiritual renewal for people and for other living things. They are the special places in the community."

"While we cherish and celebrate these special places, we recognize our responsibility to protect and nurture them as well. The Working Principles of the Community Open Space Partnership are a set of guidelines for meeting those responsibilities. Not every open space (existing or imagined) will satisfy every principle. Rather, the Working Principles are intended to serve as our source of inspiration and as a yardstick of our success in creating high quality green infrastructure in communities."

"Quality open spaces are - equitable/accessible; safe; diverse, connected; ecological; cared for; funded."

"They result from processes that are – community-driven; inclusive; science-based; and innovative."

Another group is the Sustainable Petaluma Network in California, who have restored a community based on green principles.
"A green development is similar to a standard development in that the developer buys the land and builds the project which is sold to the public in the usual manner. However, a green development also includes the following: stewardship of the land; resource conservation and energy self-sufficiency; a people-centered design; integrated agriculture; open space and green space; affordable housing; and streets and paths friendly to multiple forms of transportation."

The planning and implementation of a robust green infrastructure in the Noisette community will reap long term benefits in quality of living, sense of place, connection with nature and reduced traditional infrastructure.

"Planning is to conceive of a desired future, as well as a practical means of getting there."

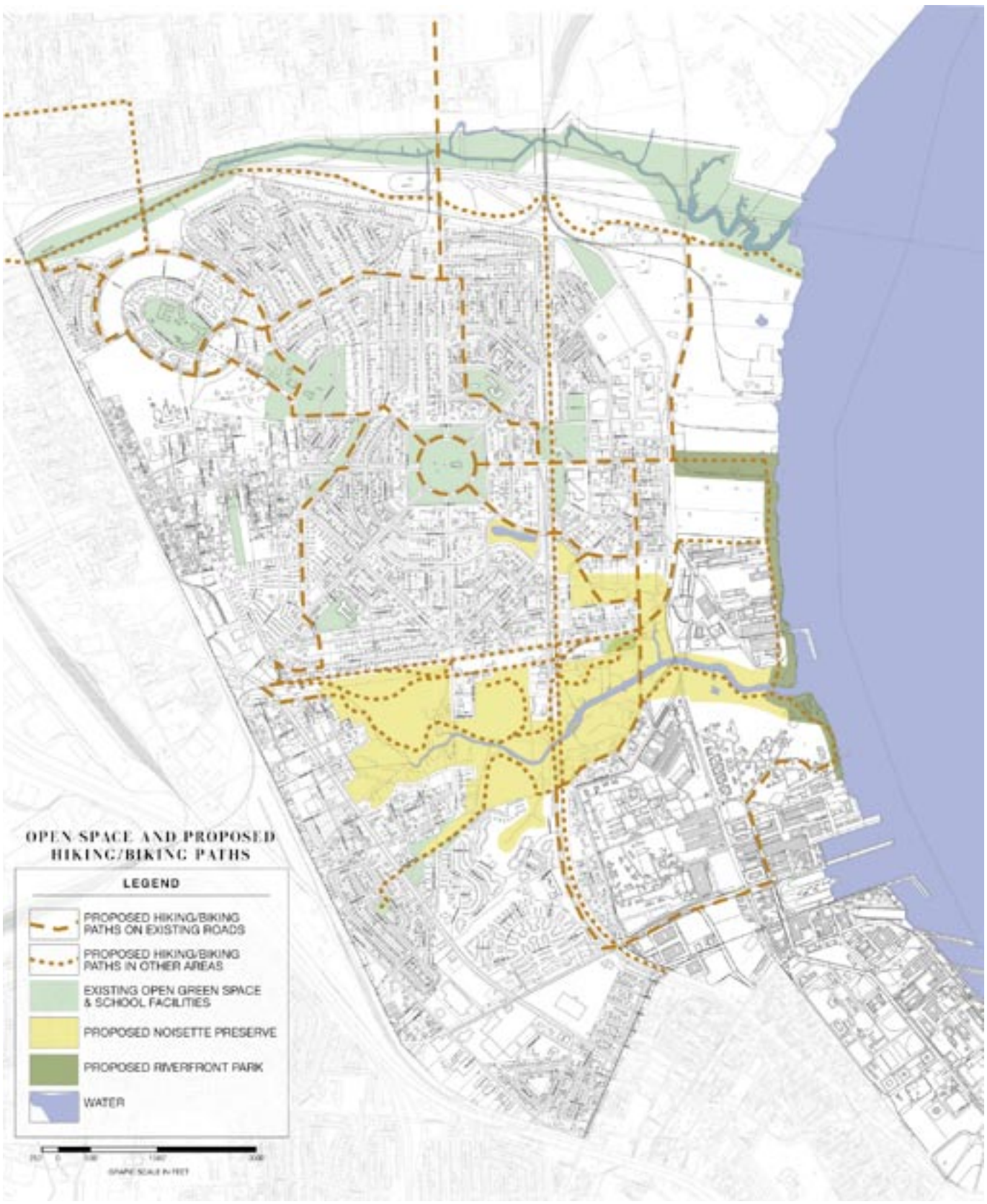
Roy Ackoff, A Concept of Strategic Planning, 1970

Philosophy

An old English proverb states;

A vision without a task
is but a dream.
A task without a vision
is a drudgery.
A vision and a task
are the hope of the world.

From the Church of England,
Sussex, England



Connective Tissue

The urban fabric of North Charleston has been built on the structure of its axial roadways and infrastructure and bound by the natural beauty of its wetlands and waterways. Combined, these features provide the ultimate edges for the city and also an opportunity to further integrate human interaction with nature. As the "New American City" begins to develop, these open spaces must continue to weave their way through the community to provide a unifying and functional element that will promote the revitalization of the city and a reaffirmed quality of life.

The vision for Noisette is to create a sense of place where one can access the riverfront, either on foot or bicycle, through a series of connected greenways. Neighborhoods would connect to industry through the seamless integration provided by these open spaces and allow for the development of a new sense of community. Chance meetings along the bikeway and opportunities for public art will be the norm as one travels along the palmetto lined sidewalks or through a grove of mature pines.

Parks and open space not only create a venue for recreation, they also contribute directly to the triple bottom line. They play a vital roll in the sustainability of the community fabric by providing aesthetic beauty combined with ecological restoration and desirable recreation, all of which ultimately adds to the market value of the community.

Restoration of healthy landscape

Over the decades, North Charleston has seen dramatic transformations to its native landscape. From stands of pines and palmettos to plantations and military bases, much of the original landscape has been reshaped by man. Restoration of a healthy landscape not only adds an element of beauty but also a unique identity to the city and a functional form in nature. The palms and palmettos that grace the landscape serve not only as a marketable image for the city but also as an element of conservation and sustainability. They help to mitigate erosion during wet weather months and moderate the microclimate by providing relief from the hot summer sun. Other natural resources such as the abundant wetlands provide opportunities for the cleansing of sediment-laden stormwater runoff and natural groundwater recharge.

Access to the Cooper River will give North Charleston's citizens a restored connection to an important cultural and natural resource.

Peaceful retreats will be part of the passive and spiritual experiences found at the edges of the Noisette Creek in the proposed Preserve.

History and Existing Conditions

Chicora Park

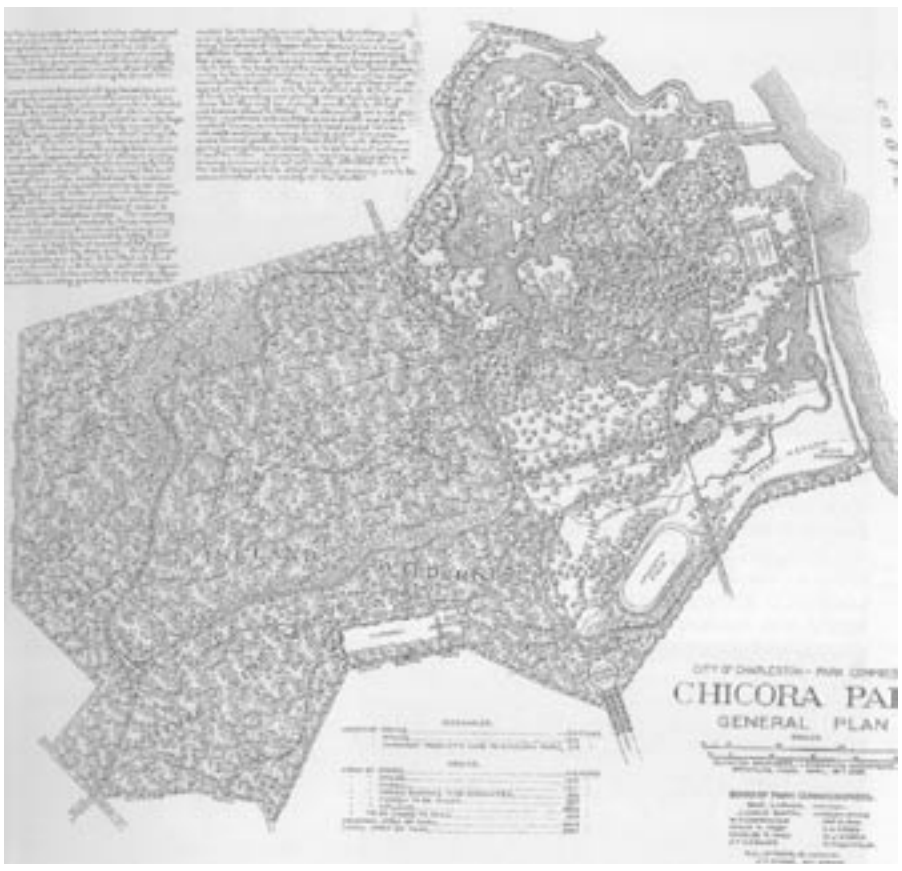
The City of North Charleston's rich history of open space planning began in 1895 when the Charleston Board of Commissioners detailed plans and activities for a nearly six hundred acre park in the unincorporated North Area. As many of the former plantations lost economic justification, most were sold for phosphates and timber, however, the Retreat Plantation and parts of Oak Grove became Chicora Park.

The Olmsted Brothers firm of Massachusetts, then the pioneers of open space planning, was retained by the city in 1896 to begin planning for the park. By the summer of 1897 the park had already become a popular place for residents. The Charleston Street Railway Company extended its electric trolley line to the park, which brought people by the droves to the newly constructed dance pavilion.

In 1899, the success of Chicora park warranted an expansion. The park was extended north to Noisette Creek with the acquisition of a 50 acre tract of land that was envisioned by the Commissioners as a new public golf course.

These plans, however, were never realized as economic forces began to drive the development of North Charleston. In August of 1901, the City of Charleston sold most of the land occupied by Chicora Park to the federal government for the construction of a new naval base. By 1902, additional lands had been purchased by the Navy and all of what was Chicora Park, save the nursery, was destined to become shipyards and military housing. What little land that remained was covered with pine timber.

Recognizing the success that Chicora Park had in its brief history, the Commissioners began planning a new park which would be located at the Exposition Site on Rutledge Avenue. Hampton Park was thus begun by relocating the Chicora nursery and several of its service buildings.



Charleston County Park, Recreation and Open Space Action Plan (1984)

In 1984, the Charleston County Park and Recreation Committee (PRC) completed the Charleston County Park, Recreation and Open Space Action Plan. Designed to review and resolve competing demands for limited public resources available for development of a countywide park system, this report set forth a philosophy and prioritized facility recommendations from 1984 to "present". At the root of the plan is the need to move toward resource-based passive recreation with income producing activities. The goal of the plan is to provide special purpose facilities (beach and water access) and large regional parks, typically greater than 300 acres, within reasonable accessibility of all county residents. To achieve this goal, the county must acquire undeveloped lands while they are available in order to preserve and protect lands for future generations.

Studies associated with this report included a population projection that identified a county wide population increase of 31% by 2015. This complicates the problem as there will be higher demands on an already deficient park system and presumably, less land to develop park and recreation space on as inward migration tends to result in land consumption through residential and retail development. One development that will provide some relief to this situation is the North Charleston Wannamaker Park (576 acres) which opened in June, 1998. Phase I improvements are complete and the park is expandable to meet future demand.

Alternative recreation options were also identified as in this plan. The Charleston County Community Education Program , a joint effort of PRC and Charleston County School District, provides the opportunity for after hours use of public schools for a variety of cultural, social and recreational programs with an emphasis on education, leisure and recreational activities.

A Needs Assessment Study was performed by the PRC in 1991 which identified three very specific goals for the short term. These goals included:

- Development of a variety of facilities to generate revenue
- Acquire and develop 1,015 acre regional park in North Charleston
- Improve and operate 19 boat landings

In July of 1997, PRC completed a county wide study on water-based parks and recreation. The primary consideration was to make the waterfront more accessible to all by providing access, transportation and facilities (shelters, boat landings, restrooms).

The only public water access in North Charleston is the County Farm along the Ashley River (Bridgeview Drive). Access is Level 1 which indicates full compliance with SCDNR standards.

Private facilities include:

- Cooper River Marina (former Naval Station operated by the PRC under lease terms with the federal government)
- Duncan's Boat Harbor (Ashley River, 4354 Bridge View Drive)
- Dolphin Cove (Ashley River, 2079 Austin Avenue)
- Wando Woods (Ashley River, Flynn Street)

The highest priority for expansion identified in this report is the Cooper River Marina.

Wetlands in the proposed Noisette Preserve

The Hendrick Park dock is a popular spot for crabbing and fishing.

Open Space & Recreation

Play equipment in the park at Liberty Hill's Felix Pinckney Center

Indoor playing facilities are provided for year-round activity.

The Felix Pinckney Center swimming pool

Local residents feed ducks at Quarterman Lake.

North Charleston Comprehensive Plan (1996) Goals and Objectives

The Comprehensive Plan adopted by the City of North Charleston in 1996 included an inventory of existing recreation facilities and an assessment of trends in preferred recreational activities.

Among the parks and recreation facilities within the Noisette planning area are:

1. Park Circle
2. Danny Jones Complex/ Armory/Exchange Club Park
3. Felix Pinckney
4. North Park Village
5. Whipper Barony
6. Ferndale
7. Ceramics House
8. O'Hear
9. Quarterman Lake
10. Ralph Hendricks
11. Triangle
12. Pump House
13. Mosstree

Four Poles Park and the land recently acquired by the city along Northeast Durant (near Garco) are additions to this inventory. There are also recreation facilities at the elementary and high schools within the Noisette area, but these were not considered as part of the inventory in the Comprehensive Plan. In addition, there are significant recreation facilities near the Noisette planning area, such as on the former Naval Base and at Westvaco Park. The Comprehensive Plan notes that while there are more recreation facilities within this planning area than in other parts of the city, there is still a deficit compared to the recommended ratio of recreation space to population based on the National Recreation and Park Association Standards.

The plan notes that preferred recreational activities include active recreation (such as playing ball), walking, fishing, swimming, tennis, and boating. Like many communities in the US, North Charleston has an aging population, and should plan for passive recreation facilities as an important component of the mix.

The Comprehensive Plan includes three key recreation goals that relate directly to the recommendations for open space and recreation in this master plan:

- Develop a geographically equitable city-wide system of parks, recreation facilities, and programs to meet the diverse needs of the community.
- Increase park to population ratios.
- Develop a signature city-wide park.

An integrated approach to recreational planning should also consider the recreational facilities that are associated with the public school system. As schools become centers of their communities, which is recommended in this master plan, their facilities can serve the needs of both students and the general public.

In an effort to stimulate park development, the Comprehensive Plan recommends two significant policy changes:

- Establish a reserve account and budget annually for the acquisition of park acreage.
- Amend the City's Subdivision regulations to require development practices that reserve park space within or close to development sites.

The Recreation Department had also developed a five year park improvements program and capital budget totaling nearly three million dollars.

There are two significant goals of the Plan:

- Develop a Master Plan Acquisition and Development Plan.
- Develop a "signature" citywide park.

The Danny Jones Complex offers a variety of recreational activities.

The group of facilities that comprises the Danny Jones Complex is a major recreational asset in the City, offering a range of primarily active sports activities. The population of the neighboring residential areas includes a large number of families who are retired and have owned their homes for many years, but is also becoming attractive to families with young children. These multigenerational characteristics should be the basis for future planning of improvements to the facilities. Since the Complex can serve as a neighborhood center, as well as a destination for other parts of the City, sidewalks and biking trail connections should be added to make the facilities more accessible. The Armory building is a valuable asset that should be renovated to improve its appearance and accommodate a wider range of functions. Like many other assets in the City, native landscaping should be added and the Complex should be a component of the city-wide environmental education initiatives.

A New Vision

Open Space Planning for the Future

As the city moves forward with the implementation of the Master Plan, it must establish a plan for its open space and recreation. Land is the most valuable commodity that exists within a community. Planning for its use and development is therefore paramount in moving forward. While the Comprehensive Plan and County Action Plan offer a firm foundation for the continued planning of open space, there are several other factors that must be considered in order to effectively move forward.

The demographics of North Charleston must be considered not only for the present but also with an eye to the future. The current demographic trends indicate that there is a general aging of the population and a severe concern regarding the outward migration of the young. Careful planning must balance the needs of the elderly while providing attractive recreation facilities not only for the current residents but also for the young individuals and families who may be interested in relocating to North Charleston and who would view these amenities as an asset. In all instances, the proximity of each park must be evaluated for a diverse population.

One of North Charleston's greatest assests is its natural resources. As noted in both the Comprehensive Plan and County Action Plan, these assets must be preserved and ultimately enhanced as a natural open space that can be used for passive recreation, education and tourism. Of note is the Noisette preserve, which must be restored to the vital environmental asset that it once was.

The development of new green space and restoration of existing natural features offers an opportunity to implement new natural resource management and bio-engineering techniques. As discussed in other chapters, concepts such as stormwater swales and rain gardens should be incorporated into the design of parks and green space.

Additionally, this process offers a unique opportunity to implement art with the landscape. "Art" is typically thought of as sculpture, murals, and structures that are set atop the landscape. However, art can be much more than that. Creative implementation of construction detailing can add a very distinct, very artistic statement to the landscape. Simple imprints in pavement or use of native materials in fence lines can act as markers within the landscape that begin to develop into a hierachy of trails and pathways.

Park Typology

Since much of the background data exists related to the needs of the community, planning should continue focusing primarily on the establishment of open space in six separate categories; public greens, active recreation, specialty parks, community links, and the signature park noted in the Comprehensive Plan.

- Public Greens:

  Large scale open spaces. Although primarily for passive recreation, this land could support impromptu active recreation such as field sports. These parks tend to be more regional in that they must serve the general population of the area. These spaces may be open fields, wetland and wildlife preserves or public plazas. It is anticipated that the future Riverfront Park will fall into this typology.

- Active recreation:

  Identified as a fundamental and immediate need of the community, active recreation spaces need to be carefully planned and programmed with the City. Shared or multiple use facilities need to be explored in order to most effectively utilize the land. Options should be explored which provide multiple use facilities such as sport courts that can be adapted to provide basketball and tennis on the same facility. The Danny Jones Complex and the and Felix Pinckney Center are good examples of this type of park.

- Passive Recreation:

  The preservation of natural open space is of vital importance to North Charleston, since these areas offer not only environmental benefits, but recreation benefits as well. These conservation areas represent an opportunity to provide vast and diverse areas for passive recreation. Whether it be strolls along a wetland boardwalk or simply enjoying a spring day at the water's edge, passive recreation must be carefully planned and included in any open space master plan. The proposed Noisette Preserve is a good example of a passive recreation park.

- Specialty parks:

  There are many instances where multiple use facilities do not make the most sense. Often, communities desire competition level facilities that are designed to support high performance level sports. The combination of the specialty parks and multiple use facilities will provide the most efficient land use while supporting the community need for first rate facilities. Some specialty parks may include skate parks, historic sites and riding trails. The incorporation of the proposed Naval Base Memorial will begin to fill the need for specialty parks within North Charleston. Originally planned for an interior space near the existing base, the current vision is to relocate the proposed memorial to a more prominent space along the Cooper River and to incorporate this as a cornerstone of the proposed riverfront park. This same concept must carry through other historical and educational sites to create key nodes of activity and an iconic presence within the context of the regional park system.

- Community Links:

  These green spaces are designed as the connective tissue of the community. They connect parks to schools, schools to neighborhoods, and neighborhoods to industry. They come in many different forms from wooded trails to tree lined, urban bikeways. North Charleston has a strong history of railroad use to serve the many industries that existed here. As these needs have changed, many of these railroad lines have fallen into disuse and disrepair. In many cases, these unused lines run through areas that are now primarily residential. These lines, along with the Michaux Promanade should be converted to hiking and biking trails.

- Signature park:

  This is the park that identifies the community. It embodies the values of the community and stands out as a defining element in the landscape. Park Circle embodies these qualities and must be further modified to enhance the community image.


Public Greens


Active Recreation


Passive Recreation


Specialty Parks


Community Links


Signature Park

Parks and open space offer opportunities to enhance simple experiences with art by celebrating details through materials, patterns and textures that are derived from nature.

Riverfront Park -

Connect back to the Cooper

Historically, cities developed along waterways, as was true for Charleston and North Charleston. After a century of separation, since the time of the Chicora Park, the citizens of North Charleston will be reconnected to the Cooper River. As it developed, the city was cut off from the river by the industrial development, initially of the General Asbestos and Rubber Company and other industries, and later by the petroleum tank farm that stretches along Virginia Avenue from the northern end of the former naval base to the I-526 overpass. The Charleston Naval Complex replaced Chicora Park and much more river frontage. With the closure of the base and the conversion of its assets to non-military uses, the opportunity exists to develop a Riverfront Park, returning access to the Cooper to the citizens of North Charleston. The Riverfront Park should be developed in phases as the land becomes available to the City of North Charleston. The initial phase of the Riverfront Park should extend from the mouth of the Noisette Creek south to the shipyard. The next phase should bridge across the Noisette Creek and extend north along the shore of the Cooper to the limit of the former naval base. A third phase should extend from the northern termination of the second phase, north along the river to the extension of Montague Avenue; this would require a modification of or partial removal of the tanks south of Montague Avenue. Since this is private land, the city should seek the cooperation of the industrial owners to permit limited use as a biking/hiking trail along the river, with the eventual dedication of this land to a combination of mixed use and open space. Montague Avenue should have a visual extension across Virginia Avenue through a green space, connecting the Old Village to the water. The design of phase one of the Riverfront Park should include the following elements:

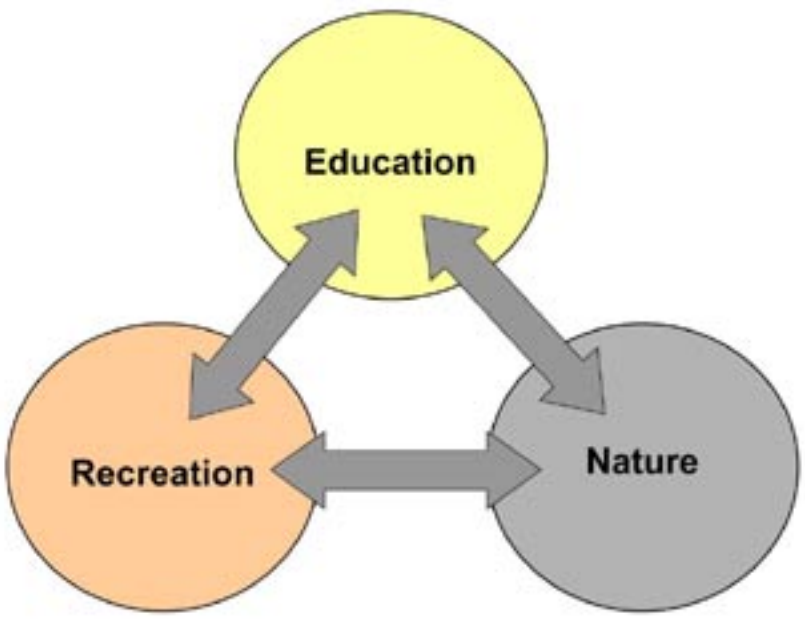
- Deconstruct the former Officer's Club and recreate the sense of the island that existed at the mouth of the Cooper River prior to the channel being infilled by the US Navy.
- Create open recreational space that can be used for large public gatherings, such as holiday events. A moveable fabric band shell and stage should be provided as a focus for events such as concerts; the location of this element can vary depending on the event.
- Locate the Naval Base Memorial at the southern end of the phase one land, closest to the shipyard, with direct access to the river.
- The existing "Panama" houses in the vicinity of Pier Bravo should be considered for public functions, such as small retail facilities providing convenience items to park users and possibly an indoor museum space as an adjunct to the adjacent Greater Charleston Naval Base Memorial.
- Restore the profile of the original river bank by removing the deteriorating seawall and reconfiguring the grade with sufficient erosion protection to withstand the water action caused by normal river traffic.
- Create public access to the river at the existing Pier Bravo; during the development of the proposed second phase of the park, restoration of Pier Alpha for public use should be evaluated.
- Public facilities such as children's play equipment, family picnic elements, and public restrooms should be provided.

Conceptual Plan for the new Riverfront Park Phase One

Access to the water's edge will be provided by a bicycle and walking trail that is connected to a larger system of paths throughout the Noisette area.

Connections

This plan, along with others like it, has discussed connections with respect to physical linkages between land uses, activities and natural resources. There is, however, a more profound connection that must be addressed as development of open space continues. The deeper connection of man to nature is paramount to the principles of this master plan. This connection, while physical at times, must be promoted through education. It is the intent of the master plan to develop programs and opportunities to promote the education of the public, both young and old, local and visitor. The Plan provides the opportunity to engage the natural beauty of North Charleston, to learn about environments, both natural and built, and to understand the delicate balance between the two. Careful planning of these spaces to provide for interpretive settings should be combined with active programs aimed at existing and proposed educational institutions to offer a wide variety of learning opportunities.



Open Spaces and Recreation Conclusions

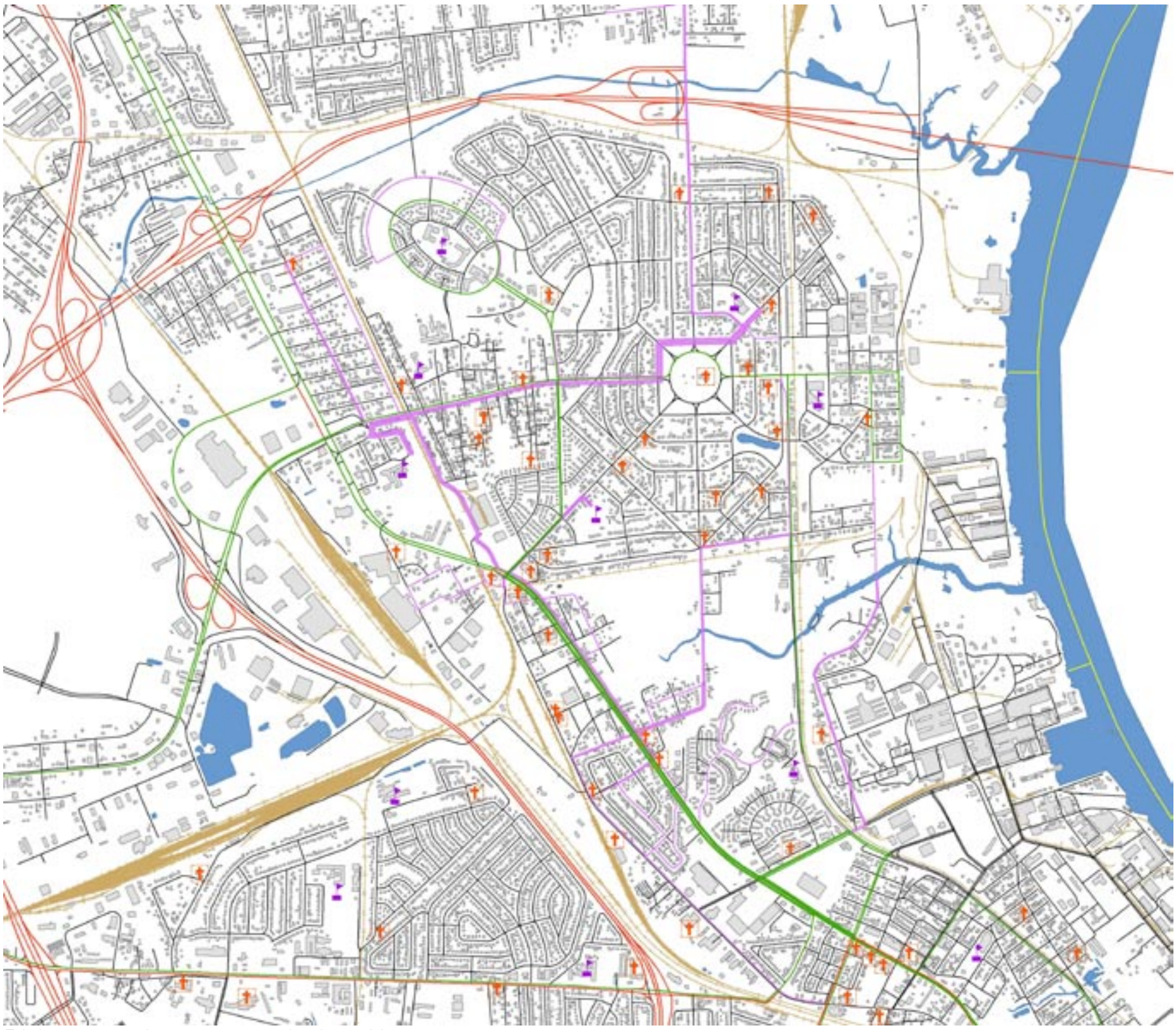
The open space and natural, scenic landscape of North Charleston will play a crucial roll in the development of North Charleston as the “New American City”. The detailed planning of these spaces will thus be the next step in creating the vision for North Charleston. Taken together, the strong existing recreational assets of the Noisette area, and the new recreational areas proposed in this master plan, will offer a broad range of outdoor and indoor choices. The key changes are:

- The Riverfront Park offers the residents of North Charleston significantly improved access to the Cooper River and the Noisette Creek. The initial phase of the Riverfront Park will be a highly flexible outdoor space that can be used for many activities, including family picnics, boating, fishing, large group activities, and passively enjoying the boat traffic on the river. As the park is extended north of the Noisette Creek and eventually connected to the proposed green extension of Montague Avenue, it will have a very strong link to the historic heart of the city.
- The Noisette Preserve will be a major environmental and educational resource giving the citizens the opportunity to experience the diverse ecosystems from the mouth of the creek, to the tributaries feeding the creek, to the highland forests along its western borders.
- A network of trails, partially along railroad lines that now divide the community, will connect existing and new recreational elements and provide residents with many choices for moving through their community.

An abandoned rail line in the proposed Noisette Preserve provides a potential connection to the new trail system.

Bridge in the proposed Noisette Preserve

Transportation



Existing transportation systems map, showing activity centers.

Transportation Systems

Using Nature as a Guide for Transportation Systems

Bus Transit

Light Rail Transit

Design for Interconnectedness

The health of natural systems is dependent on the level of interconnections that exist between organisms in an ecosystem. In nature, it is the interdependencies that make the whole system more resilient.

Many transportation systems are designed with little thought paid to the way people move between multiple modes of transportation. Where connections exist, they are often difficult and unpleasant.

The 3,000 acre redevelopment will erase barriers between multiple transportation modes resulting in a more seamless, integrated whole. Once people enter the system they will be able to easily transition from one mode to another through a network of intermodal hubs, which will link bikeways, taxi stands, buses, water taxi and someday, light rail. Participation between taxi drivers and bus drivers will be encouraged to help transfer people from bus stops to other locations. Dedicated bike lanes will be created to make commuting by bike safe and enjoyable. The system will be designed for efficiency and convenience, allowing individuals to save gas, money or even give up one of two family cars.

Design for Diversity

The health of any natural system depends on diversity. Without diversity a natural system is prone to disease and dysfunction, unable to offer the resilience that is found in diverse ecosystems.

In contrast, most public transportation systems today rely on a single system to serve the needs of a very diverse array of people throughout an entire metropolitan area. It is not surprising that these systems have low ridership and do not adequately meet the needs of its constituents. Over time, as ridership falls and the system fails, energy is lost. Conversely, positive incremental growth will occur, if diversity is carefully tended.

This master plan anticipates choices that offer viable ways to travel the city without the automobile. This is achieved through the design of infrastructure which supports multiple modes of travel, including buses, bicycles, pedestrians, taxis, water taxis and the private car.

Design for Adaptability

In nature, species that learn to adapt to changing environmental conditions thrive, those that do not, decline. Many transportation systems are unable to adapt to the changing needs of people over time. A feed-

Pedestrian bridge designed by Calatrava in Bilbao, Spain, brings art to municipal infrastructure.

back system is needed to evaluate performance, and a communication strategy needs to let users know what changes are ahead. Adaptability depends on communication, which will ultimately determine the more fine grained version of this plan.

Moving away from an automobile centered mindset is a physical, emotional and pyschological challenge. This will occur incrementally, starting with simple steps which offer services that allow people to forsake the car for their various needs:

- On Sundays, a network of 'church' routes can be created, offering ridership to various churches and provide recreation routes that bring people and their bikes to parks and waterfronts.
- On Saturdays, a network of shopping and recreation services can be created allowing people to schedule trips to the grocery stores and shopping malls.
- During the week the focus can shift to getting people to work on time and on schedule, with off-peak hours allowing for flexible scheduling.
- Commuter buses can allow small groups of people to arrange for 'van-pooling' on a reliable basis, for work or play.

Design for Multiple Use

Functioning biological systems often perform multiple functions at once, such as leaves that use photosynthesis to generate energy for a tree, while also serving as an effective way to transpire excess moisture.

Modern transportation systems on the other hand typically perform only one use. Cars transport people to and from work and school buses take kids back and forth from schools, then lay idle in surface parking lots throughout the day.

This plan suggests buses can be given multiple careers, taking kids to school and also function as part of the municipal transportation system. This multiple use approach allows more efficient, cost effective, school and public transportation with a reduction in the overall fleet size required in the city.

Design for Celebration

One needs only to look at a garden in the spring to see that natural systems find many unique ways to celebrate life. Not surprisingly, people are drawn to life and lifelike processes (which is known as biophilia).

This might explain why people are turned off by many forms of transit that seem dull and lifeless. A successful transportation system must make the whole process of travel exciting, safe and enjoyable, from purchasing a ticket, to boarding, riding and disembarking. This plan recognizes the need for a transportation experience enhanced by improvements and amenities. These should include thoughtfully designated bus shelters to make waiting more pleasant and transitions faster. At locations where ridership does not support a shelter, the stop should still have a consistant signage, identification and communication strategy, which is clear and attractive. These improvements become a civic amenity through a greater integration of artwork, lighting, and music.

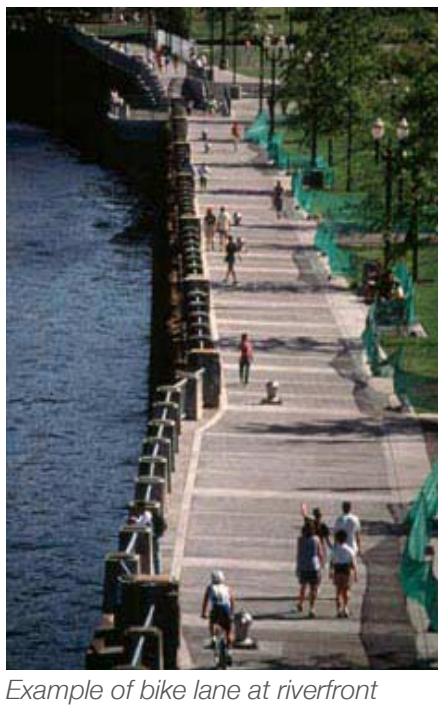
Conclusion

The goal of achieving a richly interconnected system of movement is crutial to a healthy community. Our freedom of choice and physical health depends on it.

The following analysis and recommendations are based upon these principles, and are manifested in the street hierarchy system. Later, in Chapter 5, the street systems are described in more detail, supporting more diverse attributes of the Community Plan.

Finally, strategies for inter-modal connections will be identified in relationship to existing conditions as well as future opportunities.

Example of bike lane at neighborhood



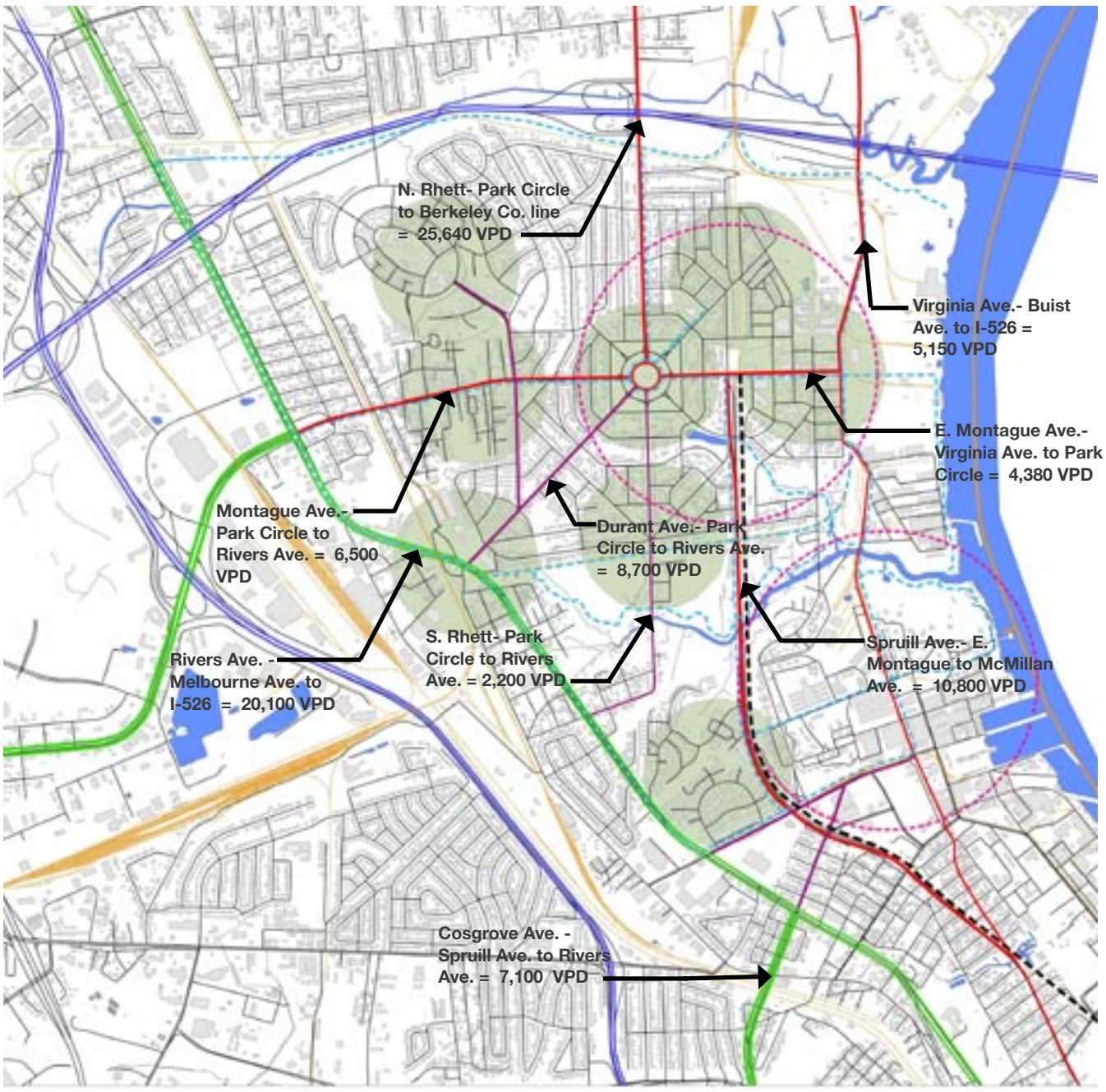
Example of bike lane at riverfront

Transportation

Existing Traffic Counts
Vehicles per day (vpd) 10 year average

A. Rivers Ave. - Melbourne Ave. to I-526 = 20,100 vpd
B. Spruill Ave.- E. Montague to McMillan Ave. = 10,800 vpd
C. Cosgrove Ave. - Spruill Ave. to Rivers Ave. = 7,100 vpd
D. Virginia Ave.- Buist Ave. to I-526 = 5,150 vpd
E. N. Rhett- Park Circle to Berkeley County line = 25,640 vpd
F. S. Rhett- Park Circle to Rivers Ave. = 2,200 vpd
G. Durant Ave.- Park Circle to Rivers Ave. = 8,700 vpd
H. E. Montague Ave.- Virginia Ave. to Park Circle = 4,380 vpd
I. Montague Ave.- Park Circle to Rivers Ave. = 6,500 vpd

4-lanes serve 25,000 to 40,000 vpd
Equals 6,250 vpd per lane
(see Arterial Streets)



Street hierarchy diagram, showing existing traffic counts at Neighborhood Connectors, justifying design changes on these streets. Pedsheds show locations of neighborhood centers and future light rail stops.

Components of the New Integrated Plan

The goal of sustainable community planning and urban design is to achieve a balance of social values, environmental health, and economic viability in the public realm. Understanding the value of neighborhood resources like public streets can help us regain the respect they require to become assets to the community.

The limits of this redevelopment area can be loosely defined by the original North Charleston area founded in 1972 bounded by I-526 to the north, I-26 to the west, the Cooper River to the east, and Cosgrove to the south. The goal is to create connectivity, amenities and integration to achieve safe, efficient and attractive street networks.

Access Roads and Streets

The smallest component of the street system, Access Roads, binds neighborhoods together internally. In these areas, local activity is more dominant and movement by automobiles must be geared to low volume, slow speed, with primary right-of-way for pedestrian and bicycle traffic, as these roads do not have sidewalks, nor are they needed.

Access Streets are the next step up, providing sidewalks for safety. These streets should occur at areas of higher traffic volumes and located closer to neighborhood centers, schools and where land use is more intense and higher densities exist, or where potential for future development of higher density may occur. They should also be used for simple and direct linkage to Neighborhood Connectors, the next step up in the system.

Example of bike lane on street

Neighborhood Connectors

Neighborhood Connectors provide relatively direct, convenient connections between Neighborhood Centers. They also become gateways to neighborhoods, and as described in Chapter 5, have a civic dimension (see page 5.3).

Because of their role in transporting people and goods between neighborhoods, Neighborhood Connectors operate at slower speeds (35mph) and carry less traffic (up to 12,500 vpd) than Arterial Streets. These are dual functioning streets because they also provide direct access to fronting properties.

Arterial Streets

There are two categories of arterial streets: primary and secondary. The diagram above shows the street hierarchy of Arterial Streets. The highest capacity of arterials streets are obviously I-526 and I-26, which can be designated as Primary Arterial Streets. This plan will however, focus more on the Secondary Arterial Streets, like Rivers Avenue (US 52) and Montague Avenue west of Rivers Avenue. Corridors like Rivers Avenue are vital links to commercial, light industrial land uses and residential neighborhoods. These corridors in which many people shop, work and live can be improved by threading different land uses together, rather than segregating and creating barriers between them.

This plan suggests extending the grass median at Rivers Avenue and adjusting the lane widths to a more appropriate capacity. A moderate count for determining number of lanes needed for a four (4) lane Arterial Street is 25,000 vehicles per day (vpd). This translates to 6,250 vpd per lane. Some cities use counts as high as 40,000 vpd. Existing traffic counts along Rivers Avenue and Montague Avenue support the reduced lane widths proposed in this plan.

Additionally, to promote an interconnected system of streets to disperse traffic loads, access management on the arterial system is important to safety and efficiency. Consequently, intersection frequency should not be any greater than is necessary to serve local access needs.

Intermodal Hubs

Intermodal hubs will help passengers to easily transition from one mode of transportation to another, and are positioned in strategic neighborhood centers to promote pedestrian activity. They will vary in size and capacity depending on their location and

Water Taxi Stop at Riverfront Park

Solar Powered Water Taxi

Inside the Taxi

service.
Other hub locations should occur in downtown North Charleston, at the intersection of Spruill Avenue and Montague Avenue, the west end of the Michaux Promenade, and at the River Center.

Water Taxi

The Noisette area has potential to utilize the Cooper River as a viable means of transportation for both mass transit and recreational opportunities. The proposed Riverfront Park will grant water front access, which was denied while the naval base was active. This plan suggests a balance between the current industrial businesses based at the Cooper River's edge and public recreational access to the Cooper River. Water taxi routes from North Charleston along the Cooper River's coast line will also link major points of interest, such as Patriots Point, Historic Charleston, Castle Pinckney, Fort Sumter, Sullivan's Island, and Fort Johnson.

Operating costs can be addressed by implementing emerging technology sich as solar powered taxis.

This plan suggests a water taxi drop point/pickup should be located at Pier Bravo on the north end of the River Center. Pedestrians can then transfer to the intermodal hub located near the River Center.

Rail Transit

North Charleston's rail lines have historically been a vital backbone of the industrial businesses along the Cooper River shore. Unfortunately, residents face the daily inconveniences of freight trains interupting many streets throughout the 3,000 acres.

This plan has identified rail lines where industrial and passenger use should be reconsidered and/or added infrastructure should occur in order to utilize rail transit as a viable option to move passengers in the North Charleston area and beyond.

If light rail becomes a reality, this plan suggests adding passenger rail stations along Spruill Avenue that continues to downtown Charleston, accommodating commuter and recreational needs. This rail line will allow the new transit plan to evolves, as shuttle routes will be created to link neighborhood centers with the rail station (see 4.21). The two new intermodal rail stops are positioned strategically within the 3,000 acres redevelopment, to serve the Noisette community north and south of the Noisette Preserve.

Chapter 5 also outlines design direction for the "Michaux Promenade" at the north edge of the Noisette Preserve along the east/west abandoned rail line between Rivers Avenue and Virginia Avenue. Through the vacation and extension of this line, an important walk/bicycle path will result. This right of way will become a public promenade offering an alternative to the nature trails within the preserve itself, connecting proposed east end historical/interpretive cultural sites with west end neighborhoods such as Iron Dog and other Rivers Avenue businesses.

Rail Transit Examples:

Example of light rail transit connecting parks and recreation

Example of light rail transit integrated with Interstate Highways

Example of future light rail along Spruill Avenue from Montague Avenue to Charelston

Bicycle Lanes Guidelines

•Establish the correct position of the cyclists on the street

•Reduce bicycle/pedestrian conflicts (fewer cyclists ride on sidewalks)

•Provide cyclists a space to travel at their own speed next to motorists

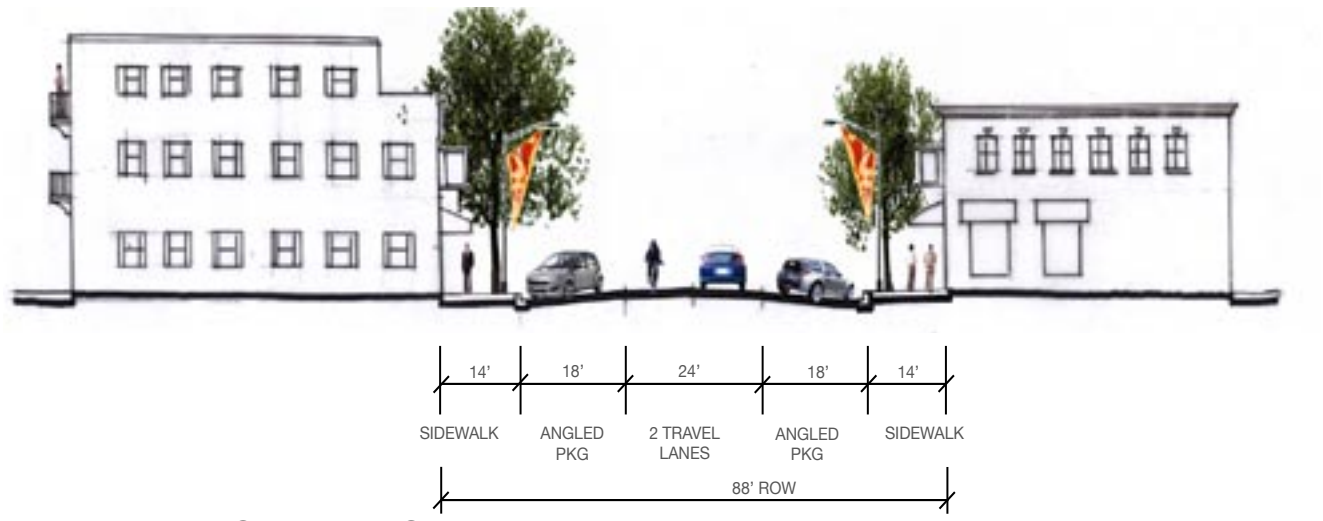
•Increase the effective turning radius for right turns at intersections

•Guide cyclists through intersections

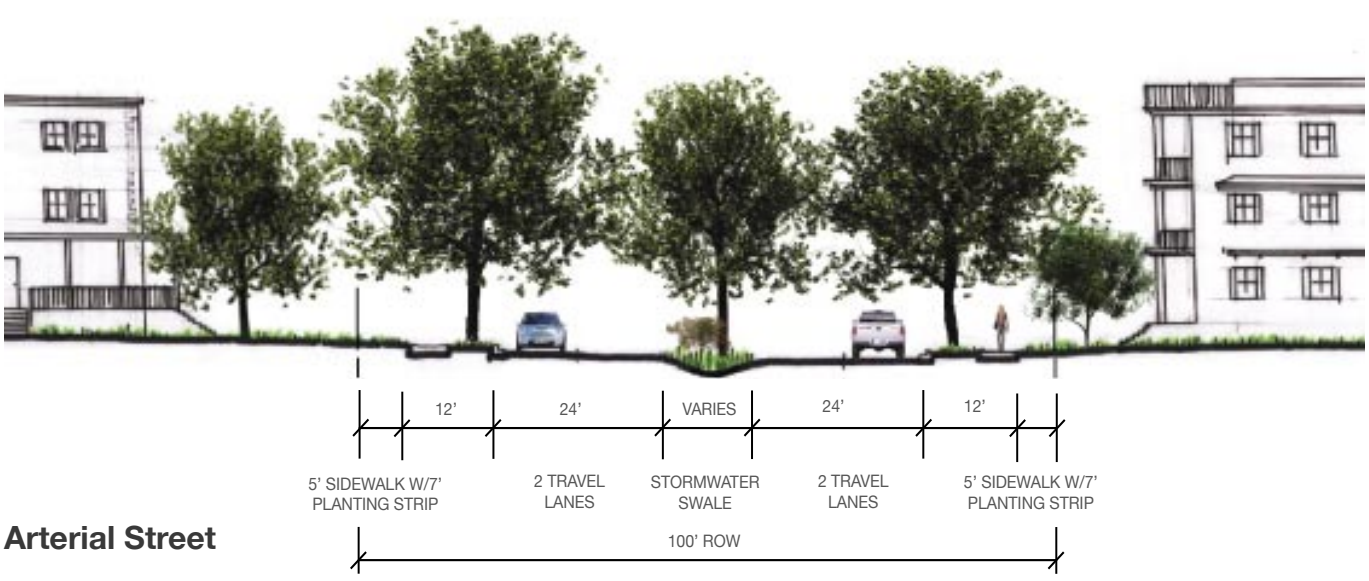
•Provide additional pedestrian buffer from adjacent vehicular traffic

•Allow cyclists to pass vehicles backed up at intersections (bike lane is a legal travel lane)

•Send a message to motorists, cyclists have a right to the roadway



Neighborhood Connector Street

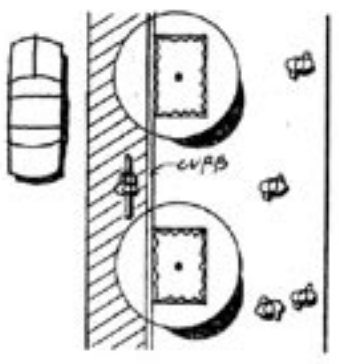


Arterial Street

Societal Well-Being and Physical Health:

Linked Through Transit and Active Living

Vehicle Yield sign for Bicycle Safety



Bicycle lane diagram

Bicycling and Walkability

The merits of bicycling and walking have become never more apparent. The Roberts Wood Johnson Foundation, a leader in health research, has created the Active Living Through Design Program, which will continue to build support for more active and healthy communities.

