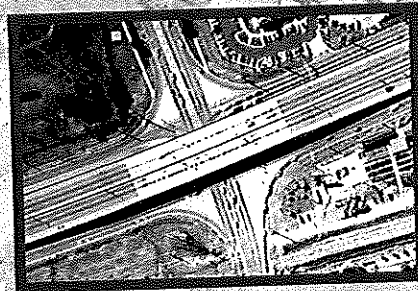


**Application to the South Carolina
Transportation Infrastructure Bank**

US 17 Urban Interchange System



Submitted by:

Town of Mount Pleasant, SC

January 29, 2004



Executive Summary

This application for funding involves the implementation of Single Point Urban Interchanges (SPUI) at the three intersections on US 17 between the Cooper River Bridges and I-526. The SPUI design concept is the most appropriate grade separated improvement given its traffic operational efficiencies and decreased right-of-way requirements in an urban area. The primary operational advantage of the SPUI is its ability to minimize conflicting movements and direct all turn movements through one signalized location. The three interchanges are proposed at *Houston Northcutt Boulevard, Bowman Road and I-526/Hungryneck Boulevard.*

This section of roadway constitutes one of the most critical links in the Mount Pleasant transportation network, as US 17 is the only major north-south arterial roadway connecting across the entire reach of the Town limits. Maintaining adequate traffic flow along this major roadway facility is of paramount importance to mobility within the entire community.

The Town of Mount Pleasant has already invested significantly in the transportation system for the East Cooper area. To this date the Town of Mount Pleasant has spent over \$16.3 M on roadway projects and will spend over \$16.2 M more to finish on-going and future programmed projects. Most of the projects funded by the Town will improve the State Highway System, with an emphasis on increasing capacity of the US 17 corridor. It is the Town's intent to utilize this funding as a match for Transportation Infrastructure Bank funds. The Town's application proposes a 33% match on requested Transportation Infrastructure Bank funds of \$110 M.

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I. Description of Project

This project involves the implementation of Single Point Urban Interchanges (SPUI) at the three intersections on US 17. The SPUI design concept, shown in Figure 1, is the most appropriate grade separated improvement given its traffic operational efficiencies and decreased right-of-way requirements in an urban area. The primary operational advantage of the SPUI is its ability to minimize conflicting movements and direct all turn movements through one signalized location. The three interchanges are proposed at *Houston Northcutt Boulevard, Bowman Road and I-526/Hungryneck Boulevard*.

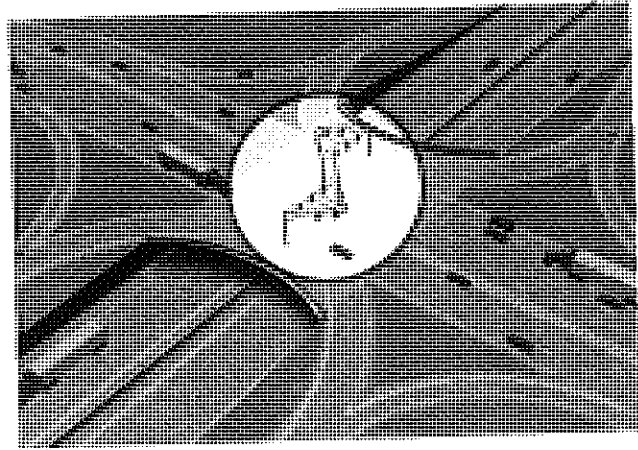


Figure 1 Single Point Urban Interchange

The Town of Mount Pleasant is a coastal peninsula, surrounded by the Wando River, Charleston Harbor, and the Intracoastal Waterway. These geographic constraints, shown in Figure 2, provide limited opportunities for parallel routes. As a result, US 17 serves as the primary arterial highway through the Town. Like many other coastal communities, high residential growth rates and increased use of the highway for statewide tourism has constrained the facility's capacity with volumes exceeding 45,000 vehicles per day.

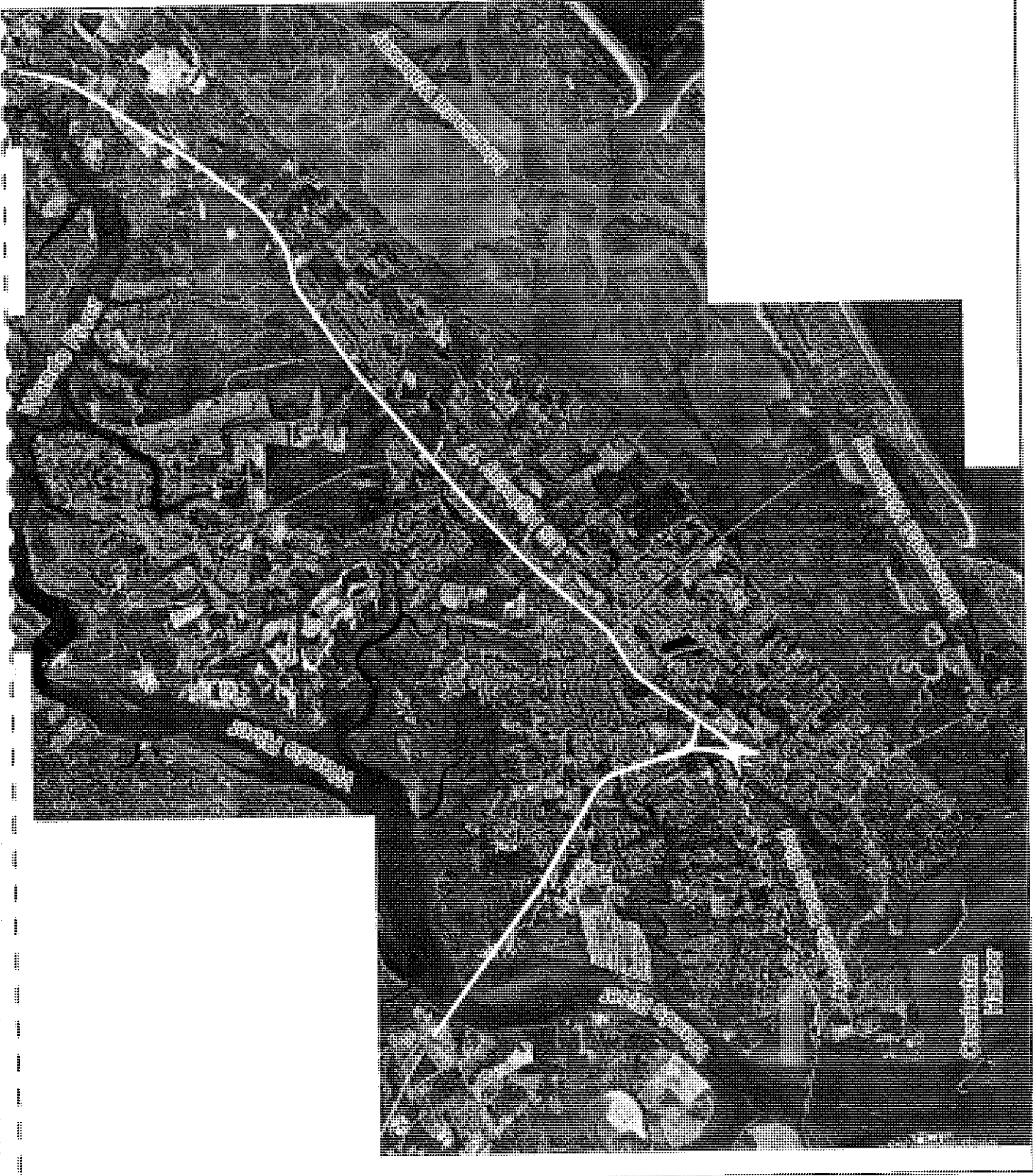
US 17, a portion of which is also known as Johnnie Dodds Boulevard, is a Federal Aid Primary route designated as part of the National Highway System (NHS). This primary arterial highway serves local traffic, traffic from two adjacent barrier islands, through traffic and a substantial amount of truck traffic serving the Charleston area ports. The corridor being considered for urban interchanges currently consists of 8 signalized intersections along a parkway-type facility accompanied by frontage roads. Given long range traffic projections, it is anticipated that five interchanges will eventually be needed within the corridor. Several of the signalized intersections (Magrath Darby Boulevard and Dragoon Drive) will likely be modified to eliminate the signal and provide limited access to the frontage roads via ramps. Figure 3 details the three proposed locations, which have the highest traffic volumes of all intersections within the corridor. The other two proposed interchange locations include North Shelmore Boulevard and Anna Knapp Boulevard.

Town of
Mount Pleasant



Figure 2

Town of
Mount Pleasant
Aerial Photograph



The Town of Mount Pleasant and its Planning
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implied, and shall not be held responsible for
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not a legal document.

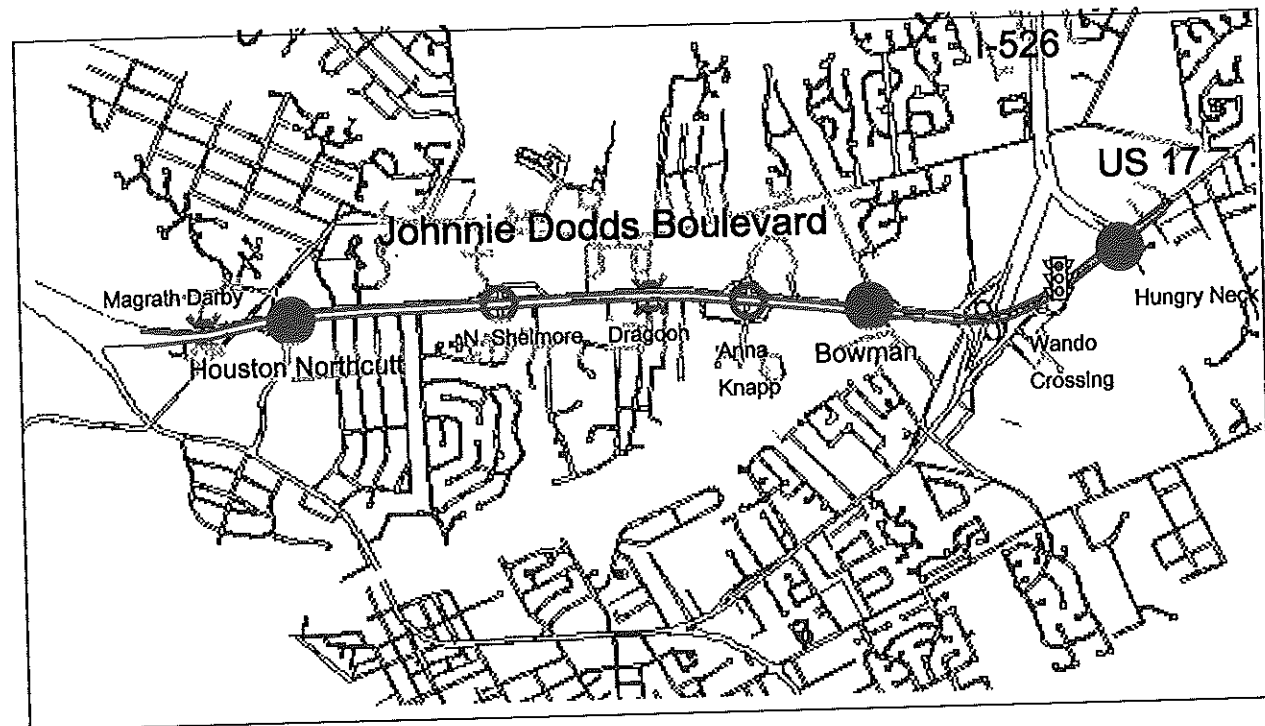


Figure 3 Proposed Interchange Locations

The following is a brief synopsis of each intersection's characteristics:

- *Houston Northcutt* is a five lane state roadway that provides residential developments along the Mathis Ferry Road corridor access to the Coleman Boulevard commercial corridor. Volumes on this facility average nearly 13,500 vehicles per day.
- *Bowman Road* is a two lane state roadway that provides access to a major hospital and a multitude of professional office and commercial land uses. Volumes on this facility exceed capacity with over 13,000 vehicles per day. Bowman Road's intersection at US 17 is one of a series of six intersections on this portion of US 17, which is designated by SCDOT as a controlled access facility with frontage roads. The Town of Mount Pleasant has funded the design and right-of-way acquisition for the widening of Bowman Road and has provided partial funding for construction. Bowman Road is one of only two routes that provides convenient access to the portions of Mount Pleasant separated by Shem Creek.
- *Interstate 526* terminates at US 17 on the north side of the intersection and Hungryneck Boulevard ties in on the south side. The Town recently constructed Hungryneck Boulevard at a cost of over \$9 million in order to relieve existing congestion on US 17. Hungryneck Boulevard runs parallel to US 17 from the I-526 terminus to the Isle of Palms Connector (SC-517). It is anticipated that demand at this intersection will exceed over 150,000 entering vehicles per day in the next 10-12 years, making it the highest volume intersection in the East Cooper area.

II. Public Benefit

The US 17 urban interchange system provides significant public benefit as it relates to growth and mobility, local and regional economic impact, tourism impacts, public safety and hurricane evacuation.

Growth

The Town of Mount Pleasant is one of the fastest growing municipalities in the state of South Carolina. Based upon current growth rates, it is estimated the Town of Mount Pleasant will have one of the highest populations in the state in the very near future. One of the most critical issues to note with regard to the population growth is the very short period of time in which it is occurring. For this reason, transportation infrastructure that was adequate just 6-7 years ago is now well over capacity and will continue to degrade with future growth. Table 1 indicates the Town's population growth as it relates to the surrounding region, the state and the nation.

Table 1 Town of Mount Pleasant Population in Regional Context

	Town of Mount Pleasant	Charleston County	Dorchester County	Charleston Metro Area	South Carolina	United States
1990 Pop.	30,108	295,039	83,060	506,875	3,486,703	226,504,825
2000 Pop.	47,609	309,969	96,413	549,033	4,012,012	281,421,906
1990-2000 % Change	58.1%	5.06%	16.1%	8.31%	15.06%	16.86%

Source: US Census Bureau - 1990 and 2000

As it is for most South Carolina coastal communities, the high growth trend continues to bring more and more pressure on the transportation infrastructure. As has occurred in the Myrtle Beach area, significant capital investments are necessary within Mount Pleasant to keep pace with growth and ensure safe and efficient transportation is provided. Table 2 gives an indication of how this significant growth trend continues and where the population is projected to be in the next 11 years.