This program documents why active living is important and also helps fund implementation and change, provided results are documented for use by others.

Implementing Change:

Public support for improved conditions for bicycling and walking has created a widespread acceptance that more should be done to enhance the safety, comfort, and convenience of the non-motorized traveler. Public opinion surveys throughout the 1990's have demonstrated strong support for increased planning, funding and implementation of shared use paths, sidewalks, and on-street facilities.

At the same time, public agencies have become considerably better equipped to respond to this demand. Research and practical experience in designing facilities for cyclists and pedestrians has generated numerous national, state and local design manuals and resources. An increasing number of professional planners and engineers are familiar with this material and are applying this knowledge in towns and cities across the country.

North Charleston has supported this approach through a number of related studies, i.e. CHATS and Charleston County Bikeway and Pedestrian Master Plan, Intermodal Transportation Facility Study, CHATS Long Range Public Transportation Plan. Each of these studies address and propose complementary systems to the use of the automobile and the community's almost total reliance on it as a means of transportation. The 1996 City of North Charleston Comprehensive Plan outlines the goal to "Develop and promote a bicycle friendly and walkable community."

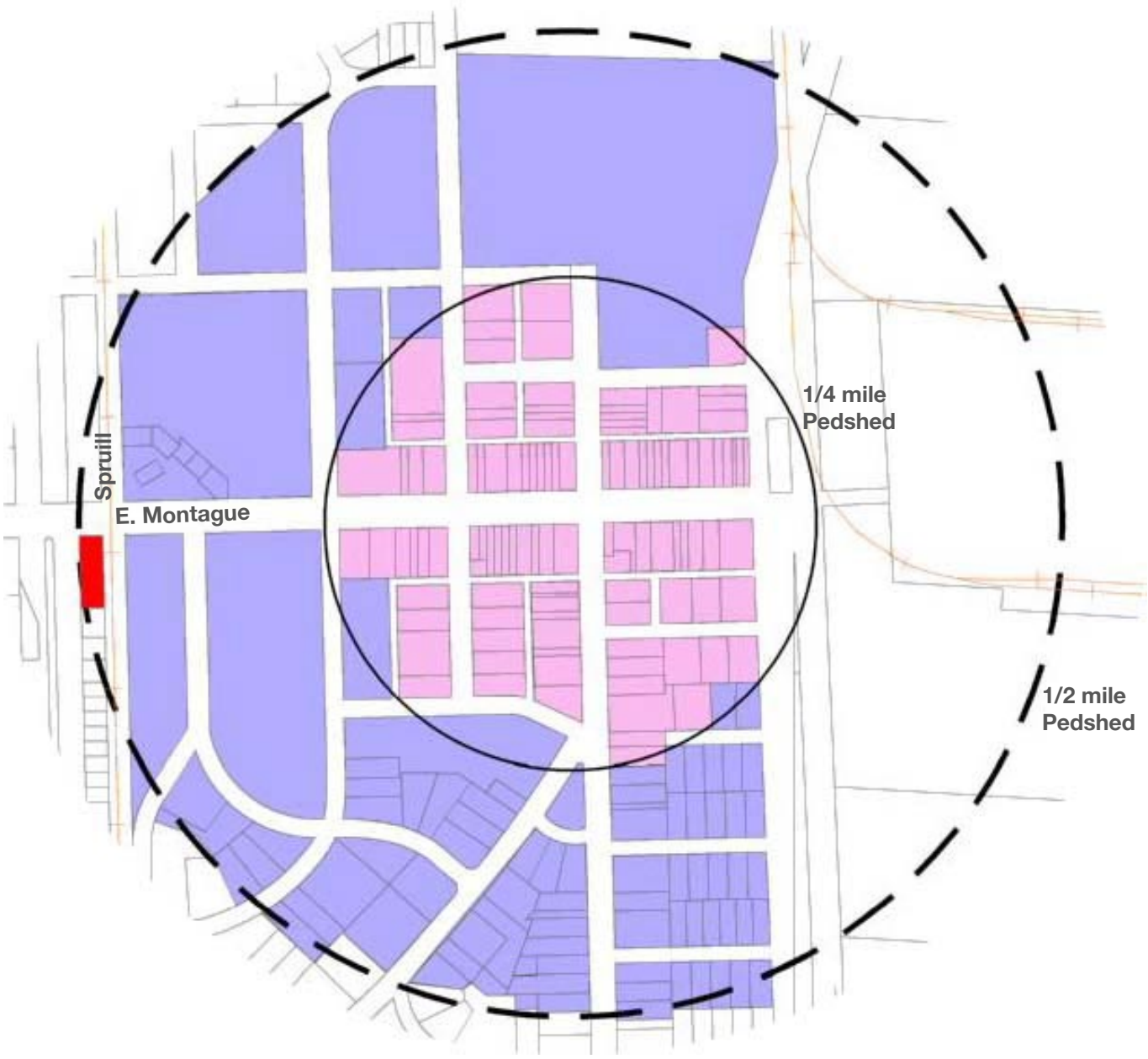
The goal of increasing pedestrian and bike use, which is supported by this plan, provides travelers safe and convenient alternatives to driving within the community, and access to neighborhood assets.

The bicycle paths and lanes (see related plan on 4.6) are planned to promote a more enjoyable experience. Bicycle lanes are typically provided along Neighborhood Connectors, promoting convenient and safe travel. Bicycle paths are also planned along the Noisette Creek at the Noisette Preserve and the Filbin Creek area, encouraging residents and visitors to experience the beauty of the natural environment that North Charleston has to offer.

Through adopting design standards that provide uniform signing and marking of all bicycle lanes, paths and walkways, the bicycling and walking system will become ingrained as a viable alternative for movement within the community.

Mass Transit

The struggle with addressing transit ridership in many urban areas points back to the negative impacts suburban sprawl has had on our cities over the last 30 years. Our culture developed an unhealthy bias that public transit is stigmatic of lower status.



Old North Charleston - showing walking distances from commercial districts to the proposed transit stop at Spruill and East Montague.

The goal is to develop a multi-purpose transit system that appeals to a larger passenger base, increasing ridership as a whole. This plan realizes, as did the 1996 North Charleston Comprehensive Plan and the Charleston Area Transportation Study's Long Range Public Transportation Plan, that broadening the passenger base to serve a larger segment of the urban area population and developing a multi-purpose transit system will not only help CARTA increase its role and economic vitality in the future, but will also avoid loss of economies in having multiple, yet redundant bus systems.

Pedsheds

A new metric used by advocates of walkable communities is the "pedshed." This unit of measure is defined by the distance considered to be embraced by a pedestrian, usually five minutes to services, and ten minutes to mass transit. Drawn as a radius, we begin to understand what falls in the pedshed catchment area. Additional attributes, know as Permeability and Connectivity, evaluate how easy it is to move through an urban area, access neighborhood centers or transit facilities etc. with diversity of choice and ease.

In general, most of the 3000 acres score high under these analyses, the obvious exceptions are the closed street systems of Century Oaks, edges of Liberty Hill and Calhoun Homes. As redevelopment or improvements to these areas are made, attention should be given to these factors.

Adaptability

Often people default to using their car for various needs due to lack of alternative and convenient means of transportation. Developing a transportation system that can adapt to various needs, transforms an aging system to a thriving system that contributes to the vitality of the community.

For example, peak ridership for mass transit and the school bus system occurs during early to mid-morning and afternoon-evening hours. Ridership drastically decreases during the evening and weekend hours. A Sunday bus route can be implemented to accommodate passengers with a convenient alternative to driving their vehicles. Routes can also be modified to provide transportation to recreational areas like regional parks, ball fields, and the Riverfront Park at the River Center. On Saturdays a similar bus route system can carry passengers to grocery stores, shopping malls, restaurants and recreational areas.

An adaptable system would customize the transportation vehicle to its ridership demand. Instead of reducing frequency of stops to various locations, smaller vehicles may continue to offer the convenience of frequent stops, reducing first costs and operating costs. Local churches and community organizations may even cost share their vehicles within the transit network route.

This type of adaptibility is possible through the re-evaluation of the role of public and private participation in transit solutions, working together for a more efficient, vibrant, and enjoyable future

Sustainable Planning Characteristics

•Based on walkable neighborhoods clustered to form intimate communities along transportation routes.

•Interconnected street pattern within site - responsive networks with high quality public spaces as focal points.

•Layout and performance objectives to provide a variety of housing stock, local retail, and employment opportunities within the site and regional context.

•Fine-grained planning framework to ensure that employment and service centers are compatibly integrated with residential areas neighborhoods.

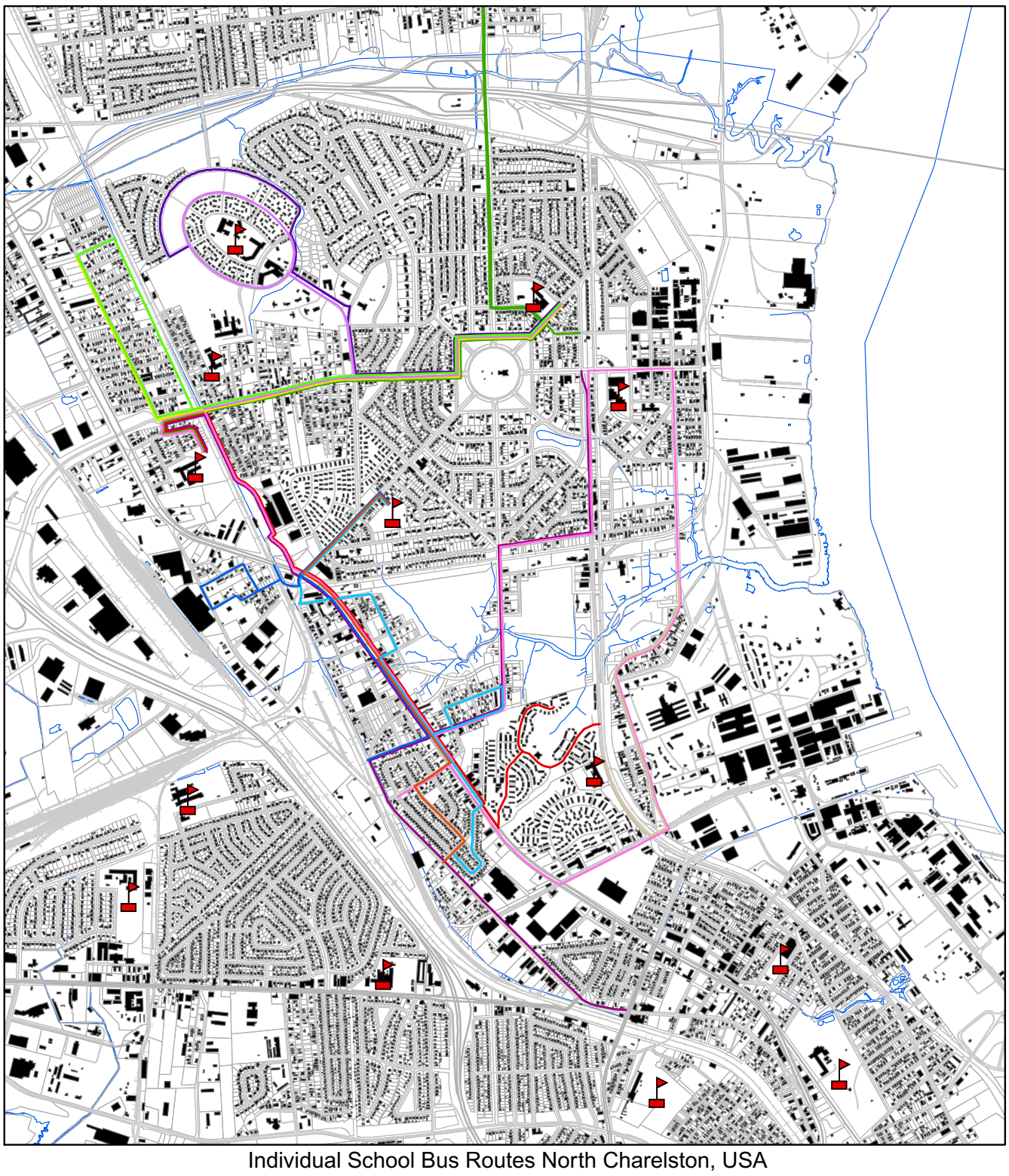
•Streets designed to comfortably accommodate multi-modal transit methods including cyclists and walkers.

Transportation

Sustainable Transportation Concepts

Twelve steps toward walkable communities:

1. Provide Continuously Linked Walkways
2. Pedestrian have a Priority at Intersections
3. Streets are Designed to Accomodate those with Disabilities
4. Signal Placement is Clearly Understood
5. Lighting Reinforces the Design
6. Simplify Median Crossings
7. Schools are Centers of the Community
8. Eliminate Vehicle Backing for Safety and Flow
9. Access Management Increases
10. Auto-Restricted Zones and Parking Restricted Zones Improves Streetscapes
11. Combine Walking with Transit: it is the First Move of Transit
12. Walkable Scale Land Use Planning: Scale up, not Down



Individual School Bus Routes North Charelston, USA

Existing Mass Transit

Challenges

The No. 14 North Charleston bus is by far the busiest in CARTA's system. Every year, passengers take nearly 500,000 trips on this route, putting about $260,000 into the bus fare boxes. That's about half of what it actually costs CARTA to run the No. 14 buses. The rest comes from state and federal subsidies. This bus route is subsidized the least of any in CARTA's system.

To minimize financial overhead, there are ways to implement a better system that adapts to ridership demand. The goal is to increase ridership by providing a more celebrated experience that gives using transit a positive connotation resulting in decreased need for the City of North Charleston and others to provide subsidies for CARTA.

Although CARTA has 36 Flyers busses with capacity of 60 passengers including standees and 18 Trolley busses with capacity for 45 passengers, the current approach, like most cities, supplies a "one size fits all" means of transit for the city. This plan proposes a unified transit system that can be adapted to better serve the community. Some complaints from riders have been the lack of stops. The average frequency is one hour or more.

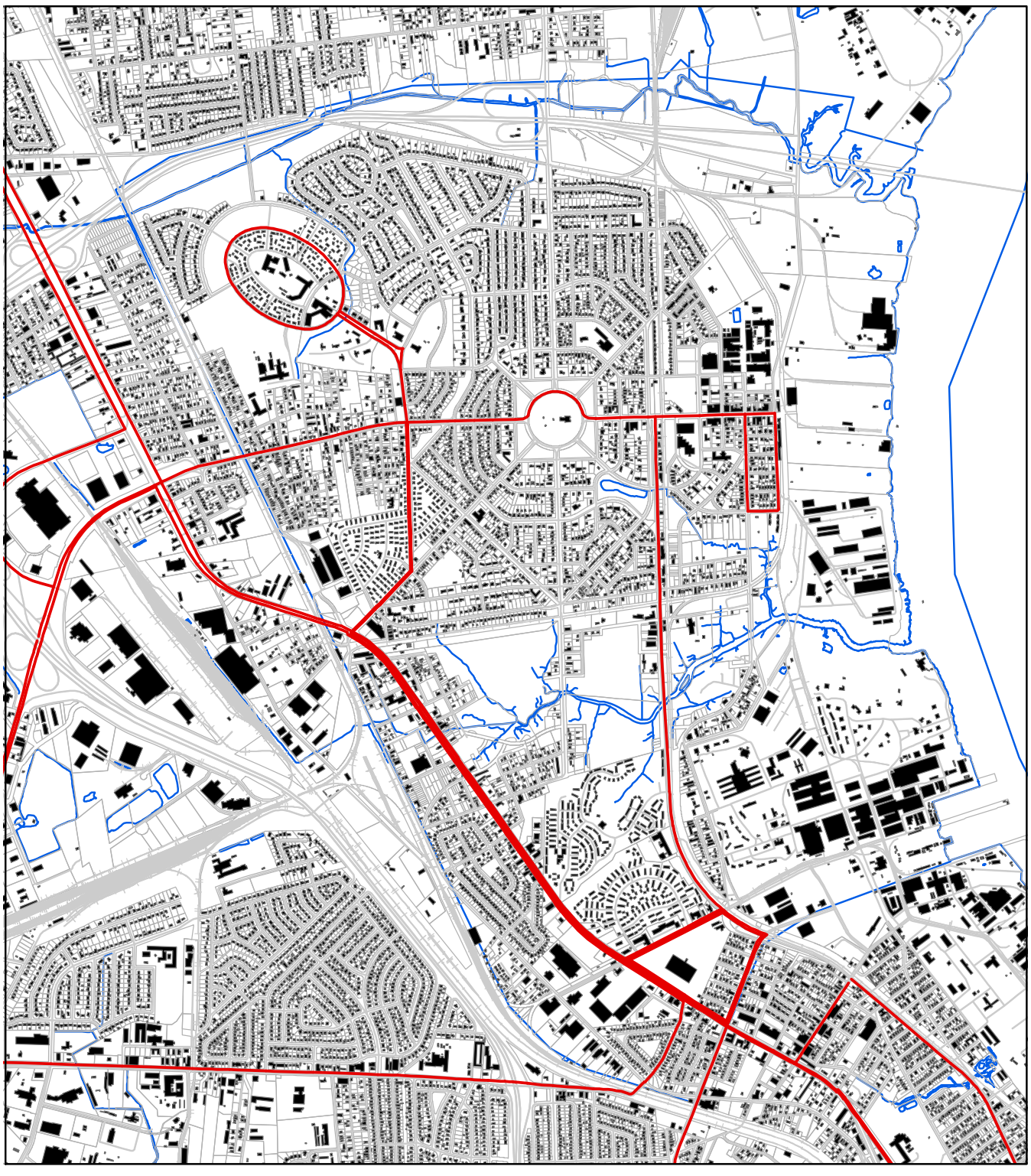
Many residents commuted to North Charleston when the Naval Base was in operation. However, since it's decommission in 1996, the number of commuters to North Charleston has drastically reduced, as evidenced by the 1990 and 2000 Census data.

New Approach to Transit

Currently for student ridership, the Charleston County School District contracts with an outside source to fulfill transportation needs. Although this arrangement alleviates the ownership responsibilities of a school bus fleet (e.g. maintenance expense, and overhead costs), consolidating the public transit and school bus transportation system offers drastic savings where duplication exists. Peak ridership for students occurs in the morning and early afternoon with little to no ridership demand during the "off hours." Many school buses sit idle during CARTA peak hours. Ultimately one transit system allows buses and shuttles to be in continuous circulation routes thus increasing frequency of stop/pick-up points.

Incorporating idle shuttles and vans owned by local churches and community organizations into a pool of transit vehicles to address requests for additional bus stop locations can assist CARTA to rebound from low ridership demand. Most of these

Key Plan



City Bus Routes North Charelston, USA

0 1 Miles

0 1,250 2,500 3,750 5,000 Feet

vehicles are used heavily on the weekends for their respective organizations when public and school transportation demands are low. This approach to transit may prove profitable if executed properly. The former Naval Base and surrounding industrial businesses supported a number of rail lines that have since been abandoned and/or vacated. Existing and proposed lines can be adapted to accommodate bicycle and pedestrian paths, which would create new opportunities for connecting commercial, industrial land uses and neighborhoods. Currently CARTA accommodates bicycle racks on some of their Metro busses, which is a good start to providing riders convenient access to larger transportation systems. This master plan suggests bikeways, rail-trails, and pedestrian trails that interconnect residential neighborhoods with business, retail and park areas.

Flexibility and ease of use for passengers is a determining factor in the success of transit systems.

"Most people believe the alternative to cars is better transit. In truth, it's better neighborhoods. The key is making the car an accessory of life rather than its central organization principle."

Alan Durning of Northwest Environment Watch

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Transportation

Barcelona Waterfront celebrates movement in it's varied forms.

Multiple use Information kiosk which sells tickets, provides information, and features a small gift shop.

Signage for transportation system should be beautiful and infomative.

Design For Celebration

Traveling in its richest form offers incredible opportunities for viewing natural scenery, architecture, and for interacting with other people. As a necessary part of living, it consumes between 5-10% of our lives, typically within the vicinity of our home. Yet the vast majority of our time is spent alone in a car, ignoring the views, and perhaps caught in slow traffic. Central to the vitality of the Noisette Community is the experience of the place as a beautiful district to travel to and through, in all modes, cars, buses, bicycles, walking, running, roller blading, skateboarding, and, as the population increases, perhaps a light rail system.

Creating vital nodes of activity where the various modes of travel intersect, that are clean, efficient, and comfortable to use is essential. As gathering places for residents, other types of services can be integrated or located conveniently to these hubs, such as coffee shops, post offices, libraries, sundry shops, laundries or city functions. Public transit stops can affect the nearby development positively. Furthermore, the convenience and opportunity to meet neighbors in an inviting location can help build community.

Art, music and other cultural or civic displays can add a new dimension to the transportation system. As people gather, the chance to see creative work being done in the district can spark curiosity, and build knowledge about the people. Outreach from the schools through displays or artwork can also give the greater community insights into the activities of the students.

Celebration of the Noisette Preserve and the natural beauty of the Cooper River will be available through the paths and streets that hug the edges and move through the Preserve. The natural beauty of these wetlands will be enjoyed in daily walks, transit rides or in routine drives. The thriving neighborhoods, the historic town center and the new River Center will also offer incredible imagery for people to enjoy.

Integrated transit feeds all the senses, and acts as a total system within the community. As the Noisette area becomes more neighborhood-oriented, more sustainable, and connected to its history and ecology, and builds a network of varied methods of travel; and as repopulation and density occur, more people will be found at all points around the 3,000 acres. Design for celebration means making a fabric of interconnected places and paths, that create a sense of a unique district for the people who live, work or visit the Noisette Community.

Integrated Transit Route

Conclusion

The end result of the Integrated Transit Plan will be a diverse and resilient system which evolves as the Noisette community grows. This system will not only be functional, but beautiful, engaging, and easy to understand.

The framework of the plan is based upon the premise by which we started: “Don’t design the transportation system and expect the community to adapt, instead envision the community you want to have, and design the transportation plan to support this idea.”

The final version of the plan shown above, shows how the diverse (intermodal) systems work together. The central idea of the plan, which works from the orientation of the pedestrian up, rather than from the highway down, is based upon the sustainable urban design principles of the master plan. This was achieved by following these steps:

Integrated Transportation Plan Design Principles

- Draw the boundaries of neighborhoods
- Locate the existing or new neighborhood centers: *draw the pedshed*
- Identifiy the Neighborhood Connectors: *the common ground between neighborhoods*
- Re-evaluate road capacities and design. Are they over or under designed? How can they be improved to promote pedestrian and bike activity?
- Look for Activity Generators: *shops, services, schools, churches, parks, and institutions*
- Analyze opportunities for connections between neighborhood centers and activity generators.
- Keep mindful of future opportunities such as light rail and water taxi: *design for the future*
- Draw the final plan: *re-assess it periodically*

This integrated transit approach produces a plan which is the result of the rich and varied aspects of sustainable community design. It is informed by the users of today, and the users of tomorrow. It seeks to produce a healthier society, enriching our capabilities by providing choice in the allocation of personal resources, in addition to promoting more active and healthy lives. It is an integral part of the Noisette Community plan, which is inspired by natural systems, and *what we can learn from them* to build a stronger future.

Utility Systems

Overview

One of the three cornerstones of sustainable design is stewardship of the planet's resources. Along with conservation efforts, the identification and use of renewable resources is an important strategy in shaping this cornerstone. By acknowledging the value and the limited quantity of our natural resources, it becomes of paramount importance to avoid unnecessary consumption. When resources must be used, we should do so sparingly and wisely.

With respect to utilities, stewardship objectives can be served by shifting towards well-integrated, distributed systems that are based on the concept of sustainably partnered resources. Sustainable partnering incorporates principles of leveraging and combining the resources of public, private, and NGO (non-governmental organization) entities in the management of utility systems. A well-integrated system will make use of closed system loops to the greatest extent possible, finding ways to conserve and recycle resources as well as re-use byproducts. These systems will provide yet another layer of connectivity to the residents of Noisette.

Finally, conserving resources is no good if it comes with undesirable side effects like pollution, so all of the above strategies should be implemented with an eye towards minimizing their environmental impacts.

Photo credit: Warren Gretz, DOE/NREL

Power Systems

Power systems should be thought of as a holistic utility with components based on conventional and, increasingly, sustainable energy sources. The idea of a single utilitity entity, or omnitility, is a concept that was originally developed by Dan Slone and published in *The Energy of Eco-Industrial Development*. An omnitility is a utility that is responsible for managing all aspects of supply and consumption of a given resource. Instead of having separate utilities for electricity, natural gas, and other power sources, there should be a single source for all types of power, a provider who will manage the power supply and fulfill the needs of its users with whichever source is most efficient. The omnitility will develop strategies to manage growth in its distribution region in ways that encourage the development of decentralized power sources. By introducing more efficient or more sustainable energy sources, the omnitility can offset the costs it would otherwise have to absorb for distribution infrastructure needed to expand services. In managing the demand for power, the omnitility will benefit from power generated by a wide range of sources, and it will be able to provide incentives for users to minimize environmental impacts of power generation.

As the Noisette area's electricity and natural gas services are currently provided by a single corporation, there is an opportunity to develop a power omnitility that would be able to act with enlightened self-interest to promote appropriate sources of supplemental power to accommodate the needs of a dynamic and sustainable New American City.

Hydro and Coal-Fired Electric Power

Power to the Noisette area is currently provided by South Carolina Electric and Gas Company (SCE&G), which is a subsidiary of the SCANA Corporation. SCE&G operates both the Saluda Hydro-Electric Plant, with a capacity of 206 megawatts, and McMeekin Station, with a capacity of 252 megawatts, to generate electricity for North Charleston.

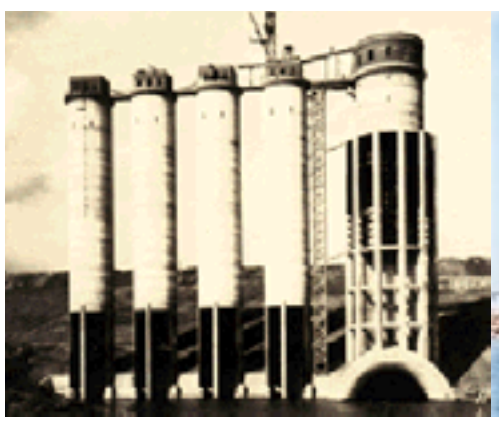
The Saluda Hydro Plant was constructed in 1930 just below the Saluda Dam on its downstream side. Originally a four-turbine facility, a fifth turbine was added to the plant in 1971 to expand its capacity. Today, the Saluda plant is used as a peaking facility, which means that it is called into service when demands for electricity are high. During non-peak periods, the plant is operated on a seasonal basis as the reservoir is filled or emptied, and it is very occasionally called into service when the spillway gates are opened to control flooding.

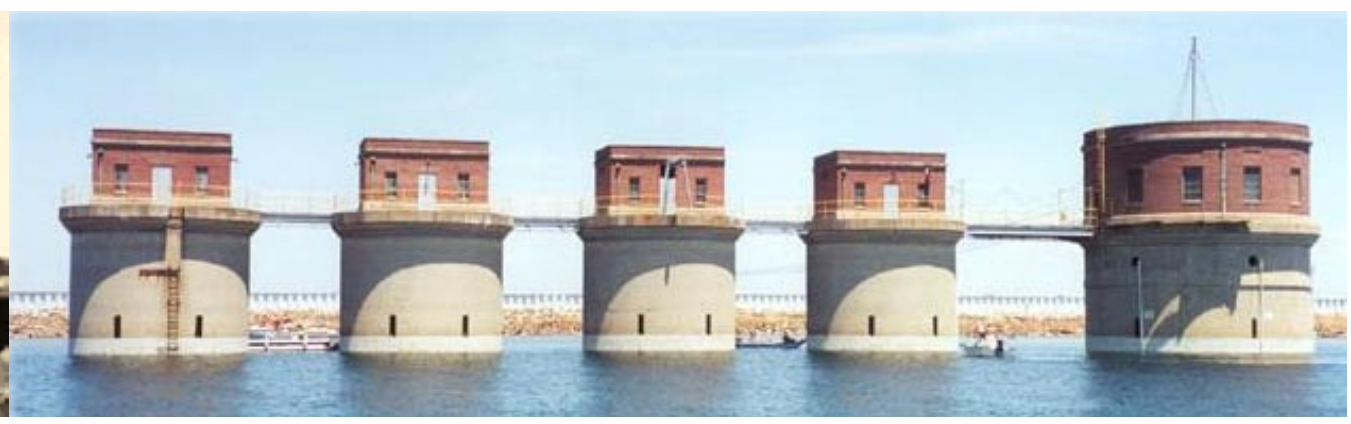
McMeekin Station was opened in 1958, and it is a pulverized coal-fired plant. The plant incorporates many emissions control measures to mitigate the pollution caused by coal combustion, and McMeekin Station is the most efficient of all of SCE&G's fossil fuel plants. Further, McMeekin Station is able to burn natural gas as an alternate fuel source.

There are environmental costs associated with the operation of both the Saluda plant and McMeekin Station. For the former, the artificial damming and the manipulations of the water level in the resulting reservoir are disruptive to the region's natural waterways and ecosystems. Damming can affect river flow and sedimentation as well as cause stratification in the water downstream of the dam. Some of these negatives are offset by the fact that hydro power is a renewable resource.

McMeekin Station poses more significant problems. Like any coal plant that burns through 96 tons of coal per hour at peak capacity, McMeekin generates pollutants. Along with the

The distinctive, 223' tall towers of the Saluda Hydro-Electric Plant under construction in 1930 (below left) and today





emissions produced by coal firing, there are solid waste byproducts that occur in the harvesting and consumption of coal, many of which have not received the same attention or mitigation efforts as the air pollutants. Airborne particulates captured by filters and water used to clean steam boilers are other, less obvious sources of liquid and solid pollutants that enter the waste stream. These wastes contain contaminants like arsenic, mercury, chromium, and cadmium, which tend to accumulate in the food chain and persist in the environment. The solid wastes from coal-fired electricity are generally diverted to landfills while the liquid wastes are kept in surface impoundments. According to a March, 2000 report by the Citizens Coal Council, none of the surface impoundments used to collect coal combustion wastes in South Carolina at that time were lined, thus making contaminated groundwater a very real threat.

In addition, both the mining and transportation of coal have a significant negative environmental impact. As no coal is mined in South Carolina, all of the coal for the plant must be transported from outside the state.

Natural Gas

The SCANA Corporation's subsidiaries also supply natural gas to the Noisette area. Of all the fossil fuels, natural gas has the best reputation with regards to its environmental impact, partly due to its chemical composition. Unlike the complex compounds that make up oil and coal, natural gas consists mainly of a simple molecule. When burned completely, this molecule produces only two byproducts: carbon dioxide and water vapor. Natural gas is also a very efficient fossil fuel that provides high energy values to go along with its low emissions, and it produces virtually no solid waste.

Unfortunately, there are no sources of natural gas within the boundaries of South Carolina. SCANA has a number of subsidiaries that transport and distribute natural gas to customers throughout most of the state, including the Noisette region. In response to regional growth within the state, some of these subsidiaries have recently initiated pipeline extension projects to increase the capacity for natural gas distribution.

For all of its comparative benefits, natural gas still has some drawbacks. Natural gas is supplied with a pipeline, and while the lines can be buried underground and placed to minimize erosion and other environmental impacts, there is still disturbance when the line is installed. While much "cleaner" than other fossil fuels, the combustion of natural gas does produce pollutants that contribute to greenhouse gases. Like the other fossil fuels, it is a limited resource, and conservation should be a priority.

In light of the emissions controls for power plants that are scheduled to come into effect over the next two decades, it is anticipated that natural gas will be an increasing contributor to the electricity market. This increased demand is likely to result in higher natural gas prices.

The Omnitility

While current power capacity for the Noisette area is adequate, the population is expected to increase. As power needs change and new emissions standards are implemented, there will be strong incentives to reduce power consumption and find cleaner alternatives to fossil fuels.

The region's anticipated growth will bring with it an increased demand for power, regardless of its source. Faced with the costs of extending distribution systems and retrofitting power plants to comply with increasingly stringent environmental standards, an omnitility is poised to make choices about how to supply power to its service region. Instead of devoting capital to incremental improvements to existing sources, the omnitility may choose to take advantage of opportunities to invest in newer, more efficient and more sustainable technologies that will better serve its users and increase the company's profits.

This turning point is demonstrated quite well by the recent extensions to the natural gas pipelines serving the southeastern portion of the state. On two separate projects, SCANA is constructing a total of 56.2 miles of new pipeline. The 38-mile portion is expected to cost $25 million; the 18.2-mile extension spurred the formation of a new subsidiary to help address the present and future needs in this portion of the state. A considerable amount of money and effort were committed by SCANA to these pipeline expansion projects — resources that a power omnitility might have chosen to invest differently.

Breakdown of Natural Gas Usage in South Carolina, 2001

Delivered to Consumers	138,864 mcf
Dry Production	0 mcf
Residential Use	19.8%
Commercial Use	14.9%
Industrial Use	57.4%
Vehicle Fuel	0%
Electric Power	7.9

Source: The 2002 S.C. Solid Waste Management Annual Report

Comparison of Air Pollution from Natural Gas and Coal

in pounds of emission per billion BTU of energy consumed

Pollutant	Natural Gas	Coal
Carbon dioxide	115,000	210,000
Nitrous oxides	100	834
Sulfur dioxide	0.6	1,700
Particulates	.5	3,100

Source: US EPA, American Gas Association

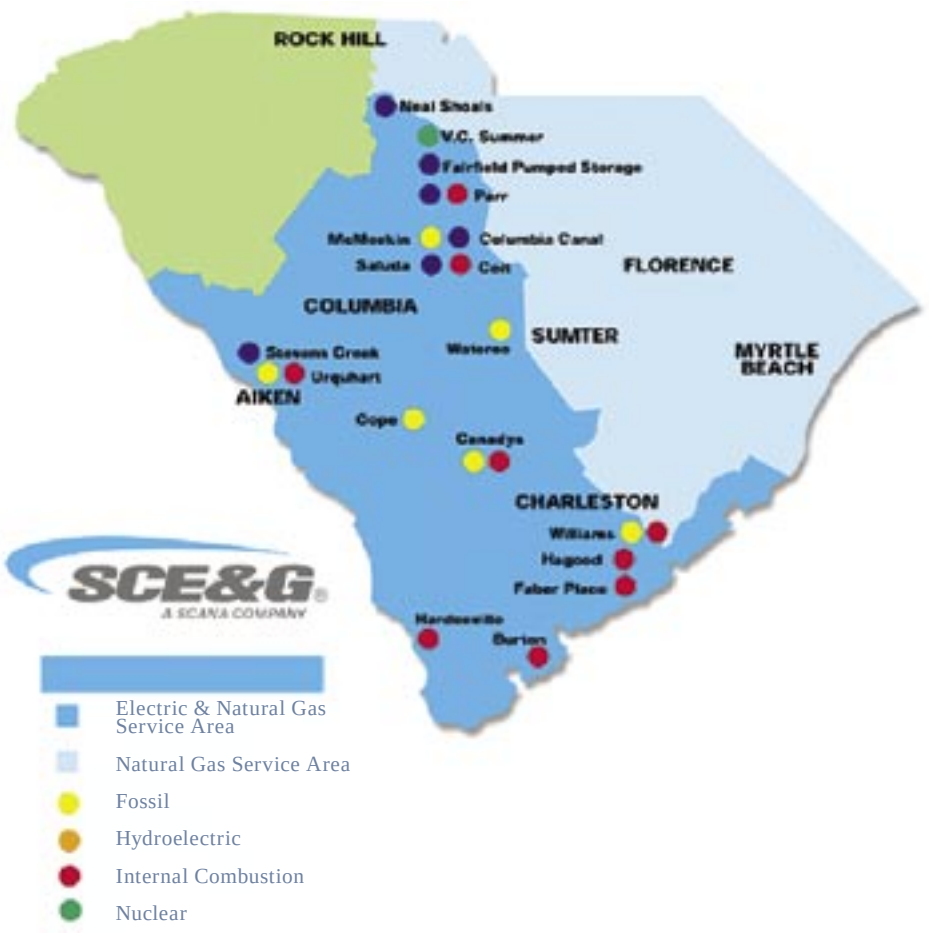
Greenhouse Gases

Pollutant	GWP*
Carbon dioxide	1
Nitrous oxides	21
Sulfur dioxide	310

* GWP = Global Warming Potential

Source: US EPA

SCE&G's generation system and service area map for South Carolina



Greenhouse Gases and Global Warming

Greenhouse Gas	Natural Source	Anthropogenic Source
Carbon dioxide	yes	Combustion of fossil fuels, wood
Methane	yes	Production/transport of fossil fuels; live stock; decomposition in landfills
Nitrous oxides	biological sources in soil and water	Combustion of fossil fuels, solid wastes; agricultural and industrial activities
HFCs, PFCs, SF_6	none	Semiconductor manufacture; refrigeration; fire protection; electric power industry

What Global Warming Could Mean to South Carolina

Climate Changes	Slight increase in temperature, ±15% increase in precipitation (see sidebar in Water section for more information)
Human Health	Increase in heat-related deaths, especially among the elderly; increase in disease-carrying mosquitos and rodents
Coastal Areas	Rise in sea level in the Charleston area likely to increase from a rate of 9 inches/century to 19 inches/century
Water Resources	Higher precipitation levels will contribute to erosion and may exacerbate pollution caused by runoff; low-lying ecosystems will be threatened
Forested Areas	Shortleaf and loblolly pines will give way to longleaf and slash pine forests; oak and hickory, as well as gum and cypress, forests will expand along the southeasterm seaboard

Source: US EPA

Utility Systems

Glazing and skylights are two types of BIPVs that are currently available

BIPVs are available in units that can be installed using conventional construction techniques

Advantages of Cool Thermal and Geothermal Systems over Conventional Systems

Cool Thermal Storage

30 - 40% Reduction in Energy Use

20 - 40% Reduction in Duct Sizes

30 - 50% Reduction in Air Handler Size

Off-Peak Energy Rates

Geothermal System

25 - 50% Reduction in Energy Costs

No Boilers/Boiler Room

No Chillers/Chiller Room

No Chiller Tower or Tower Water Treatment

No Condenser Water Pipes

Source: Cogeneration/Trigeneration Technologies web site: http://www.cogeneration.net/

Alternatives

Given that electricity produced by the combustion of fossil fuels is not the ideal power source for a sustainably-oriented community, what are the alternatives? The first strategy, and easiest to implement, is to minimize energy use. A second strategy supports the use of smaller-scale energy sources to supplement or supplant a large, centralized power utility. Because there are significant losses of power in all phases from generation to delivery, the use of decentralized energy sources that are closer to their service areas can be more efficient and less expensive to operate.

A final strategy, and perhaps the one with the greatest long-term benefits, deals with the power sources themselves and calls for a shift away from fossil-fueled energy to cleaner, more efficient sources, with renewable systems being utilized to the greatest extent possible. It is likely that renewable energy sources will supplement rather than supplant traditional power sources for the Noisette area. The alternatives to conventional fossil-fuel based electricity include

- Geothermal energy
- Fuel cells
- Renewables: biomass, hydro, solar

A good example of the first strategy, reducing energy use, is **cool thermal energy storage** (TES). This system uses off-peak power to provide cooling to buildings by extracting heat from a storage medium such as ice, chilled water or phase change materials. This technology does not affect how electricity is generated but rather how, and when, it is used. TES systems save money by shifting the power loads associated with cooling the building to an off-peak time, which allows the system to take advantage of both the cooler nighttime ambient air to run more efficiently as well as cheaper power rates. During the day, the storage medium is tapped to provide cooling for the building in an efficient manner that allows fans, ducts and air handlers to be smaller, and thus, cheaper to purchase and operate. TES systems can also be used to consolidate the cooling plants for several buildings into one efficient, central mechanical plant with a smaller capacity. TES systems have been widely adopted during the last ten years, and many electric utilities add to the savings by offering incentives and rebates to TES users. It is important to note that TES systems are primarily a cost savings strategy, with some energy efficiency achieved by the ability to down-size and/or consolidate mechanical equipment.

Geothermal, or heat, energy systems are another example of reducing overall energy use. Geothermal systems take advantage of the nearly constant temperature of the Earth's upper surface, tapping into this 50° - 60°F zone to heat and cool buildings without the need for a boiler, cooling tower or condenser water pumps. In the winter, the heat pump removes heat from the heat exchanger and pumps it into the indoor air delivery system. In the summer, the process is reversed, and the heat pump moves heat from the indoor air into the heat exchanger. The heat removed from the indoor air during the summer can also be used to provide a free source of hot water.

Cogeneration, also known as a combined heat and power (CHP) system, is a process which generates both heat and energy, and it is an example of a system that provides localized energy. CHP is an integrated system that uses 10 to 30% less fuel than a conventional energy source, performs more efficiently than a conventional system, and typically uses 80% of the energy that is produced onsite. The heat energy of the system can be used for building heating and cooling or steam generation, among other things. Other benefits of cogeneration include lower air pollution compared to conventional generation systems; improved reliability of the electric grid; reduced losses of electricity in the grid through transmission; and reduced operating costs.

Cogeneration could be utilized on a variety of scales within the Noisette project boundary as it is available in capacities ranging from 300 MW for utility systems down to modular systems that produce 20 - 650 kW. Candidates for cogeneration can be grouped into three categories: medium to large industrial companies such as refineries and pulp and paper plants; light manufacturing industry; and commercial or institutional buildings. Many of these candidates would benefit from the formation of partnerships with various utility companies. Partnering with SCE&G could lead to the construction of a new cogeneration plant; teaming up with the County's Solid Waste Department could yield a new facility for methane conversion to power and/or heat. At the other end of the spectrum, small-scale cogeneration facilities could work well in single-building applications for municipal, institutional/hospital, or even restaurant uses.

Trigeneration, or district energy, is a combined heating, cooling and power generation (CHCP) system that is even more efficient and environmentally friendly than cogeneration. Because it adds absorption chillers to the features of cogeneration, it is a particularly applicable system in warmer climates. A trigeneration plant can save about 24% of primary energy compared to a cogeneration plant with a compression chiller. Applications for trigeneration are mainly industrial and commercial uses.

Microturbines are another distributed power generation technology that has been developed for smaller scale applications. A typical unit is the size of a refrigerator and can produce 28 - 75kW of power, though some microturbines have a capacity of 500kW. While a 28kW unit could pro-

Mepkin Abbey
Geothermal heat pump system designed by Burt Hill

Case Study: Geothermal Heat Pump System

Mepkin Abbey is a tranquil community of Trappist Monks situated less than 20 miles upstream of North Charleston on a high bluff overlooking the Cooper River. The Abbey recently built a new senior housing facility and a new library on its 3,000 acre campus, and they chose to install a geothermal heat pump system to provide mechanical heating and cooling for these projects for the following reasons:

- Quiet equipment operation is not disruptive to the contemplative quiet that is fundamental to the monks' way of life — the need for noisy, exterior condenser units has been eliminated
- This environmentally friendly system is consistent with the monastery's role as a steward of natural resources: it makes use of a closed loop of the nearly-constant 70°F groundwater as a natural energy source to accommodate both heating and cooling needs.
- The system is relatively simple, which in combination with the region's mild climate, reduces the need for, and operation of, other unique components.
- Reasonable operating costs: a 19% reduction of energy costs from reduced peak electrical demand as well as an estimated 47% less in maintenance costs.
- Longevity: The equipment has expected lifespans ranging from 19-50 years, as compared to 15 years or less for conventional system components.

vide enough power for three to four houses or one commercial business, most of the current applications are in the industrial, commercial and institutional sectors. Microturbines are quiet, they have few moving parts and are thus easy to maintain, and they can be started, operated and monitored remotely. They are a highly efficient, clean system for either power production or for direct application in compression or air conditioning uses. Microturbines are compatible with a broad range of fuels, such as natural gas, ethanol, landfill gas or bio-fuel. When used with a cogeneration system, a microturbine can achieve an energy efficiency level above 80%.

While the strategies above improve energy efficiency and reduce energy costs, they do not necessarily provide viable alternatives to fossil fuel-based electricity. Perhaps the simplest alternative is a system which merely changes the fuel source, such as a biomass facilty. Along with the existing municipal Montenay Incinerator, the MeadWestvaco company is a good example of a biomass facility which gets its fuel from milling and logging waste. Their facility has the capacity to generate 48,300 kW, which is about four times the capacity of Charleston's municipal facility. Because the biomass fuel for both of these facilities is waste material that would otherwise be subject to disposal costs, it is a cost-effective process. If the municipal facility was able to make use of landfill gas as a fuel source, its operation would be even more sustainable.

However, biomass facilities rely on a combusition process to produce energy, so there are still air pollution concerns. A new process called gasification is currently being used in trial applications. Gasification works by heating the biomass fuel under pressure until it gives off volatile gases, which are then burned by a high efficiency gas turbine. If viable, this process would provide higher efficiency and cleaner power production than simple combustion.

Modular hydrogen **fuel cells** were originally developed for NASA, but most of their recent developments have been in terrestrial applications. In principle, a fuel cell operates like a battery. Unlike a battery, a fuel cell does not run down or require recharging. It will produce energy in the form of electricity and heat as long as fuel (typically natural gas, propane or even landfill gas) is supplied. A fuel cell consists of two electrodes sandwiched around an electrolyte. Oxygen passes over one electrode and hydrogen over the other, and the resulting products are electricity, water and heat.

Part of today's interest in fuel cells is due to their potential to provide point-of-use power that is not subject to transmission losses and is independent of the increasingly troubled utility grid. With "waste" products of water and heat that are easy to reuse, fuel cells are an environmentally friendly alternative to fossil fuels. Models are currently being developed for transportation, residential and small business uses.

Small-scale **hydro electric**, also known as run-of-the-river, power, is another viable source of electricity. A far cry from the megastructures utilized at the Saluda Hydro facility, high-efficiency turbines can produce power from a water source as small as a stream. If the combined head and flow conditions are suitable, any fresh water or tidal water flows could be used. The small size of these systems enables them to function without blocking their water source, so there is less disruption to aquatic ecosystems.

Among the more promising of the emerging technologies are building-integrated photovoltaics, or **BIPV**s. Instead of the traditional arrangement of solar cells that rest on top of building elements like roofs or poles, BIPVs incorporate solar cells directly into a building material. Skylights, roofing, wall panels and windows are among the options for BIPVs currently on the market. By integrating a power source directly into a component of the building envelope, redundancy is eliminated (there is no separate structure or frame for the PVs) and installation can often be done with traditional construction methods. While PV technology makes use of toxic and scarce materials and their production is energy-intensive, they are produced in a controlled factory environment, and they do not create any air or water pollution in the generation of electricity.

With several of these strategies, there is the potential for a given site to generate energy in excess of its power needs. Many utility companies offer a net metering arrangement to their clients – if the client is able to generate excess electricity, that power is fed back into the power grid, thus running their electric meter backwards. The monthly bill will be the net amount of electricity used at the site, so in some cases the utility company may have to pay its clients. An omnitility could profit from offering net metering to users with cogeneration plants or alternate power sources, purchasing their excess power at wholesale rates for resale to other users at retail prices.

Implementing the omnitility concept might seem daunting, but many of the steps have already been taken. The SCANA Corporation already acts as a single-source provider of electricity and natural gas to the Noisette region. As neither coal nor natural gas is native to South Carolina, the company could achieve significant savings in transportation costs by shifting towards decentralized, non-fossil fuel power sources. One of SCANA's environmental policy statements goals is, "To provide our customers environmentally compatible sources of energy and to promote the use of efficient, state-of-the-art electric and gas technologies." By making use of the conservation strategies and sustainable technologies mentioned above, the company will achieve this goal.

US Electricity Net Generation Using Renewable Resources, 1990-2010
(in billion kilowatt-hours)

		Reference Case	Annual Percentage Rate of Growth
	1990	2010	1990-2010[a]
Conventional Hydroelectric	288	306	0.3
Geothermal	15	62	7.2
Municipal Solid Waste	10	54	8.5
Biomass	31	59	3.2
Solar[b]	1	4	9.2
Wind	2	16	10.4
Total, Renewable Resources	348	501	1.8
Fossil/Storage/Other	2,098	2,975	1.8
Nuclear	577	636	0.5
Total Generation	**3,023**	**4,112**	**1.5**

[a]Annual percentage rates of growth are calculated using unrounded values.
[b]Includes solar thermal and less than 0.02 billion kilowatthours grid-connected photovoltaic generation.
Notes: Totals may not equal sum of components due to independent rounding. Electric utility generation data exclude internal generating station use (net); nonutility data include internal use (gross).

Sources: Energy Information Administration. 1990 data: For utilities, EIA-861, "Annual Electric Utility Report" for nonutilities, EIA-867, "Annual Nonutility Power Producer Report." 2010 projections: Annual Energy Outlook 1993, DOE/EIA-0383(93), AEO 1993 Forecasting System run AEO93B.D0918921 (Washington, DC, January 1993).

Two 28kW microturbines provide power for a fire station in Charlotte, NC

This 3kW fuel cell has been tested in a pilot application for the military since 2002

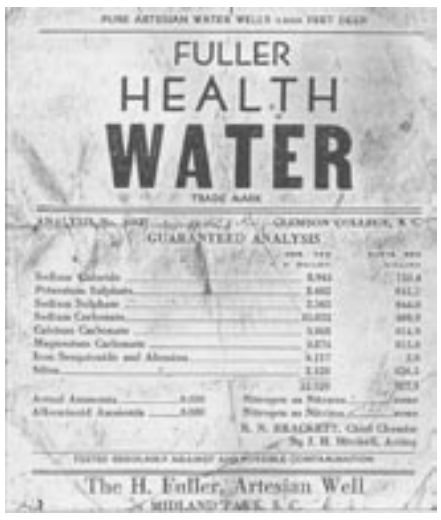
Efficiency of Power Generation

Conventional Power Plant	30 - 50%
Cogeneration	70 - 80%
Microturbine (w/ CHP system)	>80%
Trigeneration	up to 90%

Sources: US EPA

Innovations in hydro electric power include fish-friendly turbines developed for coastal and inland waterways

Utility Systems



Water Systems

The omnitility concept is also applicable to the water systems of Noisette. The water supply, whether it be from rainfall, a local waterway, potable city water or other sources, will benefit from having a consolidated conservation, distribution and management system. As with the power systems, a water omnitility will have opportunities for profit in the implementation of conservation and reuse strategies.

Potable Water

While wells may have once been important sources of water in North Charleston (see flier to the right), their role today is limited to rural zones. The Charleston Commission of Public Works (CPW) is one of nine regional suppliers of potable water, but it is the County's primary source as seven of the other eight suppliers purchase their water from CPW.

Like area industries, CPW draws most of the public water supply from the Back River and its tributaries. The Back River is fed by swamp drainage, and it is dammed to create the 850-acre Back River Reservoir on its path to the Cooper River. Currently, CPW's raw water supply has a capacity of 120 million gallons per day (mgd), all of which travels from the Back River Reservoir via the 26-mile McDowell Tunnel to the Hanahan Treatment Plant for processing and distribution. CPW is currently exploring options for an aquifer storage and recovery system to supplement the supply of water for fire fighting.

The Hanahan Water Treatment Plant (HWTP) is the CPW's only treatment facility. HWTP makes use of a dual media filtration system to supplement its sedimentation process. The plant's two holding basins were constructed around 1904, and each has a capacity of approximately six million gallons. The plant has recently purchased a FLUMP (floating lagoon pumper) for each basin for more efficient removal of solids on a continuous basis. There are plans to construct a new Dewatering Building to better handle present and future needs. Both the FLUMPs and the new dewatering facility represent significant capital outlay to upgrade existing systems.

HWTP currently has the capacity to treat 118 mgd. According to the 1999 Charleston County Comprehensive Plan, the peak demand was 70 mgd with an average demand of 46 mgd. Most of the distribution system is interconnected by lines with excess capacity, making the water system very flexible.

The Hanahan Water Treatment Plant's FLUMPs remove solids from the water supply

Wastewater

Wastewater from the Noisette area is treated by the North Charleston Sewer District (NCSD), which was established in 1972 by an act of the State Legislature. Prior to that time, wastewater collection and treatment for the area were handled by a consolidated public service district. Today, the District owns and operates 500 miles of sewer lines, 47 pump stations and the Felix C. Davis Wastewater Treatment Plant. Wastewater collection and treatment services are provided to the City of North Charleston (exclusive of Dorchester County) as well as unincorporated portions of Charleston County. The area of North Charleston that is located in Dorchester County is served by that County's Water and Sewer Department.

The Davis Treatment facility in Charleston treats effluent before discharging it into the Cooper River. The system currently has the capacity to handle 27 mgd, with slightly less than 4.5 mgd available based on a 2001 capacity report by the South Carolina Department of Health and Environmental Control (SCDHEC). In 1996, NCSD had planned to commit all excess capacity to development in North Charleston within the boundaries of Charleston County. The sewage treatment facility has an average daily flow of 17 million gallons of wastewater, which produces 18 tons of dewatered biosolids, or sludge. The sludge is then burned in the municipal incinerator, resulting in slightly less than one ton of ash per day. This ash is currently transported to and disposed of in a Dorchester County landfill because the Bees Ferry Landfill does not accept biosolids. There are considerable costs associated with the transport of these wastes as well as a tipping fee for using the landfill.

Storm Drainage

North Charleston's Public Works Department (NCPW) is responsible for the upkeep of all City streets and storm drainage. Drainage crews currently maintain about 120 miles of open drainage ditches, cutting and clearing over 35 miles of artery ditches on a regular basis. North Charleston's sewer system and the stormwater management system are completely separate entities, and until recently, there was no charge at all for stormwater management services.

At the end of 2002, NCPW established a stormwater "utility" which established a user fee for runoff generated from a parcel of land. This annual fee will help fund the upkeep of the stormwater management system, and it raises awareness of how much runoff is being produced. If property owners can demonstrate that they generate significantly less runoff than the standard for the use and size of their parcel, they can reduce their annual fee. This utility is a good example of a policy that raises awareness of an environmental concern, in this case runoff, and pro-

Water Use Statistics

Toilet, new	1.6 gal/flush
Toilet, old	3.5 to 7 gal/flush
Shower, restricted flow	2.75 gal/min
Shower, unrestricted flow	10 gal/min
Bath	50 gal/bath
Faucets	10 gal/day
Washing machine	50 gal/load
Dishwasher	9.5 gal/load
Homes: older fixtures	75 gal/person/day
Homes: older fixtures	55 gal/person/day

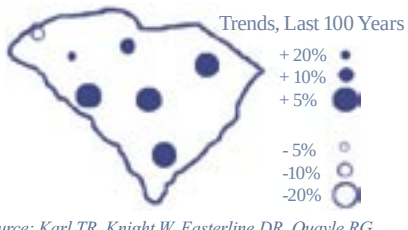
Source: Texas Guide to Rainwater Harvesting, 2nd edition, 1997

Local Climate & Precipitation Trends

Over the last century, the average temperature in Columbia, SC, has increased 1.3°F, and precipitation has increased by up to 20% in many parts of the state. The next century could bring even more change: projections made by the Intergovernmental Panel on Climate Change and results from the United Kingdom Hadley Centre's climate model suggest that by the year 2100, temperatures in South Carolina could increase by 3°F in all seasons (slightly less in winter and summer, slightly more in spring and fall). Precipitation is estimated to increase by 15% in spring, slightly more in summer and fall, and slightly less in winter. The general warming trend would lead to an increase in the number of extreme hot days in summer. It is not clear how the severity of storms such as hurricanes might be affected, although an increase in the frequency and intensity of summer thunderstorms is possible.

Source: US EPA

Precipitation Trends from 1900 to Present



Source: Karl TR, Knight W, Easterline DR, Quayle RG. 1996. Indices of climate change for the United States. Bulleting of the American Meteorological Society, 77: 279-292.

vides an opportunity and an incentive for property owners to reduce their reliance on city-supplied stormwater management.

Alternatives

The first strategy in managing the water systems of the Noisette area is to find ways to reduce use, regardless of the source or purpose. Reduction of use will help manage costs of providing water services while helping to ensure that adequate potable water supplies are available for future needs. There may be instances in which potable water is utilized unnecessarily to fulfill needs that do not require drinking-quality water. These uses should be identified so that other water sources, such as gray water, can be supplied in the future.

MeadWestvaco is a good example of how a significant amount of water could be re-sourced. The company currently utilizes 35 mgd of water, drawn by CPW from the Edisto River, to serve its cooling and processing needs. Recycled water, treated to the appropriate level, could eliminate the need to draw, treat and distribute this quantity of water. Makeup water for cooling towers, sewage transport and irrigation are other applications that may not require potable-quality water. On a smaller scale, incorporating water efficient fixtures, such as toilets, showers, faucets and waterless urinals will all result in reduced water use.

It is important to remember that city-supplied water is not the only potential water source available to the Noisette area. While graywater (see sidebar for definition) is perhaps the most plentiful source, rainwater is another good supplement to city-supplied water. Rainwater harvesting is particularly relevant as there is evidence that global warming trends will result in higher precipitation rates in the future (see sidebar text, opposite page).

In addition to using graywater systems to augment the water supply, such systems would also reduce the quantity of wastewater that is produced. Wastewater could be further reduced by implementing non-septic types of on-site treatment systems, such as the system used at the Pittsburgh Convention Center (see Case Study below). Both graywater and on-site treatment are localized systems that save money by reducing the amount of water that has to be routed to a centralized treatment plant.

Stormwater management can also be decentralized through the implementation of on-site treatment strategies as presented in Chapter 3. Stormwater Treatment Trains (STTs) can significantly reduce the amount of stormwater requiring centralized treatment. Along with providing localized filtration, STTs require less maintenance than traditional stormwater management methods, so they are good for the municipal government's budget as well as the environment. Green roofs, rain gardens, vegetated medians in roadways and parking lots, and bioretention ponds are examples of STTs that could be utilized by homeowners and commercial businesses on a variety of scales.

The Omnitility

Again, the holistic concept of the omnitility should be applied to water systems. In this case, the omnitility would oversee the sale of potable water, treatment and redistribution of gray water, sewage treatment and stormwater management. These services are currently provided by two separate entities, with the CPW handling all but the wastewater management, which is provided by NCSD. If these two entities were consolidated, the resulting omnitility would be better able to control and integrate all of the water resources. Like the power omnitility, this company would profit by optimizing the system of water usage as a whole. In streamlining the entire water system, the omnitility might choose to invest money in water reuse strategies or installing STTs rather than expanding a water treatment facility or maintaining miles and miles of drainage ditches.

An omnitility would also be well suited to address issues related to water systems, such as the management of biosolids. Other State sewer districts have developed and implemented programs to compost biosolids. Compost could be sold to residents of the Noisette area or to the landfill for use as a cover material. It may also be possible to use this compost in the development of elements in the STTs. Spray irrigation is another option, which has been successfully implemented in Seabrook and Kiawah Islands where suitable soils are available.

Treated stormwater is released into the Cooper River

What Is Graywater?

Graywater is water that has been used in showers, clothes washers, and faucets, then treated for reuse in certain non-potable applications. Water used in toilets, kitchen sinks and dishwashers is called black water and is not considered sutiable for reuse.

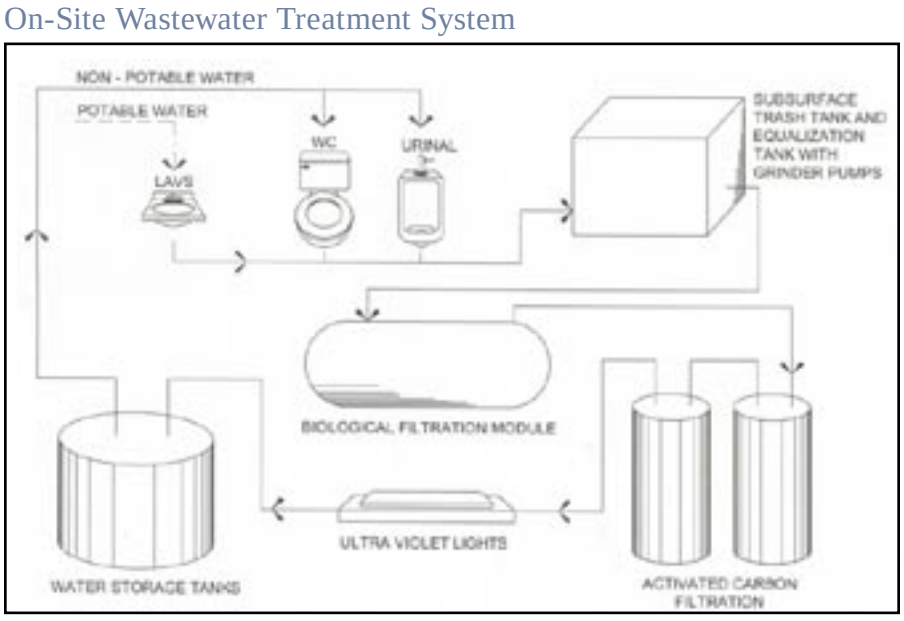
Graywater Sources

Sinks
Laundry
Showers/Baths

Graywater Uses

Toilets/Urinals
Cooling Towers
Irrigation
Sewage Transport
Firefighting

On-Site Wastewater Treatment System



Case Study: Water Use

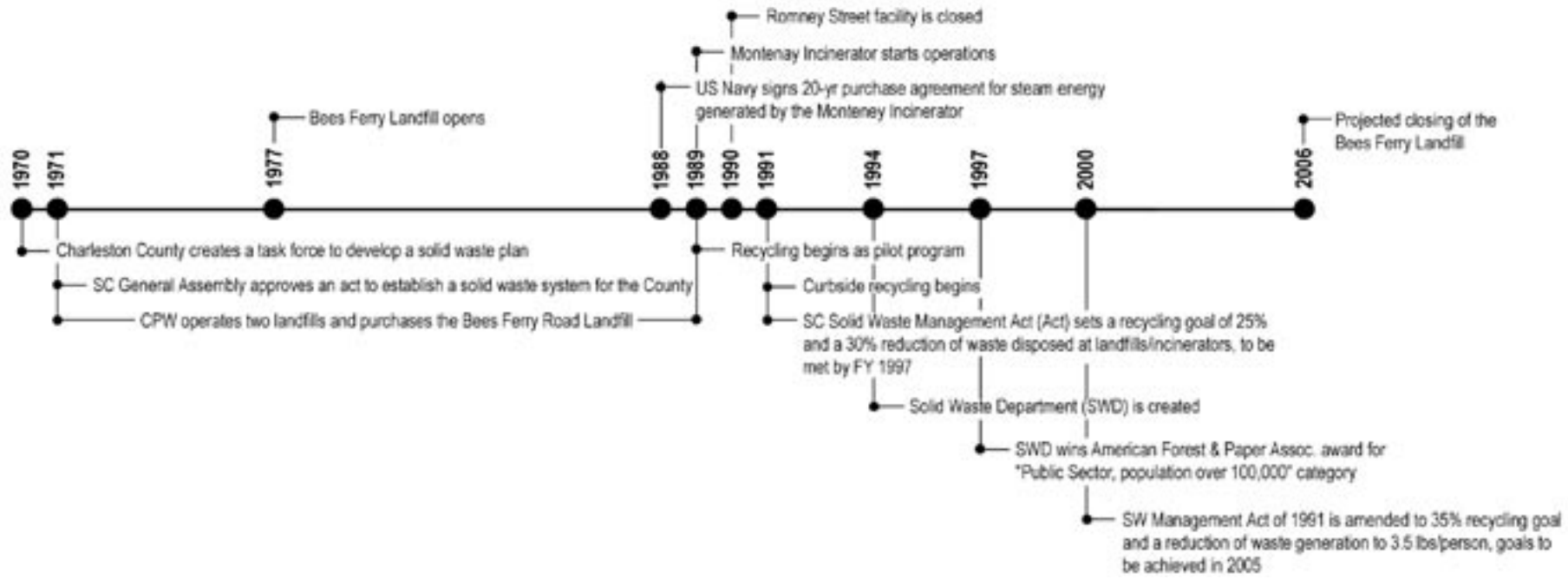
Encompassing nearly 1.5 million square feet, the new Pittsburgh Convention Center demonstrates of how a large-scale project can integrate water conservation features to achieve drastic reductions of potable water use as well as wastewater generation. As an owner-occupied civic building, a payback period of less than 10 years was used as a guideline for the Center, and current projections indicate that the building is on target to meet this goal.

- Graywater system recycles water for use in toilets and urinals. The water is conditioned by an aerobic digestion and submicron filtration system, which produces a colorless and odorless effluent. With final ultraviolet light treatment, the effluent has been treated for everything but viruses.
- The gray water system eliminates the use of potable water for sewage transport
- The system recycles 50 percent of the Center's water and saves an estimated 6.4 million gallons annually. The water reclamation system will reduce potable water use by over 75 percent.
- Indigenous landscaping uses no potable water for irrigation
- The Convention Center taps Pittsburgh's "fourth river," the aquifer that runs beneath Downtown, reducing the demand for water from the city water system.
- Pulsed-power treatment of the cooling tower water eliminates bacteria without chemicals further reduces the demand for city water. An estimated 1.8 million gallons of water is saved annually by this design.
- Water saving features saves enough water to supply 132 Pittsburgh households for a year.

David L. Lawrence Convention Center
Pittsburgh, PA
Building design by Rafael Viñoly Architects,
Mechanical/Plumbing /Electrical design by Burt Hill

Utility Systems

Timeline for Charleston County's Solid Waste & Recycling Services, 1970 - 2006



Some items left for curbside pickup could be salvaged for reuse

Methane Analysis: Bees Ferry Landfill

The projected peak flowrate of landfill gas is 456 scfm. Collecting this gas would be equivalent to ANY of the following environmental benefits:

- Removing 10,700 cars from the road
- Planting 14,400 acres of forest
- Offsetting the use of 240 railroad cars for coal
- Eliminating the need for 113,400 barrels of oil

Source: US EPA Landfill Methane Outreach Program, Landfill Gas Analysis Report for Bees Ferry Road Landfill

Many of the materials that currently enter the waste stream, such as the corrugated cardboard above, could be recycled

Solid Waste Resources

Perhaps the most direct application of the omnitility concept is in the management of solid wastes. With a single entity in charge of reducing and managing the solid waste stream, there will be incentives to promote salvage and recycling programs. The Noisette area already has a well-developed recycling program, and the development of new deconstruction and reuse programs could provide business opportunities and jobs to Noisette residents.

Waste Collection

Charleston County handles much of the solid waste managment for the Noisette area. The County developed their waste management plan in 1970. From 1971 to 1989, their Public Works Department operated two landfills, one for the disposal of dry trash and white goods (includes appliances and residential HVAC equipment); the other for receipt of shredded garbage from the Romney Street Solid Waste processing plant.

During this period, the County purchased the Bees Ferry Road Landfill to expand its capacity for shredded garbage. Today this facility is the only active, licensed, County-operated landfill. Rounding out the County's solid waste facilities are various recycling facilities and the Montenay Incinerator, a waste-to-energy facility that supplanted the Romney Street plant in 1989. In 1990, the Romney Street shredder was itself "recycled" and retrofitted to become the John L. Jencks Recycling Center for the sorting of recovered materials. All residents of Charleston County are entitled to solid waste and recycling services provided by the County. In addition, Berkeley and Dorchester Counties contract to use Charleston County's recycling services.

The Bees Ferry Road Landfill is a 312-acre site that opened in 1977. The landfill has a total capacity of 1,882,132 tons subdivided into three zones: one which currently receives dry trash, a second for construction wastes and land clearing debris, and a third, closed portion that is a monofil for ash from the municipal incinerator. A temporary composting facility, which spans portions of the second and third zones, is home to the County's compost and mulch production. It is anticipated that the landfill will close in 2006, and Charleston County has already identified and purchased a 700-acre site for a future landfill.

NCPW's Sanitation Division provides trash pickup and garbage removal for residential properties in North Charleston on a weekly basis. Residential trash must be separated into four categories: white goods/metal goods; furniture and building materials; small logs/brush/stumps; and leaves and grass clippings. Commercial and industrial properties are responsible for the disposal of their own solid wastes. North Charleston provides an additional disposal alternative in the form of a Convenience Center, where residents may dispose of their trash at times other than their scheduled collection. Residents may also choose to bring bring trees and yard waste directly to the landfill for no charge. Commercial deliveries, construction debris, and large trees/stumps are accepted at the landfill for $25/ton. There is a tipping fee of $6.25 per quarter ton.

All household garbage collected within the County is delivered to the Montenay Incinerator, which is an example of a waste-to-energy facility (in fact, this is the only waste incinerator in the state). Trash serves as a fuel that is burned to create steam, which in turn produces electricity. Byproducts like ferrous metals may be removed from the incinerator for recycling.

Every day, wastes in the landfill are deposited in a designated cell where they are crushed and covered with several inches of soil to reduce odors and control pests. Because Bees Ferry is a dry facility, biodegradation only occurs with a limited amount of materials, such as food scraps and yard waste, and even those take a number of years to decompose. The wastes that do break down are collected and sold as compost by the landfill.

While the Noisette area has a workable solution to manage its solid wastes, there is room for improvement. Both landfills and incinerators have drawbacks, many of which have negative side effects for the people and ecosystems of North Charleston.

Incinerators operate by burning household garbage, and in doing so, they release a large number of pollut-

NCPW provides a broad range of waste collection services, including residential appliances, yard wastes and building materials.

ants into the atmosphere, even with mandatory emission monitors in the exhaust stacks. At the end of the incineration process, there is a significant amount of ash that must then be disposed of — in the landfill.

Landfills have their own set of worries, though the 1976 enactment of the Resource Conservation and Recovery Act has mitigated many of the human health and environmental concerns. Landfills generate odors, attract pests and rodents, and as sanitary landfills are essentially dry waste facilities, they lack the ideal conditions for supporting decomposition at a large scale. As a result, there is much anecdotal evidence of finding legible newspapers and green grass clippings years after those items were deposited in the landfill. When solid wastes do break down, they generate leachates when rain or groundwater mixes with garbage, and flammable methane gas, both of which require management. Finally, as landfills have a finite capacity, there will always be concerns about availability of land for future landfills and the need to deal with residents who resist the siting of landfills near their communities.

South Carolina Recycling Statistics for Municipal Solid Wastes (MSW), FY 2002

SC Population	4,063,011
Recycled	1,262,331 tons
Sent to Landfills	2,921,378 tons
Incinerated	208,626 tons
Total	4,392,335 tons
Recycling Rate	28.7%
Waste Generation Rate	4.2 lbs/person/day

Source: The 2002 S.C. Solid Waste Management Annual Report

South Carolina MSW Commodity Recycling Statistics, FY 2002

Glass	9,848 tons
Metal	333,073 tons
Paper	438,804 tons
Plastic	25,588 tons
Banned Items	344,915 tons
Miscellaneous	110,103 tons
Total	1,262,331 tons

Source: The 2002 S.C. Solid Waste Management Annual Report

Alternatives

Clearly, there is a great deal of benefit in reducing the amount of solid waste that goes to either a landfill or an incinerator. There are several strategies to accomplish this goal, some of which are already in place in the Noisette project area.

Recycling in the County started in 1989 as a pilot program before expanding into a curbside recycling program in 1991. Since then, the list of recycled materials has expanded from the standbys of aluminum, newspaper and glass to include used motor oil, tires, and gypsum wallboard. Recyclable materials are collected weekly from residential properties, and the weekly pickup service is supplemented by seven, staffed Convenience Centers, (including one in North Charleston) and 35 recycling drop sites in the County.

All recycled materials are processed in the Romney Street facility, which has a capacity of 80 tons per day. This capacity can be increased signifcantly by implementing a second sorting line or multiple work shifts. The facilty accepts materials from outside the county on a charge-per-ton basis. Currently, Charleston County has an agreement with Berkeley and Dorchester Counties to sort and market their recyclables.

A Pay As You Throw (PAYT), or unit pricing, program is another strategy that has been implemented in various locations across the country, including two in South Carolina, to address the need to reduce solid wastes. Under a PAYT system, solid waste management is treated like a conventional utility in which the customer is billed based on how much of the service they use. As a result, customers have much greater awareness of the amount of waste that they generate, and they have a vested interest in minimizing that amount. Communities that have implemented a PAYT system have seen waste generation reduced by a range of 25% to 45%.

Typically, a PAYT system works with either a garbage cart subscription system (often seen where communities already had an automated waste collection system) or a system based on stickers or bags which are purchased by residents. Because PAYT programs often result in less waste generation and greater recycling rates, communities employing these programs will consume fewer natural resources and less energy, generate less pollution and use landfill space at lower rates than communities using conventional solid waste management programs. Success of PAYT programs is contigent upon two main criteria: first, the community must have good alternatives to putting garbage directly in their trash can, such as comprehensive recycling programs and yard waste collection — these alternatives are available in the Noisette area. Second, waste containers must be appropriately sized, with unit prices set at a level which encourage residents to divide their waste and recycle.

Composting can be a support strategy for a PAYT program or a stand-alone method of reducing wastes. The State's DHEC estimates that 30% of all residential waste could be diverted from landfills if households composted their yard waste and food scraps. In a matter of months, compost will be ready for use as mulch or a nutrient-rich soil additive. The Bees Ferry composting program is a good example of a beneficial use for landfill byproducts.

Another strategy to reduce the amount of material that enters the waste stream is to redirect construction and demolition (C&D) wastes. It is estimated that C&D wastes comprise 20-30% of the volume of landfills. New residential construction generates about 3-5 pounds of waste per square foot of building area, roughly 80% of which is recyclable. Reusing or recycling these wastes requires labor to separate the materials, so there is a strong correlation between recycling rates for C&D wastes and landfill tipping fees.

The Omnitility

An omnitility will boost recovery rates by developing and supporting local businesses that salvage or reuse materials in the waste stream. It may be possible to develop localized processing sites for materials such as glass, which is currently sent off to Atlanta or Raleigh. One of the best ways to reduce waste is to encourage businesses that harvest and redirect C&D wastes for reuse and recycling. Gypsum board is already on the list of recyclable materials, so the Noisette area is moving in the right direction. By continuing to develop a viable C&D waste management system and associated deconstruction and salvage programs, the solid waste omnitility will act to limit waste generation, promote salvage and reuse of items and recycling, all of which will husband the resources available in the area.

Composition of Primary C&D Materials by Building Sector *(by percent of total weight for each sector)*

	Wood[a]	Gypsum Board[b]	Concrete	Masonry Units[c]	Roofing Materials[d]	Press Board[e]	Metals[f]	Misc. Fines[g]
Residential Renov.	31%	12%	<1%	4%	11%	2%	2%	27%
Residential-New	15%	14%	8%	2%	1%	6%	1%	36%
Residential-Demo	24%	1%	15%	20%	1%	<1%	2%	34%
Commercial-Renov	13%	4%	22%	19%	13%	1%	5%	18%
Commercial-Demo	17%	<1%	2%	0	0	12%	8%	55%

[a]Includes dimensioned wood and plywood but not treated wood
[b]Includes painted and unpainted gypsum board
[c]Includes concrete block and brick
[d]Includes felt and shingles
[e]Includes chipboard
[f]Ferrous and nonferrous metals
[g]Mixed Materials of <1/2" diameter
Notes: Remaining quantities for each sector are generally less than 2% of total weight for that sector. New construction projects often have corrugated cardboard packaging that can be recycled. Some projects also have vegetation from land clearing.
Source: Gershmam. Brickner & Stratton. What's in a Building?, Demolition Age, 9/93.

Fiber optics will play an important role in the creation of Noisette's neural network

The neural network will be characterized by a diversity of the communication systems available to all businesses and residents

Communications Systems: The Neural Network

The New American City will have a sophisticated communications network in which voice, video and data systems are integrated and easily accessible. The ability to obtain information, communicate easily and access services remotely empowers a region's population. Information connectivity also enables a number of sustainability strategies: businesses and residences can employ remote energy control strategies; transportation choices can be made more efficiently using real-time information; automobile trips can be reduced with online interactions. Information connections can also contribute to social sustainability by enhancing entertainment opportunities, creating remote learning and telemedicine opportunities, facilitating telemarketing and expanding municipal services such as bill payment and tax collection.

As new development occurs and infrastructure is upgraded, fiber optic or wireless connectivity with high capacity bandwidth should be added as a matter of course. The City should coordinate with regional providers to make certain that all businesses and residences have choices for information connectivity. In effect, this system will become a community brain or a neural network of collective knowledge from the residents, businesses and institutions of Noisette.

Telephone service in the Noisette project area is provided by the BellSouth Corporation, a communications services company that spun off from AT&T in 1984. Currently headquartered in Atlanta, BellSouth serves residential and business customers in nine southern states, including South Carolina. BellSouth provides a full array of broadband data services to large, medium and small businesses. In the residential market, BellSouth offers DSL high-speed Internet access, advanced voice features and other services.

BellSouth also offers long-distance service throughout its markets and provides wireless services to customers through Cingular Wireless, a joint venture partnership with SBC Communications. BellSouth uses a network of digital and optical lines to provide services to its customers. By the end of 2002, the company estimated that 73% of the households within their service area had access to broadband service, making it one of their largest growth sectors.

Comcast Cable, the primary cable provider in the Noisette area, offers a wide array of services to the North Charleston market, including cable TV, digital cable TV, high speed internet and HDTV. Knology is a newer company that also provides digital phone, high-speed internet and digital cable services to North Charleston. All cable TV signals are carried by fiber networks, many of which have been upgraded to hybrid coaxial (HFC) lines, which form the basis of all cable-based internet services.

In addition to access provided by the telephone or cable companies, there are a number of other internet service providers (ISPs) in the North Charleston area. These ISPs range from dial-up, DSL and T1 systems to cable-based companies, and services come in a broad range of plans or prepaid options. Satellite-based ISPs are also available in the North Charleston area and may be an option for residential customers without access to upgraded cable or fiber optic networks. Satellite providers require a receiving dish that is mounted in an area that has an unobstructed view of the southern sky.

In order to ensure that no part of Noisette gets left behind, public internet access should be provided at all library and school sites. Within high-use office areas, integrated wireless strategies may be appropriate to stimulate economic activity. A similar strategy may be useful in coordinating and promoting art in various forms throughout the City. Moving a portion of the arts community "on-line" would provide a distinctive character to the area.

The public schools will be the centerpiece of the network, providing remote learning opportunities for adults as well as telemedicine centers in each of the neighborhoods. These services can support home delivery of learning opportunities and medical monitoring services. Schools can also use the internet to improve their traditional educational role by providing online access to daily homework assignments, event schedules and by allowing parent, teacher and guidance counselor exchanges to occur in this medium.

The neural network, this repository of collective knowledge, will be the engine that drives the New American City and enables it to fully realize its potential as an integrated, sustainable community.

Summary

Utility and omnitility systems are essentially resouce harvesters and managers, and they influence usage patterns within their service areas with the types of programs they offer as well as the rates they charge. As good stewards of the environment, their priority will be to first implement strategies of resource reduction, then strategies of reuse. When those avenues have been exhausted, the use of services necessitating extraction of resources should be offered at a higher billable rate.

The final step for omnitility systems in Noisette is their integration into a single, comprehensive Noisette Unitility. Just as each omnitility should be optimized, the Noisette Unitility could integrate all of its subsidiary systems into an efficient, cohesive whole. All of the omnitilities are interconnected: water systems play a role in geothermal and hydro electric power sources; wastewater treatment results in biosolid wastes which could be reused as compost or mulch; combustion of any kind generates solid wastes. The Noisette Unitility would seek to close the loop wherever possible, utilizing the "wastes" of one system to feed another.

As decentralized strategies are developed and installed, the distribution systems for each component could be integrated. Policies that raise awareness of the use of resources, such as the stormwater utility, provide tangible incentives for users to modify their usage patterns and incorporate more resource efficient practices. Further, strategies that make use of the byproducts of other systems should be encouraged.

Patterns of resource use can have a broad affect on the quality of life on the Noisette region and beyond. By decreasing the amount of emissions produced in the generation of electric power, fewer greenhouse gases are emitted which in turn contribute less to global warming trends. Warming trends affect local climate and precipitation as well as water levels and water quality. Finding ways to divert materials from the waste stream could also generate local business opportunities in deconstruction or salvage. By improving one system, the overall quality of life is elevated, and synergies are created to improve all of the other systems.

CHAPTER FIVE | NEIGHBORHOODS

Neighborhoods as Catalysts for Change

Contents

The master plan seeks to find ways to establish a sense of solidarity throughout North Charleston, while maintaining individual neighborhood character. This means raising up some neighborhoods to a reasonable level of care, while enhancing other neighborhoods to become even better. In the end, they help each other.

Introduction

"All the means of action - the shapeless masses - the materials - lie everywhere about us. What we need is the celestial fire to change the flint into the transparent crystal, bright and clear. That fire is genius."
-Henry Wadsworth Longfellow (1807 - 1882)

Change is a constant. North Charleston has seen great changes in the last century, and some of them are showing as wear shows on a piece of cloth. While the health of a neighborhood is usually visible, the diagnosis (of what might be wrong) becomes quite challenging. Identifying what needs to be fixed extends beyond physical urban fabric. Only a truly integrated plan can achieve success. What are the social factors, such as education and community? Who is politically empowered? Are there economic opportunities?

There are elements of the Noisette area that reinforce the fabric of the community and pull it together. Some of these neighborhoods, streets, and places have deteriorated over time. This master plan suggests revitalization strategies for strengthening these elements, using the momentum of their change and making them catalysts of vitality in the Noisette area, and for North Charleston. This chapter outlines changes along corridors such as Montague, Durant, Spruill and North Rhett Avenues; improvements on Rivers Avenue; creation of the Michaux Promenade; promoting Schools as Centers of the Community; and bolstering commerce with revitalized and new mixed-use centers.

- These neighborhood analyses draw from overlapping urban design philosophies, frequently known as New Urbanism, Livable Neighborhoods, Traditional Neighborhood Design, Pedestrian Oriented Development and Walkable Communities. Methodologies and metrics vary, but generally recognize the following traits:
  - Walkability is important
  - Narrow streets
  - Return to grid systems for circulation redundancy, connectivity and permeability
  - Have a center
  - Support mixed use diversity, and density in the center
  - Allow for mixing of income levels
- Historic North Charleston, city beautiful/garden city principles are part of the re-discovery by the New Urbanism movement. This body of knowledge tends to gravitate toward thematization and historicism (soulless replications of complex, beautifully messy precedents, yielding hermetically sealed and sanitized products for the consumption era).
- Avoiding a romantic view of the past, North Charleston must look toward the future.
- All of these ideas must be tied together under the umbrella of sustainability.

These strategies take into account the human capital, natural capital, and economic capital of the Noisette area as the fundamental building blocks for change. However, the best way to bring about good change is through the combined effort of the community. Everyone plays a part in working toward the goals of this master plan, from the elder historians, to the grocery store clerk, to stewards of delicate eco-systems, to children and life-long students. The *people* are the genius and the fire to bring about this change. What makes North Charleston different is the potential to take the Garden City into the future. The Noisette area has the opportunity to make an existing system become at one with ecological systems, in fact, celebrating the interface — a struggle at times, but it is a job worth doing, a gift for future generations. It's not the cheapest thing to do, or the fastest… The following *community projects* serve to capture the imagination and channel the potential of the people of North Charleston.

View east along Montague Avenue

Key Plan

Design Principles

Streets and the Community:

The street is the oldest, most basic, component of the urban fabric. It constitutes the essential framework for the movement of goods and services, but more importantly, creates a place for exchange by citizens. The land occupied by public right of way in America tends to be 25-35% of a city's developed land. These factors, the evidence of functional purpose and community spirit, result in the lasting impression of a community- its public face. Desires to promote commerce and industry have resulted in roadway policies that support only a part of the equation: that faster wider roads attract more cars (and people). However, significant livability/smart growth research has revealed these over-designed roadways have an unfortunate consequence. They are more dangerous to pedestrians, can fragment neighborhoods, create more heat and stormwater runoff, and are aesthetically inferior to their more graceful tree-covered counterparts. Additionally, there is little data to support the "build it and they will come" mentality regarding growth and road capacity. Nonetheless, for decades, Americans have tended to see road improvements as progress, just as factories belching smoke (actually air pollution) on the edge of a community was once a source of pride in our early industrial past.

There is, however, a positive aspect: planned downsizing creates the opportunity for amenities that restore a sense of community, providing desirable places for people to interact by foot and bike. These right-of-ways already exist; therefore little or no property acquisition is required. The additions of bike lanes, trails, tree plantings and bioswales are becoming part of the sustainable future of new and existing communities, resulting in highly desirable places to live. In support of walkable communities, on-street parking can be strategically added, to support new neighborhood services, parks and institutions, resulting in less off-street concentrations of parking lots, and more on-site permeable surfaces.

Neighborhood Connectors Concept:

The urban design analysis of the Noisette community has revealed the opportunity to build neighborhood identity and connectedness through the strategic improvements of key public street corridors that connect the various neighborhoods. This analysis has been informed by traffic counts from 1992 to 2002, prepared by the Berkeley-Charleston-Dorchester Council of Governments (BCD COG). The Neighborhood Connectors are the realization of the desire to establish common ground between neighborhoods within the public realm, in order to weave the neighborhoods into a more vibrant tapestry. Just as importantly, the Neighborhood Connectors serve as gateways, and as a result, bear on the civic pride of the community.

The establishment of design principles for each connector is necessary. The following analysis begins this process, but is intended as a guideline. Re-routing above-grade electrical service and re-working stormwater systems requires detailed individual analysis. This report begins the process, intending to establish a vision for the future by identifying the primary connectors and improvement priorities for the greatest impact. Further studies will need to be balanced against the recommendations found herein. The integration of the arts, and the specifics of how individual neighborhood character is inter-woven, are equally important components. The combined resources of the community, the Noisette Company, and the City of North Charleston will ultimately produce a fine-grained resolution of each corridor for future generations.

Neighborhood Connectors Design Principles:

- **Establish tree canopies for overarching affect**. Where overhead lines exist, tree canopies have been trimmed to protect the lines, causing unsightly shapes and destroying the potential for shaded streets. The lines need to be buried to allow the trees to retain their growth patterns for both shade and beauty. A program to refurbish and add rows of street trees is needed, starting with the primary Neighborhood Connectors.
- **Provide new street lighting that enhances beauty and security**. Besides human activity, lighting is the best deterrent to crime. Furthermore, streetlights create a visual repetition that can serve the dual function of banner standards.
- **Use new street improvements to improve stormwater management through the use of bioswales where possible**. For a truly sustainable environment, stormwater is encouraged to remain in bioswales, that is, planted sections that line the streets, which are not edged with curbs and gutters. In contrast to conventional below-grade piped systems that are costly to build and maintain, and can overfill and cause flooding, the swale collects rainwater, reduces the velocity of the run-off, and also irrigates the plantings as it percolates into the soil. Where the topography allows, the swales will be interconnected to allow flow to the Filbin or Noisette Creeks.
- **Add bike lanes**. Connected trails and roads throughout the Noisette footprint will offer an alternative mode of travel to vehicular transportation. Where feasible, portions of existing pavement will be designated as bike lanes, or streets will be modified to safely accommodate dual bike and car traffic.
- **Slow traffic**. Contrary to highway mentality where speed is the key purpose, on neighborhood streets that serve dual purposes of walking and biking, the traffic will be slowed. A number of devices encourage slower traffic: narrow streets, parking on the edges, and round-abouts.
- **Integrate public art.** As a district wide program, public art will be integrated into all public green spaces, and particularly within the River Center at Noisette, where the vision is to bring the vitality of the creative community of artists. This adds beauty and celebrates the culture of the area, making the Noisette district more distinctive.
- **Provide a neighborhood identity program**. Each neighborhood has a distinctive character, which can be celebrated through visual identities such as subtle entry and corner markers.
- **Increase opportunities for neighborhood services, and increased mixed use density**. Clustering different uses such as retail, business and residential allows some portion of the community to live, work and play within the area. This builds commerce and community commitment while decreasing vehicular travel.

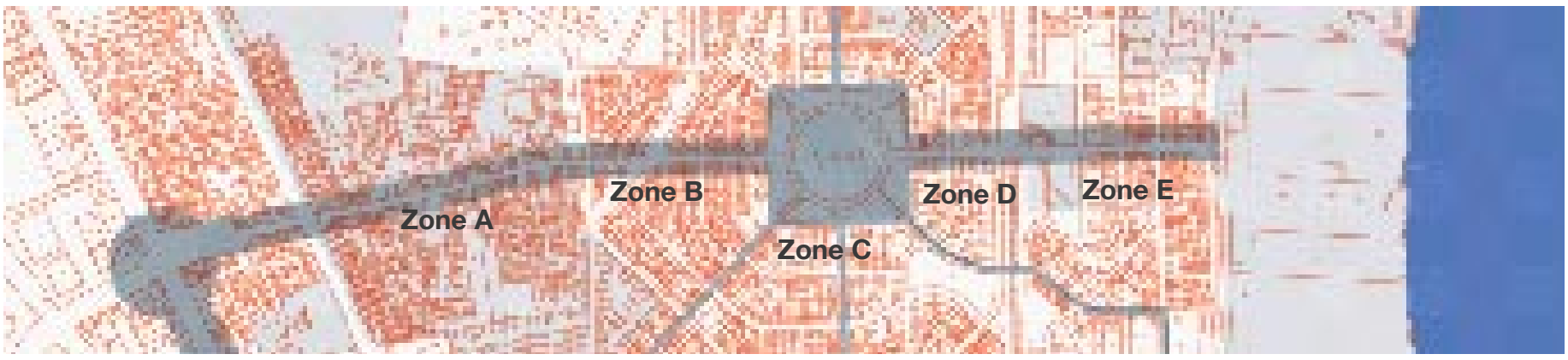
Enhancing the neighborhoods and building value through improvements in the public realm is the focus of this chapter. The Neighborhood Connectors become the first priority for knitting together the neighborhoods into a more cohesive community.

This image from ***Beaufort S.C. illustrates*** *a road of grace and beauty.*

Existing Corridor Conditions: in this image of Durant, utilities flank the roads, causing trees to be appended, eliminating the possibility of tree canopies, resulting in an unbalanced and unattractive place.

Existing Corridor Conditions: in this image of Montague, the road divides rather than connect. Generally speaking, main roads are over designed for car capacity, and under designed for interaction.

Along Montague Avenue



Montague Avenue from Rivers Avenue to Virginia Avenue, including Park Circle and the Old Village district.

Liberty Hill

The Liberty Hill neighborhood is perhaps the most unique neighborhood in the Noisette area. Initiated in 1871 as one of the earliest home ownership developments for freed slaves, the original properties purchased by the founders of Liberty Hill have been subdivided for multiple heirs, resulting in progressively smaller lots. Some of the real estate is still owned by descendants of the families from over 130 years ago.

The distinctive pattern of development remains evident today. Narrow streets lined with deep, narrow lots dominate the fabric. The majority of the smaller houses sit a few feet from the eighteen to twenty foot wide pavement. The street edge is irregularly defined by fencing and occasional landscaping. There are no sidewalks, but the neighborhood is abundant with mature trees. The close streets force traffic to move at slower speeds, making many of them attractive places for children to congregate and play. Smaller houses have been enlarged with room additions or a second structure. Historic houses are clustered among the modest newer housing and occasional mobile homes.

The compact house pattern is punctuated with small churches, some which reside in converted homes. Previously developed vacant lots permeate the district, detracting from the intimate sense of place. A few small businesses line the north side of Montague Avenue, and exhibit varying degrees of commercial success. On the south side, the Pinckney Community Center serves as a central gathering place for the area residents, many whom exhibit a deep sense of commitment to the area.

The physical characteristics of Liberty Hill result in a higher density than other neighborhoods in the Noisette area, and actually reflect many of the New Urbanists principles that are deemed desirable for walkable communities, such as narrow streets, smaller lots and front porches. Liberty Hill has a cultural history and physical fabric that should be preserved as an historic district. However, complex socio-economic problems such as lower education rate, disproportionate distribution of subsidized housing, and low level of income serve as hurdles for the community's improvement.

Although the internal streets offer some of the intimate spirit of Liberty Hill, several problems with the street system exist. Montague Avenue splits the neighborhood into north/south areas, with five lanes of fast moving traffic. Consequently, pedestrians rarely traverse the street. The small side streets in the north area dead-end and cause a safety concern for both the fire and police departments. These need to be reconnected to promote easier connectivity with the various districts of North Charleston, which is a central tenet of walkability and comprehending the area.

The Master Plan recommends that the zoning be modified to protect the existing pattern of Liberty Hill. The current R-2 zoning which is predominant in much of the neighborhood allows development, which could potentially be out of scale with the historic pattern if not designed with care. This could eventually erode the historic configuration. The new zoning regulation needs to encourage infill development of the vacant lots in the Liberty Hill neighborhood, ideally reinforcing the unique pattern of setbacks, lot sizes, building massing, and density. Safety and security concerns, access for public vehicles and the capacity of the infrastructure need to be considered.

Recent actions undertaken by the Liberty Hill Neighborhood Association changed a significant portion of the lots to R-1 Single Family zoning in an attempt to combat potential multifamily infill within the predominantly single family neighborhood. Furthermore, the group discouraged a new development on a wooded block that was seen as detrimental to adjacent property owners. These activities demonstrate both a commitment to and understanding of the value of Liberty Hill.

A number of structures in the Liberty Hill neighborhood are deteriorating beyond potential salvaging, a trend that requires immediate measures to reverse. A survey of the existing district should be undertaken, and those that are unsafe for habitation should be deconstructed. The planning should respond to relocation needs of potentially displaced residents. Development programs that integrate infill housing for mixed incomes would benefit Liberty Hill as a community and improve the tax base.

Existing Liberty Hill historical marker at Pinckney Community Center.

View of entry sign to Liberty Hill on Montague Avenue.

View of Montague Avenue showing small commercial building.

This typical Liberty Hill image shows modest homes built close to narrow streets.

Mature trees permeate Liberty Hill

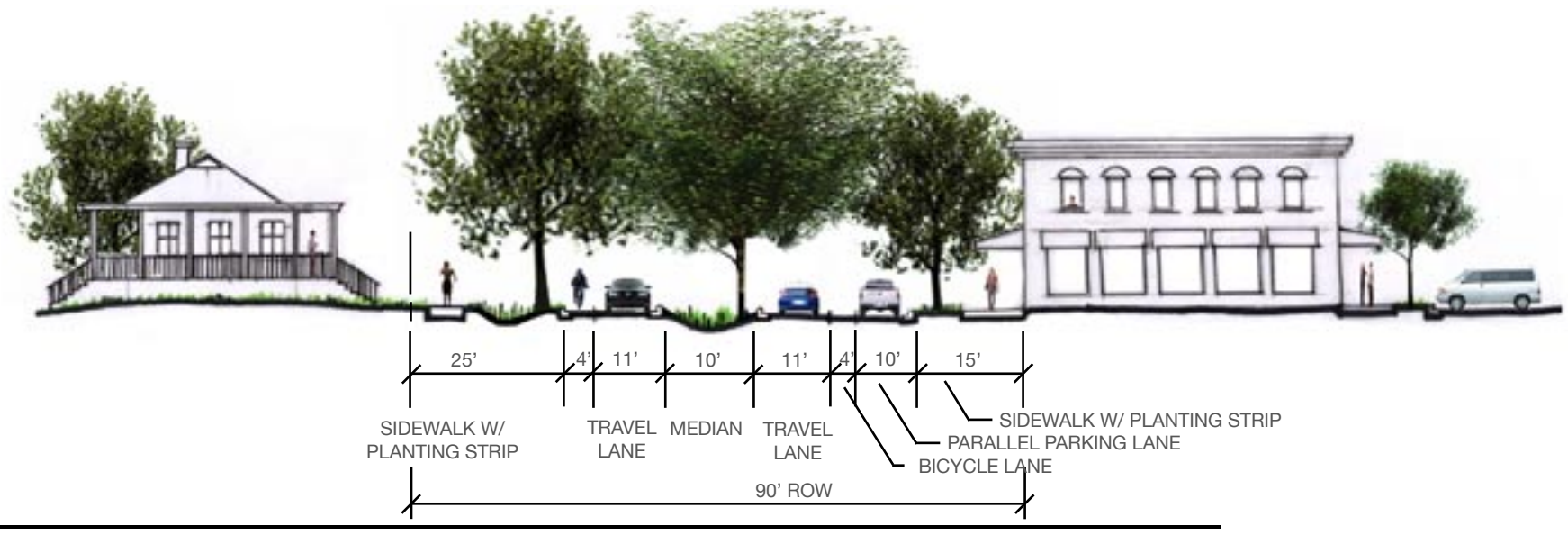
Small shops are integrated with the residences.

Fall 2003, many property owners sought and were approved for downzoning from R2 to R1 to preclude multifamily and mobile homes within Liberty Hill.

Zone A: Liberty Hill

LEGEND
- Existing Commercial
- Neighborhood Center Sites (Land Use Change
- New Building (Mixed Use)
- Pedestrian Crossing
- Sustainable Stormwater Swale
- Proposed Median
- Open Space
- Existing and Infill Residential
- Existing Public Buildings

0 100 200 FT



MONTAGUE AVENUE: ZONE A (Liberty Hill)

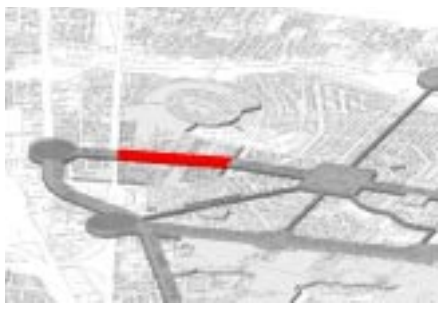
Goals for the Redevelopment of Liberty Hill:

These recommendations describe actions for both the public and private realm that require critical evaluation to determine priorities.

- Develop gateways on Montague to enhance the identity, with signage and/or cornerposts designating the district.
- Improve the pedestrian links between Montague and Rivers Avenue commercial district with a vertical element at the overpass bridge. Simplify this intersection and calm the traffic with constructed medians.
- Connect the north and south sides of the community with safe pedestrian and bicycle crossings, via crosswalks and improved median areas for ‘safe havens.’ Utilize traffic calming devices such as a planted median and a reduced traffic speed limit to reflect a residential street.
- Develop the Liberty Hill Village on Montague Avenue, to create a walkable commercial center.
- Where the right of way width allows, add sidewalks to give better access to the Pinckney Community Center and the Liberty Hill Village.
- Upgrade and repair streets with crisp, flat edges for the pavement, new streetlights, and street trees.
- Where overhead lines interfere with tree canopies, bury the lines, and plant new street trees.
- Improve connectivity of the streets by extending into adjacent neighborhoods. Eliminate dead-end streets.
- Evaluate seeking designation as a historic destrict, to receive the recognition, protection and possible financial incentives commensurate with this status.
- Create a special zoning district designation to protect the distinct characteristics of the neighborhood.
- Undertake a survey and evaluation of existing buildings and begin an aggressive maintenance and deconstruction program to raise property values and eliminate safety hazards.

View of church along Nesbitt Avenue

View looking east along Montague Avenue



Key Plan of Montague Avenue, Zone A

Neighborhoods

Before: View of Hassel Avenue. Notice the right of way limits and the opportunity to revitalize the pedestrian experience.

After: New sidewalks, landscape areas and curbs can be integrated to enhance the edge of the street and accommodates walking to Pinckney Community Center. Signage, street lights and banners are added for safety, security and visual interest.

Before: View looking south across Montague Avenue. Notice the wide stretch of pavement and the low traffic capacity requirements present.

After: Liberty Hill Village commercial area is located along Montague Avenue between Abraham Avenue and Hassel Avenue. Within this block a landscaped center median provides protection for walker at midblock crosswalks increasing the vitality and health of the commercial area.

This new commercial area will help increase the sense of community and encourage social gathering.

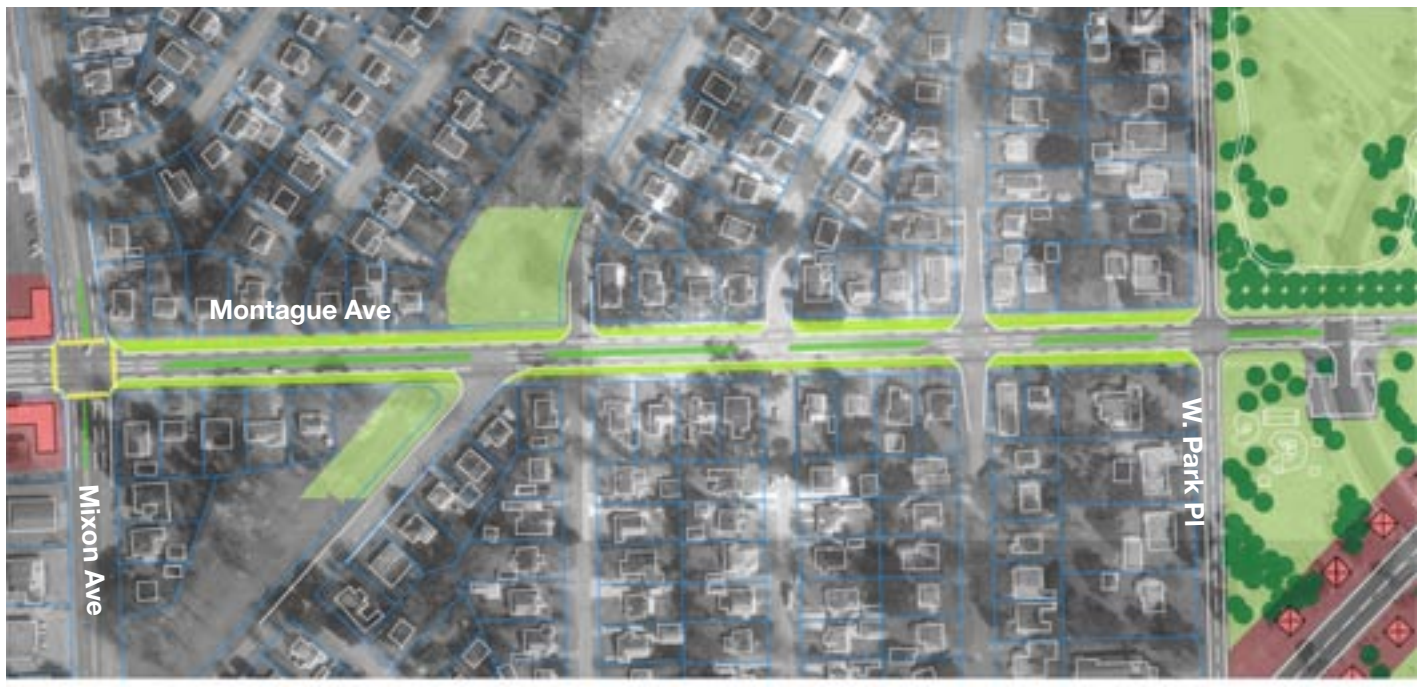
Before: View looking east across railroad tracks towards Liberty Hill residential area, with billboards and no visual identification.

After: New signage, pedestrian friendly streetscape and commercial property could be developed to enhance the gateway into the Liberty Hill residential area. Street medians are incorporated with landscaping, lighting and banners to enhance the beauty of the area, while slowing down traffic. These measures increase the sense of place.