Table 2 Town of Mount Pleasant Population and Population Projections

Population	Town of Mount Pleasant	Mount Pleasant Area
2002	55,169	58,681
2005	65,098	68,729
2008	69,824	73,560
2015	84,173	88,680

As can be seen from this table, the Mount Pleasant area will easily approach 100,000 at its build-out. Because the majority of this growth has a direct impact on US 17, it is imperative that

improvements be made to this facility. As we grow, the urban interchange system will play an integral role in the safe and efficient movement of people and goods throughout the Town and the region.

Mobility

As mentioned previously, Johnnie Dodds Boulevard/US 17 carries the majority of traffic west of the I-526 interchange. This is due to the inability to construct a new parallel route in this area or widen the adjacent Mathis Ferry Road, which is a legislatively-designated scenic roadway serving a highly populated residential corridor. According to the most recent Transportation Plan, traffic volumes of 40,000 to 45,000 vehicles per day on US 17 are projected to exceed 65,000 vehicles per day on certain segments by the Year 2015. This volume is well beyond the 50,000 vehicles per day capacity of a 6 lane facility with at-grade signalized intersections.

As Johnnie Dodds Boulevard has a controlled access design with accompanying frontage road system, implementation of an interchange system was determined to be the most appropriate design. Since at-grade intersection improvements can only be relied upon to meet short-term traffic needs, grade separation alternatives (interchanges) must be considered to ensure the long-term functional operation of the US 17 corridor. Due to the aesthetic appeal of the existing roadway and the desire to maintain the roadway's scenic parkway-like feel, it was determined that widening US 17 was not an option. Additionally, the widening approach does not address long term capacity needs with respect to the cross-street traffic or operational efficiency of the frontage road intersections. These minor street movements will continue to degrade to unacceptable levels of service due to the increasing US 17 volumes and very close proximity of the US 17 signals and the frontage road intersections. Installation of grade separated interchanges will allow the roadway cross-section to remain relatively close to how it currently exists, with two lanes in each direction, a wide landscaped median and functional frontage roads on both sides. Additionally, utilization of this corridor will maximize use of existing infrastructure and limit land acquisition in an area with some of the highest land costs in the state.

The urban interchange system concept was originally adopted by the Town in their April 1996 Long Range Transportation Plan and Study conducted by Kimley Horn and Associates (see Appendix A). The concept was reaffirmed in the most recent Long Range Transportation Plan Update prepared by Day Wilburn and Associates and adopted by Town Council in February 2000. These plans were adopted within the public review process, with no significant opposition noted for the interchange system. A copy of the executive summary to the Year 2000 plan is provided in Appendix B. Implementation of the urban interchange system is estimated to provide acceptable levels of service for the next 25 years.

Currently, the urban interchange concept is not a part of the State's long-range plan or the Berkeley Charleston Dorchester Council of Government (BCD-COG) plan. However, the 1998 BCD-COG plan was a "Cost-Feasible" plan at the time and not a "Needs" plan. The BCD-COG plan update will occur in the next 12 months and will likely include a "Needs" plan with the interchange system. Town staff is working with BCD-COG staff presently to develop an update to their plan.

In addition to the long range transportation plans, the Town of Mount Pleasant commissioned an interchange evaluation study by HNTB for the Bowman Road/US 17 intersection in February 2003 (see Appendix C). This study summarizes a comparative analysis of all alternatives for improving this intersection. The findings indicate a single point urban interchange provides the highest intersection level of service and highest degree of mobility between the frontage road system. Currently, the Bowman Road intersection has the lowest level of service for any of the Johnnie Dodds Boulevard intersections considered for an interchange. It is assumed the findings of this report will be applicable to adjacent intersections as they eventually degrade to unacceptable levels of service.

The Town of Mount Pleasant recently applied for a federal appropriation to implement an interchange at the Bowman Road/US 17 intersection. This request has been approved in the amount of \$3.25 M and will be dedicated to widening Bowman Road as a prelude to the interchange construction. The application process requested letters of support from local and state agencies. The Town received letters of support from the Isle of Palms, the Charleston Transportation Committee, and the BCD-COG (see Appendix D). The Town also received letters of support from the Mount Pleasant Business and Professional Association and SCDOT.

One key factor to note with the interchange system is the significant facility improvements being made at each end of this corridor. These improvements include the new Ravenel Bridge on the west end of the corridor and the widening of US 17 and addition of Hungryneck Boulevard on the east end. Implementation of these two improvements in the near future will cause the Johnnie Dodds corridor to become a "choke point" for traffic unless improvements are made.

The current bridge system acts like a meter for Town traffic because ramp congestion in the City of Charleston limits the amount of traffic that can get on the bridges during this time. This is particularly prevalent during the PM peak hour, where high volumes of commuters exit the City towards the Town each afternoon. However, the new Ravenel Bridge across the Cooper River, to be completed in 2005, will more efficiently convey peak hour traffic volumes to and from the City of Charleston. This will further overburden the current signal system, particularly at locations such as Houston Northcutt Boulevard and Bowman Road.

On the east end of the corridor, from I-526 to the SC 517, US 17 is scheduled to be widened from four to six lanes by the year 2007. This is a Charleston Area Transportation Study (CHATS) project being designed and constructed through the South Carolina Department of Transportation. In addition to this widening, the Town of Mount Pleasant has constructed a parallel five lane facility named Hungryneck Boulevard to alleviate existing congestion on US 17 north of I-526. Hungryneck Boulevard will be opened to traffic in February 2004 at a cost of over \$9M.

Economic Impact

The Town of Mount Pleasant, a rapidly growing South Carolina coastal community, is part of the 562,000-person Charleston-SC Metropolitan Statistical Area. The Town, with a population of 56,666, is one of the fastest growing municipalities in the Southeast. From 1995 to 2000, the Town grew by 28%, becoming the sixth largest municipality in South Carolina. By 2010, the

population growth will make Mount Pleasant the fourth largest municipality in South Carolina, surpassing both Greenville and Rock Hill in population.

This dynamic community has proven to be an outstanding location for business, offering a highly desirable lifestyle to attract and retain key employees, while providing an available "highly skilled" regional workforce. A wide range of economic development sites and facilities exist for corporate and regional offices, research and development companies and information/technology intensive operations. Competitive costs of business, a pro-business attitude and attractive financial incentives highlight the Town as a prime location for relocating, expanding, and emerging and start-up operations. The community has an impressive list of companies that have benefited from the Town's strong mix of essential factors for corporate growth. The range of companies include the headquarters of Motley Rice P.A. on the banks the Cooper River overlooking Charleston Harbor; Automated Trading Desk, Inc.'s (ATD) new "award winning" 22-acre Corporate Technology Campus; the innovative services and software of rapidly growing Benetfitfocus.com; and the worldwide products produced by the North American operations of Hubner GmbH Manufacturing Corporation. Mount Pleasant's ocean access has also allowed for expansion of the South Carolina Ports Authority and its connection to international markets.

The Town of Mount Pleasant has adopted a comprehensive Economic Development Strategic Plan to stimulate and diversify the economy, increase the tax base, and provide a spectrum of employment opportunities for residents. The Town and regional allies are aggressively promoting this highly desirable location on a national and international level to attract new corporate investment, while retaining and expanding the existing business base and encouraging the formation of new companies.

The Mount Pleasant Office of Economic Development (OED) utilizes a "team" approach to facilitate the site selection process. The OED works directly with the Mayor and Town Council on a range of economic development topics involving the attraction of new business investment, the retention and expansion of the existing business base, the formation of new companies and the creation of low-impact tourism opportunities. The OED coordinates its efforts with the South Carolina Department of Commerce, "Team South Carolina," the Charleston Regional Development Alliance; the Metro Charleston Chamber of Commerce; the Charleston County Office of Economic Development; "Team Charleston," Mount Pleasant Waterworks, utilities and other regional and local institutions, agencies and groups. The OED is a confidential source of comprehensive project information for CEO's, presidents, corporate real estate executives, facility planners and site selection consultants.

Given the aggressive nature in which the Town is seeking to attract new business and industry to the area, it is critical that the transportation network keep pace with demand. A key element of any economic development decision, whether made by the private sector or local governments, is the ability of the transportation infrastructure to meet the needs of businesses. For this reason, improvement of the US 17 corridor will play a vital role in attracting and securing economic development.

Tourism

Mount Pleasant has traditionally been known for its historical architecture, fine seafood, famed landmarks, recreational amenities, residential communities, and temperate climate. Now with enhanced access from recent roadway improvements such as the Isle of Palms Connector, increased popularity with such events as the Cooper River Bridge Run, the State Dixie Youth Baseball Series, Low Country Oyster Roast Festival, Southern Conference Baseball Championships, and Rice Planters Golf Tournament, and increased accommodations with the construction of seven additional hotels, Mount Pleasant now contributes an active part in the Low Country's tourism market.

Mount Pleasant's waterfront access enhances the historical assets to the community such as the USS Yorktown and Patriots Point Maritime Museum. The "Fighting Lady" remains the number one tourist destination in South Carolina and now houses the Congressional Medal of Honor and the Cold War Memorial. Patriots Point is linked to western travel corridors via I-26 and I-526 and to areas north and south by US 17. Patriots Point also serves as one of the two departure points to Fort Sumter.

Growth in recent years has been guided by a comprehensive land use planning program, which also encompasses recreational facilities, revitalization of the older business district and diversification of future economic development and annexation philosophies. Keeping up with the transportation infrastructure, while monitoring population growth, remains a priority. Dubbed the "Avenue of Tourism" by local officials, this vital artery connects key points. US Highway 17 runs through the Town, linking Mount Pleasant to Charleston and Myrtle Beach as well as Hilton Head and Savannah. With this strategic location in the midst of this vast transportation network - linking inland areas to the coast and shipping lanes to inland markets - it is clear that Mount Pleasant is in a position to play a vital and growing role in the functioning of the region's economy.

Safety and Hurricane Evacuation

Besides its ability to decrease delays and efficiently move both mainline and cross street traffic, another key advantage of the urban interchange system is its safety. Vehicle conflict points are eliminated for through and cross street movements. Use of channelization and one signal to control turn movements from the cross street also reduces conflict points. Merge maneuvers including acceleration lanes and on-ramp systems decrease the severity of crashes because they tend to be side-swipe type crashes. Overall, the safety of an interchange is improved over that of an at-grade intersection due to its ability to separate and channelize conflicting movements.

The segment of US 17 between the Cooper River Bridges and I-526 where the urban interchange system is proposed is a part of the State's Hurricane Evacuation Routes. Implementation of the system will decrease evacuation times by improving access to both I-26 and I-526.

III. Financial Plan

All primary and minor arterial roadways and almost all collector roadways within the Town are part of the State Highway System. Several years ago, Town Council realized the probability for construction of much needed improvements on these roadways by the South Carolina Department of Transportation was very small given their funding constraints. Based upon this fact, Council decided the only way to keep pace with the significant growth was to plan, design, finance and construct the needed transportation infrastructure themselves. This concept was implemented through an aggressive Transportation Capital Improvement Program (CIP) funded through the following mechanisms:

- Transportation Impact Fees
- Tax Increment Financing Districts
- Hospitality Tax
- Accommodations Tax
- Municipal Improvement District
- General Revenue
- Cost sharing partnerships with other agencies such as the Federal Highway Administration, the South Carolina Department of Transportation and the Charleston Transportation Committee.

The Town of Mount Pleasant has already invested significantly in the transportation system for the East Cooper area. To this date the Town of Mount Pleasant has spent over \$16.3 M on the CIP and anticipates spending over \$16.2 M more to finish ongoing projects that are in the first five years of the CIP. Additionally, to develop and implement this CIP, professional transportation staff were hired over the past five years and the Town enhanced planning and project development through numerous transportation studies. It is estimated this investment in staff and professional studies has cost the Town over \$700,000.

It is the Town's intent to utilize this money as a match for the Transportation Infrastructure Bank funding. The Town's request of \$110 M is broken down in the following estimates for the three interchanges:

Houston Northcutt Boulevard	\$35 M
Bowman Road	\$35 M
I-526/Hungryneck Boulevard	<u>\$40 M</u>
Total	\$110 M

Please note that this request is for only partial implementation of the interchange system, with only three out of five locations requested. It is estimated that the overall need for the interchange system exceeds \$160 M. Based upon most recent right-of-way and construction costs, it is also estimated that overall need for the entire adopted transportation plan exceeds \$320 M.

The CIP defines the schedule of funds disbursement for completed, on-going and future roadway improvements for an eight year period. The first four years of the CIP is primarily funded by proceeds from general obligation and special revenue bonds with debt service being paid from the aforementioned revenue sources. The funding for the last three years of improvements shown in the CIP is proposed to come from other bond issues with debt service scheduled from various revenue sources. The specific projects listed in these three years may change in accordance with project priorities and availability of alternative funding sources.

The Town's Transportation Capital Improvement Program is primarily dedicated to improvements on the State Highway System. Every project listed in the CIP is either a state highway system facility or will improve the operating capacity of the state highway system. CIP projects are listed below. Projects that are italicized have been completed or will be complete by summer 2004.