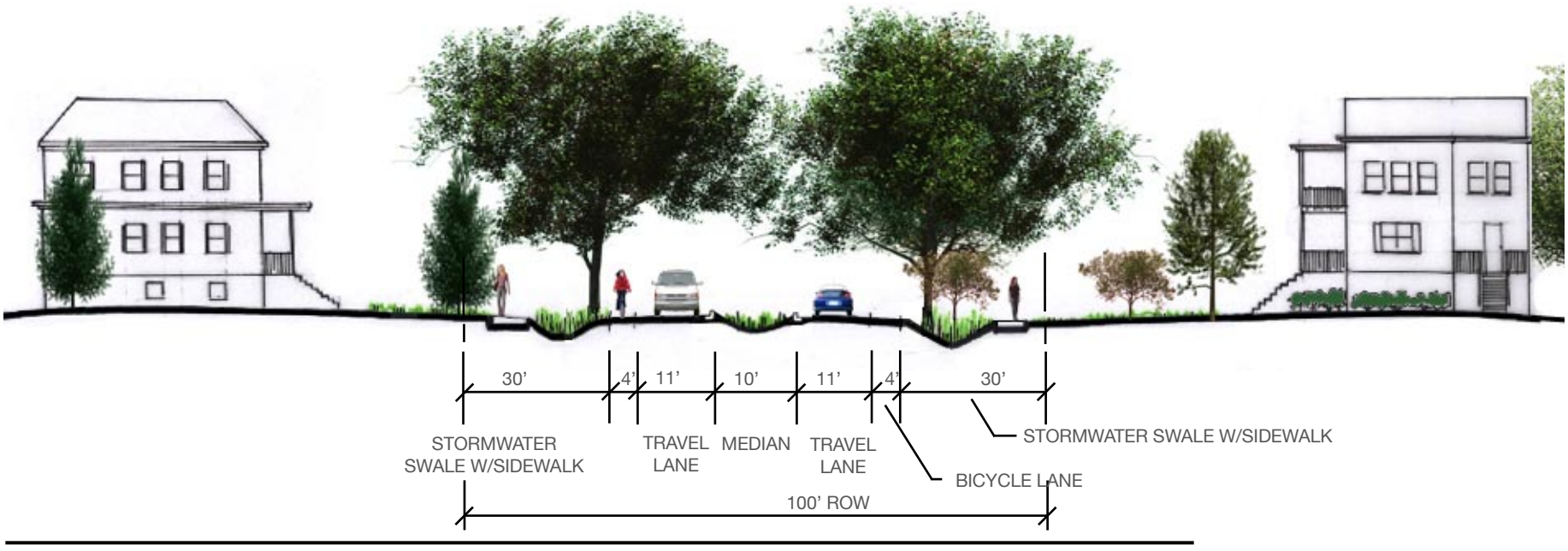
Before: View of the existing residential neighborhood along Sanders Avenue, with the overhead utility lines.

After: Delineated road edges and street lighting can be incorporated to enhance the street environment. Utility infrastructure is moved underground to improve views through the community.

Zone B: Changes from Mixon Ave to West Park Place

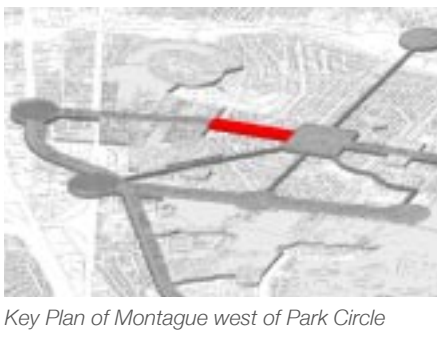


LEGEND
- Existing Commercial
- Neighborhood Center Sites (Land Use Change)
- New Building (Mixed Use)
- Pedestrian Crossing
- Sustainable Stormwater Swale
- Proposed Median
- Open Space
- Existing and Infill Residential
- Existing Public Buildings



MONTAGUE AVENUE: ZONE B

Image looking down Montague Avenue



Key Plan of Montague west of Park Circle

Zone B of Montague Avenue is west of Park Circle. With Montague Avenue at four lanes and a turn lane interrupted by a low concrete median, vehicular traffic and the distance of pavement creates a barrier to pedestrian crossing. The intimate feel of Montague east of Park Circle is lost. Yet this area is surrounded by neighborhoods that include many well-maintained homes and long established residents. Montague Avenue needs to strengthen the connections to the neighborhoods, reduce the sense of barrier between the north and south neighborhoods, and invite cyclists and walkers to use the public space. The proximity to Park Circle offers access to the primary public green space of this area.

Upgrades are intended to slow the traffic, enhance walkability, add bike paths and improve the natural stormwater drainage. Connecting to Palmetto Gardens, Calhoun Homes and South Park Circle neighborhoods to the south is critical. These neighborhoods are central to making successful linkage within the Noisette greenway system and provide access to the Noisette Preserve.

The area will be impacted by future development at Calhoun Homes, proposed as renovations to the existing houses, and retaining the mature landscaping.

Some of the areas at the southern edges of residential development are marginal and may be redeveloped, including some properties that edge the Noisette Preserve. Their relationship to this beautiful natural amenity will increase the value of the entire district, as new bikeway and trails give the residents access to the lowland nature.

To the north, the redevelopment of Century Oaks will improve the currently derelict properties and have a positive impact on the adjacent Cameron Terrace, West Cameron Terrace and Oak Park neighborhoods. Connections from Montague via Mixon and several neighborhood streets will spread the public investment into the northwest section of the Noisette area.

Zone C: Changes at Park Circle

Conceptual Sketch of Park Circle (see next page for description)

1913 plot of North Charleston by P.J. Berckmans Company showing the smaller circle within the circle

Original construction of Park Circle (photo courtesy of the City of North Charleston)

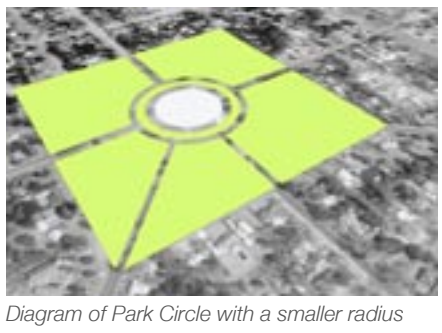
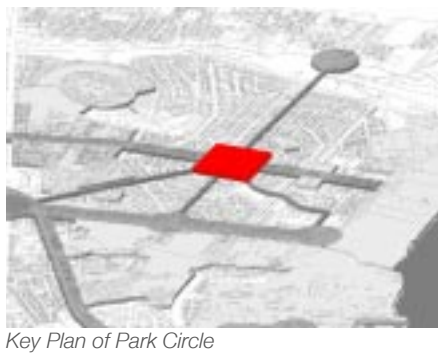


Diagram of Park Circle with a smaller radius



Key Plan of Park Circle

Yesterday and Today

The original Park Circle layout planned by P.J. Berckmans Company in 1913 aimed to bring the Garden City (City Beautiful Movement) to the North Charleston area. Originally planned as a smaller diameter centerpiece within a larger circle surrounded by a square, only the outer ring and the square survive today. A central organizing element for the surrounding neighborhoods, Park Circle serves as a common green space and landmark. Over the years, as Montague Avenue became a wider street, accessing the center park space became more difficult due to three lanes of fast moving traffic. The park currently has two softball fields for Little League play, a playground, and a recently added Frisbee golf course. The old U.S.O. Center is now a community center, which holds special events and activities. Park Circle becomes a special place during the Christmas Holiday season, as the community comes together to celebrate, even closing the circle for a brief time.

The area of Park Circle is quite large, approximately 1200 feet (four football fields end to end, or almost one quarter of a mile) to the outside of the square. The expansive diameter of the circle within the square lacks vertical attributes, such as an edge of consistent trees, or building lines which would enhance the arc. The circle itself is so broad that it is diminished in terms of the space it might create; a true landmark for North Charleston. The greatest power lies in the plan layout, viewable by air, or in a map, which is seen as the heart of old North Charleston. When experienced at eye level, the Circle can cause confusion instead of serving as an orienting device. The four major north-south streets, interspersed with four diagonal access streets create numerous options for drivers. Traffic enters Park Circle at eight different points, causing weaving, as drivers attempt to enter and exit properly. During peak traffic conditions, cyclists and pedestrians experience difficulties accessing the park across the three lanes. On the positive side, residents enjoy walking the large inner circle, uninhibited by traffic crossings. The laps around the inner circle equal about a half mile each, providing a metric for those who exercise there.

The green space between the circle and the square is divided by the eight accessing streets into a circle. The wedges serve as a buffer zone for the adjacent residences, as landscaped passive areas. Storm damage from Hurricane Hugo in September of 1989 destroyed many of the mature loblolly pines that filled it with beauty and shade. The landscape will be restored as new plantings that complement the vision mature.

Park Circle Improvements

- Reduce center traffic circle diameter to place park next to neighborhood.
- Design new North Charleston iconic landmark in center.
- Build new Community Center, based on programming input from the community.
- Build hierarchy of pavilions ranging from shade structures to picnic shelters to semi-enclosed for small vendors.
- Create an amphitheater for use by community theater, musical events and local gatherings.
- Develop parking near each major function for easy access.
- Create new landscaped areas with trails, naturalized plantings, gardens and open lawn panels.
- Design lighting, planting and communications with visual accessibility for security and safety.
- Plan for seasonal festivals with open space, landscaping patterns, parking, and power requirements including needs for temporary facilities.
- Blend into neighborhood for easy access with pedestrian crossings, lighting, paths, landscaping and uses that create value for adjacent properties.
- Create a naturalized stormwater system that integrates water into the landscape.


View of vehicular movement around Park Circle at intersection


View looking across traffic toward Park Circle


View of residential road adjacent to Park Circle


View of community center

Proposed Vision

The master plan proposal seeks to increase the potential of Park Circle as both a symbolic center, and functional parkland. This is achieved by rethinking the distribution of the space, and the relationships of the parts to the whole. Rather than the singular central space surrounded by eight passive buffer parks, the plan proposes a smaller central space reserved for symbolic value, and four more usable larger parks. These four parks will each have an individual character, and be thoughtfully designed to enhance the adjacent residences. As such, landscaping will be added, lighting will be carefully placed, and no additional access to civic parking lots will occur on the existing outer roads.

These parks will connect more directly to the neighboring community. The new layout provides a safer pedestrian environment, by placing the major functions on the outer sections of the park, more closely related to the neighborhoods. Park users will not need to cross through-traffic at the circle, except for special events anticipated to be focused around the symbolic center. In these cases, the road could be closed, re-directing traffic around the outer square, allowing the street itself to become an extension of the public space. At these times the outer road will handle traffic while also accommodate on-street parking.

Diagonal streets will stop at the outer edge of streets, and not penetrate to the center. This will simplify traffic and orientation for drivers that are moving through the Circle. It will also reinforce the existing street hierarchy, where the diagonal roads carry fewer cars, and are more pedestrian in nature. The exception to this pattern is the southwest approach of Durant, where the important connection to Rivers is maintained. The four quadrangle parks, and the center should be named, to reflect important cultural heritage and civic leaders. Careful consideration and work with the community has resulted in these recommendations, intending to increase the potential of this great asset to the community.

Southwest Quadrangle

It is envisioned this area will create an elegant aspect of street-life within the park, allowing some diagonal parking along Durant (promoting slow moving traffic), and flanking seasonal kiosks for refreshments, souvenirs, equipment, or supporting activities, such as chess games. Linked with adjacent playgrounds, this strategy offers easy access for elderly and adults with strollers, resulting in a complement to the choices in other areas. This park would also be a perfect place to incorporate interpretive projects dedicated to commerce, industry, or the naval base, acknowledging the importance of this aspect of community life.

Northwest Quadrangle

This area is the most open, intended as a public green that allows it to accommodate a variety of ad-hoc activities, such as an occasional game of touch football, or simply being in the sun. A walking trail around the perimeter would be a replacement for the old inner circle walking path. The quadrangle is large enough so that three laps would equal a mile, continuing the tradition of walking for exercise in Park Circle.

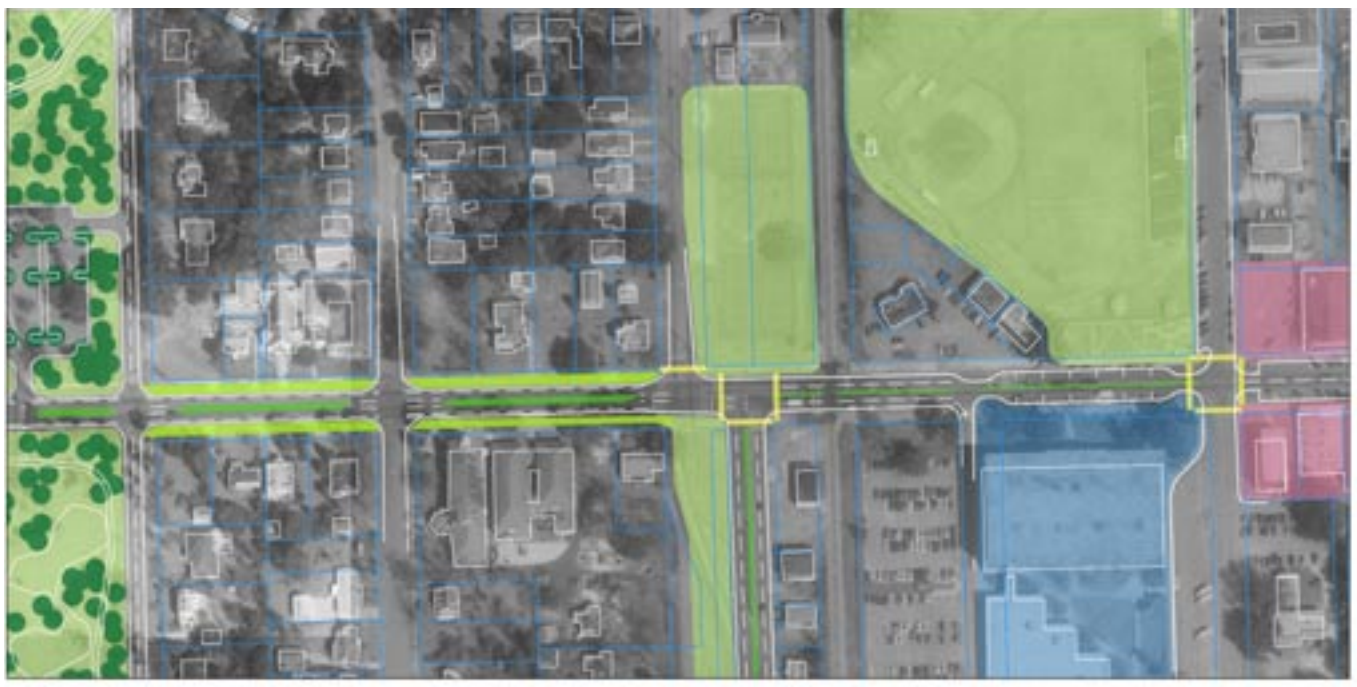
Northeast Quadrangle

This quadrant is considered the prime location for a new community center, bringing back the strong architectural qualities of the original USO building which was taken away by Hurricane Hugo. It also is closer to the Old Village, and the old Garco site, but most importantly stands across from the approach from Durant, and will thus provide a much needed orientation device for those traveling around the circle.

Southeast Quadrangle

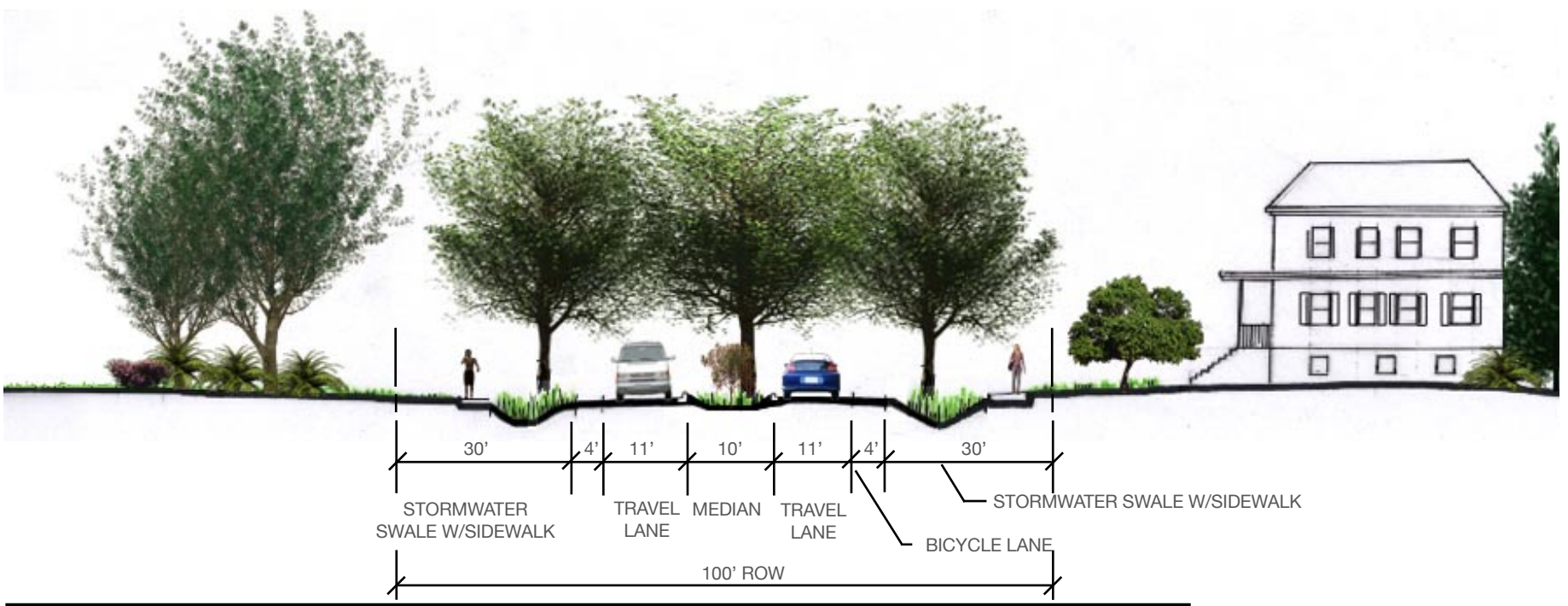
This quadrangle was originally part of a finger of the Noisette Creek watershed, and as part of the overall green space and infrastructure strategy, will represent the aesthetic of the indigenous Lowcountry landscape. Stormwater can be retained, and linked to a series of other green spaces to the southeast, such as the “Duck Pond” at Quarterman Park, and the Noisette Preserve beyond. Trails through these more natural areas can be educational and enjoyable, providing places of rest and solitude.

Zone D: Changes from East Park Place to Jenkins Ave



LEGEND

- Existing Commercial
- Neighborhood Center Sites (Land Use Change
- New Building (Mixed Use)
- Pedestrian Crossing
- Sustainable Stormwater Swale
- Proposed Median
- Open Space
- Existing and Infill Residential
- Existing Public Buildings



MONTAGUE AVENUE: ZONE D

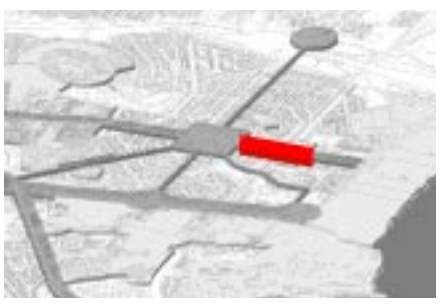
From Park Circle to the historic commercial district, East Montague becomes a shaded avenue flanked by the residential districts of Old Village, St. John’s and O’Hear to the south and Northeast Park Circle neighborhood to the north. To enhance the intimate feel of the area, to improve the stormwater collection and to make a more walkable environment, a median of trees is introduced to create a boulevard with additional street trees in planted areas on each side. This street design will serve to calm traffic, and link the north and south sides of Montague.

A key intersection is Montague at Spruill. The current condition attempts to resolve the northern termination of Spruill as arterial. This important axis should terminate on a major structure, signaling the arrival into the Olde North Charleston Historic Business District. As is, this intersection currently feels more like a barrier than a gateway. The importance will increase with the added north / south pedestrian / bikeway.

At the east end of the zone, the North Charleston High School provides a gateway to the neighborhood commercial district and historic commercial center of North Charleston. This area would benefit from a more welcoming appearance from the street, which is currently chain link fence and concrete walk to the curb. An improved fenced edge, shade trees and a planting bed with detailed pavement as shown in the sketch (on the following page) will provide a more pedestrian friendly environment.

These new projects, along with streetscape / landscape enhancements will transform this area.

View looking east along Montague Avenue

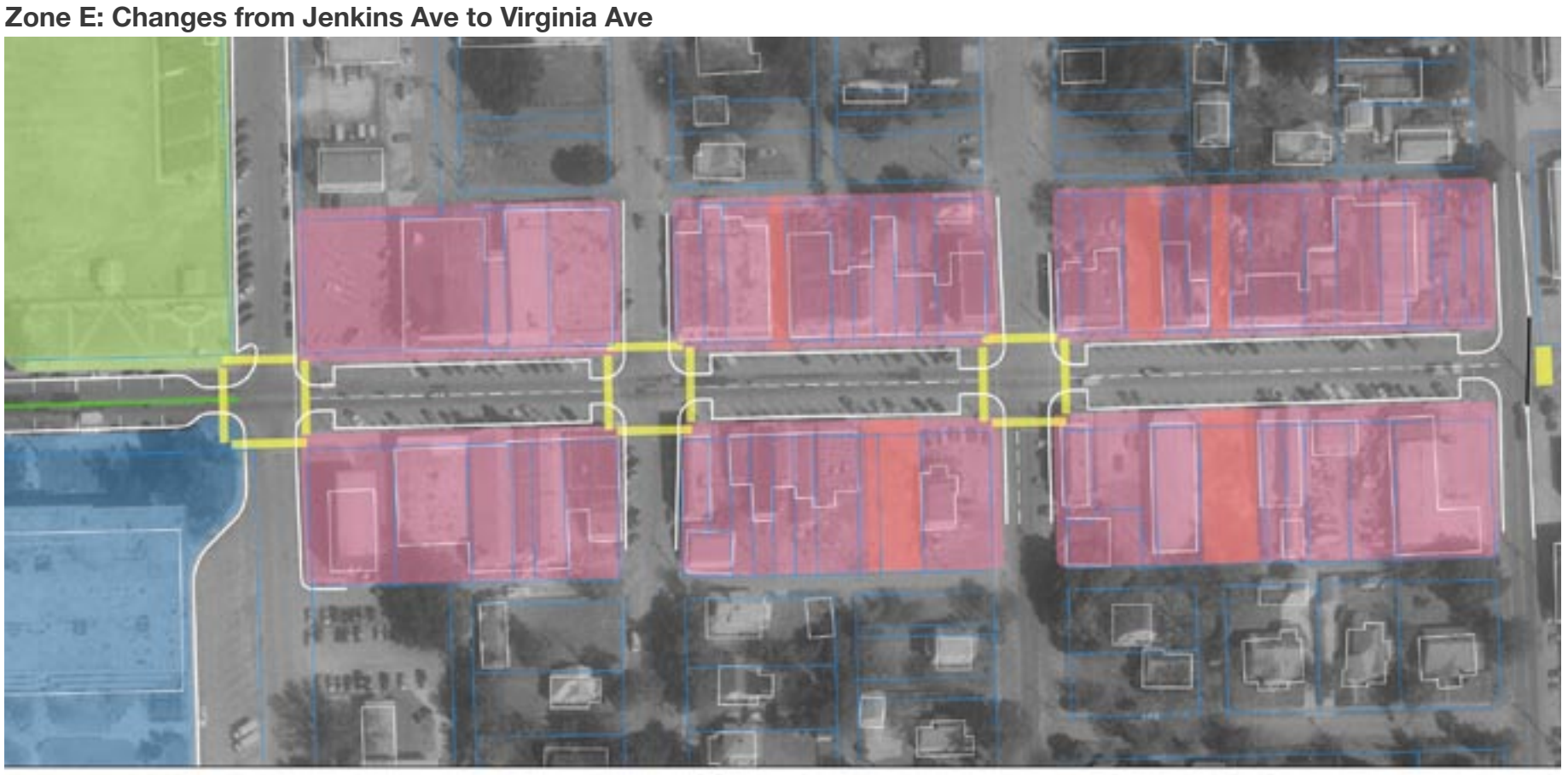


Kep Plan of East Montague

View of streetscape along Montague Avenue in front of the North Charleston High School

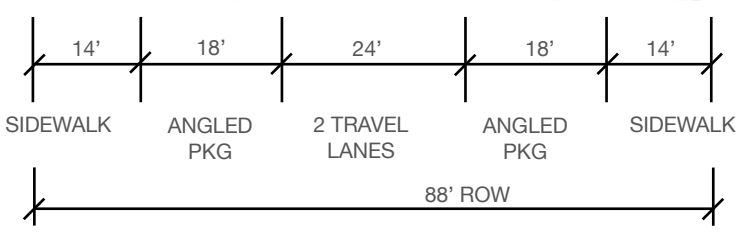
Enhancements to the streetscape increase image of property, encourage pedestrian movement and beautify the Montague Avenue corridor.

Zone E: Changes from Jenkins Ave to Virginia Ave



LEGEND

- Existing Commercial
- Neighborhood Center Sites (Land Use Change)
- New Building (Mixed Use)
- Pedestrian Crossing
- Sustainable Stormwater Swale
- Proposed Median
- Open Space
- Existing and Infill Residential
- Existing Public Buildings



MONTAGUE AVENUE: ZONE E

The historic commercial district of “Old Village” is a traditional “Main Street” with predominantly two story masonry buildings and diagonal parking on both sides of the street. Already experiencing a renaissance, new businesses have been locating in the existing buildings, including restaurants, a small grocer, and some small shops. The nightlife has been augmented by a pub, so that people and cars occupy East Montague day and night.

Although the Old Village already has much of the desirable “small town” attributes of storefronts, parking and scale, some improvements would create a more cohesive, inviting environment. The existing pear trees represent the primary landscaping and do not provide shade. Few sidewalk upgrades and minimal activities exist; so few are enticed to walk down the blocks. Several vacant lots decrease the amount of business and people in the area.

The strategies to improve this district focus on building the approximate scale and type of activities, while creating a more distinctive walkable environment. The central theme is to make the district more attractive to both businesses and customers. Public and private investments need to coordinate to build on each other. The city has initiated planning for streetscape improvements which will include shade trees with a higher canopy to connect the rows, without blocking the signage and views into the window displays. Pedestrian level lighting to make the sidewalks safer and more inviting can also light the streets and serve as a standard for customized banners.

Individual property owners should engage the sidewalk zone with awnings for shade and color, window displays and sidewalk activities, to emphasize the importance of the front entry. Signage should not only face the street, but also the pedestrian, by mounting small, lower signs perpendicular to the walk to address pedestrian traffic. Café seating, benches and plantings at doorways and windows which entice customers, can bring a new vitality to the district. Corner identification and street signs will also add to the Old Village’s distinctive identity.

Looking east along Montague Avenue shows existing angled parking and some landscaping.

Key Plan of Old Village

Before - Existing view of Old Village at the intersection of Montague Avenue and Chateau Avenue. Notice the existing crosswalk, street trees and angled parking.

After - The proposed concept maintains the existing angled parking space infront of the commercial development. Additional landscaping and streetscape amenities are added. At each intersection the curbs are pulled out into the pavement, better delineating pedestrian paths and shortening distances traveled between curbs. Each intersection is further delineated with landscaping benches, and trash/ash receptacles. It is the hope that new commercial developments will infill Old Village.

View looking east on Montague Avenue into Old Village

View of existing commercial development in Old Village

The steel tanks at the end of Montague currently act as a landmark and offer a powerful visual reminder of the relationship of the Cooper River and industry. In the future, this land is planned as a public access point to the river, and will give dramatic views which will enhance the value and importance of East Montague historic district. The City of North Charleston has engaged planners to begin the process of improvements using walkability principles and building a distinctive district identity for Old Village.

View of existing streetscape along the north side of East Montague Avenue in the historic commercial district. The lack of activity is accentuated by minimal windows or street furnishings. The street trees are not appropriate for this condition because they do not have a shade canopy.

New landscaped planting beds and shade trees will soften the pavement edge and elevate the historic district's visual quality while reducing the heat island effect. Shops with activities on the sidewalk such as displays and furniture would add to the vitality. Colorful awnings, banners and signage that face pedestrians offer information, protection from the elements and identify stores and the district as a unique place. New infilled buildings will reestablish this as a vital area.

Existing East Montague storefronts with on-street angled parking.

Historic structure houses popular restaurant.

Existing streetscape does not provide adequate shade or visual elements.

Durant Avenue

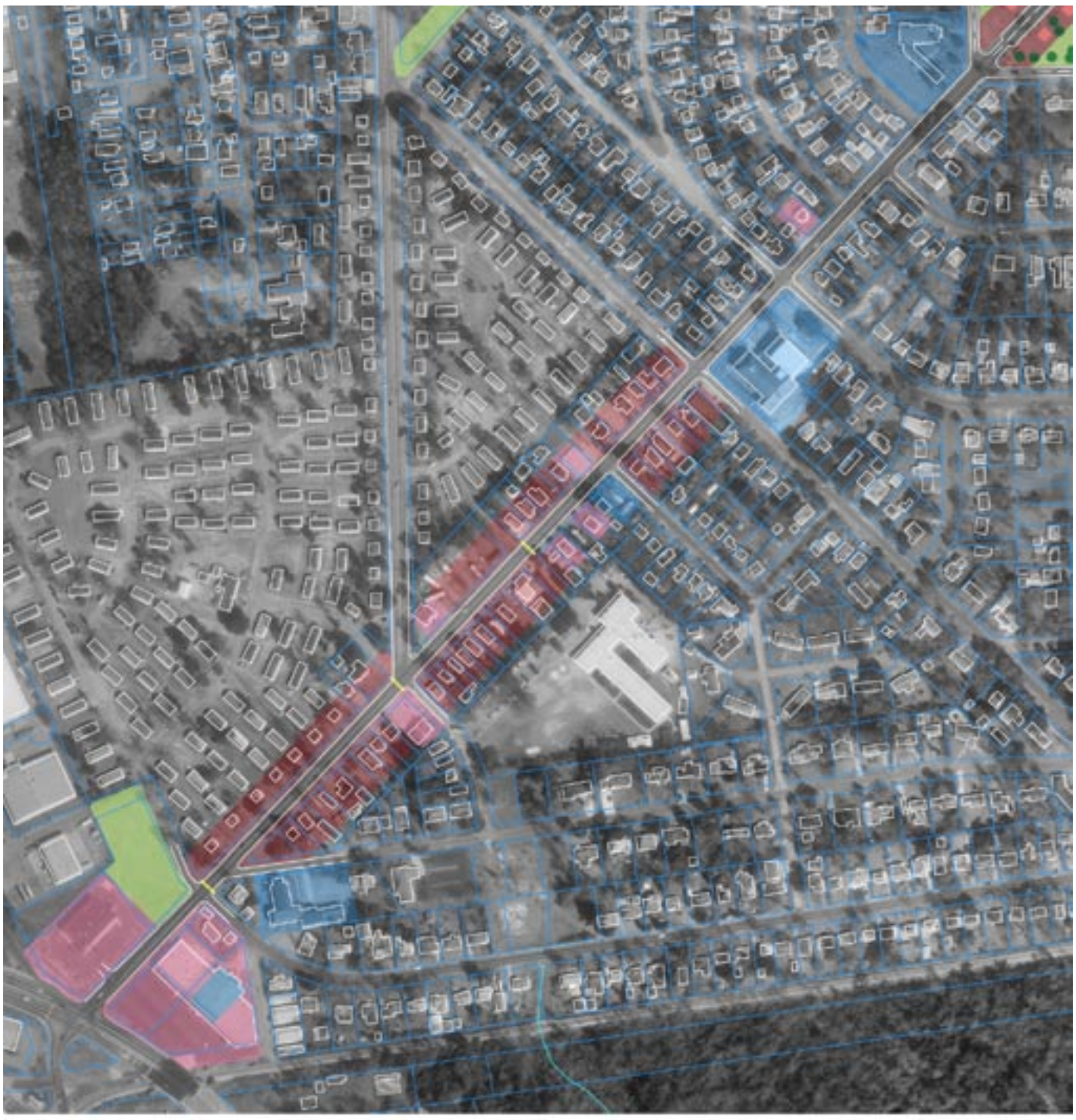
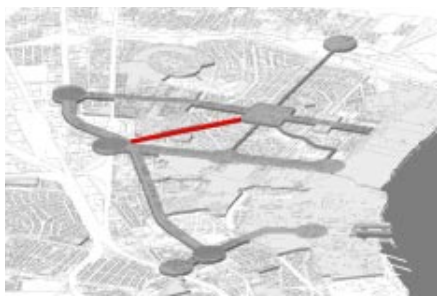


Image looking across Durant Avenue

Image looking down Durant Avenue



Key Plan of Durant Avenue

Durant Avenue serves two unique functions. It acts as a distance shortening route for people traveling from Rivers Avenue to Park Circle and surrounding neighborhoods, and it supports several long term stable businesses and churches that line its sides. Many of these are shown on the above map. As such, it is a very successful street. Due to its narrow width, the traffic is not fast, and people can be found walking under the mature trees. The connections between neighborhoods are easily accomplished. Unfortunately, overhead lines have caused the tree canopy to be disfigured through pruning.

Recommendations for Durant include continuing to foster an environment where shops, offices, churches, schools and houses coexist. This rich mix of uses allows people to stay in their neighborhood for many needs and to walk or ride bikes to these places, which builds a sense of community. The street needs to be maintained with better defined edges and improved street lighting. The businesses can add to the vitality by using their storefronts as displays and places of activity, such as outdoor dining or shopping. To create a true shaded avenue, the overhead lines need to be buried, and additional trees should be planted to augment the mature trees. Durant can remain a strong access route between the important Rivers Avenue area and Park Circle.

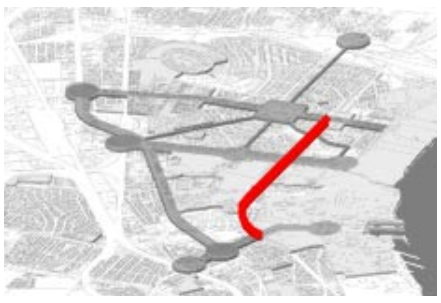
Before: View shows existing commercial development with street side parking. The existing situation provides minimal pedestrian circulation and few pedestrian connections to the surrounding community.

After: Future development will enhance the street environment. Bike lanes and designated parking areas are added. In addition, street lighting with banners will enhance the space.

Spruill Avenue

Spruill Avenue: Changes from Montague to Cosgrove Avenue

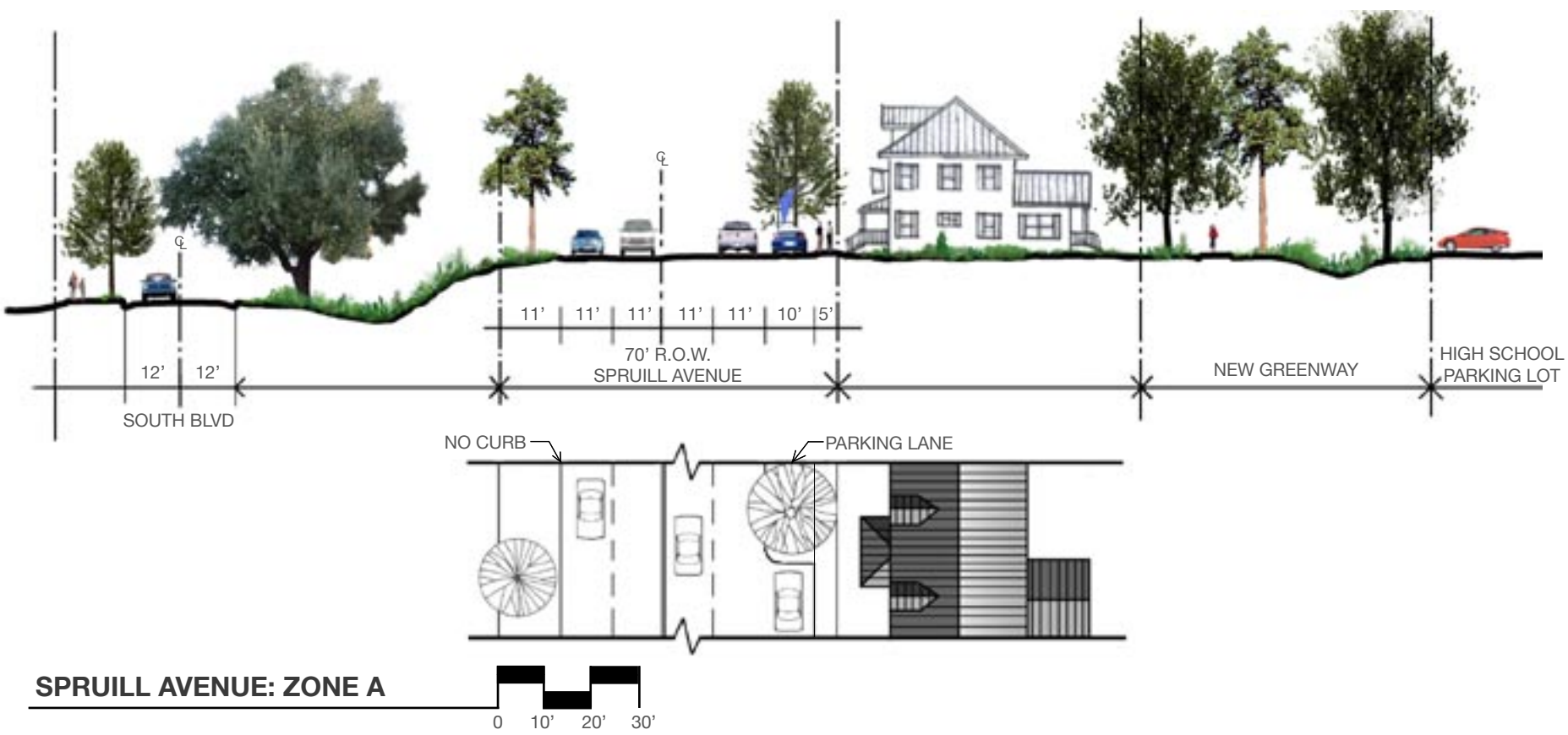
Spruill Avenue is another neighborhood connector in the Noisette area that is in need of improvement. The central length of Spruill Avenue through the Noisette area still supports a viable neighborhood business district. Unfortunately, the street is car-oriented and does more to divide the adjacent neighborhoods, leaving its potential to be a strong connector unrealized. Like many parts of the Noisette area, Spruill still has the basic building blocks to become a vibrant corridor.



Key plan of Spruill Avenue

As part of the strategy to revitalize Spruill, this plan recommends that the City of North Charleston work with CSX Railroad to convert the currently active railway along Spruill into a greenway, finding ways to reroute rail access to the MeadWestvaco facility. If this can be achieved, the existing easement will become an important connector to the proposed path system throughout the Noisette area, linking Filbin Creek, the Old Village neighborhood, the Michaux Promenade, the Noisette Preserve, and the new River Center at Noisette. The greenway would provide a variety of experiences along the length of Spruill Avenue, as well as providing an opportunity to incorporate stormwater management strategies that have been discussed in the preceding chapters of this plan.

From Montague Avenue south to Aragon Street, Spruill Avenue is primarily lined with businesses. At the northern end of this section of Spruill, the commercial zone is on the east side of the street only. This plan proposes the modification of the street to incorporate a parking lane on the east side of the street to better serve the existing businesses, which do not have access behind the buildings because of the railroad easement. The parking lane would be interrupted at regular intervals to provide street trees. The zoning should be modified so that new construction will be built at the lot line, strengthening the relationship of the buildings to the street. Sidewalk improvements, including plantings, paving materials, and lighting would be replaced to emphasize the new pedestrian focus. The opposite side of the street, down to Quarterman Park, would be more aggressively landscaped; and it could be utilized for stormwater management. Because of the residential nature of the west side, and the vegetated separation, a new sidewalk would not be proposed. However, beyond Quarterman Park, the west side of the street is also occupied by viable business uses. At this point, similar sidewalk improvements as those on the east side are proposed; and



The variety of setbacks of businesses on Spruill Avenue and wide right-of-way make the street uninviting to pedestrians.

A center vegetated median as proposed in Zone B reduces the scale of the street. Sidewalk improvements and new infill construction define a zone for pedestrians.

Spruill Avenue: Zone B

SPRUILL AVENUE: ZONE B

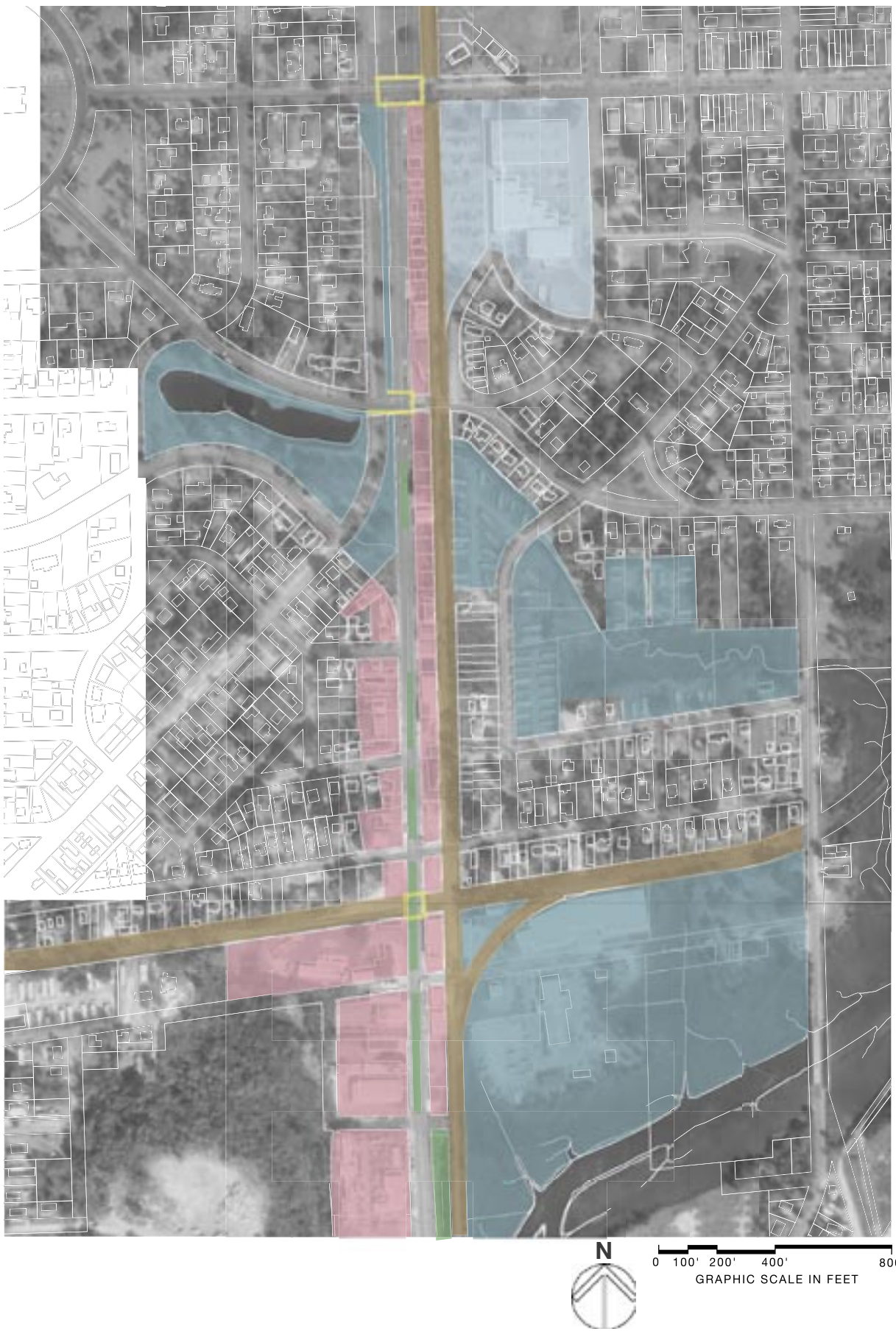
0 10’ 20’ 30’

LEGEND

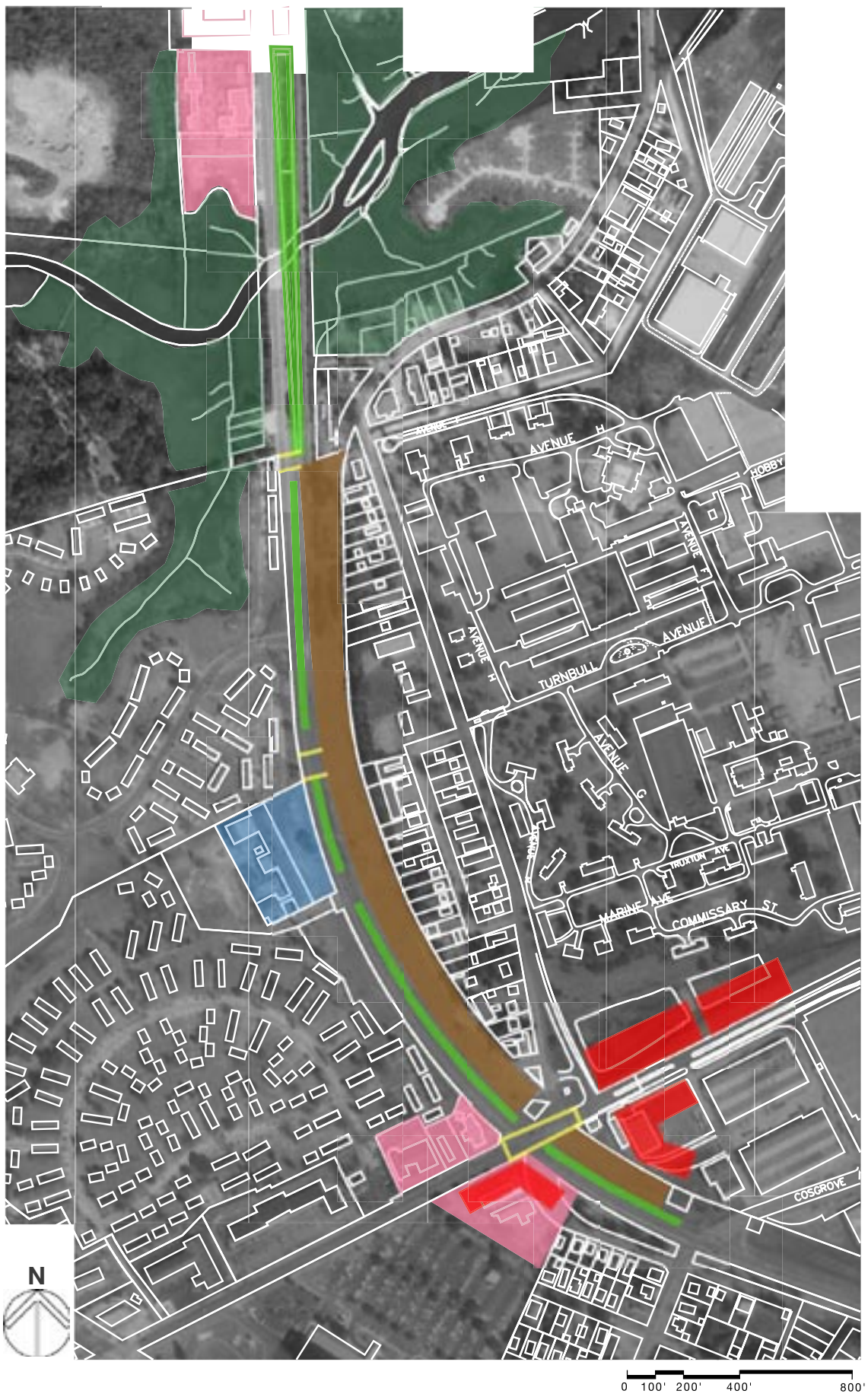
- EXISTING COMMERCIAL
- NEIGHBORHOOD CENTER SITES (LAND USE CHANGE)
- NEW BUILDING / NODE (MIXED USE)
- PEDESTRIAN CROSSING
- SUSTAINABLE STORM WATER SWALE
- PROPOSED MEDIAN
- OPEN SPACE
- EXISTING AND INFILL RESIDENTIAL
- EXISTING PUBLIC BUILDINGS
- NEW ROAD EXTENSION
- RAIL TO TRAIL PATHS

new infill businesses should be built on the lot line. Unlike the east side, the west side of the street does have the opportunity to take advantage of access at the rear of the lot. An alley could provide access, while the building frontage could address the pedestrian scale; and a parking lane would not be required. As the right-of-way width increases as one travels south on Spruill, the street would include a vegetated median to bring down the scale of the street.

Conversion of the railway easement provides an exciting opportunity to the businesses on the east side of Spruill Avenue. The possibility also exists for this rail link to remain in place for future use as a light rail passenger link to downtown Charleston, while maintaining the functions of the proposed greenway. Though they may seem at a disadvantage because of the lack of vehicular access to the rear of the lot, the greenway offers the opportunity to make these buildings have dual frontage. The “back door” of these buildings becomes a new face on the park-like setting of the greenway. Retail businesses and restaurants would have the opportunity to pull customers in from the bike path. Juxtapositions of this type offer the opportunity for creating wonderful outdoor spaces. While the properties values may have once suffered because of the train, the new trail is likely to increase property values and infuse the economy with increased business activity.



Neighborhoods



LEGEND

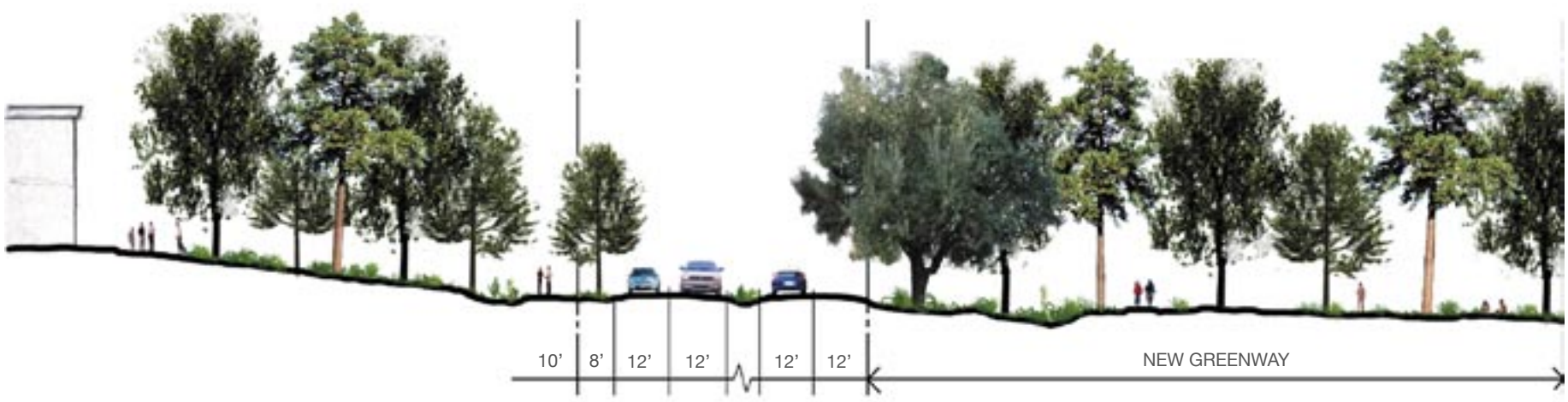
- EXISTING COMMERCIAL
- NEIGHBORHOOD CENTER SITES (LAND USE CHANGE)
- NEW BUILDING / NODE (MIXED USE)
- PEDESTRIAN CROSSING
- SUSTAINABLE STORM WATER SWALE
- PROPOSED MEDIAN
- OPEN SPACE
- EXISTING AND INFILL RESIDENTIAL
- EXISTING PUBLIC BUILDINGS
- NEW ROAD EXTENSION
- RAIL TO TRAIL PATHS

South of Aragon Street, the remaining area that is currently zoned for commercial activity should be restricted to business uses that are compatible with the Noisette Preserve, such as a native plant nursery or bicycle rental shop — businesses that support the preservation of the tidal wetlands and the low-impact recreational and educational use of the preserve.

Between the preserve and McMillan Avenue, Spruill Avenue takes on a different character. The uses along the street here are primarily residential in nature and are set back from the street as well as being located at different elevations than the roadbed. The new Horizon Village housing development will greatly strengthen the connection to the housing that is proposed in the River Center at Noisette and housing in the existing St. John's/O'Hear neighborhoods. This makes a strong case for improving the experience of the street for the pedestrian. Horizon Village will also be connected to the River Center at Noisette by the extension of Turnbull Avenue, creating a node at the intersection with Spruill that will signal the entrances to the two residential neighborhoods. The character of Spruill here can become that of a park instead of a street — with the greenway expanding in width to well over one hundred feet. This allows the bike path to meander through new trees, with areas for active recreation and opportunities to create water features for stormwater management.

Finally, the intersections of Spruill with Cosgrove and McMillan will become new entrances into the River Center at Noisette, with new buildings anchoring the corners. Both will become centers of commercial activity with retail at the street level and emphasis on a strong relationship to the pedestrian. These intersections will be the anchors of the greenway.

This is another example of triple-bottom-line performance- improving the environmental quality of the corridor, creating more vibrant people-oriented places for improving social health, and boosting the economic performance of the businesses along Spruill Avenue.



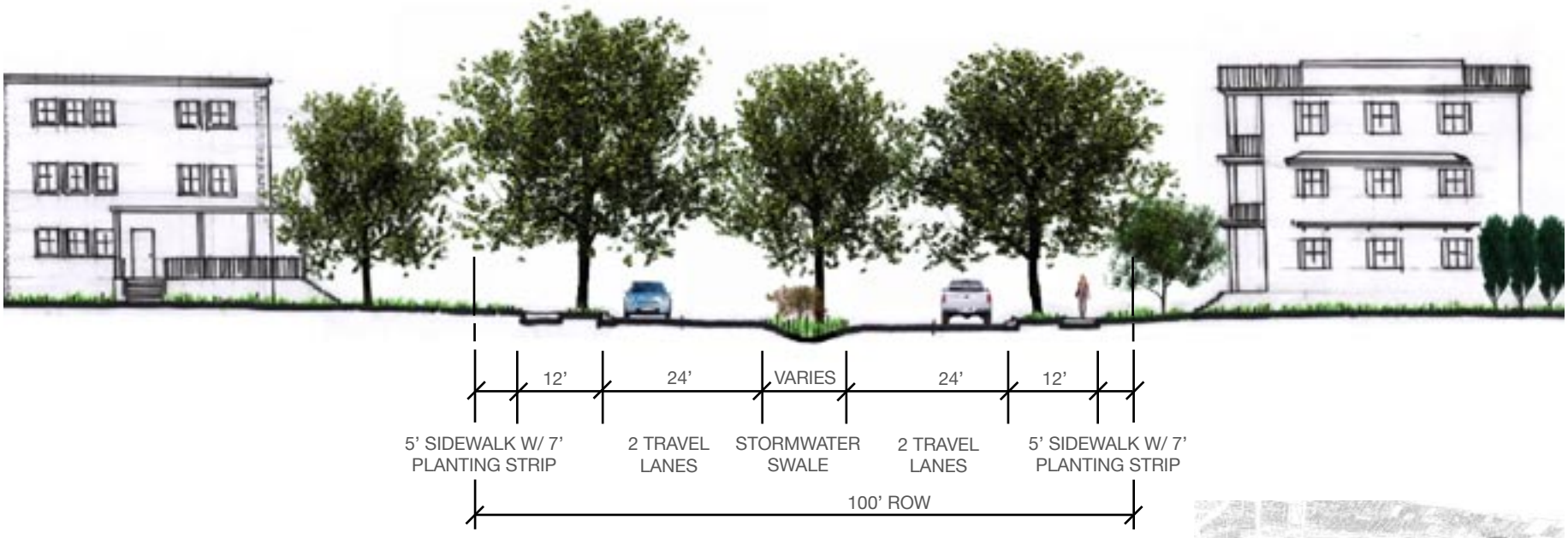
SPRUILL AVENUE: ZONE C

0 10' 20' 30'

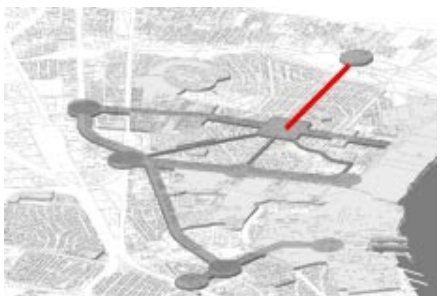
North Rhett

The north / south connectors in Noisette tie the Park Circle area to the new River Center and adjacent areas. These streets run parallel with the interstate highway, and so primarily serve local traffic. As River Center grows and together with the Noisette Preserve becomes utilized as a regional destination, the north/ south streets that will gain traffic are Virginia Avenue from the north, with North Rhett as a secondary route, through the historic downtown. With additional people in living and working at the River Center, the travel trips will remain local due to the cluster development. That is, people will be traveling within the Noisette district, to schools, churches, shops and recreation.

North Rhett gives access to Interstate 526 from Park Circle, so at peak travel times, carries enough traffic to warrant the four lanes. In order to add shade that reduces heat island effect and improve the storm water run-off that occurs on large expanses of pavement, a planted median strip is introduced. This will allow drivers a more intimate experience, while also giving a reasonable place for walkers and bikes. North Rhett will remain a primary north/ south connector, especially when there are special events such as festivals at Park Circle.

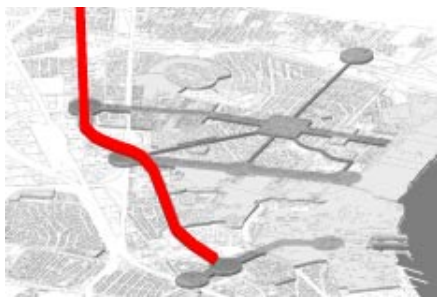


NORTH RHETT



Key Plan of North Rhett

Rivers Avenue



Key Plan of Rivers Avenue

"There is more to life than increasing its speed."

-Mahatma Gandhi

View across Rivers Avenue looking into the proposed Noisette Preserve

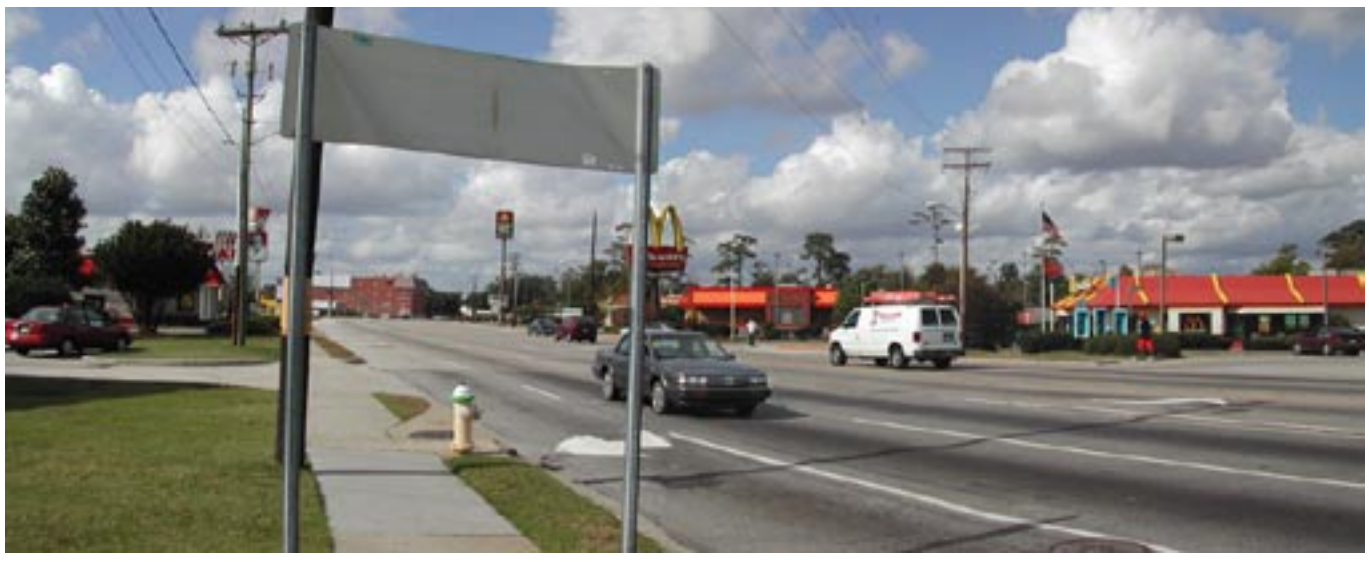
Rivers Avenue: Taking back the sidewalk

Rivers Avenue is often called the "Dual Lane," a once-prosperous commercial corridor and strong link to the southern part of the peninsula. Its character varies widely as it winds through the city of North Charleston. In the Noisette area, Rivers Avenue is a wide, predominantly automobile focused thoroughfare with few amenities and compromised aesthetics. The corridor that once had a vegetated median has become a concrete ribbon accommodates speed and little else.

The concrete ribbon is three lanes in each direction, with a continuous wide turn lane for most of the length of Rivers within the Noisette area. Toward its northern end, the vegetation in the median has been maintained, greatly changing the character. At various points, additional lanes accommodate access to other crossing roads. North of the Noisette area, Rivers Avenue is a heavily traveled commercial strip- but its character is the nondescript sprawl that plagues communities all over the U.S. It's a character that contains no identity; it says nothing about North Charleston. Despite its character, it remains today that Rivers is an important corridor. But, the character along the Noisette border begs the question- Is Rivers Avenue serving the community in most beneficial way? Perhaps changes over the years have resulted in different needs.

Streets define communities. Just as contemporary planning and zoning tend to segregate uses, streets have been engineers to separate the pedestrian and the car. Rivers Avenue is definitely NOT pedestrian-friendly. The concrete ribbon signals to the community that pedestrians are less important to cars, and worse yet, that the primary reason to travel on Rivers Avenue along the Noisette area is to pass by it. Because streets are infrastructure in which the entire community has invested, they should not be solely for the function of getting a car from point A to point B. Streets should be places for people first. They should serve as access for commerce second. They should provide parking third. And, they should accommodate through-traffic last. While serving these functions for the community, they must also work in harmony with natural systems- addressing movement of stormwater, the impacts along natural edges, and the unavoidable interactions with other species. The concrete ribbon of Rivers Avenue must change to reclaim the street for the people of the community.

View north on Rivers Avenue at the intersection of Rivers and McMillan



From Concrete to Green: People first, cars second

The area along Rivers Avenue needs to become a place that one drives to, not through. There are two ways to change this- one, decrease the number of lanes on Rivers; and, two, change the character of the uses. The amount of traffic on Rivers Avenue is far less than the design of the road can accommodate. The street is over-designed for cars, and under-designed for people. As more commercial uses have been developed north of the Noisette, the businesses along Rivers Avenue have suffered. This is illustrated in the sketch showing the length of Rivers along the Noisette area- the red areas represent empty lots with frontage on Rivers. The sketch doesn't even address the number of businesses that have failed to make it, their doors no longer open to the community. The street is now dotted with too many places with no activity, too few eyes on the street, and too many reasons to stay in your car and keep driving.

This plan proposes that the street edge be changed to better accommodate pedestrians, slow traffic down, and create a corridor where small businesses may have a chance to survive. The street width needs to change, too, with a restoration and widening of the vegetated median. Contrary to the expectations of some, property values on narrow streets quite often exceed property values on similar wider streets. If traffic is calmed, convenient parking is provided, and the character of the sidewalk is made more pedestrian friendly, drivers might not mind the changes in pattern or flow of traffic. And, why should Rivers Avenue accommodate fast moving through traffic? That's the purpose of Interstate 26!

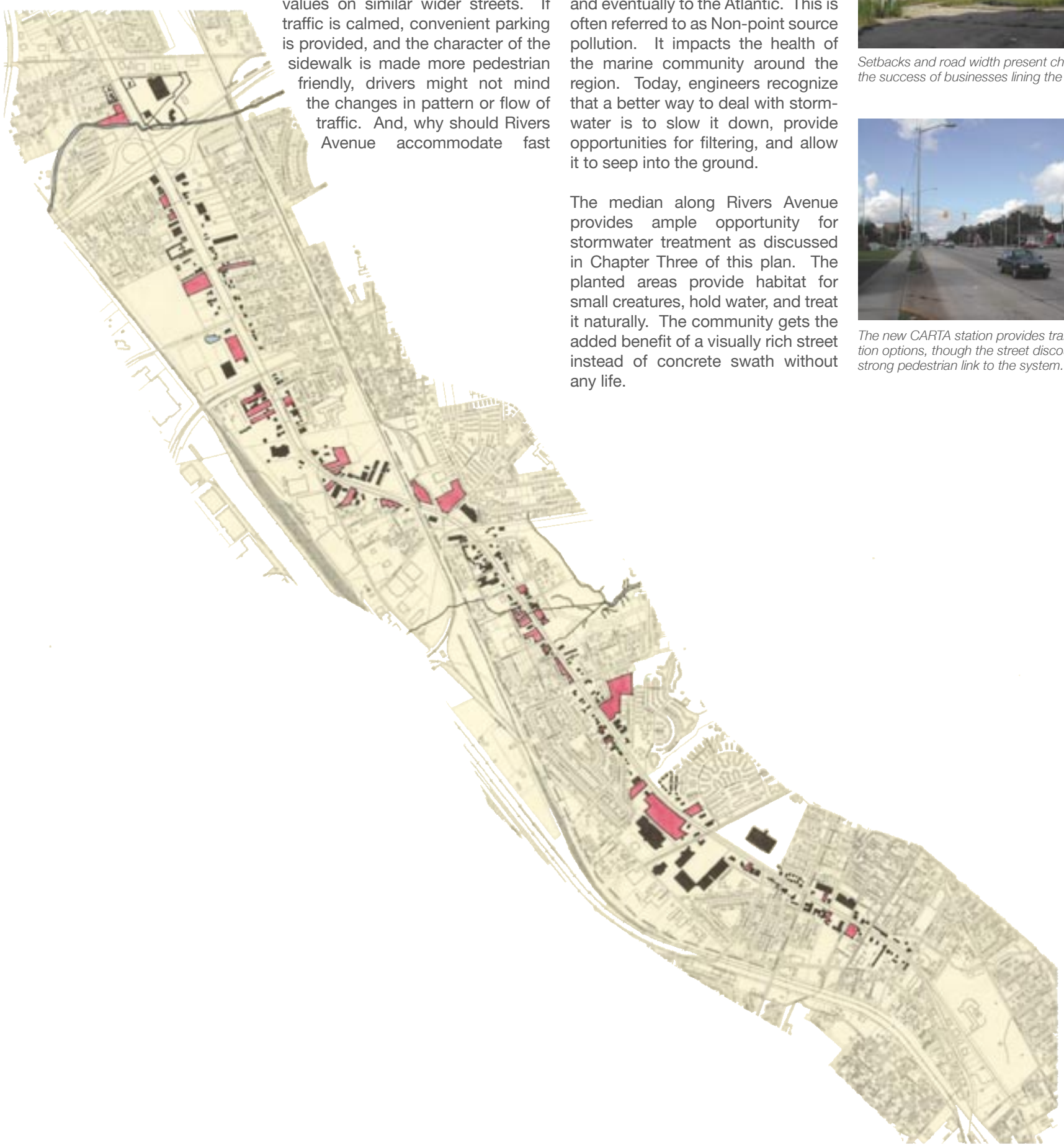
What happens in the vegetated median? Roads typically contribute large amounts of stormwater runoff. Engineers usually addressed this as a problem with one solution- put the water in pipes and move to another location as quickly as possible. Everyone understands why it is important to keep water off of roads, but this is not the only solution to dealing with stormwater. It is a solution that contributes to the primary water quality problem in the Charleston metropolitan region. Stormwater runoff from roads carries all kinds of pollution and contaminants into surrounding creeks, rivers, and eventually to the Atlantic. This is often referred to as Non-point source pollution. It impacts the health of the marine community around the region. Today, engineers recognize that a better way to deal with stormwater is to slow it down, provide opportunities for filtering, and allow it to seep into the ground.

The median along Rivers Avenue provides ample opportunity for stormwater treatment as discussed in Chapter Three of this plan. The planted areas provide habitat for small creatures, hold water, and treat it naturally. The community gets the added benefit of a visually rich street instead of concrete swath without any life.

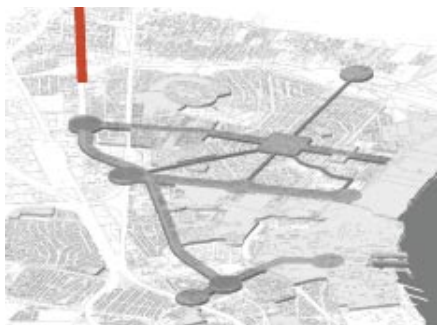
Intersection of Rivers and Melbourne Avenues

Setbacks and road width present challenges to the success of businesses lining the street.

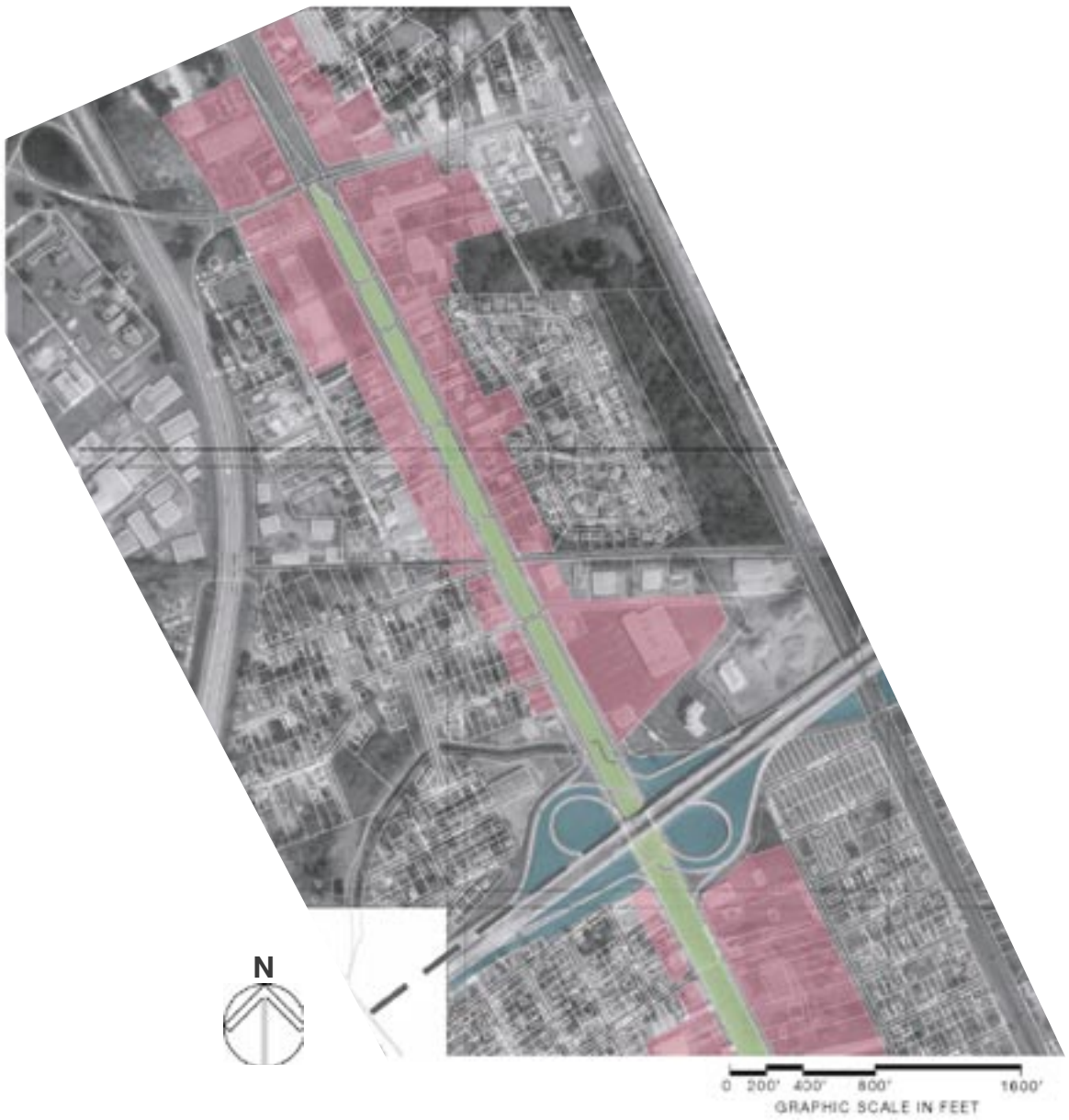
The new CARTA station provides transportation options, though the street discourages a strong pedestrian link to the system.



Zone A: Changes from Remount to I-526



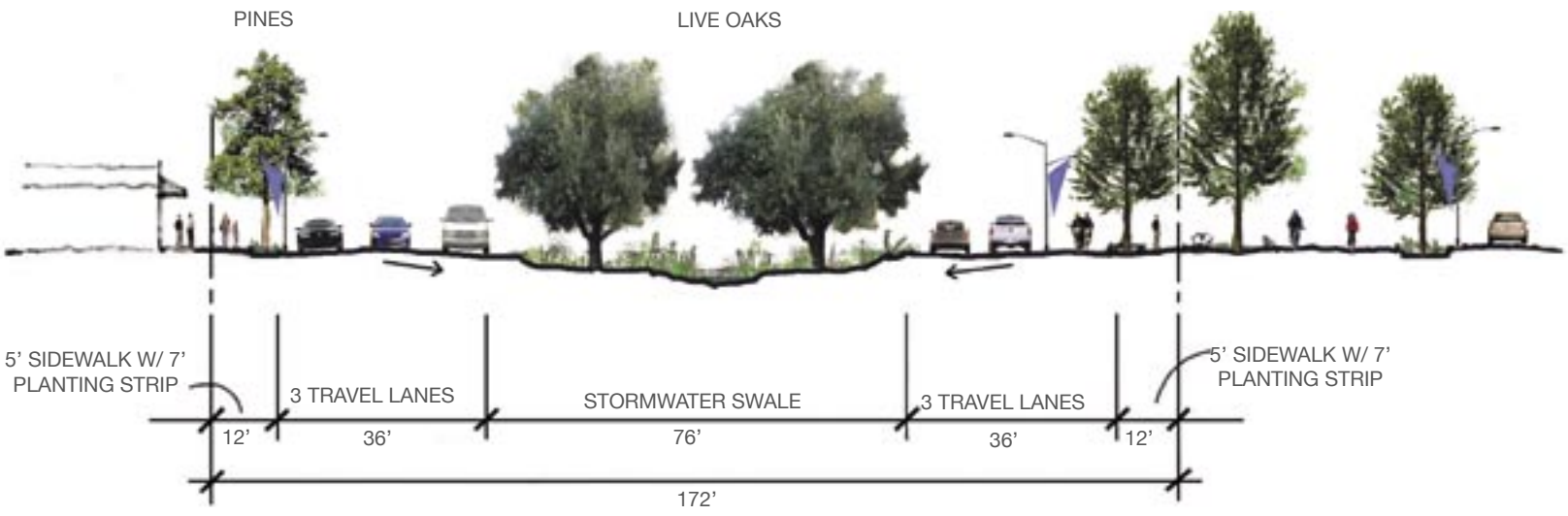
Key Plan for Rivers Avenue: Zone A



Traffic stalls on Rivers Avenue while waiting for a train to pass a surface crossing.

This section of Rivers Avenue is subjected to heavier traffic loads than the length of Rivers that borders the Noisette area. The success of the commercial uses in this zone has been supported by the design of the street instead of compromised. This section has also maintained the vegetated median that was paved in areas to the south. Still, improvements can be made. The median can be much more aggressively planted and modified for more effective stormwater management, as can the areas surrounding the I-526 access ramps. Property owners should be encouraged to provide planted areas in their parking lots and also along the sidewalk. These kinds of changes may help to attract more customers to the existing Piggly Wiggly grocery store that serves the area.

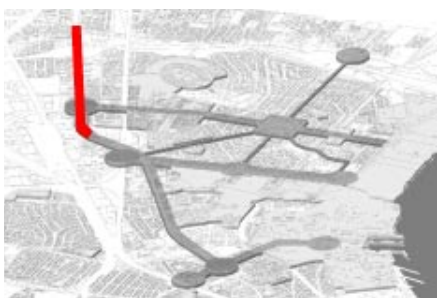
Retail box stores on Rivers Avenue



RIVERS AVENUE: ZONE A

0 10' 20' 30'

Zone B: Changes from I-526 to Polar Street



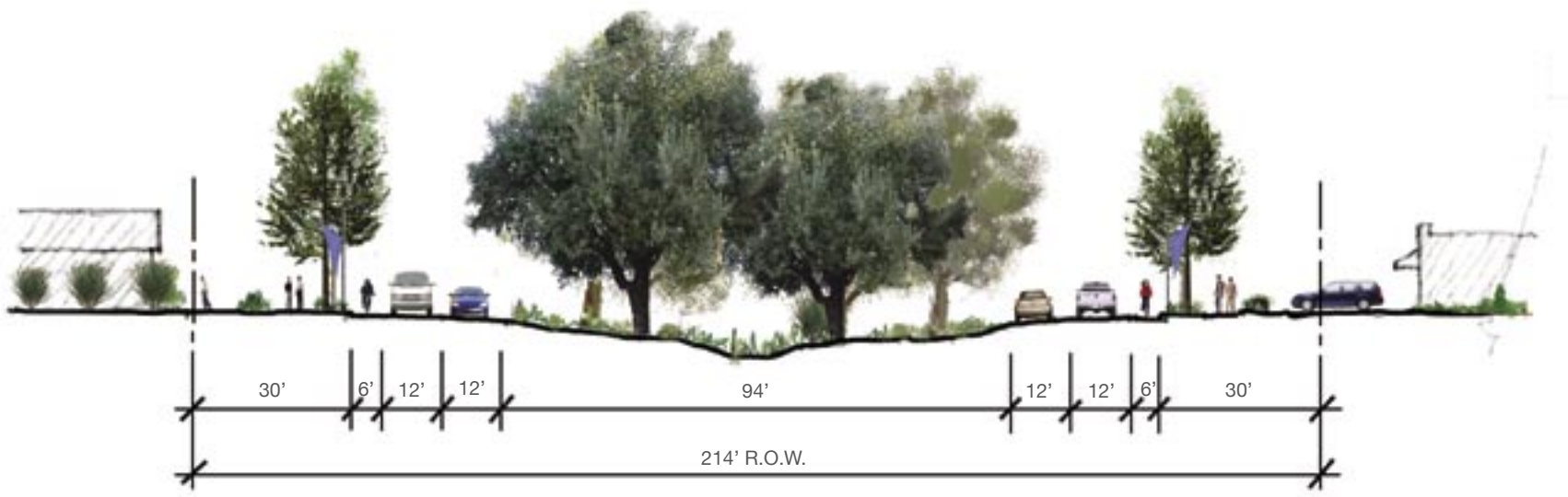
Key Plan for Rivers Avenue: Zone B

Moving south on Rivers Avenue, the character of uses changes from that of Zone A. This section is a mix of commercial and residential uses with some well established residential neighborhoods and some strong businesses. There are fewer curb cuts, and there is less traffic. Here, too, the road would greatly benefit from a reduction in width to two lanes of traffic in each direction, with turn lanes where they might be required. As in Zone A, this section still has the vegetated median with the same opportunities for storm-water management and more aggressive landscaping. This section may benefit from the introduction of a bike lane.

Zone B offers other opportunities for changing the character of the road dramatically. Mall road intersects Rivers near the midpoint of Zone B, providing an opportunity to link the community to the city's civic center. As North Charleston has grown over the years, it has outgrown the facilities at City Hall. The city needs new space for locating services that can't be accommodated in the existing facility. The old mall site is now what some refer to as a "greyfield." Many are familiar with the term "brownfields," which are contaminated urban sites, and the term "greenfields," which are undeveloped natural lands. Greyfields are failed retail centers surrounded by large areas of parking. Slightly less than twenty percent of regional malls nationwide verge on falling into this category. This provides a perfect opportunity for the City Hall to jump across the street, centralizing city services and avoiding the confusion that might be caused by locating city services in multiple locations. The mall site has a few surviving and viable businesses, offering the seeds for redeveloping the site in a way that turns it inside out. Where an old mall building was once surrounded by parking, development of the sites can push the buildings out to the edge, strengthening the relationship to the street and utilizing the site for mixed development that creates more place than parking lot. But, arguably, adding to the potential of redeveloping this site is the opportunity for turning it into a real civic center. This opportunity makes the intersection of Mall Drive and Rivers Avenue much more important. City Hall needs to be queued as a destination at this intersection with proper signage, landscaping, turning lanes, and possibly changes in the pavement material.

Another opportunity for change along this section of Rivers Avenue exists at the Montague Avenue overpass. The bridge should be utilized as an opportunity for public art, with designs to enhance the visual appearance of the bridge above the road, as well as improvement in the structural supports. The necessity for one road to cross over another does not have to be only a function of transportation, it can become an event if it is addressed so. Beautiful bridges are celebrated all over the world, and this one could become special.

Finally, another important resource is accessed from Rivers Avenue in Zone B. Morningside Middle School is tucked behind a few small business and residences at the end of Polar Street. Much like the city hall, this intersection should signal the destination. The role of schools in the city needs to be enhanced, as discussed in chapter 5, and the street needs to respond to the function of schools as centers of the community.



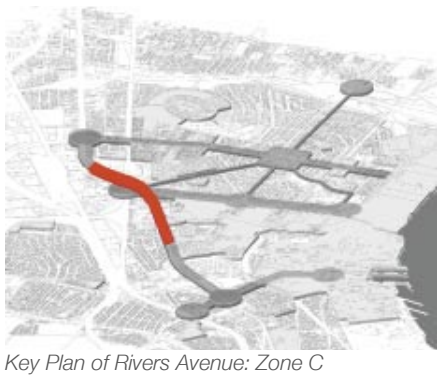
RIVERS AVENUE: ZONE B

0 10' 20' 30'

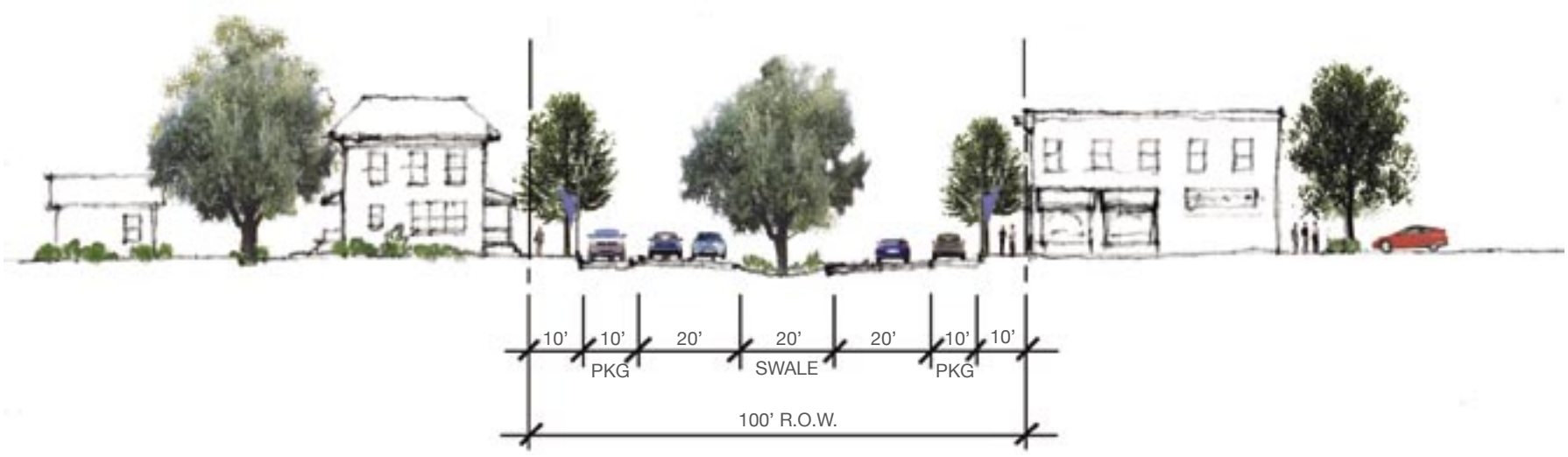
Zone C: Changes from Polar Street to Aberdeen Avenue

View across Rivers Avenue looking into the proposed Noisette Preserve

View west to Rivers Avenue on Durant Avenue



Key Plan of Rivers Avenue: Zone C



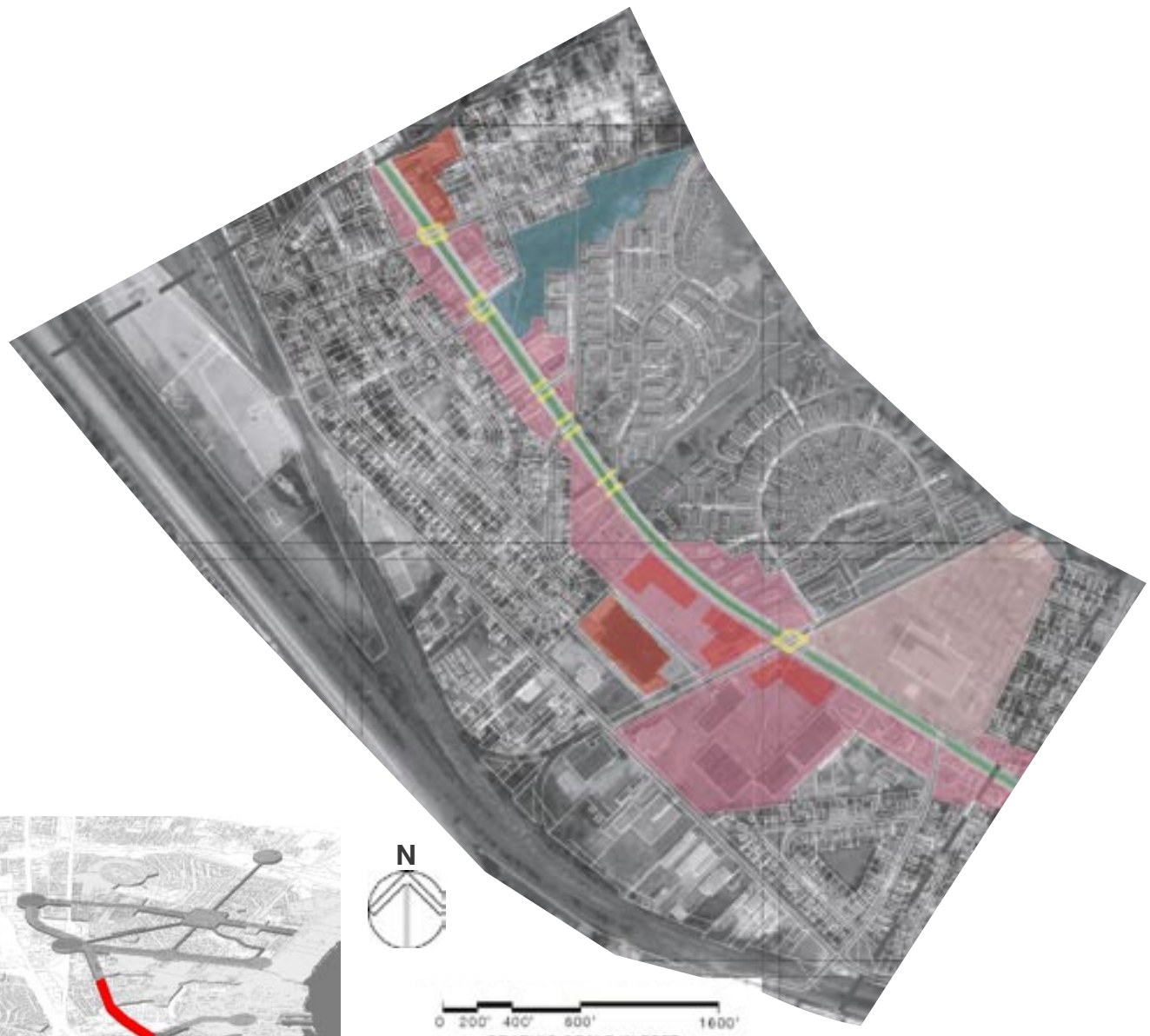
RIVERS AVENUE: ZONE C

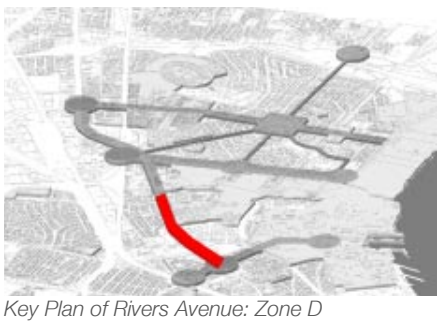
Zone C seems to have suffered most from commercial competition with development north of the Noisette area, as it is lined from end to end with struggling businesses. It has a predominantly commercial character, with a wide variety of responses from the buildings fronting the street. Here, the median that once existed was paved to maximize access to every curb cut. The change has facilitated an increase in the speed of traffic and has made the street particularly uninviting for pedestrians. In Zone C, one traffic lane should be converted to parking, with significant improvements in the streetscape and sidewalk. Two lanes in each direction should be maintained, with turn lanes incorporated where necessary. The former median should be restored for stormwater management and landscaping. And, funding must be secured to help businesses improve the relationship of the buildings to the street. This zone has great potential for commercial and possibly multi-family housing redevelopment.

Within the length of this section, there are a few special interactions. First, there is opportunity for creating an exciting place at the end of the proposed Michaux Promenade (previously described in this chapter) and the confluence of Rivers and Durant Avenue. Currently, this area has a few small retail properties, some more successful than others. These properties can be improved to create anchor points for both the intersection of the two avenues and the end of the promenade. Creating a retail destination here that serves the promenade and the surrounding neighborhoods will only boost the activity at other commercial establishments in Zone C.

Another exciting opportunity is the intersection of Rivers with Noisette Creek and the Noisette Preserve. The wetlands lap at the road today, but the area appears to have been filled; and the creek is buried under the road and reappears back in the neighborhood on the western side. Two distinct branches re-emerge, and each branch is buffered from development by stands of trees (and most likely soggy soil conditions!). If possible, it would be desirable to allow the creek to take its former path back. It could be that doing so would necessitate the design of a more sensitive culvert system to restore the flow of the creek.

Zone D: Changes from Aberdeen Avenue to Commander Road





Key Plan of Rivers Avenue: Zone D

Abandoned retail box stores (grey fields) provide opportunity to re-create retails centers with a more pedestrian focus.

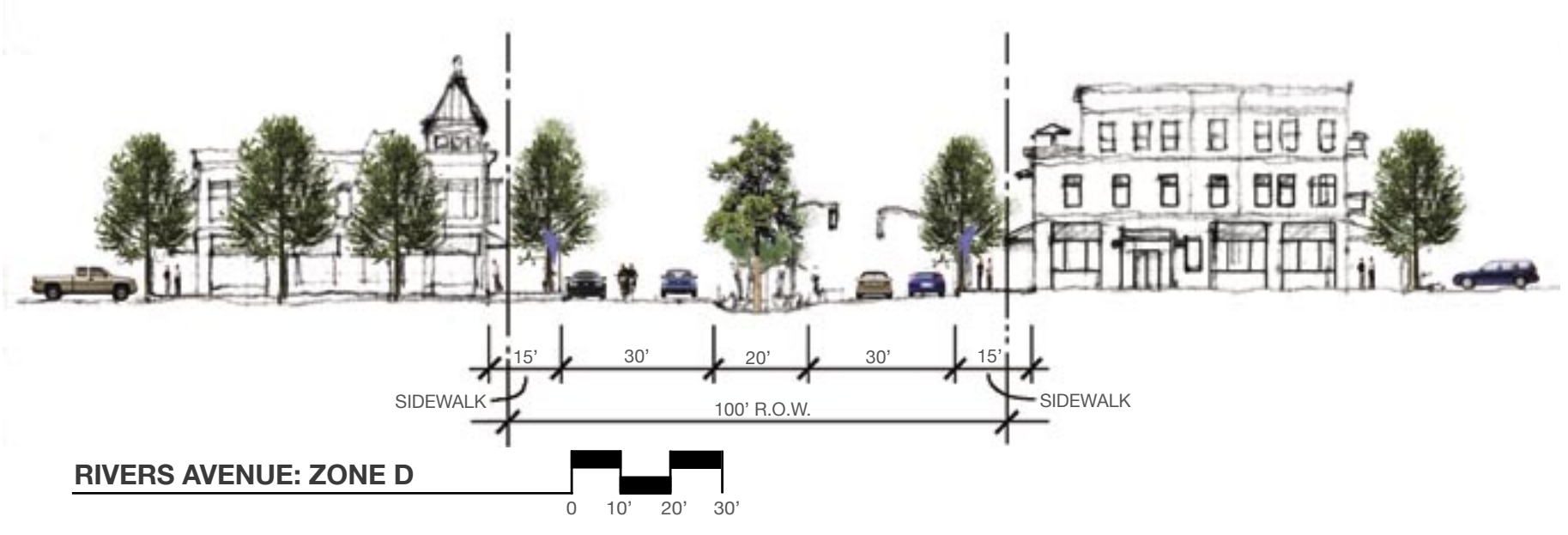
There is a distinct shift in the pattern of land use in this section of Rivers Avenue. Each side of this stretch is anchored with strong residential neighborhoods. On the east side are the neighborhoods of the Villages at Noisette Creek (discussed in Chapter 3) and St. Charles Place. Ideally, the changes that are about to occur with the Villages at Noisette Creek neighborhood should be echoed at St. Charles Place, replacing the cookie-cutter repetition with the diversity that makes great neighborhoods so interesting. On the west side is the Whipper-Barony neighborhood, a well-established community with good housing stock and visual diversity. These neighborhoods create a base to support the commercial development along Rivers in Zone D if changes would support a more pedestrian-oriented street. Therefore, the length of Rivers between these neighborhoods should incorporate some of the changes already proposed in Zones B and C. The street width should change to two travel lanes in each direction with a parking lane, and the median should be restored for stormwater management. The sidewalk should be improved, with landscaping, bus stops, and places for people to stop and interact with one another.

At the south end of Zone D, at the intersection of McMillan and Rivers, three of the four corners will need to be addressed in the near future. First, the Naval Hospital is likely to be closed. This may provide an opportunity to introduce a public health-care out-patient service in the area, if it can be supported by the existing neighborhoods and the changes anticipated at the new Noistette City Center (see Chapter 6). This has been identified as a need by Noisette area residents and is supported by the changes in demographics over the last two decades. If the hospital building cannot be reused, the property could be redeveloped as a mixed-use development, providing multi-family housing and commercial space. The latter option has the potential to tie more strongly into the community fabric of the existing Chicora/Cherokee neighborhood .

On the opposite corner sits the Shipwatch Square shopping center. The center's business has declined over the years, being severely impacted by the base closure. With the changes that are targeted for the next decade, this shopping center is well-suited for revitalization. The buildings are located at the property edges, with the corner left vacant to maximize the store exposure to the car. This corner is poised for infill development of small retail uses, with the parking zoned at the center. The stores need only to open up the facades to face the streets. Modifying the flows of goods and customers can make this shopping center better address Rivers, McMillan, and pedestrians.

Finally, the third corner is an underutilized box store carcass fronted with nearly five acres of asphalt. For the intersection of McMillan and Rivers, this lot is like two missing front teeth in what could be a wonderful smile. This parcel demonstrates development that is allowable by right in the zoning code, but shouldn't be. There are many opportunities to improve on the conditions, from basic landscaping of the parking lot, to infill development and reuse of the existing building, to complete redevelopment with mixed-use residential, commercial, and retail filling the gap.

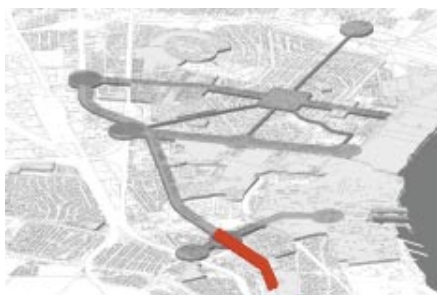
The intersection of McMillan and Rivers has the potential to become an active place; and in anticipation of the activity that might take place there, the road should probably provide turning lanes at this intersection for accessing the shopping centers and for entering the new city center. This intersection must be designed to relate to other entrance points for the new city center, but should be given a second seat in the entrance hierarchy.



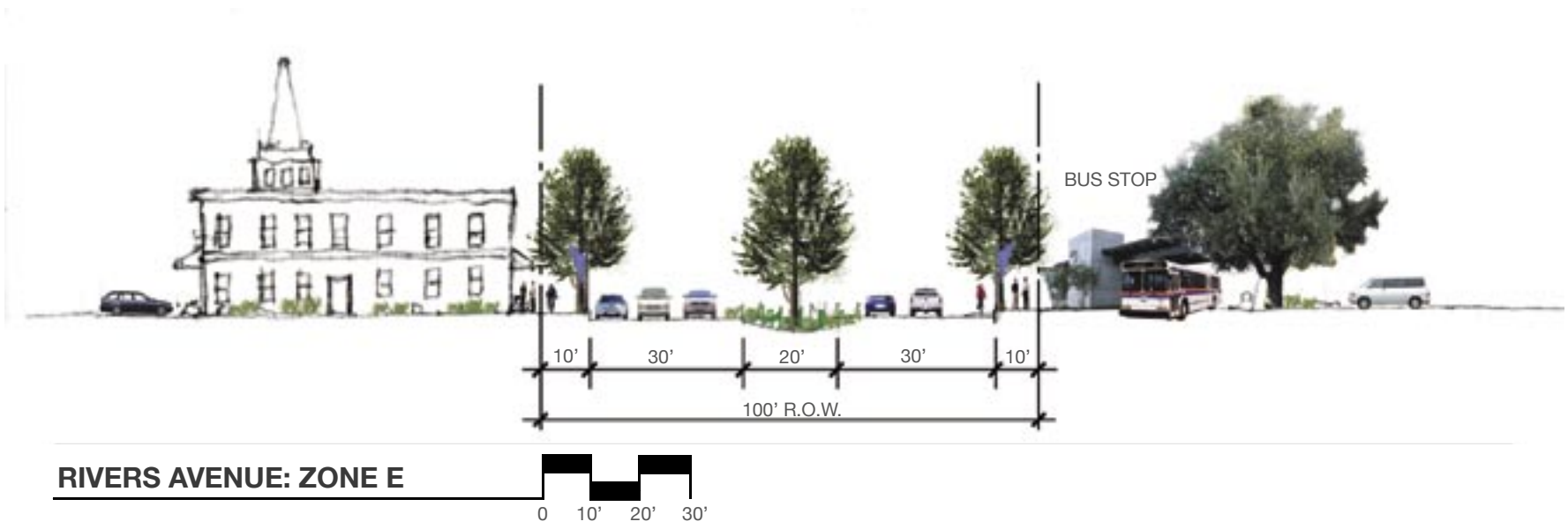
Zone E: Changes from Commander Road to St. Francis Street

This stretch of Rivers is dominated by the car.

Transit choices are provided where the sidewalk is overpowered by the street, discouraging people to leave their cars.



Key Plan at Rivers Avenue: Zone E



RIVERS AVENUE: ZONE E

0 10' 20' 30'

The final stretch of Rivers at the south of the Noisette area is lined with a mix of commercial, retail, and bits of residential development. The median in this section should be restored as in the other four zones, but the width of the road may not necessarily need to change. The sidewalk would benefit from the same streetscape improvements made along the rest of the length. This zone already has a major transportation stop on the Charleston Area Regional Transit system, and the future changes may increase ridership.

The primary focal point of this zone is the intersection of Rivers and Cosgrove- one of the new entrance points for the Noisette city center. Linking Noisette to Interstate 26, Cosgrove's existing character conveys very little about any destination and currently provides a lackluster experience as one travels from the interstate into the Noisette area. The intersection itself is anchored with a well-established church on the southwest corner and a stable business on the southeast corner. But, on the north side of Cosgrove, the corners are weak anchors. Inevitably, the uses along this stretch will be impacted by the changes at the new city center, as will the character of Cosgrove. As property values increase and streetscape improvements are made, the market will likely infuse the area to improve the overall character along Rivers Avenue.

Rivers Avenue is currently a hostile environment for pedestrians. The road is too wide; the building pattern is sporadic; and the sidewalk lacks amenities to attract pedestrians. Business on Rivers Avenue is compromised by the character that makes it a place suitable for cars only.

Encouraging infill development and decreasing the width of Rivers Avenue would help reduce the car-oriented scale back to a more desirable pedestrian scale. Landscaping the sidewalk and the new stormwater management swale at the median would make the area an attractive place for people again. Reorienting the street to the pedestrian will more strongly tie the Whipper Barony neighborhood back into the fabric of the Noisette area.

The Michaux Promenade at the Noisette Preserve

The proposed Michaux Promenade would run from Rivers Avenue to Noisette Boulevard (Avenue "D"), then extend ithe Cooper River

The Michaux Promenade is one portion of a larger rails-to-trails strategy within the 3000 acres. However, because of its position, it offers unique opportunities for strategic linkages and economic stimulus. From west to east, the promenade has the potential to build a unique multi-modal connection for the community, and enhance recreational potentials of the Noisette Preserve.

The intersection of Durant, Rivers, and The Michaux offer promise of renewed stimulus and vitality, building on strategies described earlier in this chapter. Drawing from the personality of the historic Iron Dog area, this node will stimulate new development, embracing sustainable principles, higher expectations for urban form, and mixed-use diversity. The south side of the existing shopping center east of the Durant / Rivers intersection will be the starting point of the promenade, bringing economic opportunities for visitor services. Municipal parking will be integrated at strategic points along Preserve crossings, however, this location is most suited to provide the majority of this need. Encouragement of the private sector to invest more resources in parking systems must be a combination of example and incentive, and high profile recreational locations offer great potential for broad exposure. As such, this location is ideal for public/private investment, demonstrating desired sustainable features and shared-use.

Rails-to-Trails in America

The Rails-to-Trails Conservancy has established a goal of 15,000 miles of rail-trails open by the end of 2004. This organization is a great resource to the Noisette initiative.

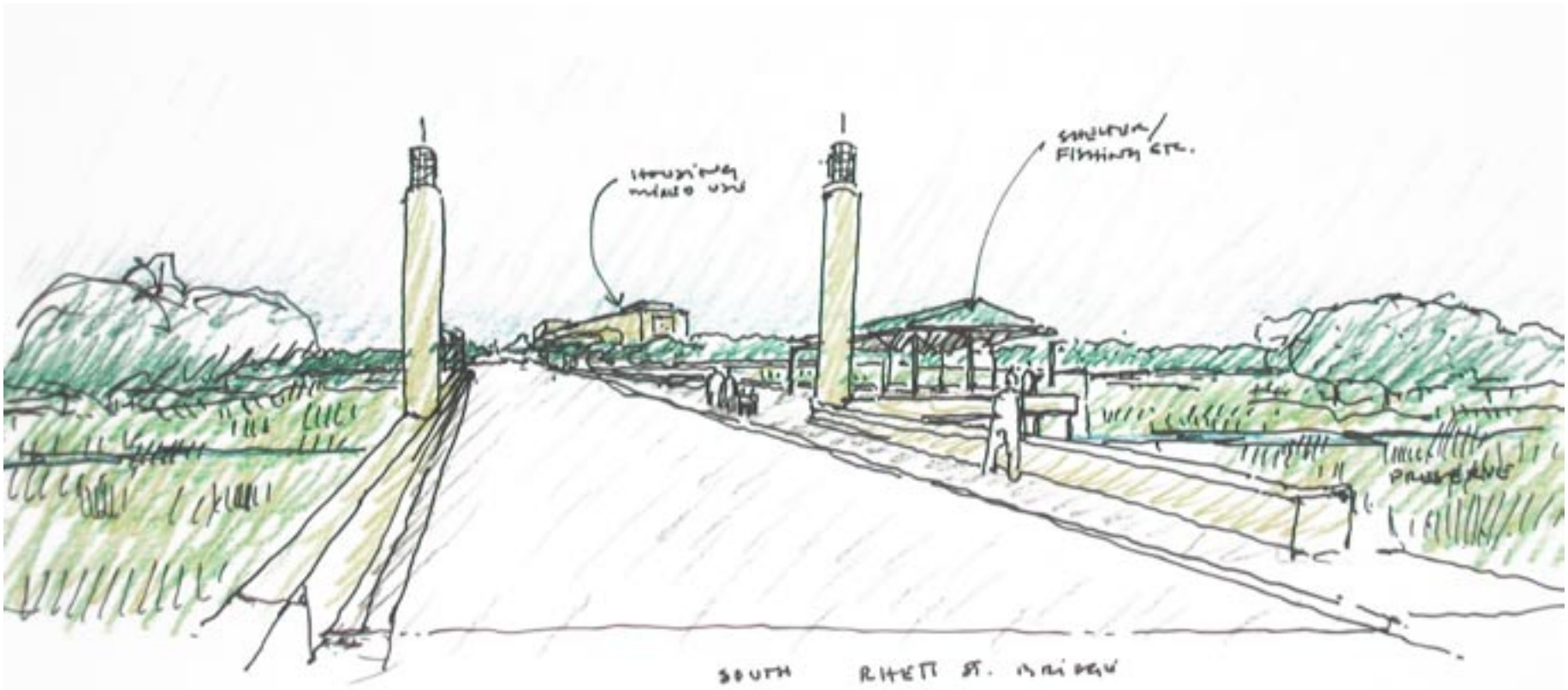
Elevated line on east end will remain as industrial artifact

Key Plan

To the east, the promenade serves as a launching point for woodland paths into stands of oak forest. Detailed descriptions of this historic pre-development landscape are described in Chapter Three. Farther east, the Michaux crosses South Rhett, and a proposed interpretive site, additional civic parking and launching points for preserve trails. Continuing on, the Michaux becomes more open to vistas, lowlands and marsh. O'Hear Crossing offers the possibility to move over the Noisette again, or continue on. Shortly after, it becomes elevated over a north tributary of the creek. A new bridge and extension to the proposed Noisette Boulevard ties the Michaux to the larger north and south bike path system. The final extension to the Cooper River will flank the northern gateway into River Center at Noisette. This last segment passes by important cultural institutions, such as the proposed nature center and maritime museum.