First five years (FY 01/02 – FY 05/06):

- *Belle Point Drive connection to Long Point Road (S-97)*
- *Patriots Point Boulevard Widening*
- Rifle Range Road (S-51) and Long Grove Drive signal installation
- Intersection improvements at Coleman Boulevard (SC 703) and Patriots Point Boulevard
- *Widening and re-alignment of Mathis Ferry Road (S-57) to US 17*
- *US 17/SC 41 re-alignment (Town contribution to overall cost)*
- Intersection improvements to Mathis Ferry Road (S-56) and Anna Knapp Boulevard
- Roundabout installation at Mathis Ferry Road (S-56) and Muirhead Road (S-503)
- Roundabout installation at Rifle Range Road (S-51) and Porcher Bluff Road (S-51)
- *Roundabout installation at Rifle Range Road (S-51) and Venning Road (S-274)*
- Roundabout installation at Rifle Range Road (S-51) and Six Mile Road (S-921)
- *Hungryneck Boulevard Phase I (new alignment five lane road parallel to US 17)*
- Hungryneck Boulevard Phase II (new alignment five lane road parallel to US 17)
- Hungryneck Boulevard Phase III (new alignment five lane road parallel to US 17)
- Widening Bowman Road (S-1271)
- Widening Magrath Darby Road
- Widening Whipple Road (S-57)
- *Intersection improvements at US 17/Long Point Road (S-97)*
- *Intersection improvements and signal installation at SC 41/Dunes West Boulevard*
- South Hampton Frontage Road (new two lane road parallel to US 17)
- Bike network improvements to State roads

Last three years (FY 06/07 – FY 08/09):

- Widen SC 41 to four lanes
- Widen US 17 from SC 517 to SC 41
- US 17/I-526 Interchange

The Town of Mount Pleasant continually seeks alternative funding sources to complete its needed infrastructure improvements. An application for a federal appropriation was made to initiate the US 17/Bowman Road interchange improvements and funding in the amount of \$3.25M was recently approved. The Town will likely re-apply for additional funding this year. The Town proposes to use these funds as part of the local match to the Transportation Infrastructure Bank funds.

In addition to potential federal funds, there is also a chance funds may become available through Charleston County. Charleston County will likely hold a referendum soon for a ½ cent sales tax increase, with about 60% of the anticipated funding dedicated to roadway improvements. It is anticipated that the referendum will be held in November 2004. As with Federal funds, the Town would propose utilizing some of the Town appropriated sales tax funds as match money for any Bank funds.

The useful life of this project is expected to exceed 20 years as determined by future level of service analyses and standard engineering design practices. Resurfacing of the project area is expected to fall within the standard 15-20 years. A portion of the proposed countywide ½ cent sales tax revenues is expected to be utilized for resurfacing of secondary roads. This should ensure adequate state funding is available for resurfacing this facility on a standard schedule.

Financial Summary

Proposed Town of Mount Pleasant Funding

Capital Improvement Program	\$ 32.50 M
Professional Staff and Studies	0.70 M
Federal Appropriation	<u>3.25 M</u>
	\$ 36.45 M

Proposed Infrastructure Bank Funding **\$110.00 M**

Percent of Local Contribution **33%**

IV. Project Approach

Results from modeling analyses utilizing the Long Range Transportation Plan indicate the US 17/Johnnie Dodds corridor requires improvement in the 2008-2010 time frame. Based upon this finding, a project development process where preliminary design, public meetings, permitting, final design, etc. has been established. The following is the estimated time frame for the completion of the project, assuming funding would be available on January 1, 2005:

<u>Event</u>	<u>Duration</u>	<u>Completion</u>
Interchange System Evaluation	8 months	December 2004
Project Design/Permitting	18 months	July 2006
Right-of-Way Acquisition	18 months	December 2007
Construction	30 months	July 2010

The most critical element of ensuring this project is completed on time is to build a community consensus regarding both the need for grade-separated interchanges and the associated design elements. The urban interchange concept is generally unfamiliar to the typical suburban commuter. It will be very important to support the need through additional traffic analyses and also educate the public on the accessibility, capacity and safety advantages of such a system. This will be particularly challenging given the commercial nature of the frontage road system and the uncertainty of business owners regarding project impacts on accessibility. Another concern of business owners and residents alike will be the elimination of certain movements at the Magrath Darby and Dragoon Drive intersections and re-routing of those movements to adjacent interchanges.

For these reasons, the Town proposes utilizing a portion of federal funds received for the US 17/Bowman road intersection to conduct an evaluation and concept design document for the entire interchange system, much like the one performed for the single interchange at Bowman Road. This would entail numerous public meetings and workshops to hear citizen concerns, solicit design input, develop alternative concept designs and produce a public relations document that can be carried into the engineering design phase. Ideally, this document would be produced in 2004, before project design and permitting efforts begin. It should be noted that no major environmental concerns are anticipated due to the ability to construct the interchanges primarily within existing right-of-way.

Because the US 17 corridor is a state and federal aid highway, the Town of Mount Pleasant anticipates a cooperative project development process involving the South Carolina Department of Transportation. The following is expected for delineation of project responsibilities:

Interchange System Evaluation	Town of Mount Pleasant
Environmental Studies	Town of Mount Pleasant and SCDOT
Design	Town of Mount Pleasant and SCDOT
ROW Acquisition	Town of Mount Pleasant and SCDOT
Construction	SCDOT
CEI	SCDOT
Operation	SCDOT
Maintenance	SCDOT
Tort Liability and Ownership	SCDOT
Law Enforcement	Town of Mount Pleasant and SCDOT
Marketing	Town of Mount Pleasant and SCDOT

V. Other Considerations

Through local ordinances, the Town of Mount Pleasant has enacted some of the most advanced and innovative growth management tools in the state, and perhaps the southeastern United States. The following items should be considered in the determination of final application points.

Impact Assessment Process

When a significant development is proposed to the Town by a developer, the developer must complete a thorough impact assessment process that reviews impacts related to wastewater, water supply, solid waste, telephone and power, transportation, drainage, recreation, education, police and fire protection, environmental resources, cultural and archeological resources, fiscal considerations, housing and comprehensive plan compliance. Specific to transportation, the analysis and mitigation requirements focus on defining both site-related and off-site improvements necessary to mitigate traffic impacts. This process is similar to the concurrency system utilized in Florida where the intent is to ensure the necessary transportation infrastructure is in place concurrent with the project impacts.

Impact Fees

The Town of Mount Pleasant has been collecting transportation impact fees for development impacts since 1996. The fees are administered to offset area-wide transportation impacts caused by developments.

Residential Building Permit Allocation Program

In an effort to control the high residential growth rates noted previously, the Town adopted a building permit allocation program in December 2000. This pro-rata program enables the Town to maintain a growth rate that averages 3% through June 30, 2007. The intent of the program is to afford the Town time to address many of its infrastructure needs. Since implementation of the program, the Town has aggressively pursued implementation of its Transportation Capital Improvement Program in order to address traffic congestion concerns.

Appendices

Appendix A	1996 Long Range Transportation Plans (cover only)
Appendix B	2000 Long Range Transportation Plan Executive Summary
Appendix C	Interchange Evaluation Study – Bowman Road / US 17
Appendix D	Copies of Agency/Municipality Letters of Support
Appendix E	Town of Mount Pleasant Transportation Capital Improvement Program

Appendix A

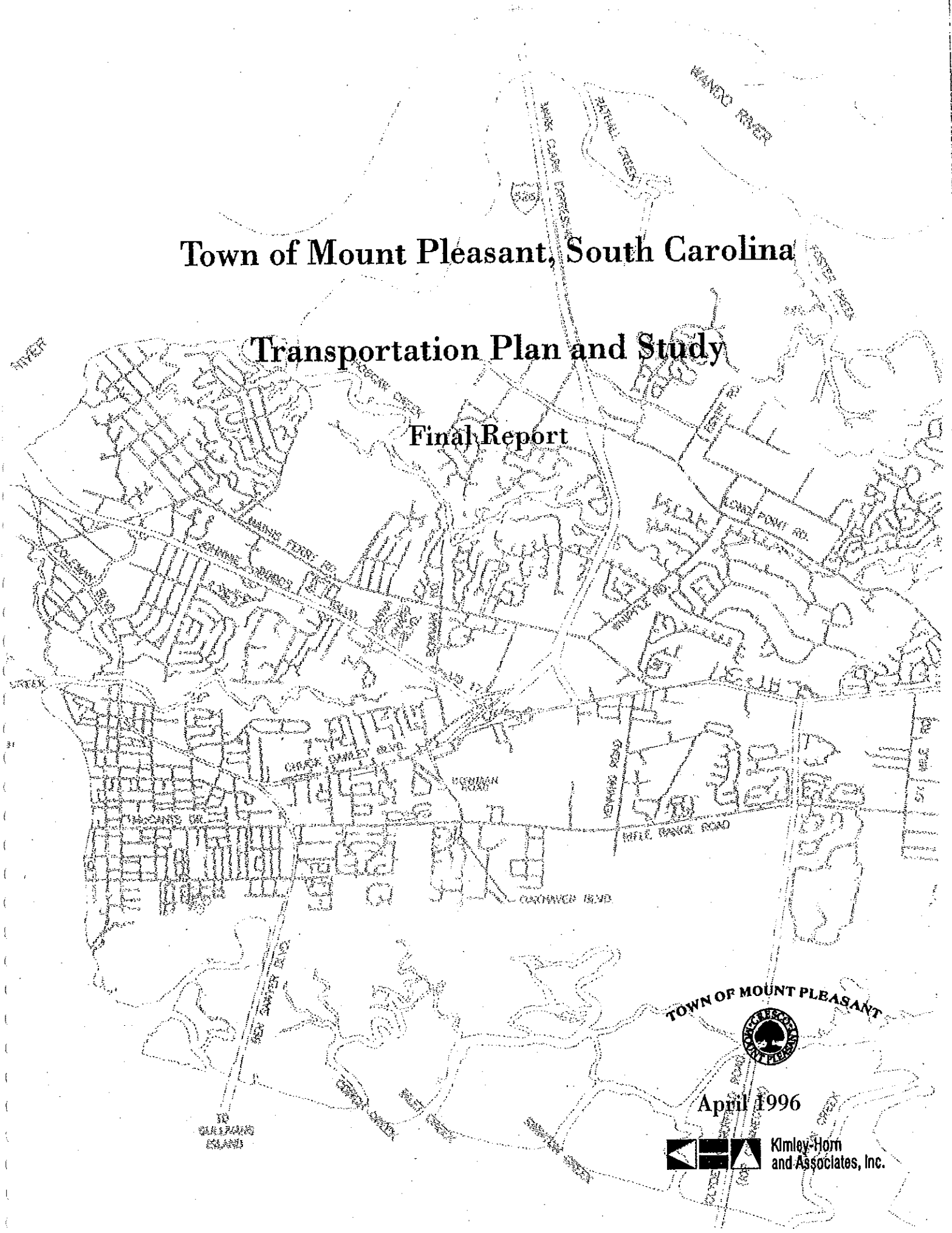
1996 Long Range Transportation Plans

(Cover only - Complete copy can be provided upon request)

Town of Mount Pleasant, South Carolina

Transportation Plan and Study

Final Report



TOWN OF MOUNT PLEASANT



April 1996

 Kimley-Horn
and Associates, Inc.

Appendix B

2000 Long Range Transportation Plan Executive Summary

(Complete copy of entire plan can be provided upon request)

EXECUTIVE SUMMARY

**Town of Mount Pleasant, SC
Transportation Plan**



Submitted by

DWA
Day Wilburn Associates, Inc.

In association with

Thomas & Hutton Engineering Co.

February 2000

**Mount Pleasant Transportation Plan**

Day Wilburn Associates, Inc. (DWA) was contracted by the Town of Mount Pleasant, South Carolina, to prepare an update to the community's Long Range Transportation Plan. DWA was assisted in this effort by Thomas & Hutton Engineering Co. (T&H).

Study Purpose and Key Issues

The purpose of this effort was to evaluate the current and future transportation needs of the Mount Pleasant area and develop a transportation plan which identifies improvements that complement or help to achieve state and local objectives in economic development, quality of life and the interconnection of people, goods, and services. Early in the study process, a number of key issues were identified that needed to be addressed for the plan to be considered responsive to the community's needs. These issues included:

- accommodating the rapid pace of residential and commercial growth;
- addressing congestion along arterial routes, particularly US17, Coleman Boulevard, Mathis Ferry Road, Rifle Range Road, Bowman Road and Long Point Road;
- identifying and correcting any physical deficiencies which contribute to high accident rates experienced at major intersections along these and other corridors;
- anticipating those corridors which are most likely to be severely impacted by planned and proposed development, such as Patriots Point Road, SC41, and the eastern portions of US 17 and Rifle Range Road, and implementing improvements before traffic conditions degrade to unacceptable levels;
- resolving differences between the previous Mount Pleasant Transportation Plan and the Charleston Regional Transportation Plan, particularly the improvement concept along US 17 between I-526 and the Cooper River, and
- incorporating the new impact fee program into the overall transportation planning process.

Data Sources and Study Process

A variety of sources was used to obtain information required to evaluate existing mobility around Mount Pleasant and to forecast how conditions might change over the next 15 years. The regional TRANPLAN travel demand model, maintained by the Charleston-Berkeley-Dorchester Council of Governments, was modified (refined zone delineation, updated development and trip generation data, additional and corrected network geometry) and used throughout the process to evaluate the impacts of various improvement projects under consideration. These sources included:

- Previously prepared reports, studies and data summaries
 - Town of Mount Pleasant Transportation Plan - Final Report; Kimley-Horn and Associates, Inc.; 1996.
 - Town of Mount Pleasant Transportation Plan - Technical Appendix; Kimley-Horn and Associates, Inc.; 1996.
 - East Cooper Public Transportation Feasibility Study; Fred B. Collins; 1994.
 - CHATS Regional Long Range Transportation Plan; Berkeley-Charleston-Dorchester Council of Governments; 1997.

**Mount Pleasant Transportation Plan**

- CHATS Transportation Improvement Program; Berkeley-Charleston-Dorchester Council of Governments; 1998.
- CHATS and Charleston County Bikeway and Pedestrian Master Plan; Berkeley-Charleston-Dorchester Council of Governments; 1995.
- Transportation Impact Fee Study Report; Kimley-Horn and Associates, Inc.; 1998.
- Municipal Impact Fee Ordinance; Town of Mount Pleasant; 1998.
- Strategic Planning for the Town of Mount Pleasant - Phase One: Findings Recommendations and Action Plans; Transportation Issue Committee; 1994.
- Demographics for the Town of Mount Pleasant; Department of Planning and Development; 1997.
- CHATS Socioeconomic Data and Forecasts - Technical Reports 1 & 2; Berkeley-Charleston-Dorchester Council of Governments.
- Zoning and Land Development Codes; Town of Mount Pleasant; 1998.
- Development Traffic Assessment and Impact Studies (prepared for approximately 30 sites within Mount Pleasant in recent years).
- United States Bureau of the Census website data summaries.
- Accident records.
- Field review and data collection activities
 - Roadway characteristics, including laneage, speed limits, median treatment, lane widths and pavement conditions.
 - Intersection characteristics, including approach laneage, traffic control treatment, signal phasing, right-of-way assignments and sight distance.
 - 24-hour tube counts on arterial roadway segments.
 - Peak period turning movement counts at key intersections.
 - Development characteristics.
 - Safety deficiencies.
 - Generalized traffic flow characteristics.
- Stakeholder outreach
 - February 18, 1999 – Kickoff meeting with Town planning staff to review data requirements and availability.
 - March 11, 1999 – Briefing for Town Council members to advise them of the study process and its purpose and to receive initial guidance.
 - May 24, 1999 – First public information meeting, conducted following substantial completion of Task 1 activities and initial findings of Task 2 efforts.
 - June 24, 1999 – Meeting with Town planning staff to review travel demand model input data.
 - July 9, 1999 – Submittal of Interim Report summarizing the results of Tasks 1 and 2.
 - July 27, 1999 – Meeting with Town planning staff to review project status and schedule.
 - October 18, 1999 – Meeting with Town planning staff to review travel demand model results.
 - October 27-28, 1999 – Retreat with Town Council members and planning staff to review travel demand model results and discuss improvement options.
 - December 14, 1999 – Briefing for Town Council to present preliminary recommendations.
 - January 11, 2000 – Public hearing on draft plan, conducted following substantial completion of all project activities.

**Mount Pleasant Transportation Plan**

- February 8, 2000 – First reading of Transportation Plan before Town Council.
- March 21, 2000 – Second reading of Transportation Plan before Town Council.

Recommendations

Improvement options were developed through a combination of suggestions received from meetings with local stakeholders, including the general public, Town Council members and Town planning staff, findings from the TRANPLAN travel demand model, and professional planning judgment. These options were then evaluated using the TRANPLAN model and sketch planning techniques, where appropriate, and verified for feasibility through a field review of conditions. Potential projects were developed and analyzed based on their ability to accommodate current travel needs and anticipated development patterns over the next 15 years. Projects with significant readily identifiable negative consequences, such as residential, business and environmental impacts that outweighed the potential mobility benefit, were eliminated from further consideration.

Projects were recommended and grouped into three time periods. The prioritization was based on the level of deficiency to be mitigated or eliminated by the project, the estimated cost and the difficulty of implementation from a design and permitting perspective. Inexpensive solutions for easily identifiable deficiencies which can be undertaken with minimal design, have strong support from the public and local officials, and require minimal environmental permitting were recommended for the short-range (2000-2002) period. Projects which are more expensive, will require detailed design and environmental studies, or which address a deficiency which is not anticipated to occur until several years in the future, were recommended for the mid-range (2003-2007) and long-range (2008-2015) periods. Figures ES-1, ES-2 and ES-3 depict recommended short-range, mid-range and long-range projects, respectively.

Figure ES-4 demonstrates that virtually the entire network will be operating at an acceptable level of service (LOS "D" is considered acceptable in urbanized areas) through the year 2015 if the proposed improvements are undertaken. This information is summarized from a TRANPLAN model run which incorporated anticipated development and applied the associated trips to the future network. For comparison purposes, significant portions of the network, particularly along US17, currently operate at unacceptable levels of service (LOS "E" or "F"). Implementation of this plan's recommendations will allow the Town to absorb additional growth while actually improving the ease of mobility around the area.

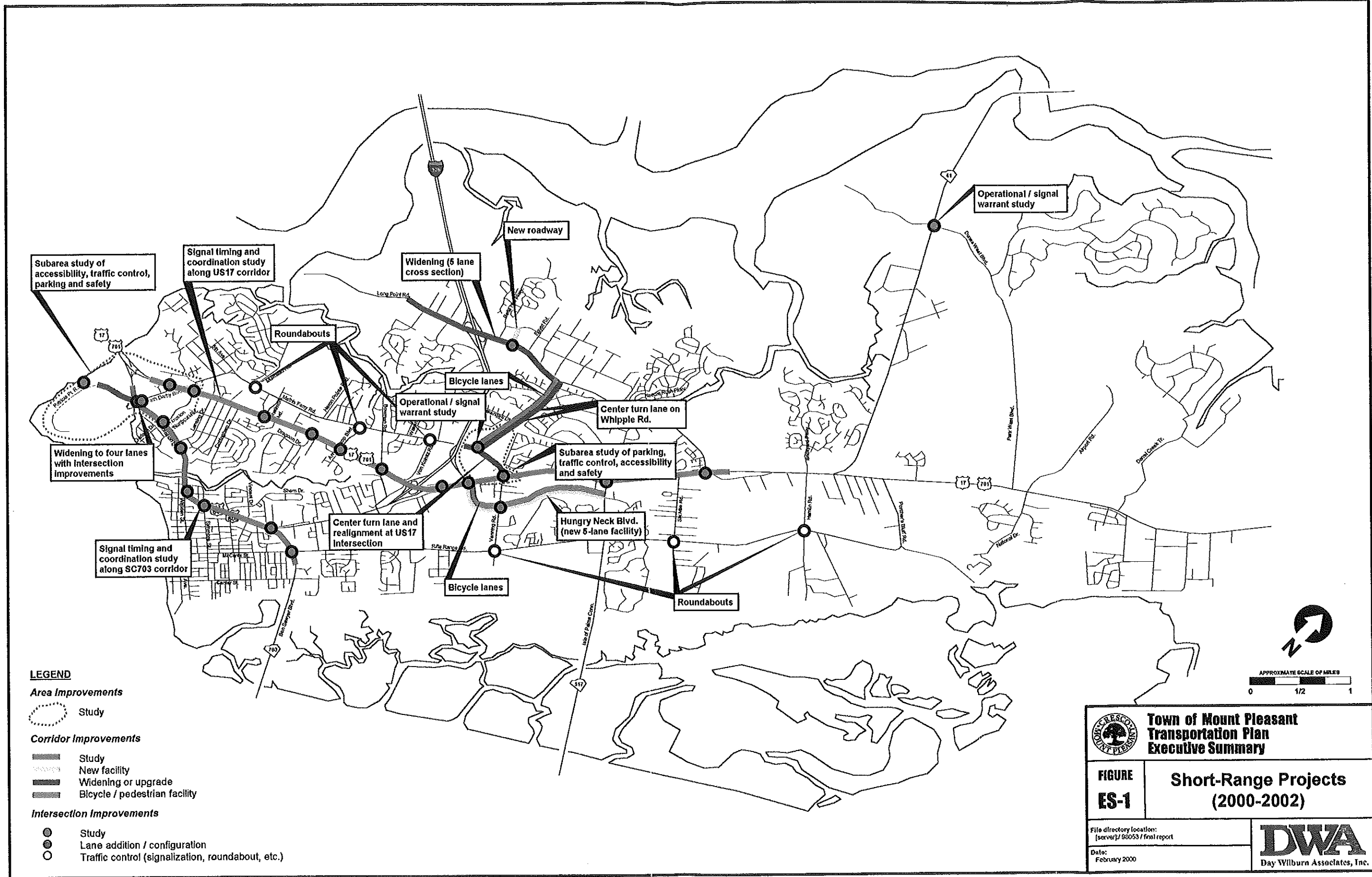
Table ES-1 presents a comprehensive summary of the recommended implementation program for projects recommended as a result of this planning process. For each project shown in the table, an estimated cost is provided. These costs, which are subdivided by design, right-of-way acquisition and construction, are approximate and subject to change upon detailed design efforts. The most likely funding sources are identified for each project, based largely on the agency responsible for maintaining the roadway or intersection of note. For example, improvements at the intersection of two municipal streets would most likely be the responsibility of the Town, while similar improvements at an intersection involving one or more state routes would fall under the jurisdiction of the South Carolina Department of Transportation (SCDOT).

**Mount Pleasant Transportation Plan****Action Plan**

Listed below are a few activities which should be undertaken by the Town to enhance the potential for success of this plan:

- Begin public outreach efforts and solicit input on identified short-range projects.
- Investigate the feasibility of alternative funding sources, such as accommodations taxes and private contributions, to generate additional revenue.
- Finalize the review of the impact fee structure and determine the need for a concurrency ordinance.
- Develop a Capital Improvement Program based on the anticipated revenues from development fees that includes all projects recommended in this plan.
- Undertake studies defined in the short-range period and implement appropriate improvements based on findings.
- Continue coordination efforts with SCDOT regarding the design of the new US 17 Cooper River Bridge, particularly with regard to improvements along Wingo Way and the development of a southbound onramp from that roadway.
- Begin design efforts on selected short-range projects.
- Identify ways to utilize local resources to accelerate the planning, design and construction process for projects identified as being the responsibility of SCDOT.

This plan sets forth a list of improvements needed to address current and future deficiencies. Taken together, the implementation program and action plan will ensure residents of Mount Pleasant a transportation system which meets both their needs and those of the traveling public through the year 2015.



LEGEND

Area Improvements

○ Study

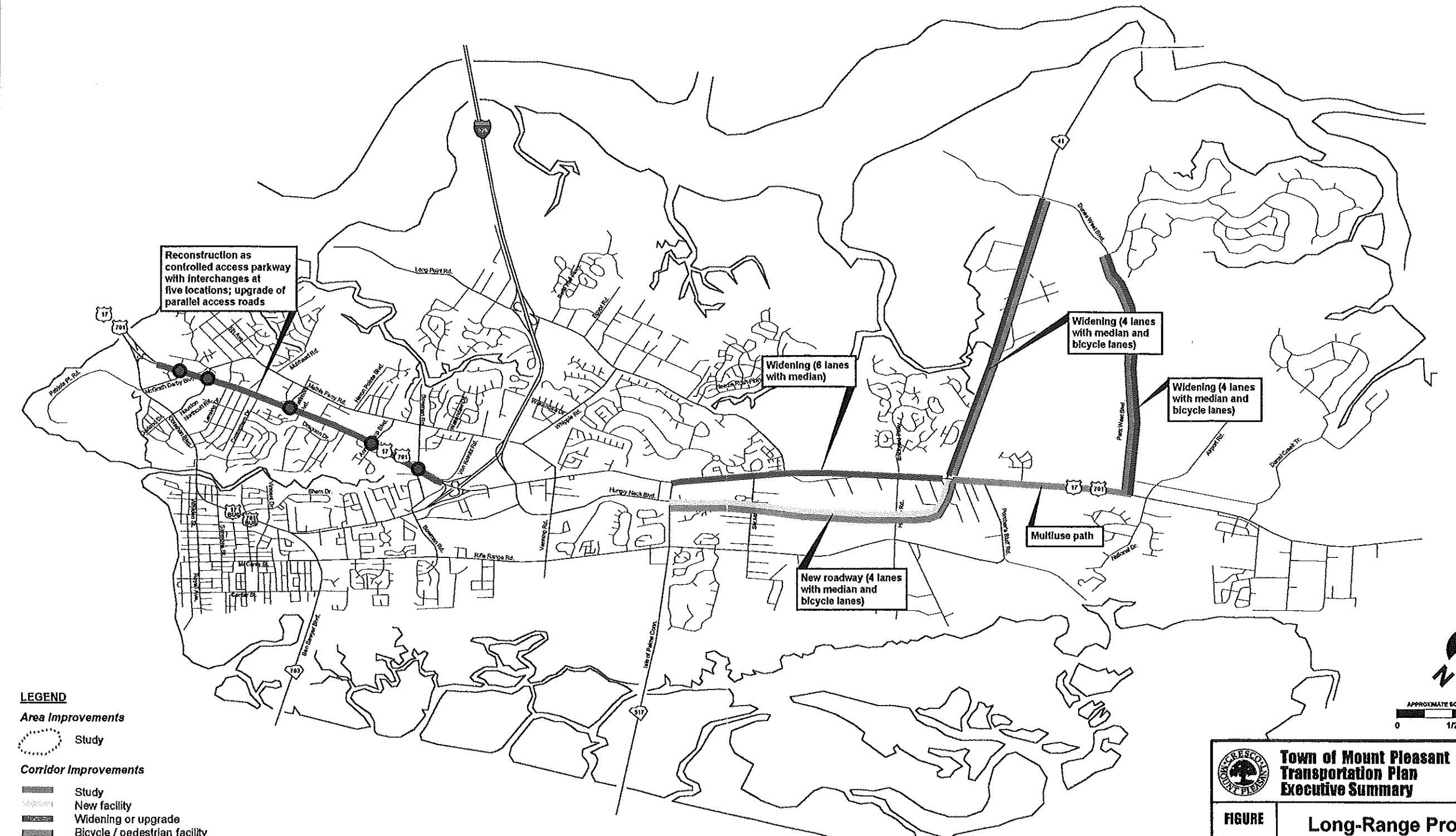
Corridor Improvements

- ▬ Study
- ▬ New facility
- ▬ Widening or upgrade
- ▬ Bicycle / pedestrian facility

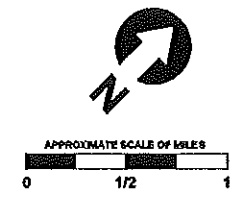
Intersection Improvements

- Study
- Lane addition / configuration
- Traffic control (signalization, roundabout, etc.)