Existing conditions at the elevated rail line looking east.

The new trail will be illuminated for safety, and be a beautiful element at night, consist of surfaces for running/walking and riding bikes. This view looking east shows the final segment leading to River Center at Noisette North, and the Cooper River.



Clearings along the preserve provide variety to the Michaux Promenade experience.

Degraded streams will become restored and easily enjoyed from the promenade.

The existing rail lines pass by wooded areas (right), and residential areas (left).

Stands of mature live oaks on the south side of the promenade.

"Instead of building schools for 1950, let us build schools for 2050. We need schools that are healthy, energy smart, environmentally sensitive, using up-to-date technology that complement and enhance academic excellence; schools designed by the community and with the students and the community in mind."

— Richard W. Riley, U.S. Secretary of Education
October 13, 1999

Proximity to schools has long been touted as an amenity of a desirable neighborhood. This ad for Whipper Barony ran in the News and Courier on May 2, 1940.

Schools as Centers of Community

Central to the concept of creating a more livable community is the quality of the services, resources and amenities that it has to offer its residents. Public schools will play an important role in attracting and retaining residents in North Charleston, and they will be evaluated not only by the test scores and quality of the education that they produce but also for their ability to enrich the lives of the non-grade school age residents. North Charleston's existing distribution of schools presents a unique opportunity: to fulfill the promise that education and community are indivisible.

Historically, the division between the public school community and the residential neighborhoods has been a soft line. Prior to the 1920s, the public schools were primarily one- and two-room buildings sprinkled throughout the residential neighborhoods; after that time there was a push to create larger, centralized schools that could accommodate more students. However, as late as 1931 over half of South Carolina's black students learned their lessons in lodge halls and churches rather than stand-alone public schools. Even the Park Circle Community Center was pressed into service as an overflow "school" prior to the completion of Hursey Elementary in the 1950s (City of North Charleston: Historical and Architectural Survey pp.67-9).

Public schools in North Charleston have also played a larger role in the social life of the community than merely educating pupils. During World War II, schools hosted various forms of entertainment, putting on events ranging from variety shows and beauty contests to sports (Images of America: North Charleston, p.49). The schools were also used for fundraising events and community meetings (p.57).

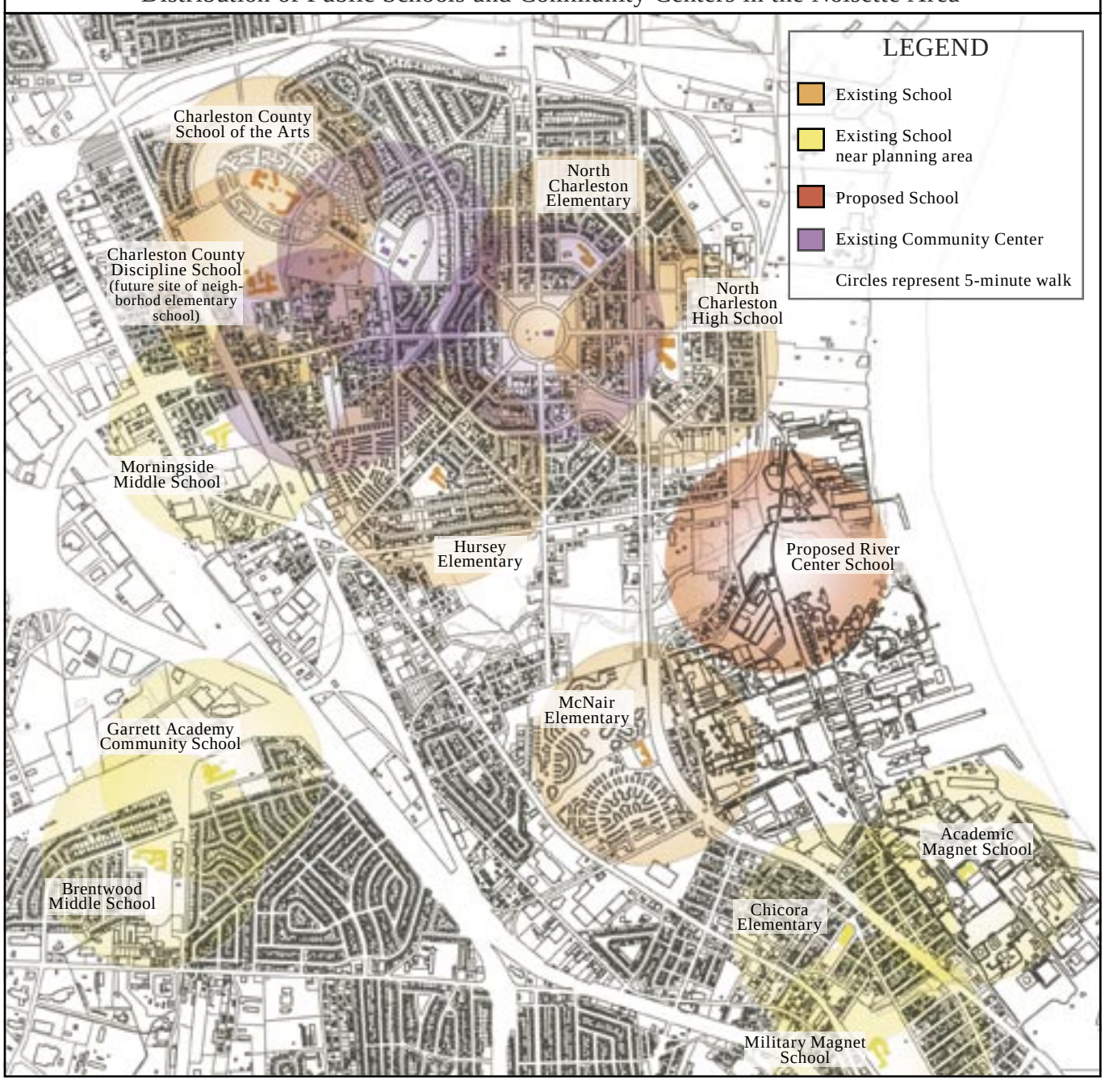
Dads dressed in drag for an all-male beauty pageant for a school fundraiser

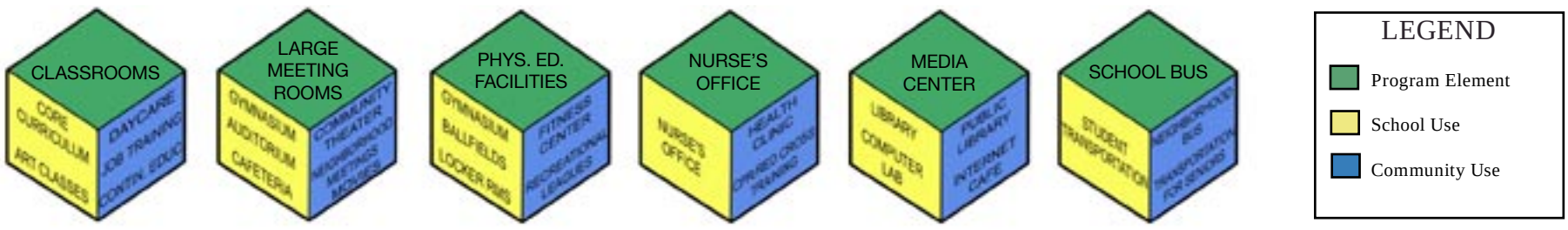
Many of the schools built in the early portion of the 20th century are still serving their neighborhoods, though the grades taught have shuffled and the role of the schools in the lives of most residents has dwindled. However, what was true in the war years is still true today: schools in North Charleston have the potential to function as community centers. While today's programs might be lifelong learning classes instead of beauty contests, the programs represent opportunities to bring community residents together. Much as branch libraries help broaden the range of library services available to area residents, so, too could the public school system be used to supplement various community-oriented services throughout North Charleston. The map to the left shows the distribution of schools and a 5-minute walking radius, or pedshed, from each. It is clear that the schools are well distributed throughout the neighborhoods of Noisette and that they could function as resources for most residents.

Demographic trends described in the 1999 County of Charleston's Comprehensive Plan indicate that the K-12 student population will remain essentially stable in the next four years. The County Plan projects a significant increase in the number of middle-aged and elderly people, so the demographic trends support the notion of providing more services and programs oriented towards the older population groups. In particular, the 65+ age group will continue to increase as a percentage of the City's total population. Schools may be ideally suited to provide additional services and programs geared toward seniors.

Even with stable student enrollment, there is still a need for capital improvements to North Charleston's schools. However, it is anticipated that the Noisette plan will affect the demographic projections and will lead to an increase in the number of families with school-age children.

Distribution of Public Schools and Community Centers in the Noisette Area





Many of the building blocks of public schools can also serve the needs of the general public

In planning for alterations to public schools, the needs of the communities and neighborhoods in which they're sited should be taken into consideration. A little extra money could pay for retro-fitting doors to allow an existing school to be partially opened up as a neighborhood library or for upgrades to an existing ballfield to enable it to accommodate a broad range of community uses. These alterations and enhancements can be achieved for much less than the cost of developing brand new, stand-alone facilities. In addition, there may be a broader range of financial partners willing to provide funds for community-based facilities, and residents may be more inclined to support school bond initiatives if they are confident that they will be able to benefit from that money.

Schools inherently have many elements that would lend themselves to community-oriented uses. Classrooms could be used for adult education, health and nutrition classes, employment training, family counseling, art instruction or lifelong learning courses. In addition, ground-floor classrooms are accessible to the mobility impaired, to seniors and pre-schoolers. Within the Noisette planning area, the North Charleston High School already offers community programs in arts, computer, finance and languages; the nearby Garrett Academy Community School has an even broader range of adult and continuing education programs.

Large meeting rooms such as auditoriums could be used to show movies, host community meetings and stage local theater productions or function as gallery space for local artists. School libraries could be supplanted by neighborhood public libraries that are located within the school building, and facility budgets could be combined to consolidate costs of the collections and staffing. School buses, instead of being idle between morning drop-off and afternoon pick-up, could make the rounds through the neighborhoods to ferry seniors and stay-at-home moms to shops and services to run their errands and get to appointments. School grounds could be used for summer camps, community recreation leagues and fitness centers. Future renovations and new school facilities should be designed for after-hours access by the community by placing entrances near shared facilities and zoning the building so that different parts of it could be used independently.

Public schools, by nature, incorporate many features that are beneficial to the community. These features should be expanded and consolidated where possible to allow for greater interaction amongst neighborhood residents and to create well-distributed centers of services for the residential neighborhoods of North Charleston. Wherever possible, schools should be co-located with complementary facilities like day-care centers, doctor's offices, outdoor recreational space and public libraries. In many cases, it is possible to consolidate these facilities within the school building itself, but regardless of their physical location, the proximity of these services will help strengthen the notion of schools as centers of community that are accessible to neighborhood residents. School communities and neighborhoods are not distinct entities, and a sharing of facilities and resources will enable a more efficient distribution of funding of facilities and services for the entire community.

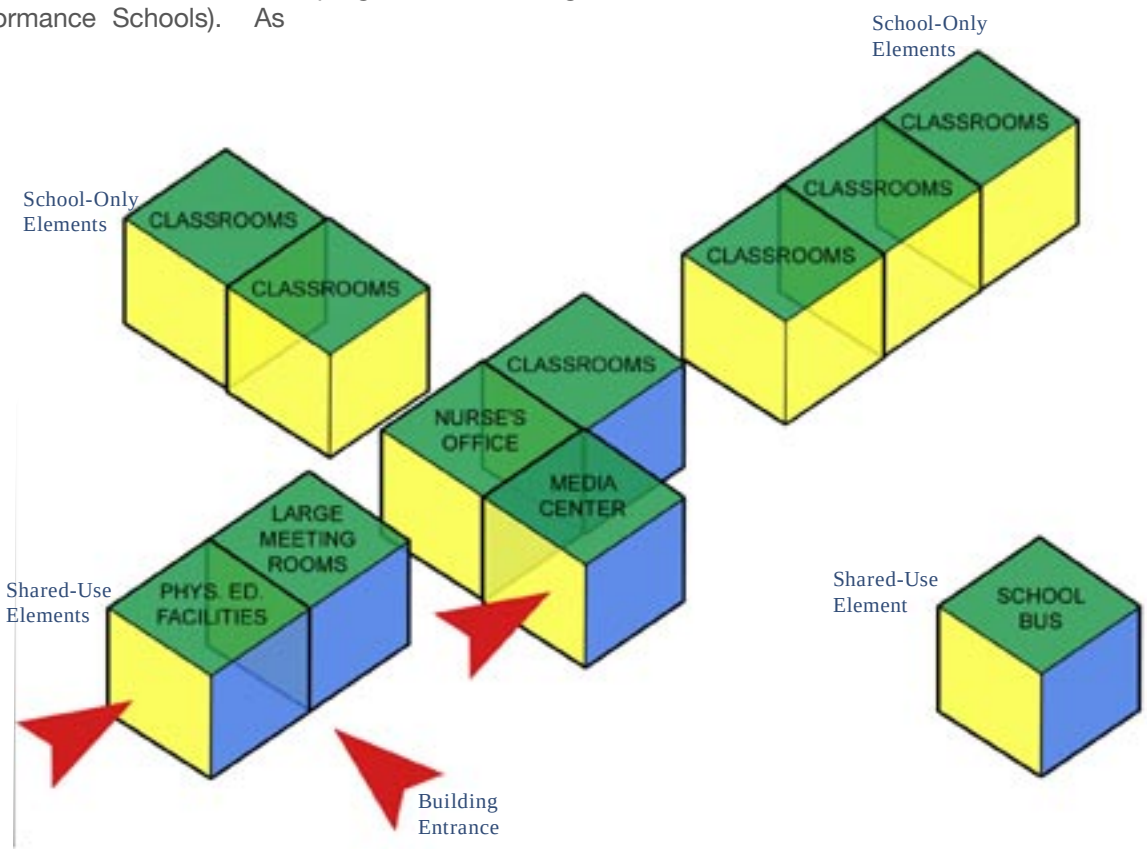
New school building and renovations should address issues of making the buildings seem inviting, accessible and significant within their communities. School design should focus on resource conservation, whether it be of natural resources or materials used in construction, and schools should incorporate daylighting as appropriate to create optimal learning environments (see Chapter 8 for more information on High Performance Schools). As public buildings, schools should be conceived of as civic art, as attractive pieces of architecture that enrich the community fabric and reinforce the sense of pride that residents take in their neighborhoods.

Schools are also well suited to serve as incubators of neighborhood-level art and businesses. Work by local artists could be displayed in the public spaces of the school building as a supplement, not a substitute, to student art which would strengthen the idea of life-long learning. Schools could also host small businesses like native landscape nurseries which could enrich the science and business curricula of public schools while raising ecological awareness and creating the basis for a hands-on adult education class in starting and running a successful small business.

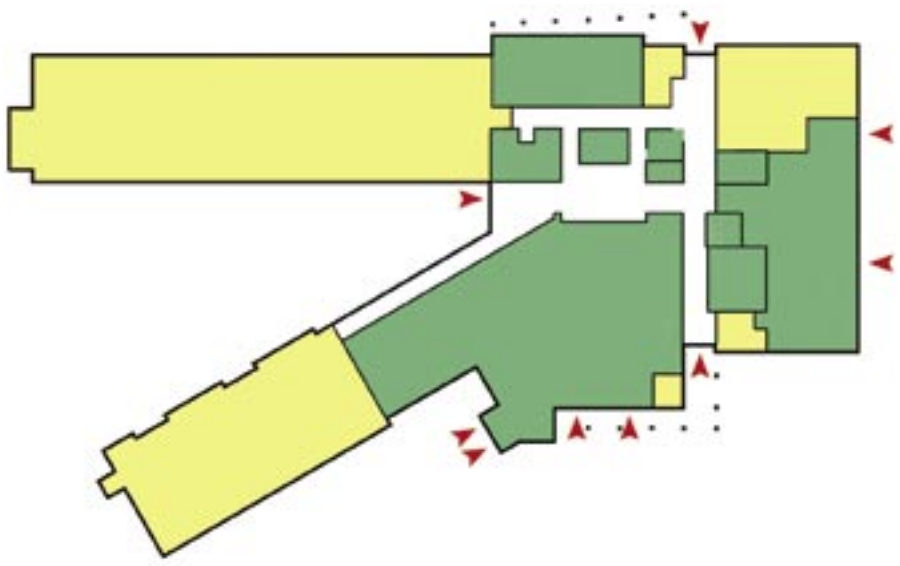
By offering a broad range of activities and resources, the chances for casual interaction among the community's residents are increased. When the school functions as a community center, it is likely to have greater taxpayer support, which in turn may improve the educational facilities for its students in addition to increasing the community facilities available to its residents. Ultimately, the school should function as a center that demonstrates sustainable building concepts and raises awareness of the natural environment, creates an inviting, accessible social center for residents of all ages, and enriches the community with a broad range of programmatic offerings.

School transportation and city transportation can be consolidated into a single system

Consolidation of the bus system could result in fuller employment and an expansion of bus routes



Case Studies: Schools as Centers of Community



North Charleston Elementary School

North Charleston, SC
Designed by McKellar & Associates, Architects

The design for the new North Charleston Elementary School (NCES) incorporates many features that contribute to its ability to function as a "Center of Community." First, by building the new school on the site of the previous one, the school is maintaining a tie to its history in the community.

Second, many of the building blocks that could serve the community as well as the school, such as the Media Center, large meeting rooms and art classrooms, are clustered towards the main entrance. By providing separate entrances to these spaces, as well as locating support functions like restrooms in the main lobby, the amount of the building that is opened to the public can be controlled. Lockable doors in the classroom wings and stairwells restrict public access to many parts of the building and create a flexible system for partitioning the school. This enables much of the building to remain designated as "school-only" use.

Finally, NCES has been designed with a number of sustainable design features which will reduce operation and maintenance costs for the building. Thus, the new NCES is able to serve the school and the community without wasting resources that will be needed by the next generation of North Charleston residents.

LEGEND

- Dedicated School Space
- Dedicated Community Space
- Shared Spaces: Community and School
- Building Entrance

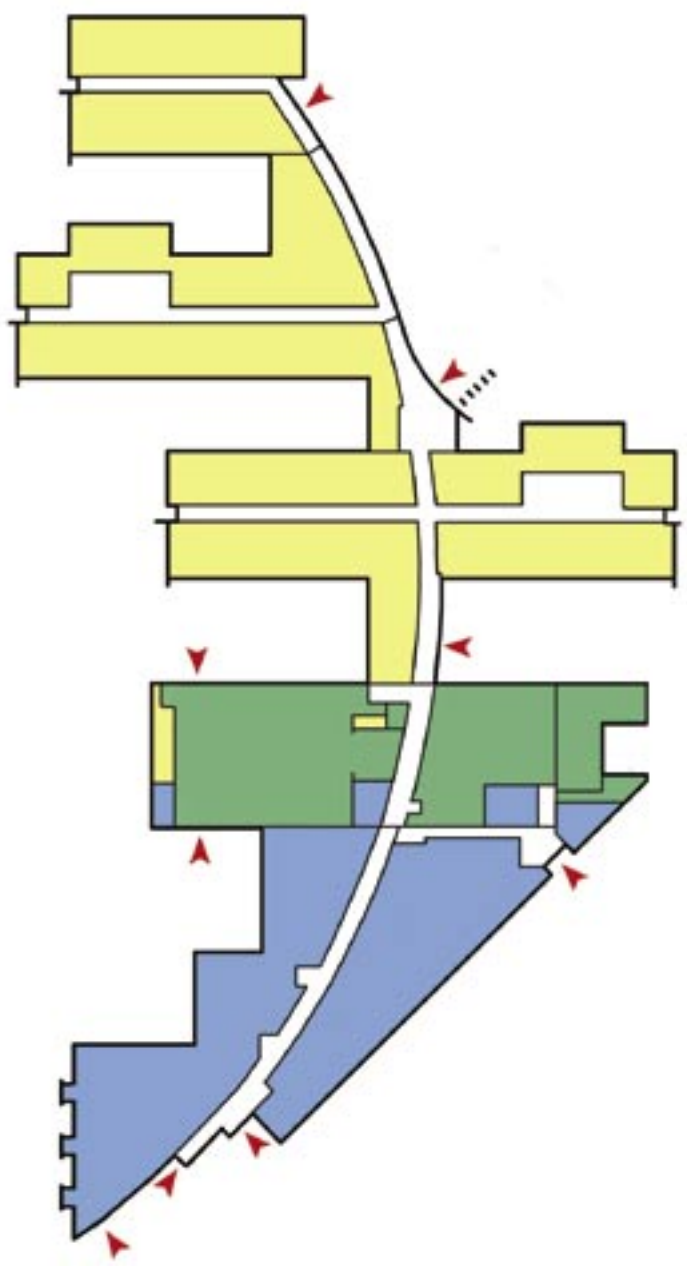
J.J. Pickle Elementary School/St. John Community Center

Austin, TX
Designed by TeamHaas Architects
Sustainability Consultation provided by BNIM Architects

At the heart of this project is a public school, but the complex has been expanded to include community-oriented features such as a shared gymnasium, a health center, a public library, and a community policing office.

The Pickle School is the product of the first "joint venture" between the School District and the City, and the partnership has facilitated both funding (the School District provided 61% of the construction costs and the city provided the rest) as well as the implementation of resource-conserving building practices. By making extensive use of daylighting and rainwater collection systems, the Pickle facility has significantly reduced its demands on City power and water.

To integrate public education and community center into a single complex, there are a series of control points within connecting corridors that connect the various building blocks of the facility. Like NCES, this enables flexible partitioning of the school portion of the building when classes are in session, thus helping to ensure student safety. The community-oriented features mentioned above all have independent entrances which allow residents to make use of those parts of the building without disrupting classes. Finally, the Pickle School features public art as well as an exhibit of items donated by neighborhood residents on its grounds, thus strengthening the idea that this building belongs to everyone in the neighborhood.



CHAPTER SIX | NEW COMMUNITY

River Center at Noisette

Early phases of redevelopment, looking north on Noisette Boulevard (Avenue D) at Storehouse 7, illustrating sustainable swales and renovation strategies

Contents

River Center at Noisette

The redevelopment of the 350 acre River Center at Noisette is envisioned as an additional neighborhood within the 3000 acre project area. While sharing many traits of the larger community, it will be unique from the rest because of its expected higher urban density and sustainability standards. Strong meanings can be derived from the history of the Old Naval Base, an important economic and social engine for the place and region. Its prominence will re-emerge, demonstrating a replicable model for sustainable urban strategies where nature, commerce and habitation establish equity, effectively playing out the triple bottom line as described in Chapter One to Five. Critical to the success of this endeavor is the restoration of the Noisette Creek wetlands, where a beautiful and rich bio-diversity will create learning and recreational opportunities,serving as a catalyst for the ideals of the New American City.

Site and Context

Important heritage sites will remain and flourish, through which a new image will result, unlike any other.

Some of the early old storehouses along North Hobson, near the historic landscape of the Old Officers Housing area

Sprawling development north of the Shipbuilding Way (shown on left beyond) is the location for recommended buffer buildings

River Center South

This portion of the old naval base is west and north of the working waterfront. The eastern boundary of the site adjacent to the old shipyard is currently most dense, a T4 urban zone (refer to Chapter 2 for transect explanations). From this area to the western boundary of the site (St. John's Avenue), the site is a less dense T3 Zone. The northern boundary is best characterized by a troubled relationship with nature. Attempts by the Navy to turn the Noisette Creek wetland adjacent to the Officers Housing area into a golf course required constant maintenance, and is now returning to it's natural state. Other areas immediately west were used as a staging area for ship building materials, in fill areas that have experienced significant settlement. In general, the residential areas to the north and west are struggling (O'Hear and St. Johns), as is the mixed use corridor of the Chicora neighborhood to the south. These areas generally contain rental properties in poor condition, either vacant where commercial or at the lowest spectrum of livable conditions for rental. A few encouraging signs of stability reside within or near the churches. The fenced boundary of the naval base may have been a contributing factor to the difficulties of the neighborhood to the north, where this slender piece of land within the 100 year AE flood zone is disconnected from the rest of the community, and has resulted in an environmentally, economically and socially degraded area.

New initiatives must be established to re-vitalize and restore these areas to a balanced condition, recognizing the advantages of adhering to sustainable principles. Again, this evaluation intends to establish the context for decisions within the site boundary, acknowledging the need for additional study. With this in mind, the planning and land use within the project area is supportive of positive change in adjacent areas.

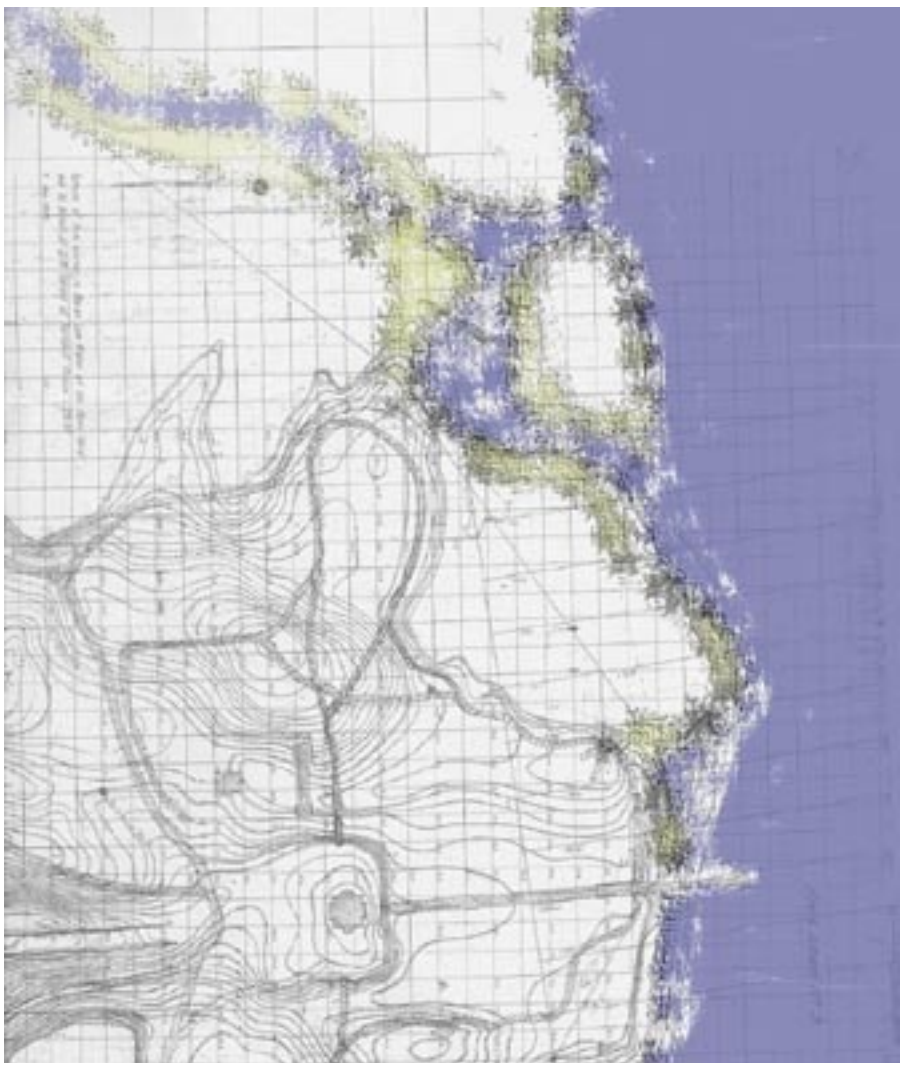
The east site boundary along North Hobson Avenue is the threshold to the working waterfront, where massive naval sheds and smaller structures center around large dry docks, one of the few existing locations designed to hold nuclear submarines. For the most part, the Hobson street edge consists of fine historic buildings, however, the condition of the streetscape and infrastructure is in poor condition. Obsolete overhead steam lines, and chain-link/barbed wire fencing create an unfriendly atmosphere and edge to the new Noisette neighborhood. The north edge of the shipyard is also the south edge of the future riverfront park for North Charleston. This is problematic, as the edge has evolved in an accidental manner typical of the strictly utilitarian concerns of the Navy. This boundary is irregular and unsuitable for the park setting, and it is imperative that the owners of the adjacent industrial property recognize the obligation to address this issue as a matter of community need.

This report proposes a buffer zone be established along this edge, negotiating a consistent urban form between the industrial area and the park, while providing much needed civic parking, services and housing for all. This need to straddle the ownership boundary is driven by the historic landscape and the old oak hummock (a wooded ridge) immediately north. As the development of the old Navy Base has sprawled to the north beyond Shipbuilding Way, it is important to modify this condition in order to preserve the historic landscape.

Secondarily, it will be important for the industrial waterfront neighbors to improve the boundaries of the district along Hobson, and continue to work with City agencies regarding commitment to move goods and services to the south, rather than north and west through the new and existing communities. Mutual respect between industry, commerce and the community must guide this process, and where purposeful self-interest may have been the rule, this plan proposes the collaborative paradigm, where self-interest is celebrated as long as it doesn't come at a cost to others, or the environment.

River Center North

The site area north of the Noisette, and south of the existing tank farm was previously the site of the Burton Lumber Company, on what was once higher ground. This same site now represents a rare commodity: the opportunity for mixed-use development with public access along the Cooper River. Currently, single story metal buildings are positioned somewhat randomly, and the current occupants maintain defensible borders for the production of government security hardware. A portion of this area is currently set aside for a Maritime Museum, of which the Hunley Submarine could be the centerpiece.



This turn of the century plan shows the old island at the mouth of the Noisette (left) and the area north of the Noisette designated for the proposed Maritime Museum (above)

Natural Systems: Restore and Reconnect

Through research into pre-development vegetation and watershed patterns, we can understand how more sustainable approaches to urban sites may emerge. Where the working waterfront and dry docks now sit on land fill, brackish wetland existed. Little documentation remains from the process of land transformation, but it is assumed the wetlands provided an ideal spot for river access, and the surrounding higher land, along with dredge spoils were used to level and fill. Farther to the west, another freshwater wetland existed. In this area, the water contributed to the Noisette Creek watershed. The oak hummock was the separating element in this hydrology pattern, and now only remain in the historic officers housing area.

The area around McMillan Blvd. was the high point of this watershed, and areas further south continued the wetland pattern natural to the Cooper River. Today, much of the site area remains within the 100 year flood zone, but the extremely high ratio of impermeable surfaces has resulted in overly artificial and costly water management strategies. Analysis of the working waterfront should be made to determine how more ecologically sensitive measures to reduce impermeability. Within the project site area, there is potential to create a rich interface between man-made and natural systems, so much so as to create the very essence of what will make Noisette River Center unlike any other place.

With this in mind, a series of strategies are designed to restore and re-weave the old hydrology patterns. These approaches are described working west to east, which like the transect diagram, is less dense to the left and more dense to the right. From a natural systems perspective, it is also the case that the water management system is simple on the left, and more complex on the right. By complex we mean that systems will necessarily be more interconnected, and serve multiple purposes. For instance, green roofs not only provide benefit to water management, but also reduce heat islands, provide settings for habitation and result in an aesthetic contribution. The lower density development will have ample permeable area to achieve simple water management techniques at the parcel level, such as the street swale and rainwater garden. The north/south pattern of water movement will be restored through a constructed stream and flanking town homes, called Noisette Row. This location is 100 feet west of the old stream bed, however, the existing city owned, federally leased DFAS building is a limiting factor, and the existing grading pattern has changed, further supporting this location. Here at Noisette Row, the conveyance systems will be like terraced water gardens, providing an opportunity to showcase the beautiful flora of the Lowcountry. Moving further east more dense structures will be encouraged to integrate green roofs and larger storm water gardens. The larger retention needs will be satisfied by the McMillan Basins. These provide the opportunity for an integrated energy approach via thermal coupling. These possibilities are described in the Utilities Systems section, in Chapter 4.

The plan also includes a comprehensive open space strategy, layering stormwater systems with passive recreational greens; from distributed public commons, to the larger linear constructed stream, to larger urban sustainable swales, to larger basins flanking major mixed use corridors. This, along with a refined street hierarchy, establishes a system where roads and water are a part of the same system: an infrastructure that supports a diverse eco-system. The storm water conveyance system will be designed to filter pavement-born first-wash pollutants, and reduce speed and piping systems, which left un-checked, contribute to stream scouring and habitat degeneration.

Allee of Crape Myrtle looking west on Truxton at Noisette Boulevard.

Concentration of Live Oaks in this natural swale will be preserved at the north end of Noisette Row.

Early phase solution for the northern approach consists of a striking new bridge over the Noisette, a meandering road and a bike bath. Flanking berms contain views, which later open to panoramic views of the Noisette Preserve. Later, as riverfront development occurs and the railway right-of-ways vacated, a formal extension of Virginia Avenue connects to the new bridge.

Before: Noisette Boulevard at the meadow looking North

After: Noisette Boulevard at the meadow looking North

Existing conditions of Cosgrove looking to the proposed River Center at Noisette

The proposed approach, enhances urban form and incorporates sustainability principles.

Built Systems: Sustainable Strategies

Key infrastructure decisions and public amenities such as parks and cultural sites form the basis for the conceptual framework of the plan. As described in chapters 4 and 5, a street hierarchy supports land use and function, with a high degree of desirable factors such as connectivity, permeability and walkability.

North to south Neighborhood Connectors include Spruill and Noisette Boulevard. East/west Connectors include McMillan, Cosgrove (the "I-26 Connector") and Turnbull. The rails-to-trails strategy on the east side of Spruill links with the east/west Michaux Promenade (refer to Chapter 5). These streets serve as the common ground between neighborhoods, and as such, are gateways to River Center at Noisette.

Continuing down the hierarchy, residential streets are more intimate in scale and capacity, passing around public commons, flanked by alternating alleys. These are encouraged to be diversified by permitting granny flats and home offices. Two residential roads provide north/south linkages across the Noisette: South Rhett and O'Hear. The former will terminate at the south in the new Horizon Village development, in turn linking Turnbull and Rivers. O'Hear as a roadway will be eliminated, however, the existing pedestrian bridge, a favorite place for fishing, is proposed to be modified as part of the Noisette trail system. The interfaces of Spruill and South Rhett at the preserve are special places, and should be redesigned to support recreational, learning and cultural possibilities.

New buildings will be designed to support the ecology of River Center at Noisette. The most powerful element, water, is a dynamic force in the Lowcountry, and especially so near the Cooper River and Noisette Creek. Occupied spaces in the majority of locations will be raised a few feet above grade level. This condition also creates a buffer zone to prevent unwanted moisture migration, typical of high water tables, from entering the building envelope. Such strategies exist in both residential and commercial buildings on the site. The old Panama Houses in the Historic Residential Area placed services, screened porches, covered parking and storage in the lower level, with living spaces above. The old Storehouses, with the ground floor at dock level height, kept goods dry. Building 400 on Storehouse Row placed an entire level of parking on the ground floor, raising the offices above. Each of these strategies has merits. However, within the context of new development in River Center at Noisette, it will be important to maintain vital ground floor streetscapes, including shops, restaurants and services. Important mixed-use streets will be encouraged to integrate galleries and art studios on the ground floor as buffer elements to parking spaces, creating more interesting public frontage.


VIRGINIA AVE
TO I-526
River Center North
Michaux Promenade
SPRUILL
T1
NOISETTE BLVD
(Avenue D)
CS
SD3
CS
Noisette Row
City Center
TURNBULL
N. HOBSON
River Center South
Storehouse Row
McMILLAN
McMillan Basins
COSGROVE
TO I-26
TRANSECT ZONES
T6A-URBAN CORE
T6B-URBAN CORE HIGH RISE
T5-URBAN CENTER
T4B-GENERAL URBAN - GREEN
T4A-GENERAL URBAN - GREEN
T1-PROTECTED AREA
CIVIC RESERVATIONS
CB-CIVIC BUILDING
CS-CIVIC SPACE
CP-CIVIC PARKING
DISTRICTS
SD1-INDISTRIAL (EXISTING)
SD2-SHIP YARD
SD3-HISTORIC RESIDENTIAL AREA
N
0 100' 200' 400' 600'

The Vision

Storehouse Row

Building 7 of Storehouse Row

Nature slowly returns through the old industrial infrastructure, creating patinas which speak to a new future

Spanish Moss among the Live Oaks in the Historic Residential Area

Historically speaking, the structures along the east side of Noisette Boulevard (Avenue D) represent not only a sampling of architectural styles, but also the adjoining values of their time. The earliest buildings, such as Storehouses 7 and 8 are richly detailed, originally designed for natural ventilation and daylighting, diversely accommodated people and goods. The latest buildings, 234 and 400, are products of different priorities, and represent standard approaches (respectively) to administrative office needs from the 60's and late 80's. Building 4, from the 50's, is another typical warehouse type. 45, and the buildings on the west side of Noisett Boulevard (Avenue D) , represent the other primary building form; the one-story metal shed.

This architectural diversity creates a type of urban pluralism, challenging, but rich in possibilities. The long term vision will see this diversity as a complement to the more urban street edge planned for the west side of Noisette Boulevard. Additionally, the existing buildings will become demonstration projects for the transformation of varied types according to sustainable principles. Air, water and energy conservation systems, designed to operate dynamically rather than in isolation, will be demonstrated differently according to the configuration of each building as replicable models for the community.

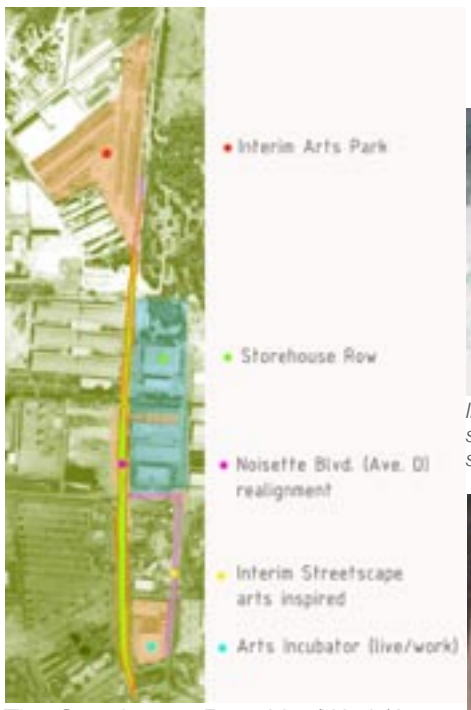
Currently, design and construction is underway to transform these structures according to their varied needs. This new vision, a viable live/work/play district, is based upon the prevailing trends in urban re-generation, where the arts play an integral role. The Bohemian Index, a demographic attributed to sociologist Richard Florida in his book *The Rise of the Creative Class*, is one example of research that connects vitality with the broader art community. His highly regarded study chronicles the Creative Class, estimated to be 38 million strong, as individuals who want to live in environments that cater to their tastes, mostly mixed-use urban areas exhibiting capacity for high levels of creative energy.

In terms of these possibilities, the buildings at Storehouse Row include instances both highly finished and raw. The office spaces are rapidly filling, whereas the empty raw space is perfectly suited as artist lofts. This mixture will provide a unique combination of activities, and support activity from day to night. The loft has become the most popular live and live/work building type, complementing other options as individuals develop families or feel the need for more connection to the land. The residential housing options planned farther to the west will complete this needed range of choice.

Ironically, artists have time after time, been the ones providing energy to developing areas, only to be pushed out by their own success. At once good and bad, this process at Noisette will consider the capabilities approach to justice theory: relocation should be a choice, not a requirement, and over time this commitment will ensure a diverse and lasting arts community. At the same time, change is inevitable, and buildings that started as live/work lofts may need to adhere to market changes, and the planned densification of the City Center. These two strong forces will require dialog and self determination, requisite elements of strong communities. Additional buildings, either new or existing, will be part of this planned balance of social equity and economics.

Additional integrated arts opportunities are being suggested through the creation of a performance plaza between buildings 4 and 8, and two anchors north and south. North, there is potential for an interim arts park. The industrial artifacts associated with the Naval Base could provide the basis for interpretation by artists, either by invitation or competition. To the south, an existing pair of buildings are perfectly suited for use as arts incubators. These two buildings center on a covered outdoor area, perfect for use for sculpture, performance, or weekend arts markets.

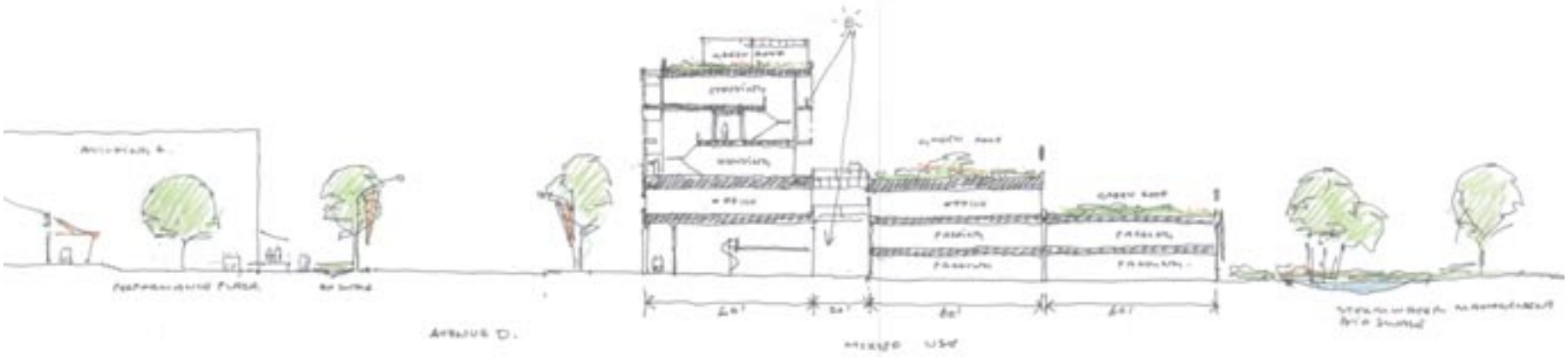
Before and After: Streetscape elements, building renovations and bioswales along Storehouse Row are first steps in the redevelopment strategy.



The Storehouse Row Live/Work/Arts District in River Center at Noisette.

Interior of an old submarine nose creates a sense of cosmic coupling effect sought by sculptor James Turrel.

Cribbing once used for large steel plate stands in the Interim Arts Park area.



Section looking south at new structures along Noisette Boulevard (Avenue D), and performance plaza (left) demonstrate integrated design practices and mixed use density.

View from McMillan looking north on Noisette Boulevard (Avenue D) showing mixed-use infill.

An example of a performance space transforming an industrial area.

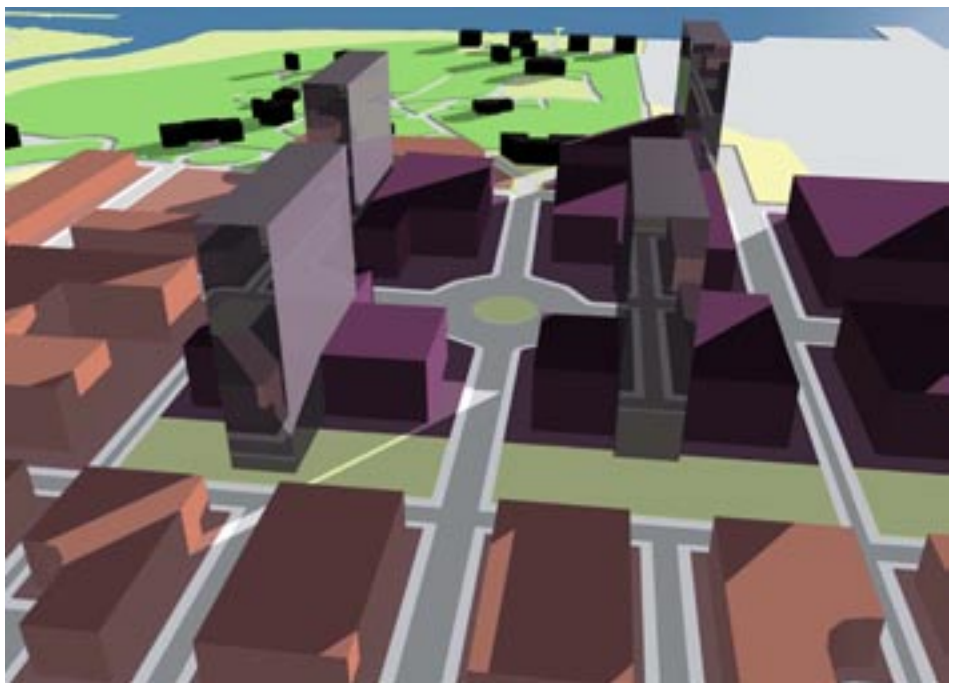
Arts festivals create opportunities to build connections and capacity.

Performance Plaza.

Large scale banners and scrims create urban space during periods of transformation.

View looking east across Noisette Way (see page 6.10) towards City Center and the Riverfront Park beyond.

Existing conditions looking east at Turnbull near Avenue 'G.'



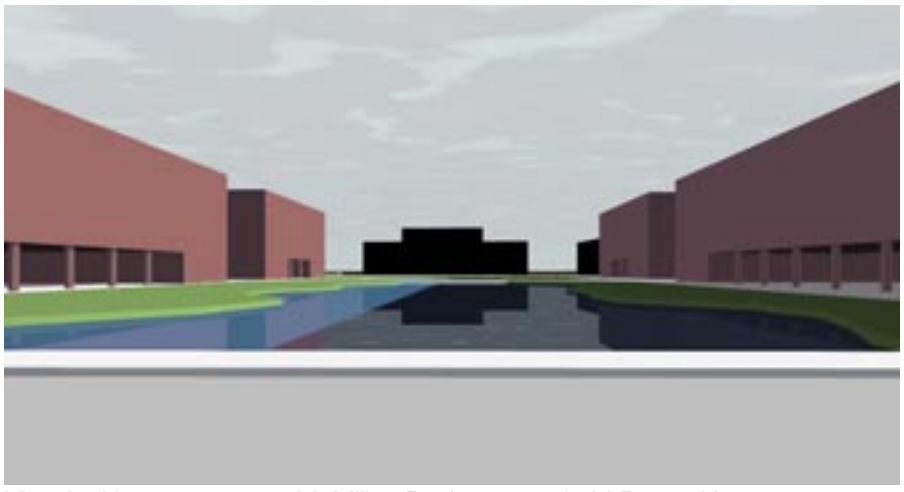
Aerial view of the City Center looking east to the Historic Residential Area and Riverfront Park

The City Center

The City Center district, focused around the intersection of two neighborhood connectors, Turnbull and Noisette Boulevard, will have the highest density, and as such is positioned next to cultural and recreational amenities. These taller mixed-use buildings look to the waterfront, creating sufficient density for restaurants, shops and transit systems.

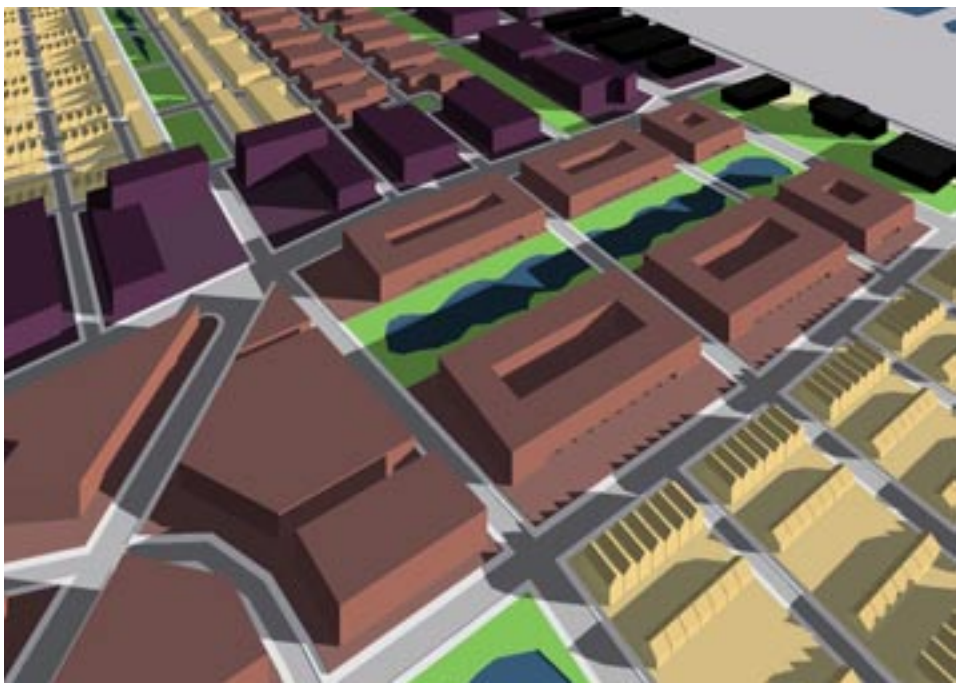
The City Center also creates the gateway for Riverfront Park, conference / research center and Historic Residential Area. The taller structures will create a new icon for the Low country, building upon the success of small footprint high-rise living, such as demonstrated in downtown Vancouver, British Columbia.

In the River Center, these buildings will be the next generation of this type, recycling water and waste materials while setting new standards for building performance. From a combination of Lowcountry climate, culture and sustainability, an aesthetic will be specifically tailored to place and people.



View looking east across McMillan Basins toward old Power House

Restored Power House and Public Arts Plaza



The old Power House in the beaux arts tradition.

McMillan Basins and the Restored Power House

The McMillan Basins area will is envisioned as formally arranged courtyard buildings around a series of informal water retention basins. Focused on the restored Power House, these basins will be landscaped in the Lowcountry vernacular, providing a restful place in the urban center. The buildings on each side will enjoy this beautiful amenity from balcony and window.

Initial concept studies of the flanking courtyard buildings suggest strategies that integrate horizontal lobbies at the street level, opening to interior gardens and the sky. Ground level parking entrances are located on short north / south streets, as are restaurant and shops. Approximately half of the ground floor is integrated parking, rising twelve feet vertically to span over the lobbies and horizontal atrium spaces. The gardens, roofs and basins work together to process storm water, graywater, and reduce energy requirements of inhabited spaces.

The restored Power House will serve as an important cultural destination. The possibilities for this building include a museum of science, emphasizing how energy affects all aspects of human activity. The availability of this commodity varies greatly, especially among developing nations. Shifting attitudes among leading countries on important issues, such as non-renewable resource depletion, depend upon public education. Museums provide an engaging educational experience, promoting new national, regional and local energy policies through individual action. At the exhibit level, demonstrations will explain the potential accumulative impact of distributed conservation measures. Combined with state-of-the-art innovations, the overall message will be twofold: how simple steps improve quality of life today, and raise awareness for the challenging needs of tomorrow.