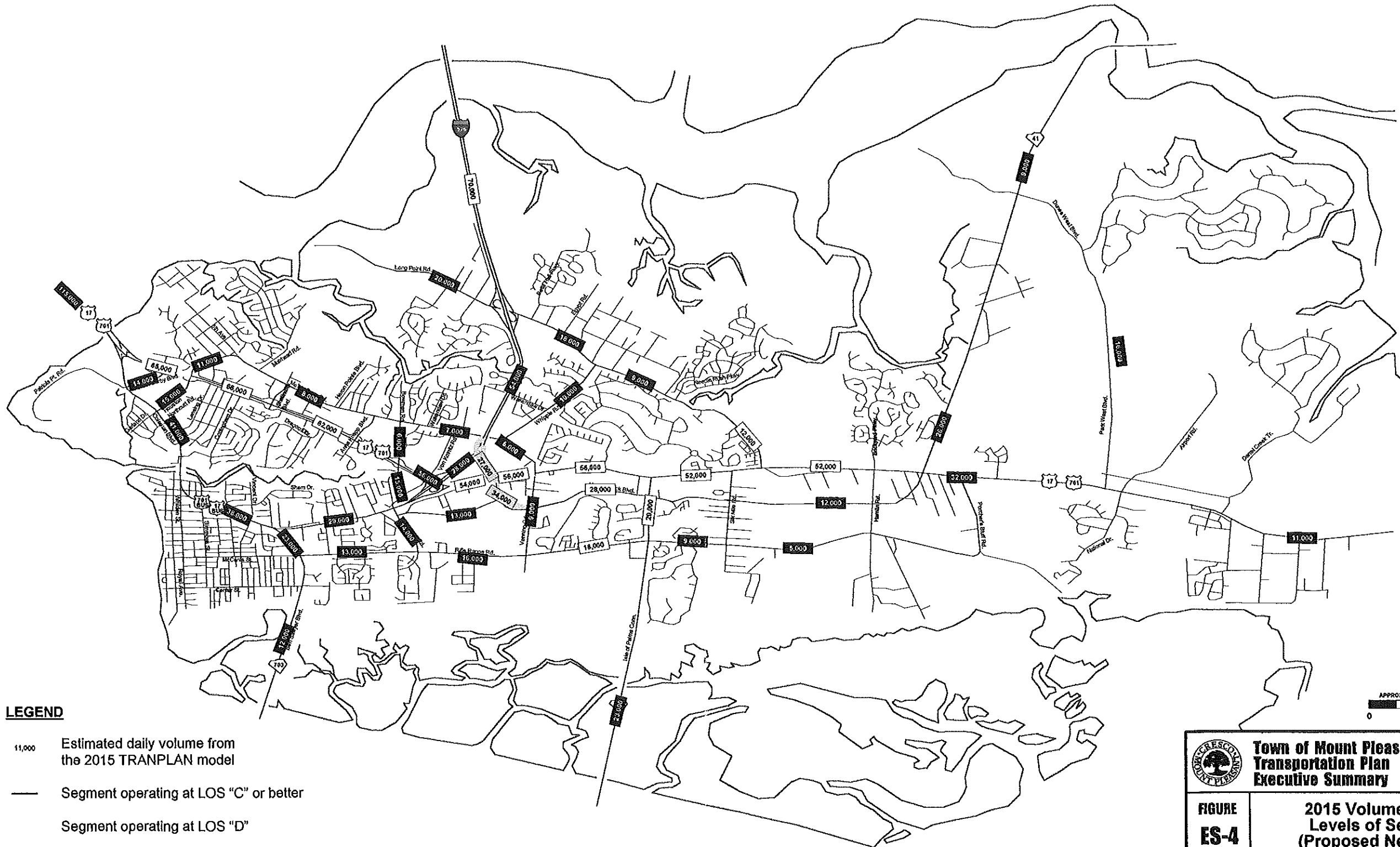
	Town of Mount Pleasant Transportation Plan Executive Summary	
	FIGURE ES-1	Short-Range Projects (2000-2002)
File directory location: [server]/82053/fnal report		 Day Wilburn Associates, Inc.
Date: February 2000		



- LEGEND**
- Area Improvements**
- Study
- Corridor Improvements**
- Study
 - New facility
 - Widening or upgrade
 - Bicycle / pedestrian facility
- Intersection Improvements**
- Study
 - Lane addition / configuration
 - Traffic control (signalization, roundabout, etc.)

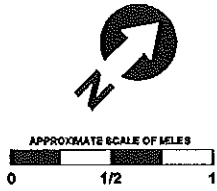




	Town of Mount Pleasant Transportation Plan Executive Summary	
	FIGURE ES-3	Long-Range Projects (2008-2015)
<small>File directory location: [server]/98053/final report</small>		 Day Wilburn Associates, Inc.
<small>Date: February 2008</small>		



LEGEND

- 11,000 Estimated daily volume from the 2015 TRANPLAN model
- Segment operating at LOS "C" or better
- - - Segment operating at LOS "D"
- · · Segment operating at LOS "E"
- Segment operating at LOS "F"



	Town of Mount Pleasant Transportation Plan Executive Summary	
	FIGURE ES-4	2015 Volumes and Levels of Service (Proposed Network)
<small>File directory location: [server]/98053/long range plan</small>		 DWA <small>Day Wilburn Associates, Inc.</small>
<small>Date: February 2000</small>		

**Table ES-1
Implementation Program**

Time Period	Project Description	Cost Estimate				Potential Funding Sources		
		PE	ROW*	CST	Total	State	Local	Private
Short-Range (2000-2002)	Operations / warrant study and signalization at two intersections: SC 41 at Dunes West Blvd. Whipple Rd. at Mathis Ferry Rd.	\$30,000	\$0	\$120,000	\$150,000			X
	Center turn lane on Whipple Rd.	\$150,000	\$150,000	\$1,200,000	\$1,500,000	X	X	
	Bike lanes on Whipple Rd.	\$20,000	\$0	\$100,000	\$120,000		X	
	Intersection improvements at six locations: Rifle Range Rd. at Venning Rd. Rifle Range Rd. at Six Mile Rd. Rifle Range Rd. at Hamlin Rd. Mathis Ferry Rd. at Muirhead Rd. Mathis Ferry Rd. at Anna Knapp Blvd. Mathis Ferry Rd. at Von Kolnitz Rd.	\$600,000	\$300,000	\$1,800,000	\$2,700,000	X	X	
						X	X	
						X	X	
						X	X	
						X	X	
						X	X	
						X	X	
	Hungry Neck Blvd. from US 17 to Isle of Palms Connector	<i>Project already financed under TIP</i>						
	Realignment of Mathis Ferry Rd. approach at US17; center turn lane between US 17 and I-526 overpass	\$200,000	\$500,000	\$2,000,000	\$2,700,000		X	
	Widening of Long Point Rd. to five lanes from Wando Terminal to Whipple Rd.	<i>Project already financed under TIP</i>						
	Widening of Patriots Point Rd. and intersection improvements at Coleman Blvd.	\$625,000	\$30,000	\$2,500,000	\$3,155,000	X	X	
	New connecting road between Paul Foster Dr. and Long Point Rd.	\$50,000	\$200,000	\$200,000	\$450,000		X	
	Subarea study in vicinity of Wando High School	\$10,000	\$0	\$0	\$10,000		X	
	Subarea study in vicinity of Patriots Point	\$20,000	\$0	\$0	\$20,000		X	X
Signal timing / coordination study along US 17 corridor	\$30,000	\$0	\$0	\$30,000		X		
Signal timing / coordination study along SC 703 corridor	\$20,000	\$0	\$0	\$20,000		X		
Subtotal					\$10,855,000			

**Table ES-1
Implementation Program**

Time Period	Project Description	Cost Estimate				Potential Funding Sources		
		PE	ROW*	CST	Total	State	Local	Private
Mid-Range (2003-2007)	Extension of Wingo Way to Patriots Point Rd. with bike lanes and turn lane improvements	\$375,000	\$225,000	\$2,400,000	\$3,000,000	x	x	x
	Onramp from SB Wingo Way to SB US 17 at Cooper River	\$875,000	\$175,000	\$3,500,000	\$4,550,000	x		
	Flyover ramps to/from I-526 and Hungry Neck Blvd. at US 17	\$1,000,000	\$50,000	\$4,000,000	\$5,050,000	x	x	
	Widening US 17 (six lanes and median) from I-526 to Isle of Palms Connector	\$1,750,000	\$2,000,000	\$6,250,000	\$10,000,000	x	x	
	Widening Isle of Palms Connector (four lanes and median) from Seaside Farms entrance to US 17	\$450,000	\$0	\$1,850,000	\$2,300,000	x		
	New roadway (two lanes) parallel to US 17 between Darrel Creek Rd. and Park West Blvd.	\$425,000	\$250,000	\$1,750,000	\$2,425,000			x
	Bowman Rd. corridor improvements: Widening (5 lanes) from Chuck Dawley Blvd. to US 17 Center turn lane from US17 to Mathis Ferry Rd. Center turn lane from Rifle Range Rd. to Dawley Blvd. Signalizing intersection at Mathis Ferry Rd. Bicycle lanes along entire length	\$950,000	\$275,000	\$3,800,000	\$5,025,000	x	x	
							x	
							x	
							x	
							x	
	New roadway (2-3 lanes) between Hungry Neck Blvd. to intersection of Bowman Rd. and Stuart Engals Blvd.	\$300,000	\$200,000	\$1,200,000	\$1,700,000		x	
	Reconstruction of SC 41 and US 17 intersection	\$575,000	\$125,000	\$2,325,000	\$3,025,000	x		
	Complete gaps in bicycle facility network: Upgrade / extension of existing Mathis Ferry Rd. path Extension of existing bike lanes on Coleman Blvd. Bike lanes on Rifle Range Rd. (Ben Sawyer to IOP)	\$90,000	\$125,000	\$900,000	\$1,115,000	x	x	
						x		
North / south bicycle corridor from SC 703 to Long Point Rd.	\$100,000	\$25,000	\$500,000	\$625,000		x		
Center turn lane on McGrath Darby Rd.	\$20,000	\$0	\$80,000	\$100,000	x	x		
Isle of Palms Connector restriping feasibility study	\$10,000	\$0	\$0	\$10,000	x	x		
Subtotal					\$38,925,000			

**Table ES-1
Implementation Program**

Time Period	Project Description	Cost Estimate				Potential Funding Sources		
		PE	ROW*	CST	Total	State	Local	Private
Long-Range (2008-2015)	Reconstruction of US 17 from Cooper River to I-526 as a controlled access parkway with interchanges at: McGrath Darby Rd. / Houston Northcutt Rd. Shellmore Blvd. Anna Knapp Blvd. Bowman Rd.	\$5,625,000	\$50,000	\$22,500,000	\$28,175,000	x		
	Upgrading US 17 parallel access roads in conjunction with parkway development	\$375,000	\$0	\$1,500,000	\$1,875,000	x	x	
	Widening US 17 (six lanes with median) from Isle of Palms Connector to SC 41	\$1,250,000	\$1,000,000	\$7,000,000	\$9,250,000	x		
	Widening SC 41 (four lanes with median and bike lanes) from US 17 to Dunes West Pkwy.	\$1,500,000	\$475,000	\$6,000,000	\$7,975,000	x		
	Extension of Hungry Neck Blvd. (four lanes with median and bike lanes) from Isle of Palms Connector to SC 41	\$1,575,000	\$1,775,000	\$6,300,000	\$9,650,000	x	x	
	Widening of Park West Blvd. (four lanes with median)	\$1,575,000	\$600,000	\$6,300,000	\$8,475,000			x
	Multi-use path along US 17 from SC 41 to Park West Blvd.	\$25,000	\$0	\$275,000	\$300,000			x
Subtotal					\$65,700,000			

Total Implementation Program Cost

\$115,480,000

* The scope of this study did not permit a detailed review of land valuation in the vicinity, existing right-of-way boundaries or identification of specific developed properties which would need to be acquired. More precise right-of-way cost estimates will need to be determined during preliminary engineering activities.

Appendix C

Interchange Evaluation Study – Bowman Road / US 17



HNTB

ARCHITECTS ENGINEERS PLANNERS

Interchange Evaluation Study Bowman Road / U. S. 17 Mount Pleasant, SC



Prepared For:

Town of Mount Pleasant, SC

Planning Department

February 7, 2003



Executive Summary

This report summarizes evaluations and comparisons conducted to address long-term road improvement needs at the intersection of Bowman Road and US 17. Improvements required to address ever increasing travel demands were analyzed within the context of related corridor-wide issues occurring along a 4-mile crucial stretch of US 17 extending from the New Cooper River Bridge northward to the Hungry Neck Boulevard/I-526 ramp intersection. This section of roadway constitutes one of the most critical links in the Mount Pleasant transportation network, as US 17 is the only major north-south arterial roadway connecting across the entire reach of the Town limits. Maintaining adequate traffic flow along this major roadway facility is of paramount importance to mobility within the entire community. An overview of the findings from this evaluation study include the following:

- Proposed travel and turn lane improvements on Bowman Road will accommodate an approximate ten year growth in traffic at the US 17 intersection, after which additional grade separation construction or extensive lane widening will be needed to address long-term traffic demand.
- A system of six interchanges will likely be required to accommodate long term traffic growth along the US 17 corridor; which is expected to top 60,000 vehicles per day. In addition to Bowman Road, other interchange locations are likely to include: McGrath Darby Boulevard, Houston Northcut Boulevard, Shellmore Drive, Anna Knapp Boulevard and Hungry Neck Boulevard/I-526 ramp.
- Use of interchanges will help preserve existing landscape features and serve to maintain the aesthetically appealing nature of the corridor, rather than creating an unsightly “sea of asphalt.”
- The existing frontage road system along US 17 will likely need to be converted to a one-way circulation pattern to safely connect the interchanges, provide efficient access to commercial properties, reduce construction/right-of-way impacts and greatly assist with construction phasing.
- Construction costs are expected to range from \$20-25 million per interchange, not including right-of-way acquisition/impacts and relatively minor roadway improvements that may be necessary between interchanges.

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I. Introduction and Study Overview

This report provides a conceptual evaluation of possible long-term traffic flow improvements at the intersection of Bowman Road and US 17/Johnnie Dodds Boulevard. The configuration of the road network within the Town of Mount Pleasant finds this intersection at the heart of north-south and east-west traffic movements. Furthermore, the importance of US 17 as the only major north-south arterial roadway across the Town dictates traffic flow along this highway to be of paramount importance to mobility within the community. With US 17 traffic flow being of major significance to the community, the evaluation study area was increased to include other sections of US 17 adjacent to the Bowman Road intersection, specifically south to the New Cooper River Bridge and north to the Hungry Neck Boulevard intersection. The overall corridor length studied is approximately four miles. See study evaluation area shown in Figure 1.