Noisette Row: rowhouses with ground floor live/work spaces creates vitality at the street level.

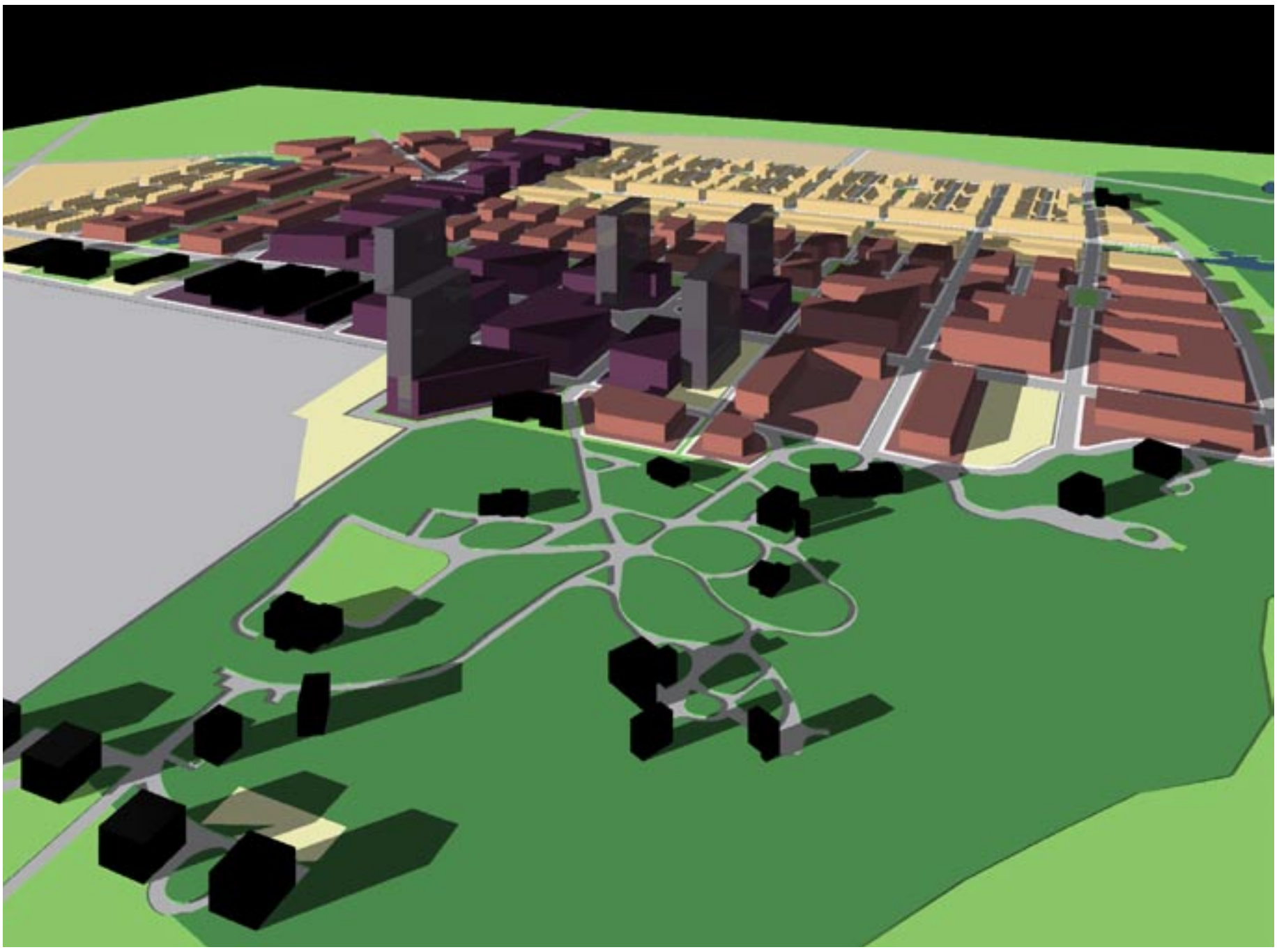
Section of Noisette Row looking north.

The constructed stream is the focus of Noisette Row

Noisette Row

The buildings of Noisette Row will face a new constructed stream, consisting of a series of controlled segments designed to retain water and promote a lush Lowcountry habitat. Consistent with elsewhere, frontages remain in the public realm, to be enjoyed by all.

Pedestrian bridges w))ill be sculptural additions to the urban landscape



Historic Residential Area: The Research Center and Riverfront Park

Character Sketch looking west showing new infill at historic Officers Housing Area. The new research/conference center (beyond) and buffer building (left) will be sensitively designed for the historic area.

The Historic Landscape Area is a one of the kind landscape experience, consisting of richly detailed residences, picturesquely placed among mature live oaks. Meandering single lane roads connect the structures, representing neo-classical, colonial and Italianate homes ranging from grand to modest in size. These structures stand under tree cover, and are in the first zone, next to the clearings along the Cooper and Noisette.

In many cases, these residences from the Old Officers Housing Area have been extensively modified by the Navy, as larger structures where converted to office use. Additionally, many structures suffer from lack of maintenance, including extensive termite and moisture damage. Condition surveys, working with the South Carolina State Historic Preservation Officer will help evaluate strategies for their conservation, providing a necessary understanding of historic relevance, and potential costs involved.

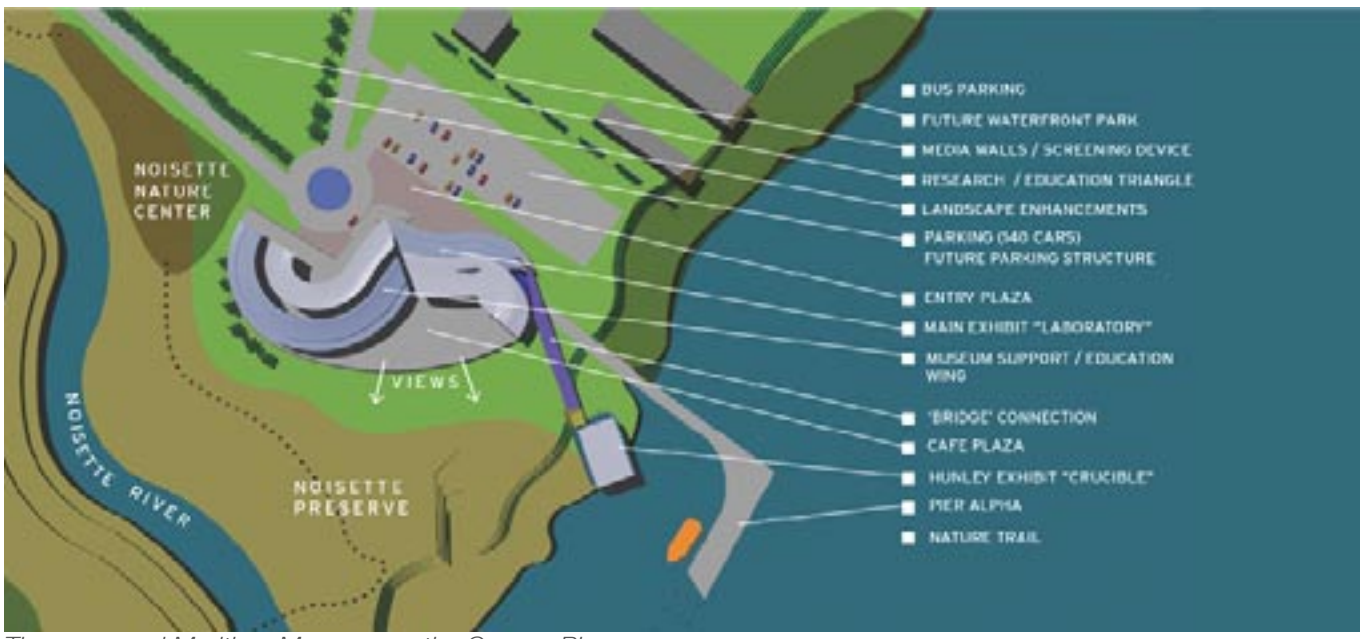
The next zone to the west contains residences of non-historic nature, generally ranch and patio homes. These will be removed, deconstructed and recycled where possible, creating an opportunity for new structures, including a Research Center, hotel and conference facilities. Programmatically, this type of activity is well suited to the contemplative and inspiring landscape. Smaller historic structures may provide places for scholars in residence, retreat areas, restaurants and conferencing.

New buffer building between shipyard and park should be designed to allow future connections, as the shipyard becomes less insular over time

Historic residences are woven with the landscape

River Center at Noisette

Interior, entry and view from the Cooper River (top to bottom)



The proposed Maritime Museum on the Cooper River.

Maritime Museum

(Excerpts from the H.L. Hunley Proposal, by the City of North Charleston, BNIM/BHKR, Ralph Apfelbaum Associates to The Hunley Commission, February 15, 2002)

The Museum is…"inspired by the unique site of Pier Alpha on the northern end of the former Charleston Navy Base. This concept is site-specific, meaning that it cannot be executed at any other location –simply, the design of the Hunley Experience takes advantage of its location by exploiting the natural amenities of the adjoining Cooper River waterfront and Noisette Creek.

The proximity of the existing Warren Lasch Conservation Center is crucial to the proposed North Charleston museum concept, in which the setting of the Noisette Preserve enhances the immersing, historical experience of the H.L. Hunley, including interactive, multi-media exhibits, forensic reconstruction of crew remains in artwork, a 100-seat virtual reality theater, and ancillary exhibits including vessels like the Union Navy's Intelligent Whale.

Literally, the Hunley Experience will be designed to virtually transport 21st Century patrons –with the latest in animation and simulation technology– on a journey through the War Between the States, the Siege of Charleston, and the moving story of the H.L. Hunley and its three crews.

In addition, to establish a powerful conclusion to the Hunley Experience the project team envisions a shuttle/harbor tour, with possible destinations including such Hunley-related sites as Fort Sumter, Castle Pinckney, Fort Johnson and Sullivan's Island."

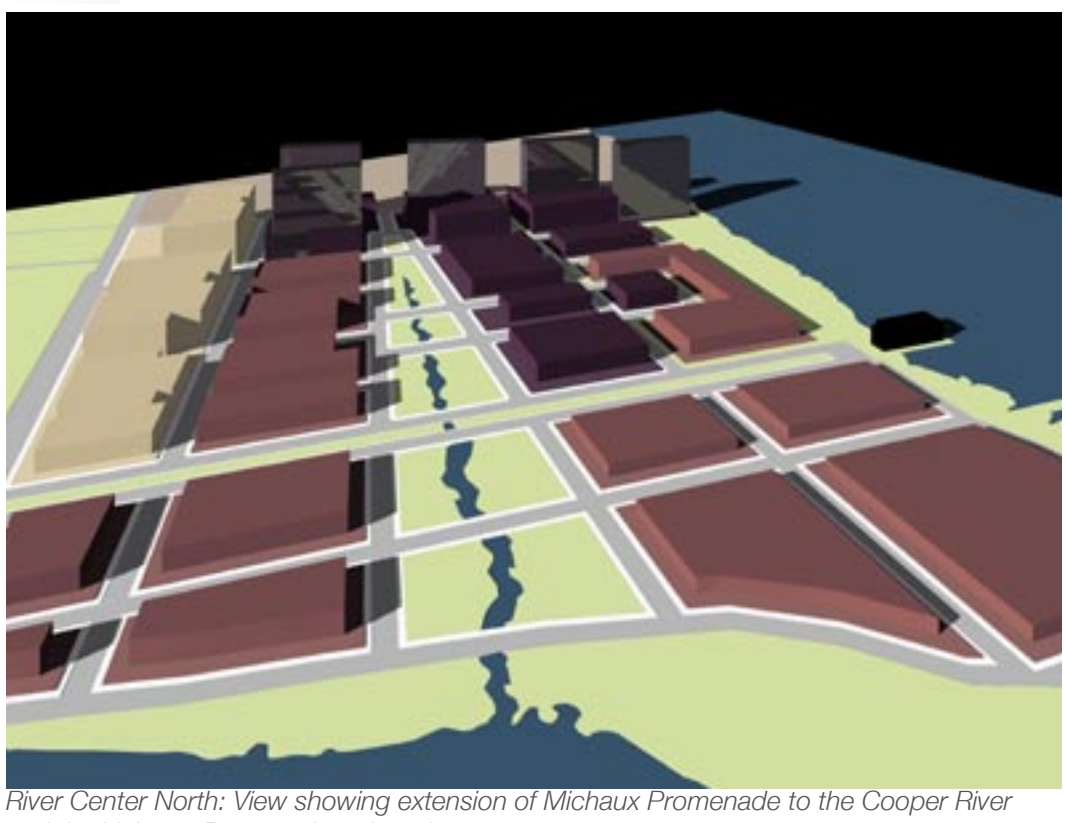
River Center North: Maritime Museum, Michaux Nature Center, and Mixed_Use Waterfront

Looking west at the Noisette Preserve

River Center North creates a new mixed-use center, extending the Riverfront Park from the south and the Michaux Promenade from the west to a dramatic urban waterfront district. Two major cultural institutions occupy the southern edge between the preserve and urban district. Over time, the district will grow from these institutions and waterfront inland, eventually changing roadside access by extending Virginia Avenue, upon vacation of the railway right-of-way near the Preserve.

Michaux Nature Center

The Michaux Nature Center is strategically positioned along the Michaux Promenade, spanning over extensions of the wetland into the urban center. This educational facility complements the adjacent Maritime Museum and the Power House Museum as a triad of institutions which provide a rich basis for understanding past, present and future needs.



River Center North: View showing extension of Michaux Promenade to the Cooper River and the Noisette Preserve into the urban area.

Project Phasing

Contents

Project Phasing

Existing Montague Avenue

Existing Naval Base Conditions

New Shops at Liberty Hill on Montague Avenue

Full development at the River Center

“A rising tide raises all boats.”

— Anonymous

Project Phasing

Tax Increment Financing (TIF), described in Chapter 8, will be utilized to create infrastructure as a catalyst to encourage investment and new development in strategic patterns that accelerate the rate of change and economic revitalization in North Charleston. As a result, the decisions made relative to the timing and location for the use of this public/private development tool will become a major driver in the phasing of development activity in the 3000 acre Noisette Community during the next quarter century.

In conventional development, the phasing of construction and TIF projects are defined in the development plan and usually modified over time as a result of market forces and additional taxes generated from initial TIF projects. TIF projects typically fund the construction of infrastructure improvements on, or immediately adjacent to, land controlled by the developer (or city).

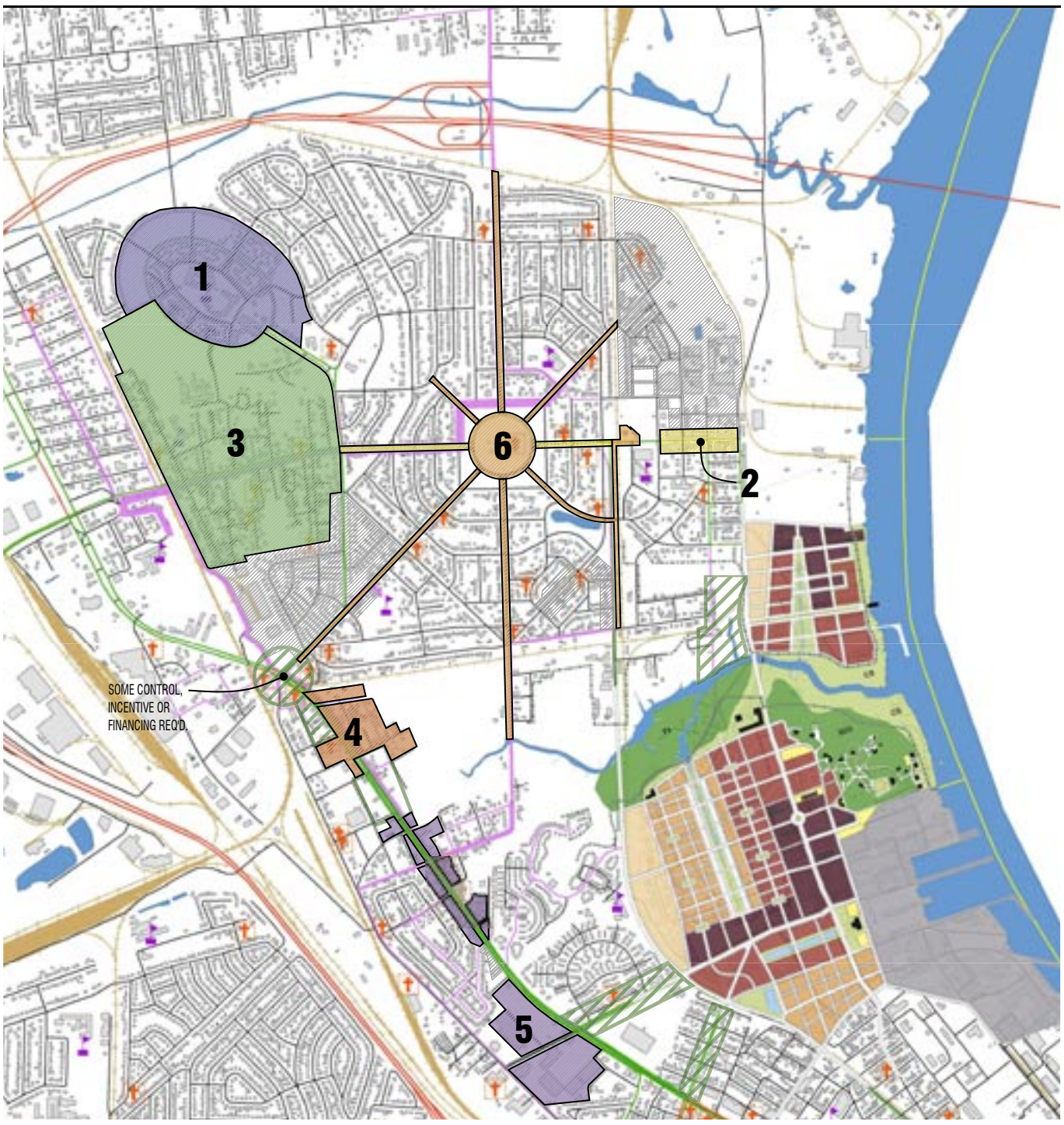
This master plan proposes an alternative approach. TIF resources are distributed throughout the 3,000 acres defined by this plan, of which the Noisette Company only controls approximately 10%. Additionally, 25% of the TIF funding is allocated to improving the schools if LEED is implemented and if schools function as centers of the community. As a result, the phasing of this work will be determined through a joint planning effort involving the City, the School District, and the Noisette Company.

The two approaches share a common characteristic. The choice of TIF projects must be informed by comprehensive analysis of the catalytic and synergistic potential to accelerate investment, market transformation, and the creation of new taxes. It is a critical, strategic public/private decision. And, the ability to sell the bonds and retire the debt with additional tax revenue is dependent on the quality of that analysis and decision.

The alternative presented in this plan requires a much more comprehensive analysis than the conventional approach. Distributing the TIF projects over the 3,000 acres increases the complexity of the analysis resulting from larger benefit districts and multiple uses and ownerships outside the control of the Noisette Company and the City. The same is true for the TIF investment in schools because of defining the benefit district broadly, but more importantly, defining and convincing the bonding community of the link between improved schools, economic capacity, property values, economic vitality and increased tax revenues. Also, the strategic analysis in this proposal includes potential increases in social and environmental vitality in addition to the normal economic evaluation. Further, this approach utilizes a measurement/evaluation tool (The Noisette Rose – see Chapter 9) to track the results of the initial TIF decisions and to inform subsequent decisions.

As the evaluation of possible scenarios is accomplished to inform decisions concerning location and phasing of TIF projects, it is expected that there will be creative tension between the results of the comprehensive analysis and the desires of some citizens, neighborhoods or schools. It will be critical to maintain the open community dialogue that has informed this plan to date to insure that these critical community investment decisions are smart, catalytic investments accelerating the impact on social, economic and environmental vitality.

It is not possible to accurately predict the precise schedule for the phasing of this process because of the variety of social, economic and political issues that will influence these critical decisions, but the sequence of phasing and an estimate of timing is provided below. It is anticipated that the creative use of TIF will increase public confidence and initiate a process that will attract private investment and generate considerable development outside the TIF areas specifically defined in this plan and, in fact, beyond the limits of these 3,000 acres.



Off-Base TIF

First Five Years (2004 through 2008)

1. Century Oaks:

- Planning work has begun in Century Oaks to create a neighborhood of quality housing. The North Charleston Redevelopment Commission and the Noisette Company have begun the planning and design of this new neighborhood development of approximately 380 homes.
- Deconstruction and construction of infrastructure and new housing is anticipated in the summer of 2004.

2. Montague Improvements:

- Virginia Avenue West to Jenkins Avenue (see Chapter Five for description).
- Spruill West to Park Circle (see Chapter Five for description).
- Park Circle West to Mixon (see Chapter Five for description).

3. Liberty Hill and Bonds Wilson Area Neighborhood Improvements:

- Montague Avenue from Mixon west to Gaynor. (See Chapter 5 for description.)
- Four schools in this area: Bonds Wilson, the School of the Arts, Liberty Hill Elementary and the Charleston Youth Development Center are all considering changes that include relocation, renovation and demolition. Bonds Wilson and Liberty Hill Elementary are under demolition and temporary classrooms have been located on the Bonds Wilson site to house the Charleston County Discipline School. As these important decisions are made, there is an opportunity to utilize a portion of TIF that has been reserved for schools to create a school that serves as the center of the community and is designed to increase the students' capacity to learn while reducing operating costs. Any land not required could be used to develop new housing.
- New housing in the Bonds-Wilson area will generate new tax revenues to accomplish important infrastructure improvements in Liberty Hill, including street improvements, storm water management and landscape including street trees, sidewalks and lighting.

Second Five Years (2009 through 2013)

4. Rivers Avenue at North Whipper Barony:

- Infrastructure improvements including streetscape as described in Chapter Five (Rivers Avenue, Zone 3) will encourage reinvestment in this important area at the intersection of Rivers, Durant, the Michaux Promenade and the Noisette Preserve.
- The flood zone map in Chapter Three will inform this redevelopment and may create an opportunity to reduce flooding and improve visual access to the restored Noisette Preserve and increase property values of all the properties in this neighborhood.

5. Rivers Avenue at South Whipper Barony:

- Infrastructure improvements as described in Chapter Five (Rivers Avenue, Zone 4).
- Redefining this section of Rivers Avenue with a more narrow, pedestrian friendly environment will increase the potential for mixed-use redevelopment.

6. Park Circle and Durant, Buist and N&S Rhett Avenues:

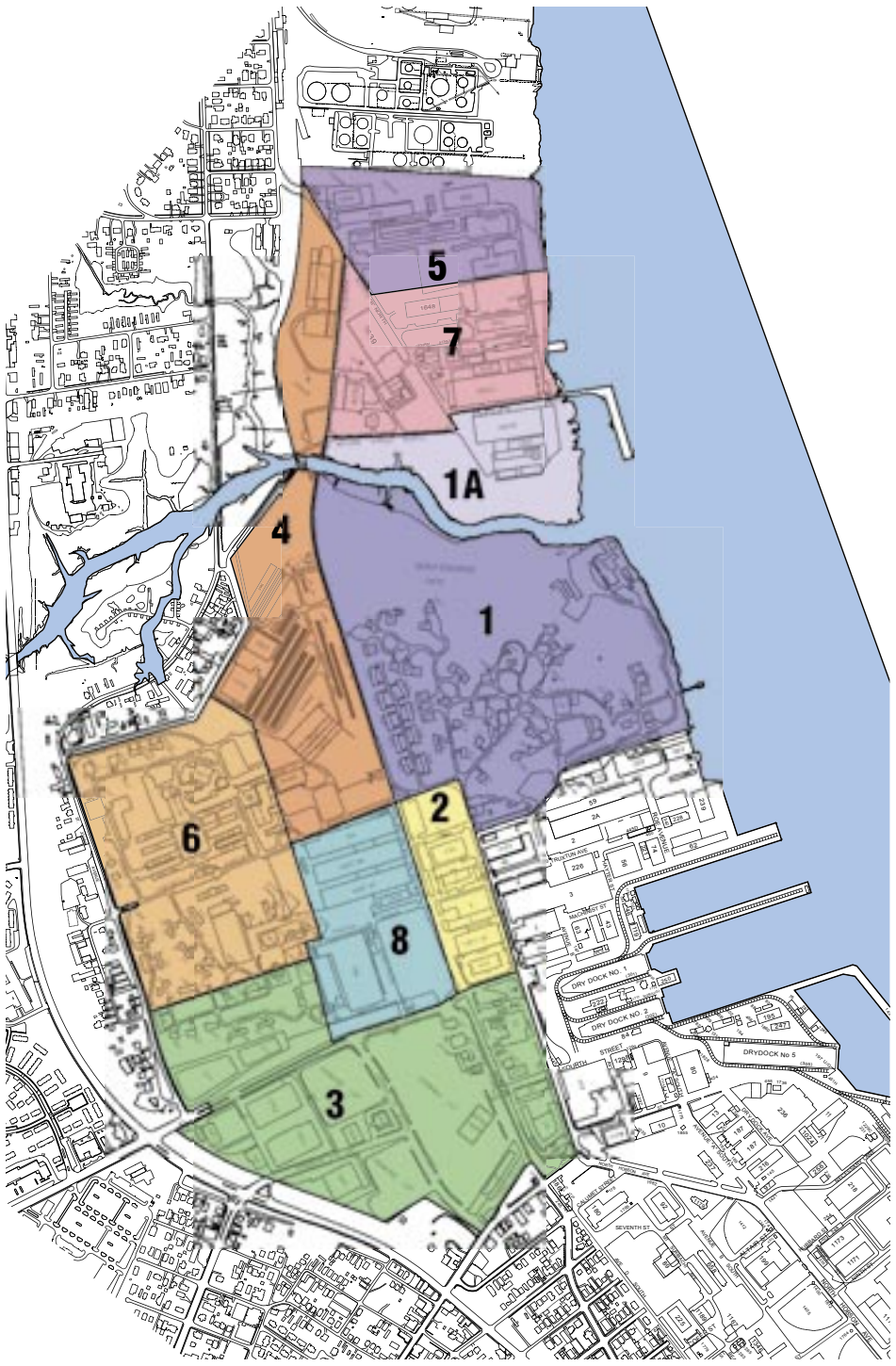
- Park Circle is the Centerpiece of North Charleston but the community center and recreation facilities are separated from the neighborhoods by the traffic circle, and traffic to and from the 8 streets connected to the circle is confusing.
- This will reduce the diameter of the circle with a new landmark in the center (fountain, sculpture and/or landscape) and, more importantly, create a site for a new community center and a variety of park and recreation areas with better pedestrian connections to the neighborhoods and more adequate parking.
- All the streets that connect the neighborhoods with Park Circle (other than Montague which will be improved in the first five years), Durant, Buist and N&S Rhett Avenues will be improved as delineated in Chapter Five.

7. There will be additional TIF for schools during this period but the School Board and community will determine which projects will receive this support.

Third Five Years (2014 through 2018)

8. There will be additional TIF for schools during this period but the recipients will be determined as stated in 7 above.

Project Phasing



On-Base TIF

First Five Years (2004 through 2008)

Naval Base Map - Transect

Hunley Museum

1. Historic Officers' Housing:

- New infrastructure will facilitate access to, and the creation of, a new Riverfront Park (see Chapter 4).
- It will also create a site and access for the Navy Memorial adjacent to the new park and make possible the continued restoration of the tidal marshland, as nature has already started reclaiming the golf course (see Chapter Three - Noisette Preserve) and construction of new higher density housing and conferencing facilities (Chapter 6).

1A. New infrastructure for the Maritime Museum and Noisette Preserve restoration North of Noisette Creek.

2. Redevelopment of the infrastructure along Noisette Boulevard (Avenue D) and Hobson Avenue between Turnbull and McMillan as described in Chapter Six.

3. Redevelopment of the infrastructure in the area bounded by 2nd Avenue on the North, McMillan on the South between Goldberg and O'Hear Avenue, and all of the land transferred to the Noisette Company South of McMillan, including the area known as the reverter land.

4. The realignment and redevelopment of Noisette Boulevard (Avenue D) North of Turnbull Avenue to its connection with Virginia Avenue. North of Noisette Creek, this includes areas East of Avenue D as shown. South of Noisette Creek this includes an area West of Avenue D bounded generally by Turnbull, Avenue F, St. John's Avenue and ND Avenue as shown.

5. New infrastructure from the north SPAWAR property to the North limit of the property transferred to the Noisette Company.

Second Five Years (2009 through 2013)

6. Redevelopment of the infrastructure in the area North of Second Street and South of St Johns Avenue between Avenue F on the East and O'Hear Avenue on the West.

7. New infrastructure for the existing SPAWAR site.

Third Five Years (2014 through 2018 and beyond)

8. New infrastructure for the site generally bounded by Turnbull on the North, Avenue D on the East, McMillan on the South and Goldberg Avenue on the West.

The ultimate goal of this TIF investment strategy is to accelerate the occasion when the 3,000 acre Noisette Community is valued as a unique, mixed-use waterfront district that celebrates its rich history and natural environment and is enjoyed by a diverse citizenry who find it adds value, vitality and joy to their lives.

Initiatives and Strategies

Contents

Creating the New American City requires more than creative planning and the integration of sustainable design principles. To be truly successful, the Noisette Community must also have initiatives and strategies that address arts integration, high performance schools, housing, historic preservation, economic revitalization, TIF utilization and other elements. There must also be an overall institutional framework that provides an ongoing basis for the long-term implementation of these ideas. This Chapter describes many of these concepts.

Noisette Institutional Framework

The New American City requires a new set of institutions that are organized to support a sustainable culture, which respects and serves long term the health of the economy, environment and the social fabric of the community. These institutions need to subscribe to the two core elements of socially durable communities and the principles of Sustainable Partnering of Resources outlined in the Introduction. These institutions will be guided by and support collaboration not competition, a connected and involved community, community harmony not divisiveness, the importance of connection to our natural world, and the necessity of each member being knowledgeable of the historic legacy of this place called Noisette.

The Sustainability Institute

The Sustainability Institute's role is "BUILDING the COMMUNITY CAPACITY to be a SUSTAINABLE CULTURE." They are focused on the connection between man's choices in creating the built environment and how it affects human health and the health of the natural world in which man is a participant. They are the teachers that empower the actions of the Noisette Community at all levels to live sustainably and grow a sustainable culture for generations to come. They are focused on the most important green infrastructure of all, "THE PEOPLE."

The Noisette Foundation

The Noisette Learning Foundation's role is "CREATING THE LIFE-LONG LEARNING COMMUNITY." This non-profit will house all of the arts initiatives, the schools as centers of the community, the museum development, the womb to tomb learning vision, programming for improved schools, the Graduate Internship Center, and all initiatives to restore the social health of the community.

The Michaux Conservancy and Land Trust

The Michaux Conservancy and Trust's role is "RESTORING OUR INTUITIVE CONNECTION TO THE NATURAL WORLD." This non-profit trust will own and acquire all lands in the Noisette preserve and any other park and environmental areas. They would establish and run the Noisette Interpretive Center. They would establish the relationships that catalyze the community, including the school students and teachers, to become stewards of the preserve. They would develop holistic and cross-disciplinary environmental education programs as part of every schools curriculum in partnership with the Learning Foundation. Aldo Leopold's writings and philosophy would be the foundation for all its endeavors.

High Performance Schools

Characteristics of High Performance Schools

Thermal comfort
Daylighting and visual comfort
High indoor air quality
Acoustic comfort
Security and safety
Energy & resource efficiency
Ease of operation and maintenance
Higher test scores
Improved attendance and retention
Building as a teaching tool

High performance schools are designed for thermal and acoustic comfort, high indoor air quality, security and safety, energy and resource efficiency, ease of operation and maintenance, and they make good use of natural light. Extensive research has uncovered a relationship between the physical setting of the classroom and academic performance. The bottom line: when students are in a quiet, well-lit and properly ventilated environment, they will learn faster because they are more comfortable and thus better able of concentrate and assimilate information.

As the schools become Centers of Community and draw in a larger portion of the neighborhood population, it becomes critical that their physical facilities are designed to be environmentally responsible, cost effective, physically comfortable and inviting. Building orientation and form, amount of natural light, low maintenance materials and well-designed HVAC systems are all design considerations that contribute to the creation of a high performance school.

High quality daylight enters classrooms through windows and roof monitors. Combined with the light-colored interior finishes, this reduces the amount of energy expended to light each classroom.

Daylighting in Schools:
An Investigation into the Relationship
Between Daylighting and Human Performance

This 1999 study conducted by the Heschong Mahone Group revealed a statistically compelling link between the presence of daylighting and student performance. Researchers pored over 21,000 student records from three school districts, tracking performance as well as the classroom characteristics (according to the size, tint, and orientation of the windows and/or skylights) for each pupil.

Students in the classrooms with the most daylighting were found to have test scores in the range of 7-18% higher than sudents in the classrooms with the least daylighting. Also, in classrooms with operable windows, progress of the students was found to be 7-8% more rapid than that of students in rooms without operable windows, regardless of the presence of air conditioning. These results were observed with 99% statistical certainty.

Museum Initiatives and Arts Integration

We have identified four museum focus areas that are unique to Charleston, the Southeast, and the nation. These museums would be funded through foundation, corporate, individual, and government grants as well as tax increment financing. These areas are: Industry of the Cooper River over 300 years; a Maritime Museum for shipbuilding in the Southeast going back to native American cultures; a Black History museum celebrating the contributions of this group to American science, invention, education, arts, business etc.; and a Native American Museum focused on the diverse tribal cultures in the Southeast. Each of these areas has been identified as uniquely connected to the Noisette area and missing in the Charleston and Southeast market areas.

These four focus areas have now evolved into two museums, "The Spirit of the Land" and "The Spirit of the Water'. The Spirit of the Land would celebrate all the diverse cultures and groups that have settled this land throughout human history – Native Americans, English, Irish, Scottish, French, and Spanish colonists, and the African American heritage, from the slave trade to the Mosquito fleet. The Spirit of the Water would integrate the Maritime and shipbuilding history with the Industries of the Cooper River. Plans are also in development to create the Greater Charleston Naval Base Memorial, recognizing the nearly 100 year history of this military base. We have also identified a third museum, the Noisette area itself, which would become for sustainability the equivalent of peninsula Charleston and its role as a living historic preservation center. From the beginning, the Noisette area is being planned as a national center to teach and evolve the understanding and growth of a sustainable culture.

These museums will link with educational programs targeting the environmental, maritime and industrial heritage of the Low Country. Ultimately, the goal of the City and Noisette is to create a pedestrian-friendly attraction, a major destination similar to the Inner Harbor development in Baltimore. Today, cities around the world are capitalizing on similar projects, symbolized in the so-called "Bilbao Effect", in which the New York-based Guggenheim Museum and the northern Spanish city of Bilbao transformed a decaying industrial site into a global destination by creating a great architectural and cultural element. In its first year of operation, the Bilbao Guggenheim art museum lured 1.4 million visitors into the city and has consistently tallied similar numbers since 1997.

A fourth area of focus is to establish Noisette as the area where artists live, work, perform, and exhibit. Charleston has been one of the major art centers in the US and is in jeopardy of losing this resource because of the gentrification of Charleston. This also provides a unique opportunity for funding a perpetual center to assure that artists have a permanent place in this region.

Early conceptual rendering of the Greater Charleston Naval Base Memorial

A fifth area is the creation of a nationally recognized center and performance hall to support ballet, symphony, opera and chamber groups in an integrated performance hall. This facility would also be a resource and internship center for the School of the Arts as well as college and graduate level programs in the region. The Noisette cultural center also plans a Shakespearean level theater designed to support the South of Broadway, a Lords Proprietor Theatre group, as well as other regional and traveling shows.

The sixth is the development of a museum for fine arts exhibit and education that in its exhibition space is designed in the manner of the Gardner Museum in Boston. This would be in support of the expansion of the Gibbs Museum.

The seventh area is a program or concept of arts integration. As we study the great places in the world that people flock to, we learn that the art and architecture emerge organically over time. They are rarely imposed, which is why they fit so well and have an almost timeless appeal and value. This is a process that engages the community and region in a dialogue about art and the community and slowly and thoughtfully starts to choose where and what is created through out the city. Allowing opportunities for this to occur over the decades, and even centuries, is one of the core elements of great places.

Within the Noisette Community, seven building blocks work together to create a city that is totally infused with the arts:

1. Outdoor Spaces – unique public spaces, amenities, and design elements that create a sense of arrival in a special place – an environment that invites people to get out of their cars and explore the area as pedestrians.
2. Multi-Discipline Program Spaces – spaces that bring people into the area for a portion of the day with the intent of developing live/work, leisure, and educational facilities in the future. The North Charleston Cultural and Civic Complex (formerly Sterett Hall and Barracks area) contains the multi-discipline spaces needed for a broad range of activities. The Cultural and Civic Complex will serve as a point of entry into the Noisette area for small or emerging artists or organizations. Artists or Arts Organizations that outgrow these or who simply need larger spaces will be located elsewhere within the broader Noisette Community. The Complex will also serve as a catalyst for sustaining a revenue stream for continued cultural programs, networking/partnering opportunities between cultural groups, and economic redevelopment of the area.
3. Large Studio Spaces – create a mix of production and rehearsal spaces for artists, arts organizations, and arts businesses.
4. Housing Spaces – create a mix of housing units for artists and non-artists who like to live in an arts community, and regular housing (studio-loft, condominium complex, and single family).
5. Arts Galleries – establish a mix of galleries showcasing the full range of two and three-dimensional art: fine art, folk art, functional art, etc. Ownership could be by a combination of business, non-profit, co-op, and city entities.
6. Theatre Spaces – establish a mix of theatre spaces to bring people into the area after hours and to enhance business opportunities for restaurants and related businesses.
7. Museums – establish museums based on the Spirit of the Land and the Spirit of the Water.

Even parking lots can become temporary art venues, as shown in an annual arts event in Kansas City, Missouri.

The Noisette Company is establishing a comprehensive cultural foundation that would oversee this funding effort as well as integrate each of these areas creatively with the public schools. The objective is establish an Arts Overlay Zone with art in both accidental and planned locations throughout the 3,000-acre area, demonstrating Noisette as the 21st century architectural answer to creating a place that is responsive to its culture and place in the same way that the 19th century gave us historic Charleston.

Housing For All

Much of the new home residential activity in the Charleston Metropolitan Area is confined to “green field” communities that continue to sprout up on or near the furthest edges of the current “paths of development” These paths of development lie along primary highways and within relatively short distances from existing utility services. This approach is a formula for “Urban Sprawl”. New development continues to add infrastructure at the outer edges of served areas, while existing facilities, serving bypassed or under-utilized declining areas, are ignored. In addition, the typical affordable new home neighborhood is populated with homes of essentially the same size, limited features and a narrow price range. This approach tends to discourage economic diversity within the neighborhood and serves to isolate the residents from those with greater or lesser financial worth (a kind of economic segregation). These typical subdivision neighborhoods will rarely contribute sufficient tax revenues to cover the additional cost of expanded municipal services required by its residents. This means that cities must find other revenue sources to subsidize the cost of the growth.

Housing for All

The description of the housing solution adopted by the Noisette Company is termed *Housing for All* and can be described as the creation of a wide variety of homes in both single family and multi-family forms built in traditional city blocks as part of the urban core of the New American City. This mix of housing types will permit substantially higher development density and an opportunity to provide a more diverse mix of home sizes and price ranges within each block.

Noisette is establishing the Housing for All approach as opposed to a traditional affordable housing program. Affordable has come to mean housing is subsidized locally by the public and private sector as well as the federal level. Housing that requires subsidy by the public or private sector is, by definition, not sustainable. We believe that an improved approach to housing will not require short or long term subsidy.

Housing affordability has its roots in segregation of uses, zoning policy that limits diversity and density, and property tax policy that affects fixed income and lower income families as areas improve. Additionally, the separation of commercial and retail from residential, coupled with an ineffective and unreliable transit system has required the use of cars as the primary means of transportation and has forced many families to have two or more cars. There are numerous examples of families paying more of their monthly income for car payments, insurance and operating costs than on their rent or mortgage.

Affordable housing is also affected by the costs of operating and maintaining a home over time. Homes that are built with little regard to the climate, and its affect on energy and durability of materials, create an affordability gap. This also creates a need to repair and replace homes on a more frequent basis. In addition, there are few effective rehabilitation/ renovation assistance programs available.

Over the years, the financial industry has used many unique financial tools to create the prospect of higher percentage of ownership. The FHA program created the first long term mortgage that opened up homeownership in ways that could never have been imagined previously.

In the lower price range there are tools available such as ground rents, which could have significant impact. Ground rents are essentially a tool that allows the sale of real property without the ownership of the land. This has been done for over 90 years in several areas of the country and would allow a $120,000 home under traditional financing to be purchased for $70,000 plus a monthly ground rent.

There are also a series of new mortgage instruments that include- Green Mortgages, Energy Efficient Mortgages and Transportation/ Location Mortgages. These programs have recognized that when homes are designed and built more sustainably and located closer to employment and shopping, the overall costs for a home owner decrease. These programs are designed as incentives for the form of development that is proposed by the Noisette Master Plan.

The homes in the urban core of the River Center at Noisette will coexist not only with a broader array of residential forms, but also with numerous other uses in the same neighborhood. Some of these uses will include commercial, retail, office, recreational and institutional facilities. This approach will contribute to a much more dynamic and convenient lifestyle with easy access to many goods and services and perhaps even employment opportunities for the residents within a short walking distance.

Live/Work

One of the more popular approaches for accomplishing this microcosm of uses in a relatively small area is a live/work configuration, which offers commercial or retail space at street level with residential on the floor(s) above. As a town home or attached home, the resident above may be the businessperson below; or in a multi–story structure, floors may be leased or owned independently of one another.

Owner-Occupied and Rental (Diversity by Block)

The Noisette Housing objectives will be "Equal Housing Opportunities" and are driven by a desire to satisfy a broad spectrum of buyers and renters. Their occupations may range from service sector employment, to professionals, to retirees with home prices or rents that are within their respective ranges of affordability.

The Noisette Company will be offering both for-sale and rental housing opportunities on many of these blocks. Within these blocks, a mix of various sized housing alternatives will be available with a broad array of room counts and configurations as well as standard and optional features at prices ranging from the very affordable to several hundred thousand dollars.

Included and Optional Services

We all live much busier lives and there rarely seems to be enough time to get everything done. Many individuals are choosing to remain single or marry later in life, and both partners are more likely to pursue their individual careers even when raising a family. We are also seeing multiple combinations of non-traditional relationships that choose to live together. All of these factors create a demand for diverse services that are difficult to find or deliver in traditional neighborhood settings.

As a result of the higher density of homes and broader spectrum of resident incomes present in these more urban neighborhoods, many services can be made available and be much more cost-effective. These include home maintenance and improvement, both exterior and interior to the home in the form of, or similar to, a condominium or maintenance-free situation.

Another category of services would be best described as personal, family or safety/security services. Some of these services are child-care, elder care, meal preparation, entry monitoring, health care, laundry and dry cleaning and numerous others. One of the advantages of these neighborhoods with residents who are willing to accept service related employment, is that you can often employ your neighbor or local service provider rather than bringing a stranger into your home or neighborhood.

Senior Housing

As our population ages, our older citizens are dramatically affected by the way we have homogenized housing product over the last fifty years and how we have limited the diversity of size within neighborhoods. Many of our citizens would like to stay in the area where they currently reside but cannot afford or desire to maintain a larger home. There are no options but to leave.

This creates a disconnect of our youth from their grandparents generation, eliminating a vital part of the socialization and value building between generations. This problem is exacerbated by the lack of public transportation options, which is caused by the economics of low density and lack of diversity in uses.

The Noisette Solution would be to provide alternative home designs that accommodate the special needs of aging residents. The intention is to retain these seniors within the community and not to further isolate them in remote, age-restricted neighborhoods. The special needs of health care should be readily available until the need to move to a level of continuous care. This allows these valued members of the community to remain and be active in their neighborhoods.

Financing Alternatives/ Support Programs

The Noisette Company envisions an alliance of regional and national mortgage lenders, private sector builders, public agencies and non-profit housing providers who will support the kinds of financing alternatives that can provide both construction funding and individual mortgages for the creation of this breakthrough community.

The financing activity should take advantage of the benefits available to lenders who are proactive in investing in recovering blighted neighborhoods and should permit this to be done without direct subsidies.

Historic Preservation/Restoration Strategies

Respecting the architectural as well as the community history is an important ingredient in preserving a sense of community and economic stability. This can be achieved through the selective preservation of individual buildings and designation of entire neighborhoods, such as Liberty Hill, as historic districts through listing on the National Register of Historic Places. Such preservation programs are an asset and economic driver to the overall area.

In order to implement such a program it is necessary to put in place guidelines to identify and determine qualification of prospective buildings and neighborhoods. Affected owners' property rights must also be dealt with fairly by limiting the impact and using alternative funding methods:

1. Funding from the National Trust for Historic Preservation may be available for developing a tax credit program or even for making physical improvements, but funds are only available to properties on the national Register. The US department of Housing and Urban Development also has various funding programs available for preservation activities in economically depressed residential neighborhoods, including Grants-in-Aid, the Urban Renewal Program, and Rehabilitation Grants and Loans available for repairs and upgrades of individual owner occupied homes.
2. The City should work with Charleston County and the State of South Carolina to develop and implement a heritage Rehabilitation Tax Credit program, to provide relief to low-income residents in designated historic neighborhoods and encourage repairs to deteriorating housing stock. Similar programs have been successful in Maryland, Missouri, Iowa, Wisconsin and Tennessee. Such programs may reduce the private property tax generation, but ultimately, they successfully infuse the local economies that have implemented the programs. In some states, the dollars "spent" on the tax credits generate one and a half times the income.

Existing Historic Districts on the Naval Base

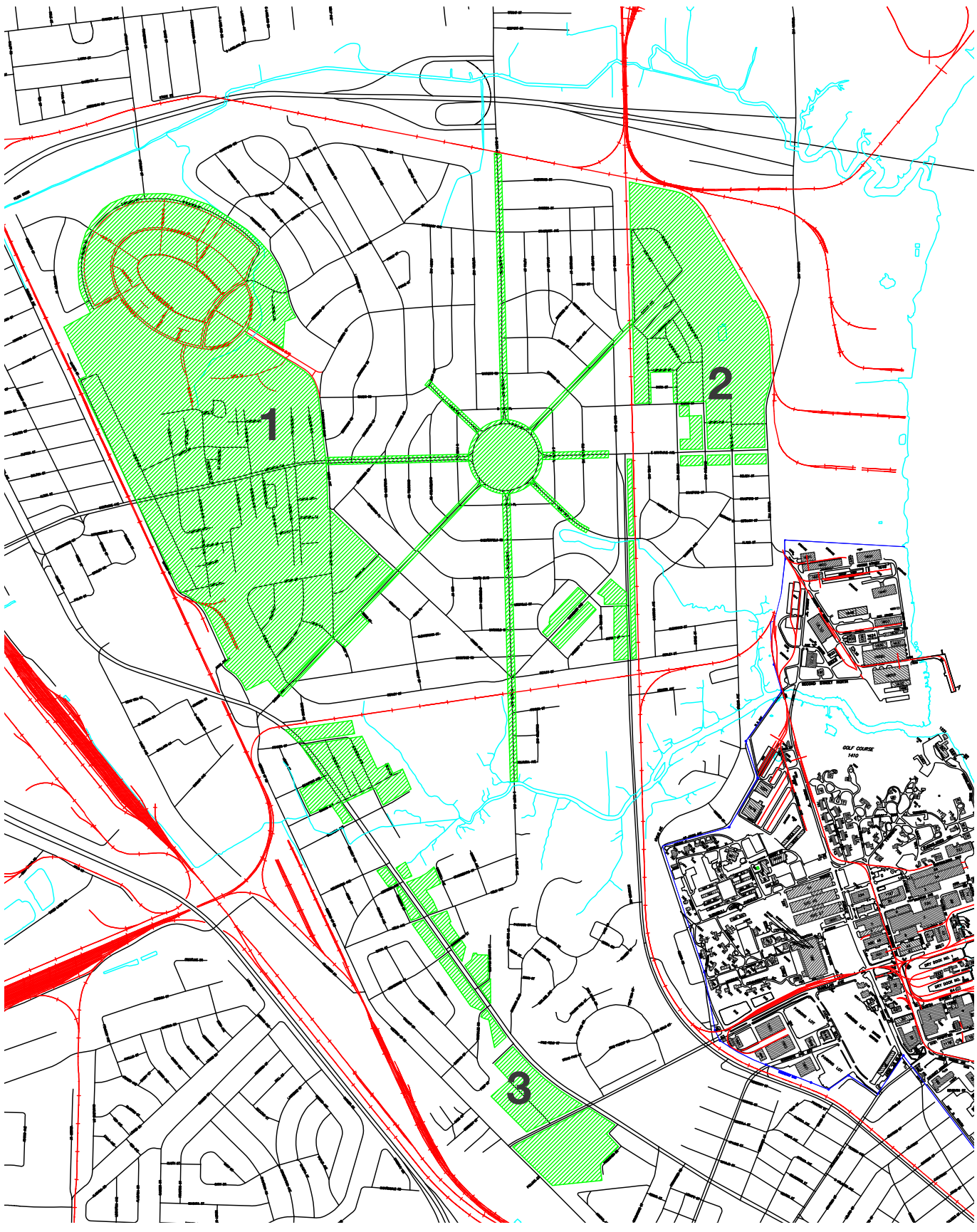
When the Base was closed, the Navy determined that three specific areas were eligible for the National Register of Historic Places: the Officers' Housing District, the Naval Hospital District and the Naval Shipyard District. All of the first two and part of the third are in the Master Plan area. All buildings within these districts are categorized as "contributing" or "noncontributing" and are the specific concern of the South Carolina State Historic Preservation Officer. Since the Base closure, unfortunately, many of the "contributing" residential buildings have fallen into substantial disrepair and are basically unoccupiable without major restoration, including repair of rotting exteriors and roofs, plumbing, electrical, and HVAC systems. Some structures may be past repair. The RDA has already demolished some commercial "contributing" buildings included in the districts after meeting the SHPO's requirements. The redevelopment of the former Naval Base will need to be sensitive to these districts, as well as the individual buildings, and the owners should work closely with the SHPO.

TIF Utilization

Tax increment financing (TIF) is a municipal financing device that uses the incremental increases in property or other tax collections within a specified area, and over a defined term, to finance public improvements in order to draw businesses and residents to a community. A TIF district with specified boundaries is created within an area in need of redevelopment. During the development period, the tax base is frozen at the predevelopment level. Property taxes continue to be paid, but taxes derived from increases in assessed values (the tax increment) resulting from new development go to pay for the redevelopment costs. Municipalities set up these districts to help develop blighted areas, build and repair roads and infrastructure, create municipally owned parks and museums, and put underutilized properties back to work for the citizens of the local and surrounding communities. By returning formerly vacant or underutilized properties to the tax rolls, the municipality creates new sources of revenues from new development within the TIF district, generating the funds needed to make necessary improvements without raising the taxes of the existing community. The municipality's investments in these areas are repaid when improved, productive properties become new, permanent revenue generators.

The State of South Carolina has addressed the issue of TIF legislation in two different sections of its state law. The first is in Title 31, Chapter 6 of the Code of Laws of South Carolina 1976, as amended. This chapter enables municipalities across the state to create TIF districts within their boundaries as needed and in compliance with the provisions of the law. The second is in Title 31, Chapter 12 of the Code of Laws of South Carolina 1976, as amended. This chapter created a TIF district specifically for redevelopment of the former Charleston Naval Complex.

The City of North Charleston currently has three Tax Increment Financing districts within its borders. Two of these districts are within the Noisette Project area: one dealing specifically with the area encompassing the former naval complex and the other with areas around the Montague corridor. Tax increment financing will play a vital role in enacting the changes suggested in the master plan. With coordinated phasing of the master plan elements, whole areas of the city can be revitalized to create incentives for new, private sector development of residential, commercial and retail properties. These new properties will add to the tax base and, in turn, pay for the TIF projects that enticed them to the area in the first place.