Work for this concept development was conducted as a follow-on evaluation to the traffic analysis used in design of roadway improvements along Bowman Road. The traffic analysis was limited to travel and turn lane additions along Bowman Road.

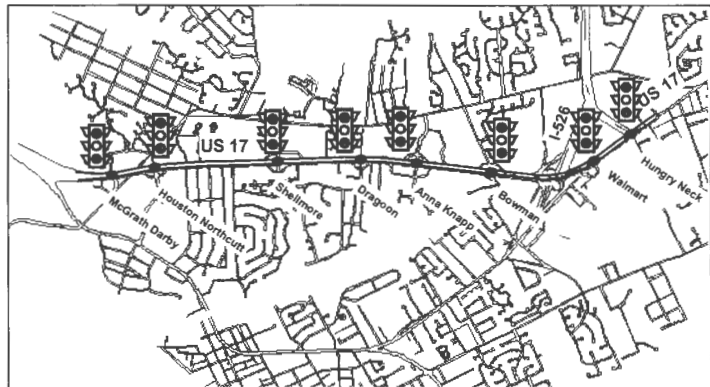
No improvements were proposed for US 17. Improvements along Bowman Road have been developed based on an at-grade intersection with US 17 and, as a result, this design will only accommodate the 10-year projected traffic levels. It is worth noting that the 10-year projected traffic volumes are for the year 2011. Therefore, the proposed improvement project at Bowman Road and US 17 is considered to provide a short-term solution to the capacity needs at the US 17 intersection.

Since at-grade intersection improvements can only be relied upon to meet short-term traffic needs, grade separation alternatives (interchanges) began to emerge as a necessary step in insuring the long-term functional operation of the US 17 corridor. This approach would likely involve all existing at-grade intersections within the evaluation area. Due to the aesthetic appeal of the existing roadway and the desire to maintain the roadway's scenic parkway-like feel, it was assumed that widening US 17 was not an option. It was also assumed that the installation of a grade separated intersection would likely allow the roadway cross-section to remain relatively close to how it currently exists, with two lanes in each direction, a wide landscaped median and frontage roads on both sides.

Findings from this evaluation are presented within the following context:

- Need for grade separation (interchange)
- Types of grade separations for consideration
- Identification of other related issues
- Bowman Road/US 17 grade separation concept development
- Concept for grade separations along US 17 Corridor
- Benchmark comparison with similar corridor (US 231, Huntsville, AL)
- Corridor summary and recommendations

Figure 1 – Study Evaluation Area



II. Need for Grade Separation (Interchange)

The proposed widening project along Bowman Road was developed based on providing a five-lane typical section east of US 17 and a three-lane typical section west of US 17. This improvement configuration was developed based on the imperative constraint that no through lanes could be added to US 17. The right-of-way of this road currently exists with numerous aesthetic landscape features providing the roadway with a picturesque parkway-like feel. The well-liked and greatly admired landscaping features are a source of community pride, necessitating that the preservation of these assets receive major consideration in the development of any capacity improvement plans. Accordingly, the at-grade intersection improvements for US 17 and Bowman Road include adding turning lanes for all approaches and providing additional through travel lanes along Bowman Road.

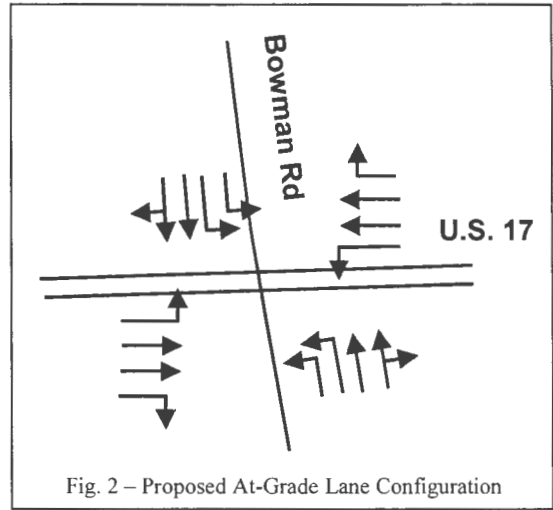


Fig. 2 – Proposed At-Grade Lane Configuration

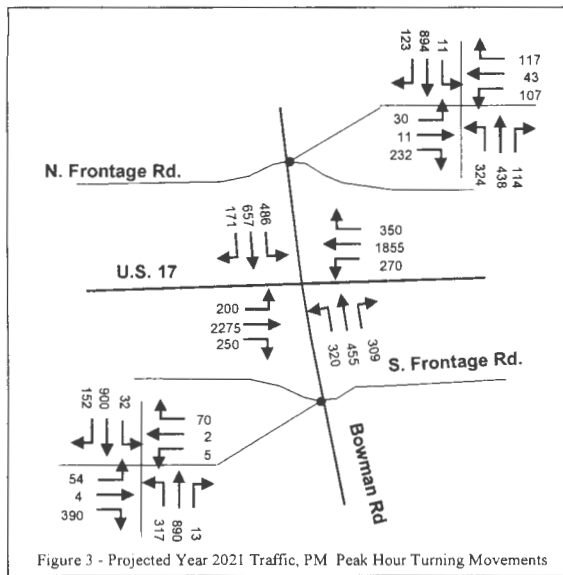


Figure 3 - Projected Year 2021 Traffic, PM Peak Hour Turning Movements

include adding turning lanes for all approaches and providing additional through travel lanes along Bowman Road. The lane configuration proposed for construction at the subject intersection location is summarized in Figure 2. These proposed improvements roughly accommodate a ten-year growth in traffic, at which time the intersection is anticipated to operate at a Level of Service F. Capacity analysis calculations conducted to evaluate operational conditions for this intersection configuration are summarized in Table 1.

From a review of these results, it is obvious that the proposed at-grade improvements will not provide a long-term solution for addressing future traffic demands projected on the 20-year horizon, shown in Figure 3. With the previously enumerated constraint precluding travel lane additions along this section of US 17, the possibility of providing an interchange emerges as a potentially viable solution meriting further consideration. As similar at-grade intersection traffic conditions exist at several other locations along US 17, the ultimate solution would extend beyond the limits of this single intersection at Bowman Road and require the inclusion of other improvement locations that would join to create a system-wide corridor solution. The US 17 right-of-way also includes a frontage road system extending for most of the 4-mile study area length. Any consideration of grade separated improvements will require that the frontage road system be included in the evaluation of feasible alternatives. The following report section provides an overview of typical interchange configurations that merit consideration for existing at-grade intersection locations along US 17.

From a review of these results, it is obvious that the proposed at-grade improvements will not provide a long-term solution for addressing future traffic demands projected on the 20-year horizon, shown in Figure 3. With the previously enumerated constraint precluding travel lane additions along this section of US 17, the possibility of providing an interchange emerges as a potentially viable solution meriting further consideration. As similar at-grade intersection traffic conditions exist at several other locations along US 17, the ultimate solution would extend beyond the limits of this single intersection at Bowman Road and require the inclusion of other improvement locations that would join to create a system-wide corridor solution. The US 17 right-of-way also includes a frontage road system extending for most of the 4-mile study area length. Any consideration of grade separated improvements will require that the frontage road system be included in the evaluation of feasible alternatives. The following report section provides an overview of typical interchange configurations that merit consideration for existing at-grade intersection locations along US 17.

Table 1 - US 17 & Bowman Road, Intersection Capacity Analysis Summary

Year	Condition	Design	LOS	Delay	V/C	Demand
2001	PM	Exist	D	46.9		
2011	AM	10-yr.	F	96.7	1.23	5,915
2021	AM	20-yr.	F	165.3	1.40	6,809
2011	PM	10-yr.	F	120.7	1.31	6,528
2021	PM	20-yr.	F	195.0	1.52	7,598

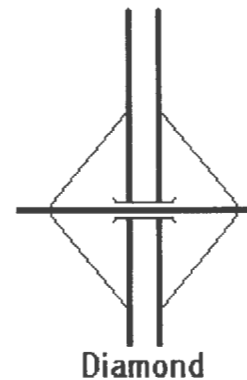
III. Types of Grade Separations (Interchanges)

Information in this section is presented for the purpose of providing an overview of interchange configurations commonly utilized as grade separations along controlled access highways. The objective of including this summary information on the basics of interchange design is to establish a basis for determining which best suits the conditions present along the US 17 corridor in the Town of Mount Pleasant, south of the proposed Hungry Neck Boulevard intersection. The significance of this corridor will further increase in the future due to predicted area-wide traffic growth and increased urban development within the northern bounds of the Town limits. It is useful to note that the ability to move increasing traffic volumes through limited amounts of space is the preeminent challenge in urban highway design. A proven and highly effective approach widely used to maximize the traffic flow in growing urban areas is to greatly enhance the efficiency of typical at-grade intersections by constructing partial or full grade-separated intersections where major streams of traffic converge, merge or intermingle. Undue reliance on at-grade intersections can lead to excessive motorist delays. Interchanges that channelize traffic flows and reduce points of conflict have come as a welcome relief to congestion woes in many urban communities throughout the United States and beyond. The following sections summarize pros and cons of commonly utilized interchange configurations.

Diamond Interchange

The diamond is generally considered the simplest type of interchange. Therefore, the basic diamond is often the configuration of choice for lower-traffic locations without any special considerations or constraints. Diamond interchanges typically have the following characteristics: relatively straight ramp alignment, direct turning maneuvers at the crossroad, and minimum construction costs.

While a diamond type interchange is adaptable to a wide range of traffic volumes, its traffic handling capacity is limited by the at-grade ramp intersections with the crossroad. Traffic signals can be installed at the two access points where the ramps meet the crossroad, but higher traffic volumes can cause backups on the crossroad and ramps under worst case conditions, even resulting in stopped traffic on the mainline. An inherent problem exists in that opposing streams of left-turning traffic from the major roadway must cross one another. Traffic signals on both ends of the crossroad frequently prevent turning vehicles from clearing the interchange in a single traffic signal cycle. Under heavy traffic conditions, it may take several cycles for a motorist to make a left turn and clear the interchange limits. Widening the access ramps and/or the crossroad in the vicinity of the intersections may increase vehicular capacity. This provision will have an adverse affect on the bridge construction cost due to increased span length to accommodate under-crossing turning lanes and additional width required for over-crossing travel lanes. All ramps serve to connect the mainline with the crossroad, as well as to transition traffic from low speeds or stop conditions to free flow limited access speeds. If queued (backed-up) traffic is to be stored or stacked on the ramp, the length of the ramp becomes a critical design factor. In order to accommodate higher traffic volumes, the crossroad will need additional left turn lanes for the entrance ramps. Space for providing storage and transitions is severely limited because of the short length between ramps available in a tight diamond configuration. When necessary, these turn lanes force the crossroad to be wider and transitions to be pushed out, expanding construction limits.



Cloverleaf Interchange

Cloverleaf interchanges consist of four legs with right lane exit loop ramps to accommodate left turning traffic movements. Provided the interchange is not too congested, the cloverleaf allows “non-stop” full access between two busy roads. Traffic is required to merge and weave, but does not cross at-grade. Traffic is not required to stop unless the interchange is too congested. Ramps may be omitted from the full cloverleaf to obtain a partial cloverleaf. In appropriate locations, partial cloverleaves can provide useful designs for roadway interchanges.

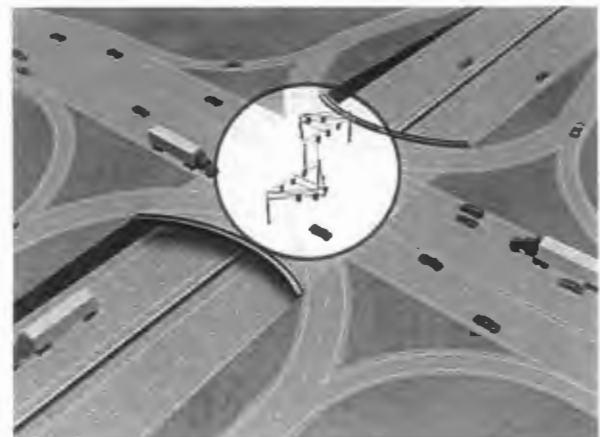


Typically, a cloverleaf is used where a freeway intersects a busy crossroad, though many older freeway-freeway interchanges are also cloverleaves. Today the full cloverleaf is not considered as applicable in some situations as it might have been a few decades ago. In fact, in several places cloverleaves have been replaced with either signalized interchanges or higher-capacity directional ramp interchanges including multi-level flyover bridges that better accommodate higher ramp speeds and larger traffic flows.

A disadvantage to the cloverleaf is the presence of “weaving” zones, where motorists exiting one of the loop ramps have to merge and crisscross other motorists entering the downstream ramp. Weaving, which causes bottlenecks and accidents, is the primary reason cloverleaves are currently much less prevalent in designs for new or revamped interchanges. Cloverleaf ramps typically have low posted operating speeds because of their tight curvilinear alignment and corresponding step banking (superelevation) which serve to limit the amount of left turning traffic that can be efficiently accommodated by these dated configurations. Cloverleaf designs require substantial right-of-way and therefore are generally only considered for rural locations where adjacent real estate prices are not at a premium and where relatively low turning volumes exist. For these reasons this configuration is not considered feasible for the US 17/Bowman Road intersection.

Single Point Urban Interchange (SPUI)

The single point urban interchange (SPUI) is a relatively new variant of the diamond. The biggest advantages of a SPUI are the compact layout (requires less right-of-way acquisition) and the ability to allow concurrent left turns for greater capacity.



The SPUI is being used extensively in reconstruction of existing freeways and major arterial roadways. This simple design makes the most of safety, capacity and efficiency. The name “Single Point” refers to the fact that through traffic on the arterial

side street as well as all traffic turning left onto or off of the interchange can be controlled from a single set of traffic signals. In this example, all traffic signals are located at a single point in the middle of the interchange. In a SPUI, the streams of left-turning traffic do not cross. Opposing left turns are made at the same time, and with only one set of traffic signals, more vehicles can make a turn and clear the interchange during one signal cycle. The SPUI resembles a slim classical diamond. However, where a diamond has two ramp intersections at the crossroad (one on each side of the freeway), a SPUI's ramps are placed close together to make them effectively part of the same intersection. This allows one traffic signal to control all crossing movements, and enables concurrent opposing left turns, which increases the capacity of the interchange.