The Noisette Community Redevelopment TIF Plan

In July of 2001 the City of North Charleston approved the TIF district outlined in The Noisette Community Redevelopment TIF Plan. The plan was prepared in accordance with Title 31, Chapter 6 of state law. The duration of the plan is 20 years and the term of tax increment financed bonds will not exceed 15 years. The Noisette Community Redevelopment area covers approximately 565 acres and involves three primary areas. The **first area** encompasses the Liberty Hill Community, Century Oaks and Calhoun Homes. The **second area** encompasses the old Montague Avenue central business district and the area north of it. The **third area** includes commercial and retail parcels along Rivers Avenue. Additional commercial parcels are included along Spruill Avenue between Montague and Bexley Avenues. Also included are specific public and street rights of way areas centered on Park Circle and its radials connecting the thoroughfares of Montague Avenue, North and South Rhett Avenues, Durant Avenue and Buist Avenue.

In order to assist in the effort to improve the public schools in the Noisette project area, the Noisette Community Redevelopment TIF plan reserves twenty five percent of the projected TIF value to deal specifically with improvement of school facilities. The plan calls on Charleston County Schools to meet two conditions in order to be eligible for these funds. First, the schools must be built or renovated using the sustainable guidelines found in the U.S. Green Building Council's LEED certification program. Second, the schools must be designed using the principles of the Schools as Centers of Community concept described in Chapter 5. This approach enables members of the community to benefit from and contribute to the public school system, making it better for all involved.

The Charleston Naval Complex Redevelopment TIF Plan

In July of 1993, Congress approved the closure of the Charleston Naval Complex, and by April 1996 the close-out process was completed. In response to the need to redevelop the base and reintegrate it back into the City of North Charleston, the state passed legislation designating the entire Charleston Naval Complex as a special TIF district. The law requires the City to issue obligations within fifteen years of the creation of the TIF district, and the obligations must mature at a time or times not exceeding thirty years from their respective issuance dates. The naval complex TIF district has a distinct advantage in that the initial property values have been determined to be zero. Since the federal government was never subject to local property tax, the predevelopment tax level is frozen at zero and any increment from new assessment will go directly to the TIF district.

Implementation and Phasing

Many of the proposals suggested in this master plan can be implemented with the aid of tax increment financing. The city, in conjunction with public input, will need to analyze the proposed changes to determine which projects are to be undertaken initially. An example of how tax increment financing can aid in the revitalization process is currently underway in North Charleston. The Noisette Community Redevelopment TIF Plan has been implemented and is already being used in conjunction with the Century Oaks project. The city has purchased the Century Oaks property and is currently planning to completely redevelop the neighborhood. Deconstruction of existing structures, removal of obsolete infrastructure, and redesign and construction of new infrastructure will be funded with the help of tax increment financing.

The Charleston Naval Complex Redevelopment TIF Plan is currently in its final stage of completion. The plan is on schedule to be approved by the Charleston Naval Complex Redevelopment Authority and the City of North Charleston during the first quarter of 2004. Since the naval complex was fenced off from the surrounding neighborhoods many of the entrance corridors are not compatible with the redevelopment envisioned in this master plan and will need to be altered and enhanced. Streetscapes will need to be changed to enhance storm water runoff capability and to provide an inviting access corridor to developable sites. Also much of the existing infrastructure on the base is obsolete and inadequate for the development densities envisioned. The closing of the naval complex also created the opportunity for public access to the Cooper River that has long been denied to the citizens of North Charleston. Given the entrance corridor issues, the infrastructure inadequacies and the need for a public riverfront park, the initial TIF projects should focus on these items first. Concentrating on these areas for improvement as first phase projects will enhance and promote the efforts to attract new commercial, retail and residential development. As the new development is created, additional tax increment would be available for projects that promote continued revitalization of the area.

Economic Revitalization

An economic revitalization plan for an area must drive towards a balanced and diverse mix of business and residential opportunities.

The economic strategy should be built around the philosophy of aggregating competencies that can benefit from close association with each other. The two primary aggregating strategies are:

a) Aggregate existing core competencies of the area rather than chasing industries with which there is no connection and are just the latest "hot" industry. It is therefore important to identify the historic skill sets and values that can provide the basis of an aggregation strategy to attract new business. As the geographical epicenter of the Tri-County area, Noisette is well placed to aggregate any of a number of existing Low Country industries that are now dispersed.

b) Aggregate future competencies that relate to the new world economy and have a strong connection to local resources such as the Port, MUSC and sustainability. The existence of the Noisette Project as perhaps the largest "sustainable project" in the country provides an ideal opportunity for:

- Attracting mature industries, which have embraced sustainability as an overriding part of their corporate culture such as manufacturing and distribution of sustainable building materials and equipment.
- Creating a center for a restorative economy built around the growth in demand for healthier and renewed environments. Examples of these are aqua culture, native plant nurseries, deconstruction and recycling, remediation and restoration companies and eco tourism.
- Establishing Noisette as the center for sustainable retail and service business as well as unique regionally based retail.
- Aggregating the Noisette area as the home for artists to live, work, exhibit and perform.

To support all of these strategies and nurture these industries, close attention should be paid to the creation of incubation opportunities for new businesses. These companies are the next generation of major employers and will keep the local economy from stagnating. In addition, the unique cultural and historic fabric of the neighborhoods of Noisette, such as the Navy Base and Liberty Hill, should be celebrated and highlighted as part of an economic strategy.

Finally, to support new business it is essential to create:

1. Amenities
2. Retail
3. Service industries
4. A broad range of housing types and prices
5. Effective schools
6. Public transportation

Benchmarks for Success: Measuring, Reporting and Learning from Results

Contents

Benchmarks

Creating a Learning Community

This Noisette Community Master Plan for the New American City is based on the Triple Bottom Line – a balance among people, planet, and prosperity – embodying the belief that sustainable cities must be equally responsive to social needs, environmental responsibility, and economic vitality. To evaluate our success in achieving these goals, we need ways of measuring progress, a mechanism for reporting the results, and a method to enable the planners of future projects to learn from the experiences of completed projects.

Measuring Results

This chapter sets forth three methods of measuring different aspects of progress:

- **The Noisette Quality Home** Performance Standards have been specifically developed for the Noisette community. They are used to evaluate new low-rise residential buildings based on six measurement categories: sustainable sites & communities, water efficiency, building durability, energy, materials & resources, and indoor environmental quality.
- The US Green Building Council **Leadership in Energy & Environmental Design** (**LEED™**) is the foremost national standard for evaluating the occupant well-being, environmental performance, and economic returns of commercial and high-rise residential construction. The LEED™-NC is used for new construction and major renovations of existing buildings. Additional LEED™ tools are being developed for existing buildings and commercial interiors projects.
- **The Noisette Rose** is a highly flexible tool that permits the measurement metrics for social, environmental, economic, and other types of performance to be selected specifically for each project. Created for the Noisette community, the Noisette Rose can be used independently or in combination with the Noisette Quality Home or LEED™ performance standards.

This chapter also describes a national initiative to measure the health of lands, waters, and living resources of the United States. This endeavor, by The Heinz Center, is presented in a report entitled *The State of the Nation's Ecosystems*.

Noisette Quality Home Performance Standards

The Noisette development team and the City of North Charleston are committed to delivering high quality, sustainable housing in the community of Noisette. Housing in the Noisette community will exhibit improved comfort, durability, energy efficiency, and indoor environmental quality, while also minimizing the environmental impact of residential construction activities. High quality, sustainable housing is an important element of the overall development strategy to enhance the quality of life in the community of Noisette and preserve / restore local ecosystems and natural landscapes.

The Noisette development team and the City of North Charleston have created the **Noisette Quality Home** Performance Standards in order to define the specific levels of performance to be attained by low-rise residential development in the Noisette community. These Performance Standards were developed for the specific climatic and geographical conditions of the South Carolina Low Country. To a greater extent than other residential performance standards, they seek to establish high quality levels for moisture control, human health, hurricane protection, and flood protection. Also, these Performance Standards specifically recognize that well-designed smaller houses are more efficient users of energy and natural resources than larger homes; the evaluation point structure is designed to reward these characteristics.

The **Noisette Quality Home** Performance Standards include multiple levels of compliance (Certified, Silver, Gold, and Platinum) so that minimum performance requirements can be clearly defined while also encouraging and challenging homeowners, builders and architects to far exceed these benchmarks. The Noisette development team and the City of North Charleston intend for the **Noisette Quality Home** Performance Standards to be a living, evolving document that fosters an attitude of building the absolute best houses that are economically feasible in the community of Noisette.

In order to facilitate the process of building better, more environmentally friendly houses, the **Noisette Quality Home** Performance Standards are intended to educate homeowners, builders, and architects about the environmental impact of residential construction and the fundamental principles of high quality residential construction. The **Noisette Quality Home** Performance Standards outline primary criteria for high performance, sustainable houses, and then suggest improved construction practices, materials, and technologies which can be used to achieve improved performance levels. The Noisette Quality Home Performance Standards give homeowners, builders, and architects flexibility to develop their own strategies for achieving the desired performance levels, by combining methods described in the Performance Standards or by proposing new, innovative methods.

qualityhome®

The **Noisette Quality Home** Performance Standards are a separate publication, incorporated in this Master Plan by reference, and intended for use throughout the New American City. The Performance Standards are a point-based system, with some mandatory prerequisites in each category. The major categories and performance objectives of the **Noisette Quality Home** Performance Standards are:

Sustainable Sites & Communities

- Preserve natural ecosystems and wildlife habitats
  - Cluster development into higher densities, and maintain open space
  - Preserve existing trees and natural vegetation
  - Preserve local watersheds and associated ecosystems
  - Control erosion and sedimentation during construction
- Preserve natural stormwater drainage, percolation patterns, and groundwater resources
- Use native species for landscaping in order to maintain natural systems and reduce irrigation requirements
- Create high quality outdoor spaces to create opportunities for outdoor recreation and promote social interaction among neighbors
- Create mixed-use, pedestrian friendly neighborhoods
- Re-use and/or revitalize existing buildings and/or sites
- Incorporate concepts of universal design into site plan and house design

Water Efficiency

- Use low flow fixtures & appliances and efficient plumbing design to reduce indoor water consumption
- Minimize or eliminate use of potable water for landscaping & garden irrigation
- Employ landscape design methods which minimize irrigation needs
- Educate the homebuyer/owner on outdoor water conservation

Building Durability

- Hurricane protection system to be designed and approved as part of the building program
- Minimize potential damage from flooding
- Create a continuous drainage plane from the roof ridge to the foundation footing
  - Ensure that the roof system is water-tight and properly integrated into adjoining walls, chimneys, etc.
  - Secondary drainage plane behind exterior siding, properly drained down and out at the bottom of wall assemblies, at windows and door openings, roof / wall intersections, etc.
  - Minimize penetration of ground water and moisture through the foundation system and into the house
- Minimize diffusion of water vapor from the outside through the structural frame and into the house during the cooling season
- In order to minimize the air transport of water vapor through the structural frame, create a continuous air barrier around the entire building enclosure
- Minimize potential damage from termites and pests

Energy

- Achieve minimum Home Energy Rating System (HERS) score according to house size & occupancy
- Use passive cooling and passive solar heating design concepts
- Construct a high performance thermal envelope
  - Create a continuous air barrier around the entire building enclosure
  - Create a complete, continuous insulation layer around the entire building enclosure
  - Install high performance windows and doors
- Install energy efficient heating & cooling equipment
- Install efficient, well-designed duct systems
- Install energy efficiency water heating systems
- Use high quality, energy efficient lighting & appliances
- Install sustainable energy generation equipment

Materials & Resources

- Use efficient building design to build more house with less material
- Use sustainable materials (reclaimed, recycled, renewable resources, durable, locally produced) to construct the home
  - Structural Frame
  - Roof
  - Exterior & Interior Finishes
  - Porches & Decks
  - Sidewalks, Patios, & Driveways
- Minimize and recycle construction waste
- Educate the homebuyer/owner on household recycling & composting

Indoor Environmental Quality

- Ensure that combustion by-products are exhausted to the outside and kept from entering conditioned space
- Ensure that car exhaust in garage is kept from entering conditioned space
- Use materials of minimal toxicity, and minimize the occupants exposure to toxic materials
- Prevent radon and soil gases from entering the home
- Minimize dust collection in the indoor environment
- Install whole-house mechanical ventilation to provide adequate fresh air to occupants
- Provide exhaust ventilation in rooms with point-source indoor pollutants (odors, humidity)
- Maintain indoor relative humidity between 30-50%

Each of these categories and measures has specific performance characteristics that earn points if they are included in a given project. A residential builder or developer would complete a worksheet documenting the performance measures to be incorporated in a project and the performance level (Certified, Silver, Gold, or Platinum) that will be achieved.

The **Noisette Quality Home** Performance Standards should be established as a requirement for new and major renovation of low-rise residential buildings in the Noisette Community. An objective third party consultant, such as IBACOS, the developer of the **Noisette Quality Home** Performance Standards, should serve as a coach or guide to assist the builder and the City to implement the Standards. The City of North Charleston should monitor the compliance of specific projects with the Standards as part of the residential permit and field inspection review process.

Leadership in Energy & Environmental Design (LEED™)

The US Green Building Council (USGBC) is a national organization comprised of about 3,600 corporations, government entities, professionals, builders and environmental organizations with interests in the green building industry. Recognizing the need for a definitive standard by which the energy and environmental performance of buildings could be assessed, the USGBC developed the Leadership in Energy & Environmental Design **LEED™** Green Building Rating System, which has become the definitive consensus performance standard for commercial and high-rise residential building projects in the US and throughout the world.

LEED™ is structured around five performance categories, with specific prerequisites and credits in each. Prerequisites are a baseline requirement and do not earn credits; the number of credits earned in the five categories determines the **LEED™** certification level: Certified, Silver, Gold, or Platinum. The project applicant submits documentation of the features that are included in a specific project and the number of credits being sought. The USGBC performs an objective evaluation of the project and determines the performance level that the project has achieved.

The categories, prerequisites (P1, P2, etc.), credits (C1, C2, etc.), and credit intents of **LEED™** – NC, Version 2.1 are:

Sustainable Sites

SS P1: Erosion & Sedimentation Control – reduce negative impacts on water and air quality
SS C1: Site Selection – avoid development of inappropriate sites and reduce the environmental impact from the location of a building on a site
SS C2: Development Density – channel development to urban areas with existing infrastructure, protect green fields, and preserve habitat and natural resources
SS C3: Brownfield Development – rehabilitate damaged sites where development is complicated by real or perceived environmental contamination, reducing pressure on undeveloped land
SS C4: Alternative Transportation – reduce pollution and land development impacts from automobile use
SS C5: Reduced Site Disturbance – conserve existing natural areas and restore damaged areas to provide habitat and promote biodiversity
SS C6: Stormwater Management – Limit disruption and pollution of natural water flows by managing stormwater runoff
SS C7: Heat Island Effect – reduce heat islands (thermal differences between developed and undeveloped areas) to minimize impact on microclimate and human and wildlife habitat
SS C8: Light Pollution Reduction – eliminate light trespass from the building and site, improve night sky access and reduce development impact on nocturnal environments.

Water Efficiency

WE C1: Water Efficient Landscaping – limit or eliminate the use of potable water for landscape irrigation
WE C2: Innovative Wastewater Technologies – reduce generation of wastewater and potable water demand, while increasing the local aquifer recharge
WE C3: Water Use Reduction – maximize water efficiency within buildings to reduce the burden on municipal water supply and wastewater systems

Energy & Atmosphere

EA P1: Fundamental Building Systems Commissioning – verify and ensure that fundamental building elements and systems are designed, installed, and calibrated to operate as intended.
EA P2: Minimum Building Performance – establish the minimum level of energy efficiency for the base building and systems
EA P3: Reduction in HVAC&R Equipment – reduce ozone depletion
EA C1: Optimize Energy Performance – achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use
EA C2: Renewable Energy – encourage and recognize increasing levels of on-site renewable energy self-supply in order to reduce environmental impacts associated with fossil fuel energy use
EA C3: Additional Commissioning – verify and ensure that the entire building is designed, constructed and calibrated to operate as intended
EA C4: Ozone Protection – reduce ozone depletion and support early compliance with the Montreal Protocol
EA C5: Measurement & Verification – provide for the ongoing accountability and optimization of building energy and water consumption performance over time
EA C6: Green Power – encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis

Materials & Resources

MR P1: Storage & Collection of Recyclables – facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills

MR C1: Building Reuse – extend the life cycle of existing building stock, conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport

MR C2: Construction Waste Management – divert construction, demolition and land clearing debris from landfill disposal. Redirect recyclable recovered resources back to the manufacturing process. Redirect reusable materials to appropriate sites

MR C3: Resource Reuse – reuse building materials and products in order to reduce demand for virgin materials and to reduce waste, thereby reducing impacts associated with the extraction and processing of virgin resources

MR C4: Recycled Content – increase demand for building products that incorporate recycled content materials, therefore reducing impacts resulting from extraction and processing of new virgin materials

MR C5: Regional Materials – increase demand for materials and products that are extracted and manufactured within the region, thereby supporting the regional economy and reducing the environmental impacts resulting from transportation

MR C6: Rapidly Renewable Materials – reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials

MR C7: Certified Wood – encourage environmentally responsible forest management

Indoor Environmental Quality

EQ P1: Minimum IAQ Performance – establish minimum indoor air quality (IAQ) performance to prevent the development of indoor air quality problems in buildings, thus contributing to the comfort and well-being of the occupants

EQ P2: Environmental Tobacco Smoke Control – prevent exposure of building occupants and systems to environmental tobacco smoke

EQ C1: Carbon Dioxide Monitoring – provide capacity for indoor air quality monitoring to help sustain long-term occupant comfort and well-being

EQ C2: Ventilation Effectiveness – provide for the effective delivery and mixing of fresh air to support the safety, comfort and well-being of building occupants

EQ C3: Construction IAQ Management Plan – prevent indoor air quality problems resulting from the construction/renovation process in order to help sustain the comfort and well-being of construction workers and building occupants

EQ C4: Low-Emitting Materials – reduce the quantity of indoor air contaminants that are odorous, potentially irritating and/or harmful to the comfort and well-being of installers and occupants

EQ C5: Indoor Chemical & Pollutant Source Control – avoid exposure of building occupants to potentially hazardous chemicals that adversely impact air quality

EQ C6: Controllability of Systems – provide a high level of thermal, ventilation and lighting system control by individual occupants or specific groups in multi-occupant spaces (e.g. classrooms or conference areas) to promote the productivity, comfort and well-being of building occupants

EQ C7: Thermal Comfort – provide a thermally comfortable environment that supports the productivity and well-being of building occupants

EQ C8: Daylight and Views – provide for the building occupants a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building

LEED™ has additional possible credits for Innovation & Design Process. The intent is to provide design teams and projects the opportunity to be awarded points for exceptional performance above the standards set by the **LEED™** Green Building Rating System and/or innovative performance in green building categories not specifically addressed by **LEED™**.

The **LEED™** Green Building Rating Systems should be established as a requirement for new and major renovation of commercial and high-rise residential buildings in the Noisette Community. Individual projects could either be required to submit documentation for rating by the US Green Building Council, resulting in a **LEED™** certified building, or could be designed to achieve a specific **LEED™** performance level, as assessed by an objective third party consultant. Projects that go substantially beyond **LEED™** Certified or Silver level, to **LEED™** Gold or Platinum, are likely to incorporate means for generating energy on site and treating waste on site. The incorporation of such features reduces the impact of a building on the utility infrastructure and could be rewarded by an increase in allowable Floor Area Ratio (FAR) or other favorable treatment. The City of North Charleston should monitor the compliance of specific projects with the Standards as part of the residential permit and field inspection review process.

LEED Buildings Costs and Financial Benefits

Do Green Buildings cost more? What are their financial benefits?

To find the answers to these questions, the State of California and the Massachusetts Technology Collaborative commissioned studies of buildings that have received LEED certification. The study, led by Gregory Kats of Capital E, (1) determined that the average design and construction cost premium for 33 LEED buildings was less than 2%. The study also documented a trend of declining costs associated with increased experience in green building construction, which has been experienced in Pennsylvania, Oregon, and Washington over the past six years.

Green buildings provide financial benefits that conventional buildings do not. These benefits include energy and water savings, reduced waste, improved indoor environmental quality, greater employee comfort/productivity, reduced employee health costs, and lower operations and maintenance costs.

A detailed review of 60 LEED rated buildings demonstrated that green buildings, when compared to conventional new buildings, are on average 25-30% more energy efficient and have an even greater reduction in peak electricity consumption.

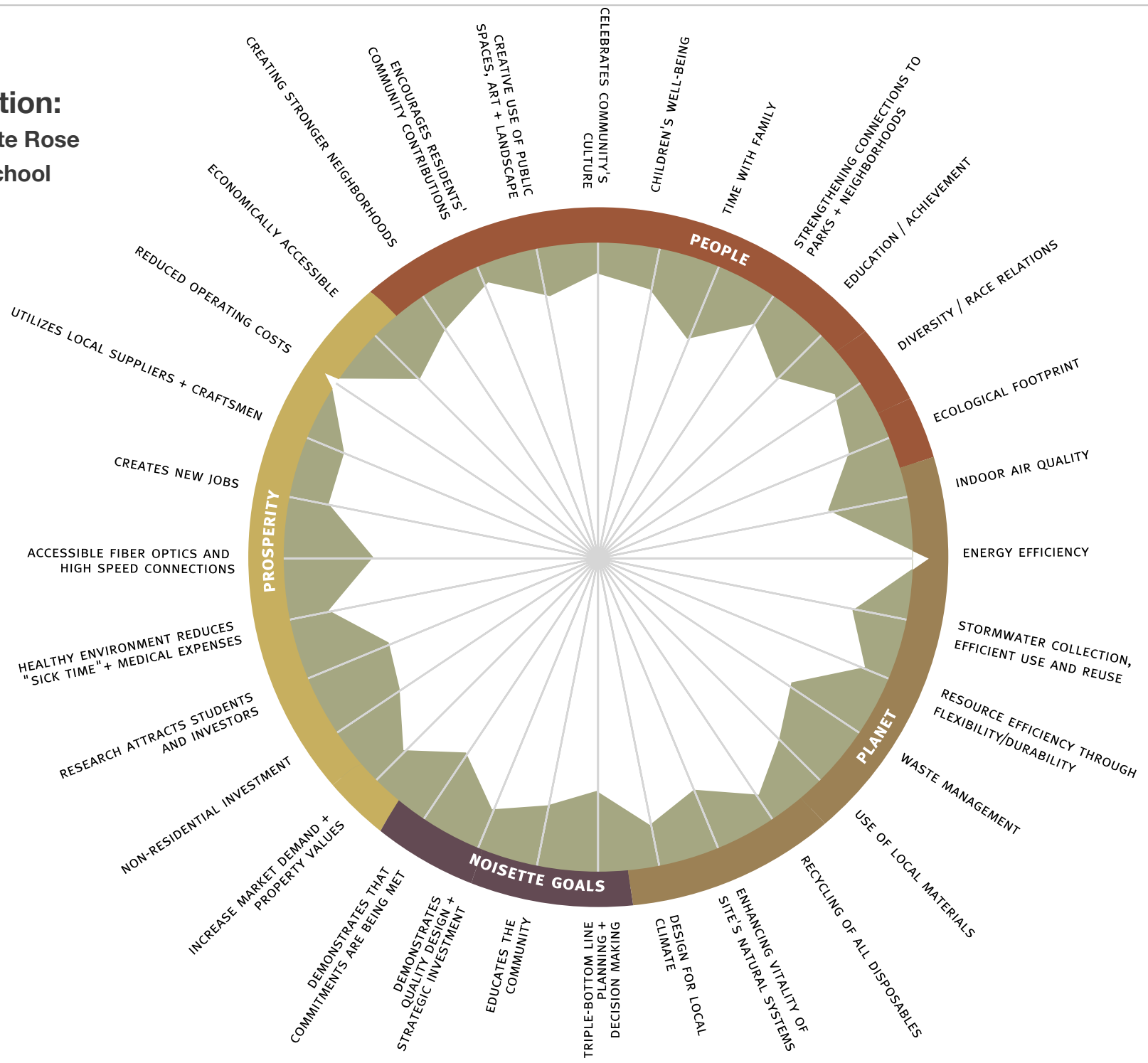
There are also strong indications that these buildings have significant productivity and human health benefits. Green buildings typically have increased ventilation control, increased temperature control, increased lighting control, and increased daylighting, which have been positively and significantly correlated with increased productivity. While it is difficult to draw direct links between specific design features and productivity increases, The Rocky Mountain Institute documented numerous measured studies of occupant performance in new green buildings showing increases in productivity, or decreases in absenteeism, in the range of 15 percent. (2) Even a five percent increase in productivity is worth about $3,000 per year for an average office worker, which is equivalent to about $15/square foot in a typical office building, a savings that is far greater than the increase in first cost.

(1) *Green Building Costs and Financial Benefits*, by Gregory Kats, published for the Massachusetts Technology Collaborative, 2003.

(2) *Greening the Building and the Bottom Line*, by Joseph Romm and William Browning, published by Rocky Mountain Institute, 1994.

Sample Evaluation:

Applying the Noisette Rose to a Hypothetical School Project



Creating a Learning Organism

The Noisette Rose

This master plan is intended to provide a road map for the transformation of 3,000 acres of North Charleston. City leaders and the Noisette Company share a commitment to create The New American City; a city where each planning decision improves the triple bottom line performance of the City.

The Noisette Rose was created to provide a flexible tool to facilitate goal setting and measurement and to chart the success of this holistic integrated community building process with specific measurable criteria.

The Rose is a graphic representation that includes both quantitative and qualitative measurements of the components of a planning process or building project within the community. The Rose is composed of groupings of individual metrics to gauge the varying success of specific criteria for a project evaluation. These criteria are grouped in alignment with the Triple Bottom Line:the first grouping represents the people (responsiveness to social needs), the second grouping represents the planet (environmental performance), and the third grouping represents prosperity (true economic performance). A smaller, fourth grouping represents Noisette criteria.

It is envisioned that a Rose would be created for each planning effort or building project. The stakeholders for a project would identify which issues are most critical in each area and what metrics should be utilized to set goals and measure results. The complexity of the Rose will change from project to project; a small residential rehab may only have three issues (radials) to be measured in each sector, while a commercial or institutional project may have 10-16 in each sector. The complexity of measurement may also increase if a project is being supported and/or measured by a university, national lab or outside institution.

The individual metrics are presented as radial arms extending from the center out toward the perimeter of the circle. As a specific goal (radial arm) is measured, the length of the arm is extended as performance increases.

Some goals will be quantitative and relatively easy to measure, such as energy efficiency, which might be measured in BTU/sq.ft./year. Other qualitative goals, like stimulating community pride, might be measured by surveying residents' responses on a scale of one to ten.

The Noisette Rose as shown in this Chapter illustrates a hypothetical example of a school building, which is enacting the principle of Schools as Centers of Community. Each radial line demonstrates the level of achievement in a particular goal.

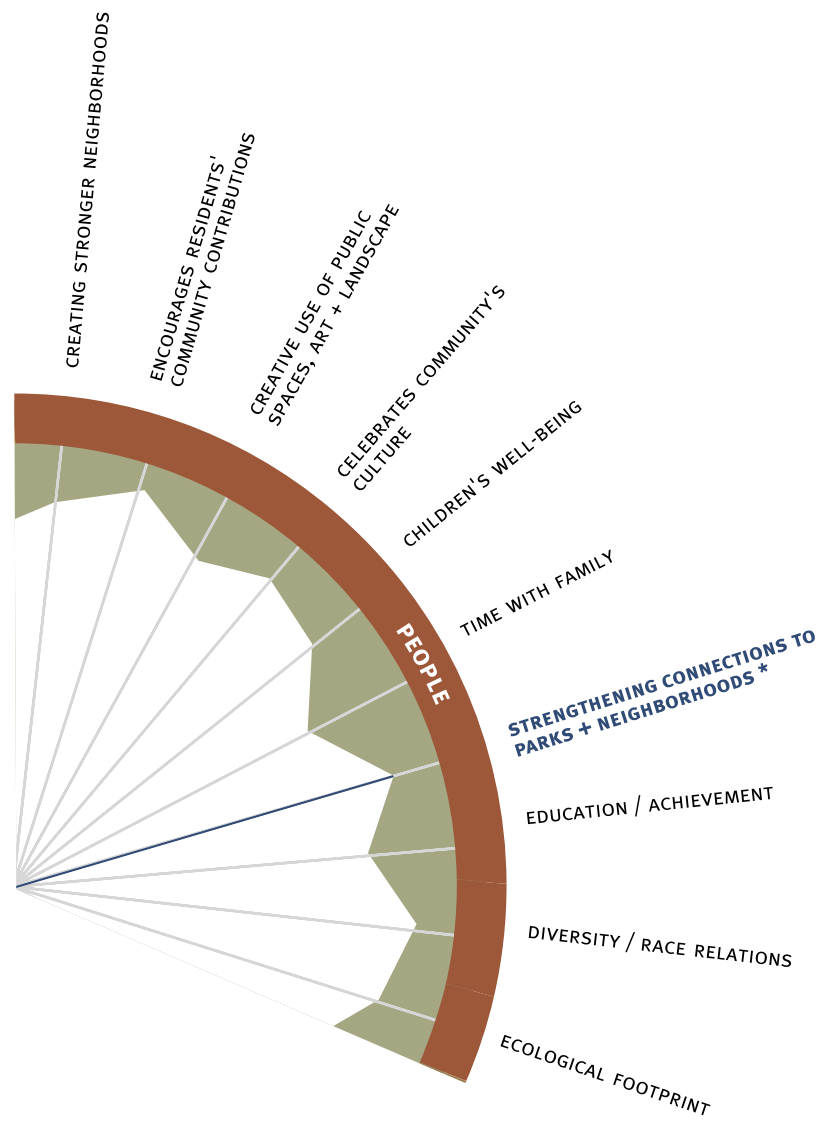
The fact that the image resembles an open rose indicates exemplary performance. The rose shape for a poorly performing school would show points closer to the center (resembling a rose bud) or asymmetrical with one side of the rose collapsed.

The primary advantages of the rose are its flexibility and the simplicity and clarity of the graphic image.

People (Social Goals)

Specific criteria to measure the responsiveness of a project to the people within the community and contributions to the social vitality of the community could include the following:

- creating stronger neighborhoods
- enhances or celebrates community's culture
- education / achievement (increased test scores and graduation rate)
- Creative use of spaces, art, and landscape to improve the quality of life
- stimulating community pride
- celebrates and encourages residents' contributions to the community
- **strengthening connections to parks, neighborhoods and resources**
- documents history of residents and communities
- increased awareness and sensitivity to local history, art, and vernacular architecture
- schools as Centers of Community
- children's well-being
- time with family
- education / attainment (movement toward specific test scores or percentage of students continuing to college)
- neighborhood vitality
- diversity / race relations
- reductions in crime and violence



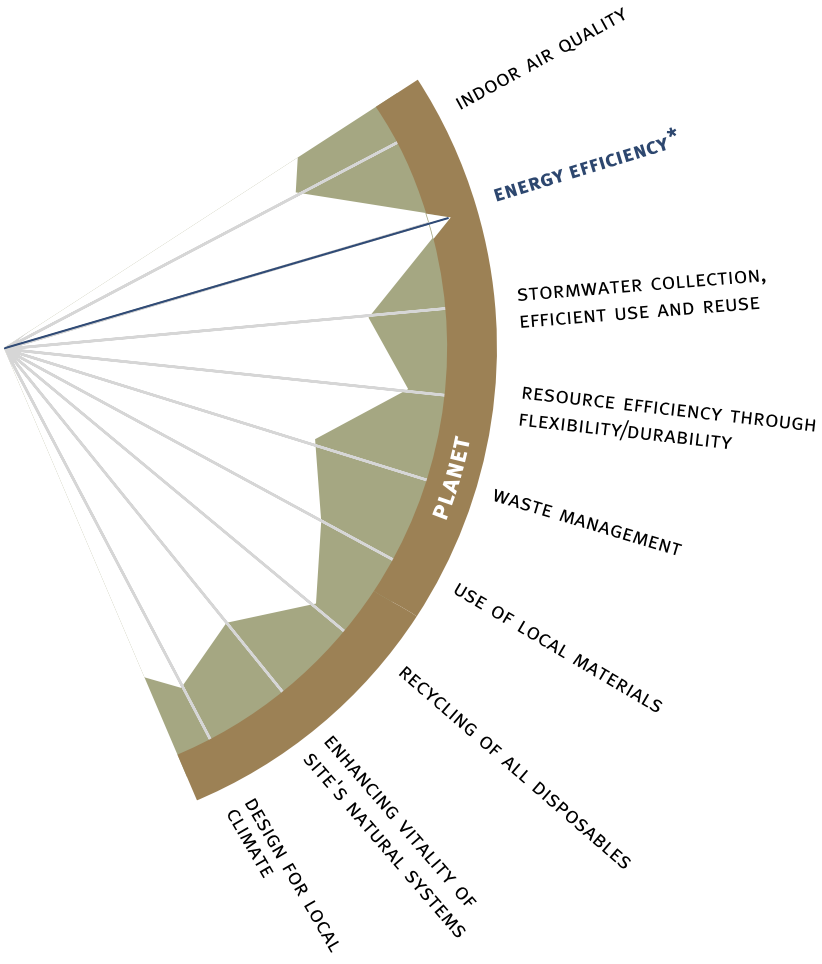
* Example: Strengthening Connections to Parks + Neighborhoods

Redesigning schools as Centers of Community as described in Chapter 5 will strengthen the connections to the neighborhoods. This could be measured in a number of ways. One possibility would be to set a goal of 2000 increased visits to the school by members of the community for recreation, use of the library, adult education programs, or community meetings. If, at the end of the first year, 1800 visits (beyond normal parent visits) were realized, 90% of the goal would have been reached. Therefore the tip of the rose for this radial would be at 9/10ths of the radial.

PLANET (Environmental)

Criteria to measure the responsiveness of a project to the planet and the environment within and beyond the community could include the following:

- **energy efficiency**
- storm water management
- water collection, efficient use and reuse
- site development and enhancing vitality of natural systems
- recycling by the residents
- use of local materials
- waste management
- indoor air quality
- design for local climate
- resource efficiency through material selection
- resource efficiency through durability and flexibility
- ambient air quality
- water quality
- quality public transportation
- vehicle miles driven per capita
- ecological footprint per capita



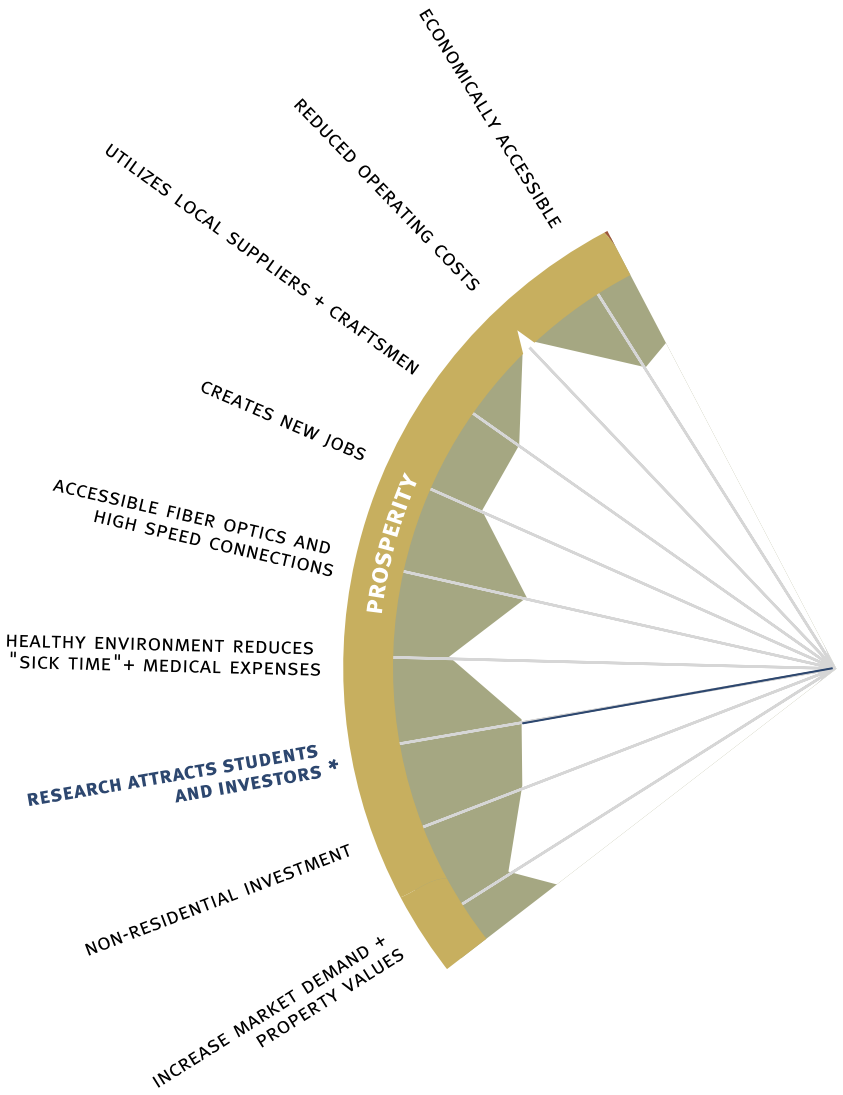
* Example: Energy Efficiency

An appropriate goal for energy efficiency might be to exceed ASHRAE 90.1 (1999) energy performance levels by at least 20%. If the performance of the school achieved the goal of 20% (100% of the goal) the tip of the rose on the energy radial would touch the outer circle. If, for example, it was 21% better than ASHRAE 90.1 the tip of the rose would extend into the outer ring as shown.

Prosperity (Economic Goals)

Criteria to measure the responsiveness of a project to the prosperity or true economic vitality within the community could include the following:

- economically accessible
- reduce operating costs
- utilizes local suppliers and craftsmen
- creates new jobs
- fiber optics and high speed connections improves education and job opportunities
- healthy environment reduce sick time and medical expenses
- low interest loans from utility and mortgage companies creates more investment in renovations and more conversions
- increase market demand and property values
- **post occupancy research attracts institutions, students and investors**
- household income
- average salary offered by employers
- rate of employment (unemployment)
- poverty rate
- job growth
- more graduates entering college increases economic capacity
- non-residential investments



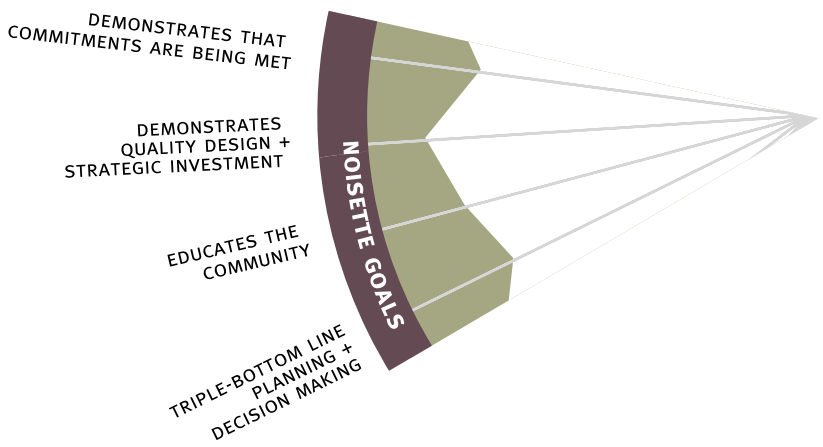
* Example: Research Attracts Students and Investors

There is a growing body of information linking the design of high performance schools to improved student performance, increases in daily attendance, increases in staff satisfaction, and retention together with reduced operating costs and liability exposure. But more research is required to document and understand this intriguing pattern. As existing schools are renovated or new schools are created integrating these design attributes, several institutions, national labs and foundations will be interested in post-occupancy research to better understand and replicate these advantages. A reasonable goal might be to assume that this initiative would attract two foundations or labs for research, at least one foundation providing additional resources for the students, and at least 25 students who choose to attend because of this initiative. If all these goals were achieved, but only one foundation was attracted to the post-occupancy research, 75% of the goal would be achieved, so the rose would extend to 75% of this radial.

Noisette Goals

Additional criteria to measure the responsiveness of a project within the community as it aligns with the vision and goals established for Noisette could include the following:

- demonstrates that commitments are being met
- demonstrates quality design and strategic investment
- educates the community and investors
- increases understanding of benefits resulting from triple-bottom-line planning and decision making



The New American City will utilize the Noisette Rose as an analytical and educational tool to inform future design and community decisions to insure continuous improvement, and to educate other communities about the potential of restorative community building.

The State of the Nation's Ecosystems

The H. John Heinz III Center for Science, Economics and the Environment, in concert with nearly 150 experts from businesses, environmental organizations, universities, and federal, state, and local government agencies, has created a succinct, comprehensive, scientifically sound, and nonpartisan system of measuring the health of our nation's lands, waters, and living resources. Their report, *The State of the Nation's Ecosystems: Measuring the Lands, Waters, and Living Resources of the United States*, (Cambridge University Press, 2002) puts forth a set of environmental indicators, which are comparable to economic performance indicators such as interest rates, unemployment and inflation rates, the Dow Jones average and the GDP. Having identified a crucial set of ecosystem characteristics, the report uses the best available national data to describe these characteristics.

The system presents indicators for six ecosystem types: Coasts and Oceans, Farmlands, Forests, Fresh Waters, Grasslands and Shrublands, and Urban and Suburban Areas. For each ecosystem type, a set of indicators has been created to describe the System Dimensions, Chemical and Physical Conditions, Biological Components, and Human Uses.

For example, the Urban and Suburban Areas ecosystem type has indicators such as:

- Area of Urban/Suburban lands
- Patches of Forest, Grasslands/ Shrublands, and Wetlands
- Nitrate in Urban/Suburban Streams
- Phosphorus in Urban/Suburban Streams
- Air Quality
- Chemical Contamination

The National Indicator reporting system is being used by Noisette as part of a beta effort to evaluate this approach for reporting on the health of our communities and nation. John Knott, CEO of the Noisette Company, was the chair of the Urban and Suburban working group that developed the indicators for the Urban and Suburban Areas Ecosystem. John now sits on the national design panel that is overseeing the next report and evaluating the evolution of this set of indicators for a permanent set of indicators on our environmental health, similar to the current national economic indicator system.

Reporting and Learning From Results

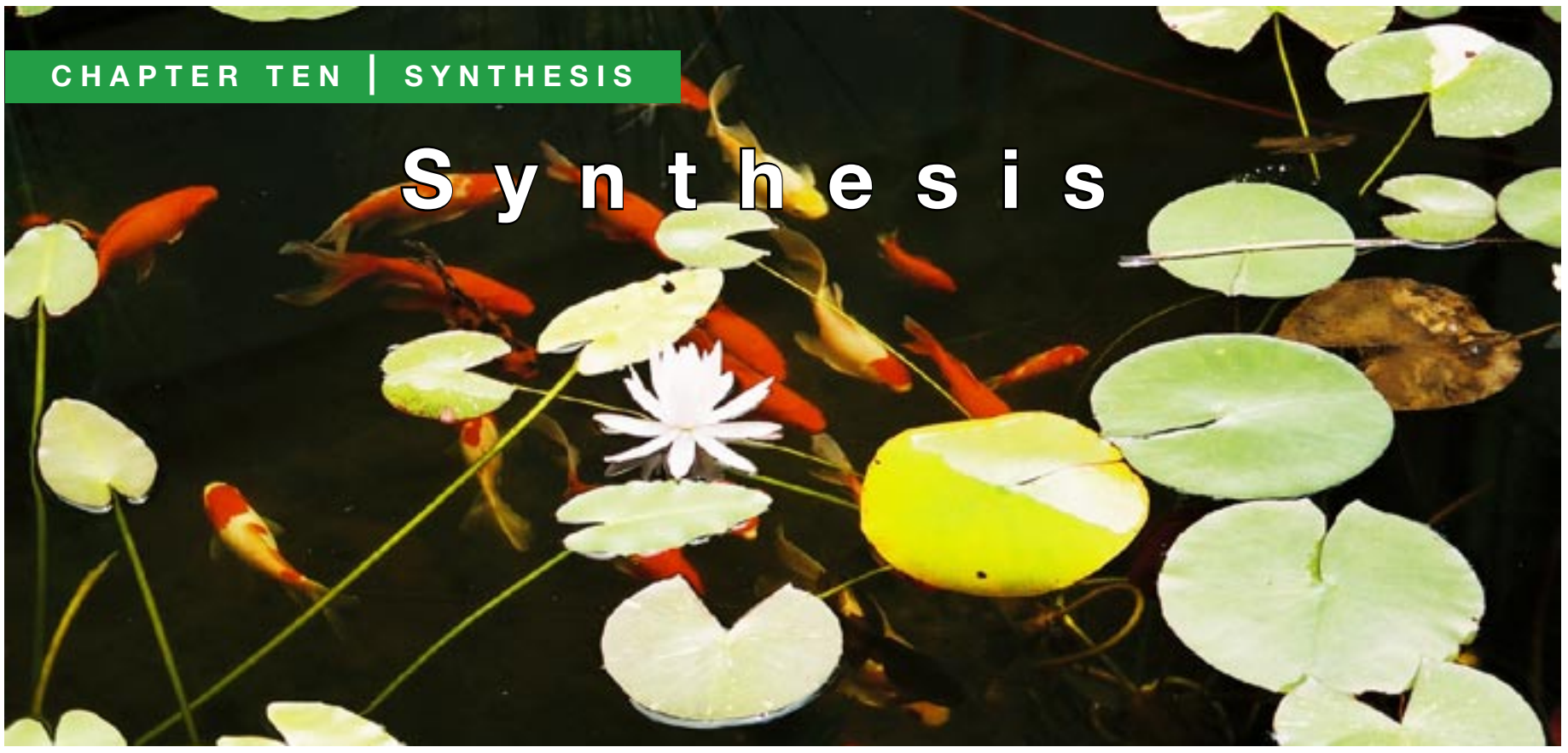
These four systems of measuring results can be used individually or in combination to evaluate the performance of individual buildings, groups of buildings, or sections of the community. They also establish a performance standard that could be required for new development and should be strongly encouraged for residents of established areas within the Noisette Community, to move the entire community toward a culture of sustainable buildings, sites, and resource utilization.

By reporting these results and using them to inform the planning of future projects, a cycle of continuous improvement can be established. The *Noisette Neighbor*, a regular publication of the Noisette Community, is an effective way to communicate performance summaries. Additional detail can be provided using the Noisette Community web site or other means of publishing results.

The proposed Noisette Sustainable Graduate Internship Center, a university collaborative representing the physical and social sciences, will also be an effective means to oversee the creation, measurement, and monitoring of the objectives set forth in the Noisette Community initiatives.

CHAPTER TEN | SYNTHESIS

Synthesis



Contents

"We abuse the land because we regard it as a commodity belonging to us. When we see the land as a community to which we belong, we may begin to use it with love and respect."

— Aldo Leopold

The New American City: The Noisette Community of North Charleston, South Carolina

This Noisette Community Master Plan begins with a vision for the New American City: A vibrant, healthy city, embracing its heritage and celebrating its role as community, ecosystem, and marketplace. The vision is based on the Triple Bottom Line – a balance among people, planet, and prosperity – embodying the belief that sustainable cities must be equally responsive to social needs, environmental responsibility, and economic vitality.

The Master Plan responds to many of the goals set out in the 1996 City of North Charleston Comprehensive Plan, and to the City's Pledge to its Citizens, a set of principles that underpins a future of prosperity, opportunity, social harmony, educational excellence, and ecological restoration.

This Master Plan also acknowledges the Partnership Agreement between the City of North Charleston and the Noisette Company, in which the City recognizes the necessity to move to a 21st Century infrastructure that is more economically and environmentally self-sustaining, to reclaim its natural resources, and to create not only growth, but a wise and sustainable redevelopment of its community. In this agreement, the Noisette Company pledged to develop this Master Plan, and to be the community developer that will transform the northern end of the former Charleston Naval Base, and a large portion of the surrounding city, into a sustainable City Center for the 21st century.

To achieve this vision and these goals, this Master Plan sets forth specific recommendations and guidelines to create the elements of this New American City:

- A **Regenerative Land Use** plan to create a mixed-use pattern, promoting a Live/Work/Play environment, revitalizing key portions of the City, and selectively increasing density. The plan includes elements to enhance the sense of neighborhood identity, while linking the diverse neighborhoods throughout the community. This master plan recommends specific tools to develop and implement these changes, in concert with existing land use ordinances.

- A plan for **Restoring Natural Systems** so that they are integral to the functions and aesthetics of this place, and linking the roles of individuals, neighborhoods, and the community as stewards of the natural environment. This Master Plan is based on fundamental environmental principles for ecological restoration, conservation, native landscaping, and water management. A central element will be the Noisette Preserve, serving as a recreation area and education center for the citizens of the City and the greater region.

- A plan for **Restoring Connections** of the community through sustainable infrastructure improvements in transportation systems, open space and recreation, and utility systems. The Transportation plan is designed for diversity, inter-modal connectivity, adaptability to change, and multiple uses of transportation elements. The Open Space plan provides a range of recreation options and reconnects the City to the Cooper River. The Utility plan proposes integrated utility systems, designed for stewardship of natural resources.

- Implementation of this plan based on **Neighborhoods as Catalysts for Change**. Each neighborhood should have a vital center, support a mix of uses, be pedestrian– and bicycle-oriented, and have its own character and beauty. This master plan recommends specific changes on major corridors serving the City and revitalizes Park Circle as the historic symbol of the original garden city. Schools should become the centers of their communities, offering services, resources, and amenities to all the residents of a neighborhood.

- Creation of a new community, the **River Center at Noisette**, utilizing a major portion of the former Charleston Naval Base. This vibrant new urban center will have a mix of uses, a range of density, a link to the history of the place, and a strong connection to the natural ecological systems. Art will be infused throughout the community in both traditional and impromptu forms. The sustainable design, construction, and operation of the built elements will make this a manifestation of the Triple Bottom Line, unifying social, environmental, and economic goals.

- A recommendation for **Project Phasing** over the next fifteen years, and beyond. This plan addresses the important first steps that will be catalysts for further development. It also considers diversity of housing opportunity, business incubation, transportation elements, recreational enhancements, and environmental restoration as key elements of creating a vital, robust urban center.

- **Initiatives and Strategies** that are essential for sustainable change. The plan creates an institutional framework for sustainable community development, life-long learning, and restoration of natural resources. It also proposes strategies for arts integration and museum initiatives, high performance schools, housing for all, and historic preservation/restoration. Finally, it sets out initiatives for economic revitalization and tax increment financing.

- **Benchmarks for Success**, presenting standards for measuring, reporting, and learning from results. The Noisette Quality Home Performance Standards have been created specifically for the climate and geographical conditions of the South Carolina Low Country. The LEED Green Building Rating System is the definitive consensus performance standard for commercial and high-rise residential buildings. The Noisette Rose is a flexible tool developed to establish and measure specific sustainable goals for projects within the community.

This plan is the product of a five-year collaborative discovery process. The citizens, leadership, and professionals of North Charleston have contributed their wisdom and vision. The team of national expert planners, architects, urban designers, landscape architects, engineers, ecologists, educators, and artists assembled by the Noisette Company has been inspired by the culture and history of North Charleston and impressed by the level of interest and contributions from community leaders and residents during this remarkable five-year journey of discovery.

The team has built this plan on the vision, rich history, and culture represented by the community, and utilized the history of the natural systems and the evaluation of their current conditions. All of this and their collective experience of restorative community designs have informed these recommendations. It is unique. This plan holds enormous potential for the future of this community and its citizens.

Taken together, these elements form the integrated planning basis for establishing the Noisette Community of North Charleston as the leading sustainable redevelopment of an urban environment in the US.

The City of North Charleston and the Noisette Company should expand their working partnership to include other government entities, NGOs, business organizations, and citizens groups, to develop the mechanisms for implementing this Master Plan. The core partners must recognize that profound change is not easy, and will be resisted by some, but that it has the power to transform this City and the lives of its citizens.