IV. Concept Development for Grade Separation Improvements at Bowman Road & US 17

Construction of grade-separated improvements at the US 17/Bowman Road intersection will most likely become an unavoidable necessity due to the inevitable advent of higher traffic volumes that are forecasted to occur in the next 20 years. Present arterial traffic demands along Bowman Road and, especially, US 17 are of considerable magnitude on a daily basis. The existing intersection layout functions poorly under current traffic conditions, and proposed at-grade improvements are anticipated to accommodate only a 10-year design, with 20-year forecasted traffic volumes creating over-saturated conditions and an unacceptable level of operation at the intersection. Construction of grade separation improvements at this busy location appears to be imperative for a long-range solution to traffic woes and constitutes the most feasible means of providing additional capacity necessary to carry future traffic flows.

An operational analysis of the existing intersection conditions (2001), proposed improvements (contained in the Bowman Road widening plans) and possible interchange alternatives was conducted to evaluate capacity and performance related measures for each layout. Individual configurations were modeled via computer simulation techniques using "Synchro 5.0," a traffic engineering software program that evaluates vehicle delay, operating speeds, cumulative stop time and other efficiency parameters. Based on existing traffic counts obtained from the Town of Mount Pleasant, future traffic volumes were projected for the years 2011 and 2021. Simulation scenarios were created using peak hour traffic volumes for pertinent years, lane configurations and likely signal operating plans. Results of the analysis are summarized and presented for comparative purposes in Table 2. Currently, the intersection functions at a Level of Service (LOS) D. Even with the construction of at-grade improvements with the Bowman Road widening project the intersection will regress to a LOS F operation by year 2011, primarily due to expansive growth in traffic along the US 17 corridor. By the year 2021, at-grade improvements will be completely beyond the level of acceptable operation with excessive motorist delay occurring on all approach legs of the intersection. For arterial roadways of this level of importance in the urban road

Table 2 - Operational Comparison of US 17 & Bowman Road Intersection/Interchange Configurations

Layout	Year	Period	Design	Intersection Analysis			Network Analysis	
				LOS	Int. Delay (sec/veh)	ICU (%)	Avg. Speed	Net. Delay (sec/veh)
At-Grade	2001	Exist.	Exist.	C	33.2	97.7	7 mph	106.6
At-Grade	2011	10yr.	Bowman widened	E	65.8	117.8	7 mph	111.5
At-Grade	2021	20yr.	Bowman widened	F	111.6	137.5	6 mph	205.6
Interchange	2021	20yr.	Diamond	C (NB)	22.7 (NB)	77.6 (NB)	20 mph	26.1
				E (SB)	55.6 (SB)	52.7 (SB)		
Interchange	2021	20yr.	SPUI	C	29.8	50.5	19 mph	26.5

network, this level of congestion and amount of delay is unacceptable. In reviewing the performance of the two feasible interchange improvement alternatives, Diamond and Single Point Urban Interchange (SPUI), these configurations do a much better job of accommodating future traffic demand within the context of a 20-year design horizon. A diamond configuration is anticipated to provide LOS C/E operation for the two ramp intersections with Bowman Road, whereas the SPUI alternative provides a solid LOS C operation in the year 2021. Additionally, future vehicular delay for these alternatives will be reduced from those currently experienced today at lower volume levels under the at-grade intersection configuration. It is important to note that both interchange alternatives affect the existing frontage road system extending along US 17; implications as such are discussed in more detail in the following section of this report. However, this circumstance required instigating some underlying assumptions regarding traffic flow, travel lane configurations, traffic volume re-distribution and access modifications. The most significant of which necessitates the frontage road system operate as a one-way pair. For visualization purposes, a schematic traffic diagram for the SPUI alternative showing traffic circulation patterns and combined through/turning movement volumes is presented in Figure 4.

With respect to operational performance, both interchange alternatives provide significant improvements in traffic flow, capacity and overall circulation for accommodating forecasted 20-year volumes. The diamond interchange alternative has the disadvantage of requiring two separate signalized intersections along Bowman Road and operationally does not perform as well as the SPUI alternative. As shown in Table 2, the simulation analysis indicates the diamond configuration would function at an acceptable level of service (LOS C) at the northbound ramp intersection, but at an unacceptable level of service (LOS E) at the southbound ramp intersection. This less desirable operating condition is likely to be exhibited at the northbound ramp intersection in the AM peak hour conditions, in that traffic flows are reversed in the morning commute hours. Due to this shortcoming, inefficiencies of two closely spaced traffic signals, more extensive right-of-way requirements and difficulty in providing free-flowing u-turn lanes for the frontage roads, the diamond interchange is generally not considered as desirable as the SPUI. Therefore, based on this preliminary evaluation, the SPUI is perceived as the more desirable of the two grade-separated alternatives. Additional generalized comparisons between SPUI and diamond interchange configurations are summarized in Table 3. All evaluation aspects point to the SPUI as being the superior alternative. State and local transportation jurisdictions are considering this same comparison all over the United States. The numerous interchanges of this type being planned and constructed around the country substantiate the findings of this study, which support implementation of the SPUI alternative. Schematics of both grade-separated alternatives are presented in Figures 5 and 6.

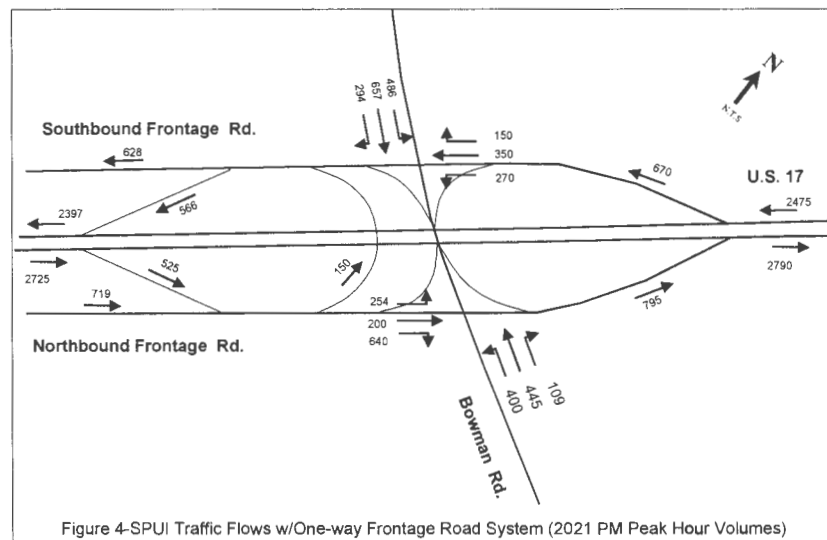


Table 3 – Interchange Design Comparison Summary

Issue	SPUI	Tight Diamond
Signals Required	1 signal	2 signals
Signal Phases	3 phases	3 coordinated phases
Vehicle Delay	Fewer stops, less delays	More stops, longer delays
Signal Coordination	With a single traffic signal, no coordination is required	Presence of two signals requires good coordination be maintained at all times
Left Turning Speed	Higher speeds due to flatter turning radii, leading to higher capacity	Lower speeds due to tight turning radii, hence reduced capacity
Left Turn Efficiency	Left turn movements accommodated at single intersection	Left turn movements must negotiate two intersections
Vehicle Travel Path	Shorter travel path through interchange	Longer travel path through interchange
Left Turn Lanes	Double left-turn lanes on crossroad oppose each other	Double left-turn lanes on crossroad extend beyond confines of interchange
Bridge Width	Increased bridge deck width	Greater increase in bridge deck width
Cost	Higher construction cost	Higher right-of-way cost
Signing	Simple guide signs needed for lane configuration and traffic movements	Dual left-turn lanes carried through ramp intersections requires additional signs
Wrong Way vehicles	Potential for wrong way entry is reduced via intersection channelization	Potential for wrong way entry is increased due to left turn lanes being carried through ramp intersections



Figure 5 – Tight Diamond Alternative, Bowman Road and US 17



Figure 6 – Single Point Urban Interchange (SPUI) Alternative, Bowman Road and US 17

V. Other Related Interchange Issues

Currently, two-way frontage roads extend along both sides of US 17 for nearly the entire four-mile study area. Virtually all driveway connections are made along the frontage road system with direct connections to US 17 at cross street intersections. This creates a very undesirable situation in that three intersections exist very near to one another with minimal spacing. Operational and vehicle queuing (storage) problems abound during periods of peak traffic flows. The access provided via the frontage road system generates considerable traffic (5,000 to 10,000 vehicles per day) as significant commercial development exists within the corridor and receives primary access along these frontage roads. The frontage road system extends from McGrath Darby Boulevard east to the I-526 interchange. Clearly, frontage road access is vital to local businesses along the corridor and any changes will be of utmost interest to property owners, patrons and proprietors.

Maintaining access to businesses during construction will be a crucial project development issue that must be adequately addressed by all feasible improvement plans and interchange alternatives. This requirement mandates that traffic access and circulation disruption along the frontage roads be minimized to the largest extent possible. To allow the construction to progress in a safe, efficient and timely manner, it is recommended that the existing frontage roads be converted to a one-way pattern of circulation. Ultimately, this will be extremely beneficial at interchange locations and have the significant additional advantage of being useful in diverting US 17 traffic during periods of reconstruction. Once interchanges are completed, a one-way frontage road system offers considerable operational improvements in accessing local businesses. In locations where traffic warrants, a free flowing u-turn would be designed into the interchange allowing motorists to maneuver from the northbound frontage road to the southbound frontage road without having to travel through the interchange. This proposed configuration reduces delay from levels currently being experienced. For the commercial site shown in Figure 7, travel time access for traffic approaching SB on US 17 was reduced by 25 percent from the existing condition, with savings being primarily derived through reduction of delay at existing signalized and stop controlled at-grade intersections.

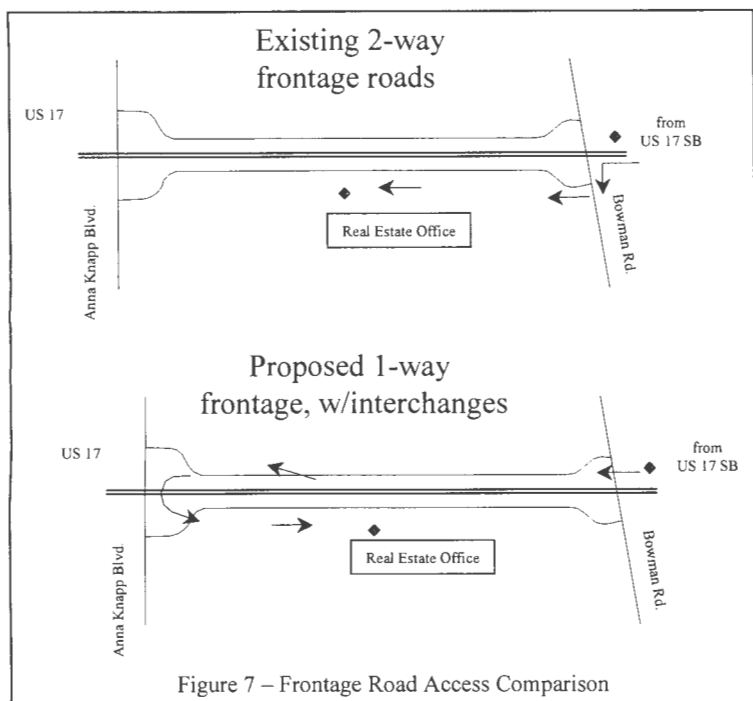


Figure 7 – Frontage Road Access Comparison

For any proposed grade separated interchange improvements to function efficiently and achieve their full operational benefit for motorists traveling US 17, improvements would need to be implemented within a large master plan made along a longer segment of the corridor, most notably from the new Cooper River Bridge to the I-526 spur interchange with the proposed Hungry Neck Boulevard. Operational and capacity improvements will be needed at each of the intersection locations along US 17 within these limits if this facility is to accommodate future traffic growth in the Town of Mount Pleasant. Elimination of existing traffic signals and direct turning movements on US 17 is the ultimate objective, allowing through

traffic on US 17 to travel freely along this crucial section of the corridor and facilitating preservation of the parkway-like appearance and many of the associated landscaping features. Additionally, local traffic wishing to patronize businesses in the area would be able to use the frontage road system for improved access.

Development of schematic configurations for interchange alternatives required cursory evaluation of whether US 17 should pass over or under side streets within the study limits. A number of factors corroborate the suggestion that US 17 should cross over intersecting side streets encountered along the corridor. Major side streets along the corridor include: McGrath Darby Boulevard, Houston Northcut Boulevard, Shellmore Drive, Dragoon Drive, Anna Knapp Boulevard, Bowman Road, and Hungry Neck Boulevard. Primary factors supporting the construction of overpass structures along US 17 include:

- Reduced conflicts with existing commercial driveway connections, as no driveways currently connect directly with US 17, while a multitude of connections currently exist along the side streets.
- Diminished right-of-way impact, as an ample 200-ft. right-of-way width exists along the US 17 corridor, but limited right-of-way is available along side streets.
- Use of embankment material for bridge approaches will have much less impact along US 17 than the side streets and a decorative finish wall (or landscaping) could be used to minimize visual impacts.
- Consolidated and economized construction limits, as work along US 17 will be required anyway to create ramp connections, while work on side streets will be minimized.
- Lower utility costs as less facility relocations will be required within the US 17 right-of-way.
- Improved maintenance of traffic during construction phasing, as use of the existing frontage roads along US 17 will be very beneficial in creating detour routes.

Furthermore, in addition to grade-separated improvements at signalized locations and frontage road circulation modifications, relatively minor modifications would be required at the US 17/I-526 interchange. It is anticipated that impacts at this interchange would be limited to the ramp modifications on the south side of the main overpass. Ramps connecting I-526 eastbound with US 17 southbound and US 17 northbound with I-526 eastbound are likely to be affected by construction of an interchange at Bowman Road, requiring some realignment to maximize the distance between entering and exiting streams of traffic along US 17.

VI. Concept Development for Grade Separations Along the US 17 Corridor

Currently, there are eight existing traffic signals located along the US 17 corridor between the Cooper River Bridge and Hungry Neck Boulevard/ I-526 ramp intersection. Signal location, corridor length and average spacing distance are summarized in Figure 8. The US 17 corridor typical section consists of a four-lane divided roadway, with frontage roads on both sides, and an open drainage system, south of I-526 for approximately 3.5 miles and as a five-lane roadway with curb/gutter north of I-526. The interchange concept will need to be adapted at each location to provide an optimal combination of increased traffic efficiency and minimized right-of-way and commercial development impacts. Determination of interchange layout and lane configuration at each side street crossing will be dependent upon unique constraints encountered at each location. Due to differences in right-of-way constraints and traffic patterns at each existing intersection, a corridor-wide improvement plan is likely to include both SPUI and diamond interchange configurations. This and other overall corridor issues related to construction of interchanges along US 17 are summarized in Figure 9.

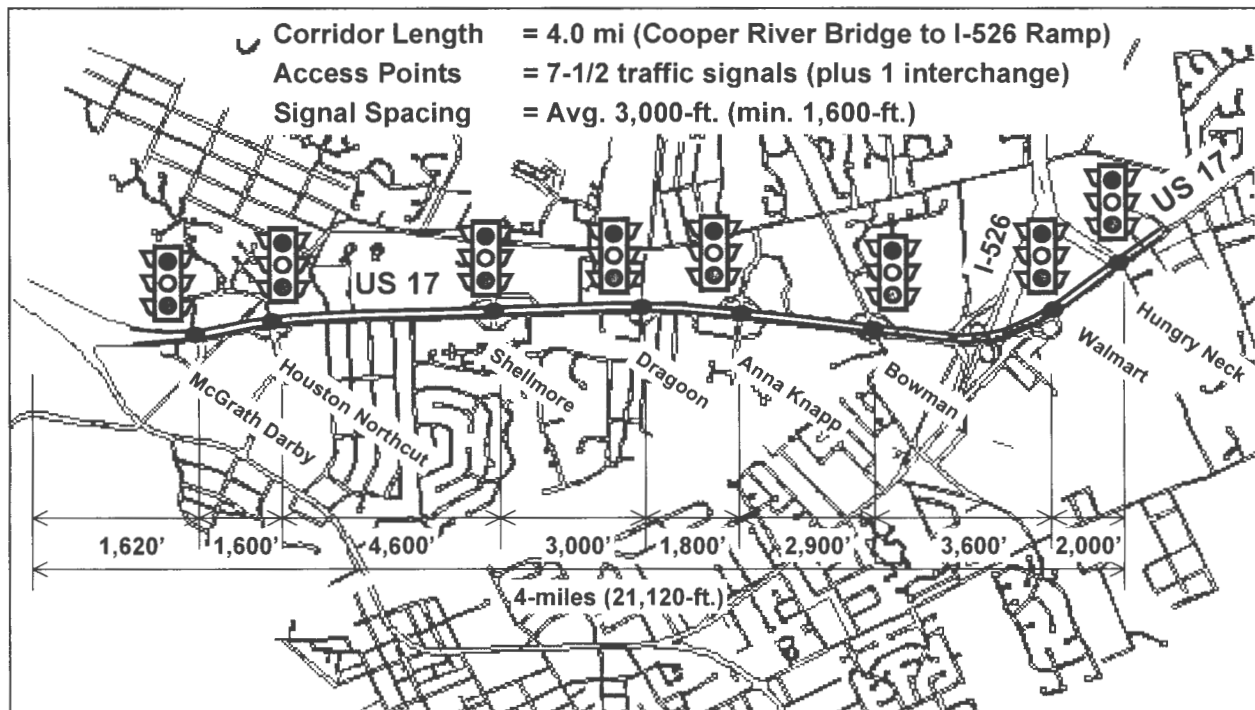


Figure 8 – Existing Traffic Signal Locations within US 17 Corridor

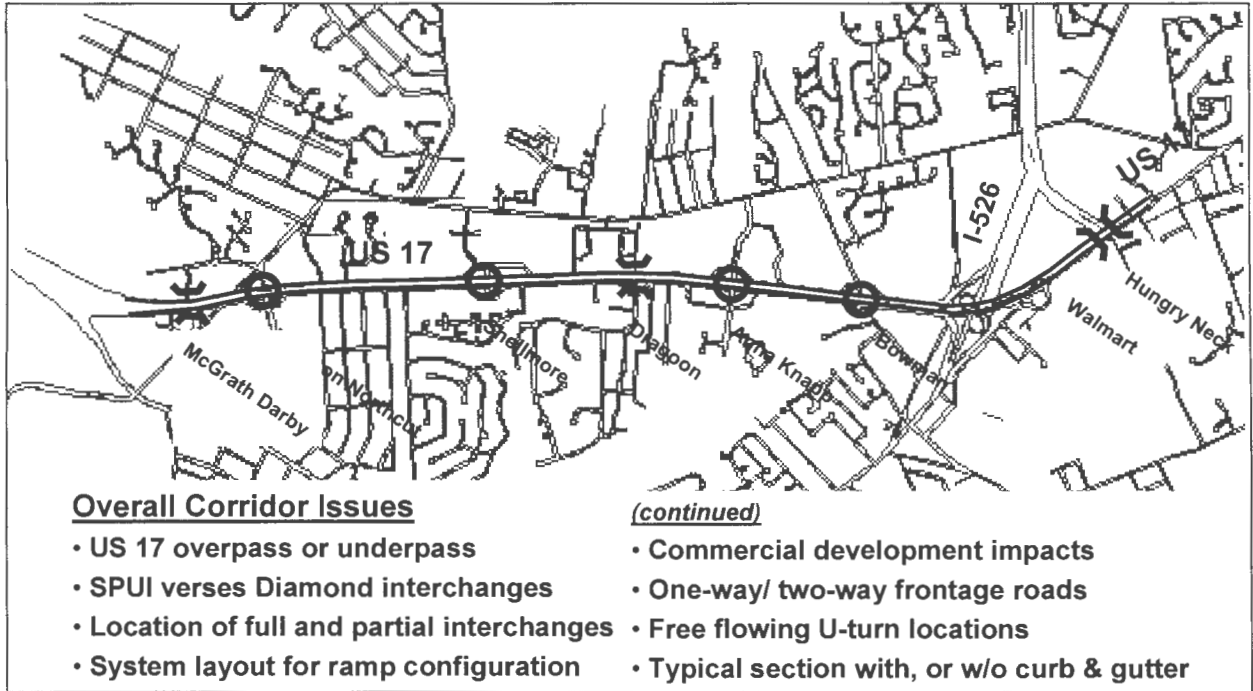


Figure 9 – Overview of Corridor Improvement and Interchange Issues

Further evaluation of specific design issues at each intersection location produces an additional list of considerations. These issues are summarized in Figure 10. It is likely that some intersections would merely be constructed as simple overpasses, without direct access to US 17, such as the partial intersection at Dagoon Drive. Traffic from these streets desiring access to US 17 would do so by

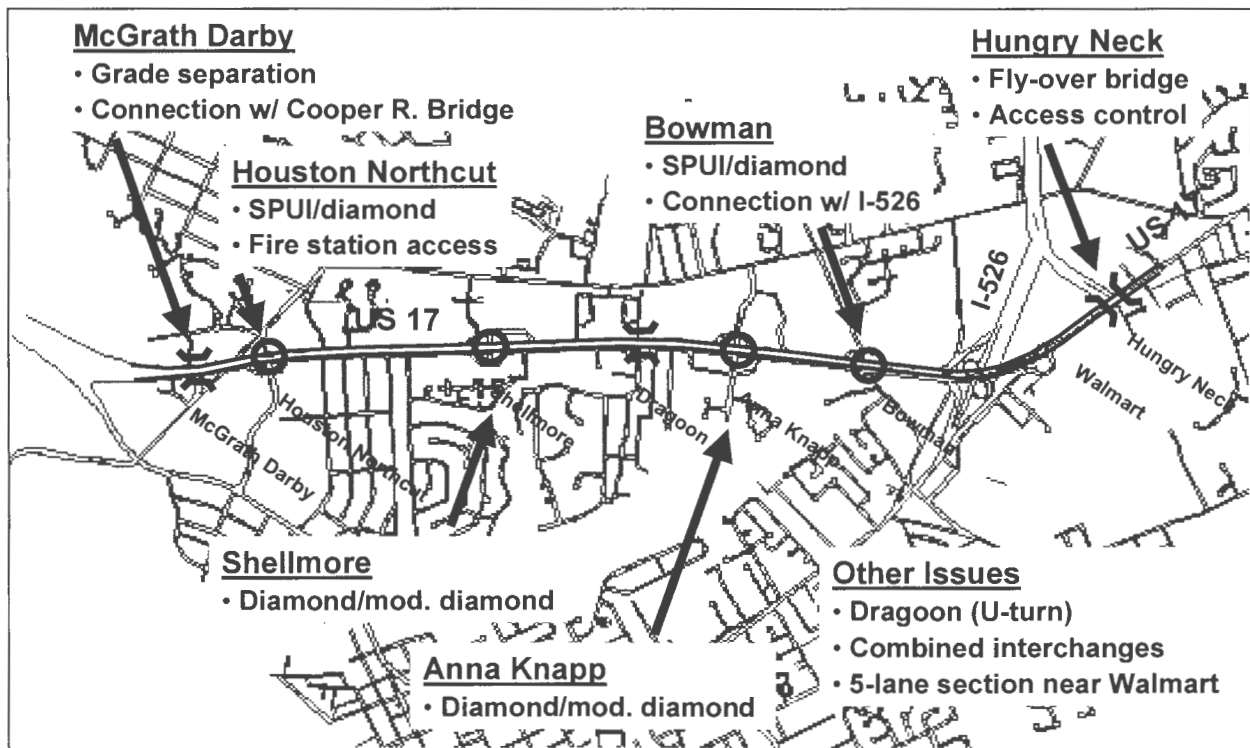


Figure 10 – Specific Interchange Improvement Issues within the US 17 Corridor

travelling along the frontage road system to the next major intersection, where entry onto the main travel lanes on US 17 would be permitted in either direction. As previously noted, for this expanded interchange system to work efficiently, it is of paramount importance that the existing two-way frontage roads be converted to a one-way frontage road system. This would have a significant operational benefit of reducing constraining and unsafe points of conflict near each major interchange. Otherwise, access to adjacent frontage roads and abutting properties would need to be accommodated via a complex network of flyover bridges needed to connect with US 17 and major cross street locations. A simple one-way frontage road system with free flowing u-turn lanes at appropriate locations will work best in efficiently moving traffic and serving the community's mobility needs.

Another major consideration in implementing of such an immense undertaking is related to phasing and construction issues. As previously discussed, the existing frontage roads would be very helpful in facilitating construction of the interchange system. The frontage roads would need to be converted to a one-way operation prior to the commencement of major construction along US 17. Specific to the Bowman Road location, the northbound traffic on US 17 could be diverted to the frontage road along the northbound side beginning at Anna Knapp Boulevard and connected back to US 17 prior to the I-526 interchange. Likewise, the southbound US 17 traffic could be diverted onto the frontage road along the southbound side from south of the I-526 interchange and extending to Anna Knapp Boulevard. Temporary pavement would be used as necessary to connect with existing pavement. After which, at-grade crossing of the frontage roads and Bowman Road would each be temporarily signalized while traffic is diverted from US 17. The US 17 overpass over Bowman Road could be constructed while traffic is using Bowman Road. Once the overpass is completed, traffic would be permitted to stay on US 17 while the remainder of the construction takes place. This sequenced phasing would be repeated at other locations along the corridor.

Construction of proposed interchange improvements along this section of US 17 would play a major role in accommodating the substantial level of traffic growth forecasted to occur over the next 20 years. Significant assets within the corridor consisting of a wide 200-ft. right-of-way and extensive frontage road system serve to make this challenging and monumental modification plan feasible. It is obvious that without major addition of travel lanes or removal of conflict points though the construction of interchanges this important transportation corridor will experience major congestion problems and not be able to meet forecasted travel demands of the future.

VII. Benchmark Comparison with Similar Corridor, Memorial Parkway in Huntsville, AL

Fortunately, there are communities that have already addressed similar traffic congestion problems within the context of parallel roadway and urban development conditions. Conversion of parkway-like urban arterial roadways into grade-separated facilities is occurring within growing cities and metropolitan areas at numerous locations throughout the United States. A specific location was identified that shared a wide number of characteristics with the US 17 corridor in the Town of Mount Pleasant. This was used to create a benchmark comparison in terms of construction impacts, traffic operation, corridor integration, adjacent commercial access and project funding. The location selected for comparison is Memorial Parkway (US 231) in Huntsville, Alabama. This is a community of approximately 200,000 people. Memorial Parkway existed as a four-lane divided roadway, with frontage roads on both sides, and an open drainage system prior to its on-going conversion to grade-separated interchanges and limited access

control along an approximate 5-mile length. Modifications have been phased in over time, with another SPUI currently under construction on the northern end of the system at Sparkman Drive. Other characteristics summarizing the corridor description are provided with a corridor map in Figure 11. See photos in Appendix A for roadway features along the US 231 corridor. It is worth noting several features of these improvements that are directly pertinent in consideration of similar measures along the US 17 corridor in Mount Pleasant. These include:

- Memorial Parkway was constructed to overpass all of the intersecting side streets and was vertically aligned to accommodate a 50 mph posted speed limit.
- One-way frontage roads extend along both sides of the corridor and in many cases were initially converted from existing two-way access roads prior to project construction.
- With a four-lane typical section and supplemental auxiliary lanes connecting to and from the frontage road system, the corridor efficiently accommodates levels of traffic demand that US 17 is forecasted to experience in the next 20-years.
- Most side street interchanges operate based on a four-phase traffic signal plan with each approach having it's own individual phase. Through and left turning traffic have consecutive green time and wide sweeping overlapping left turns are eliminated, effectively reducing bridge span lengths.
- Recent interchange construction costs are averaging \$20 million per intersection, excluding right-of-way acquisitions and easement expenses.

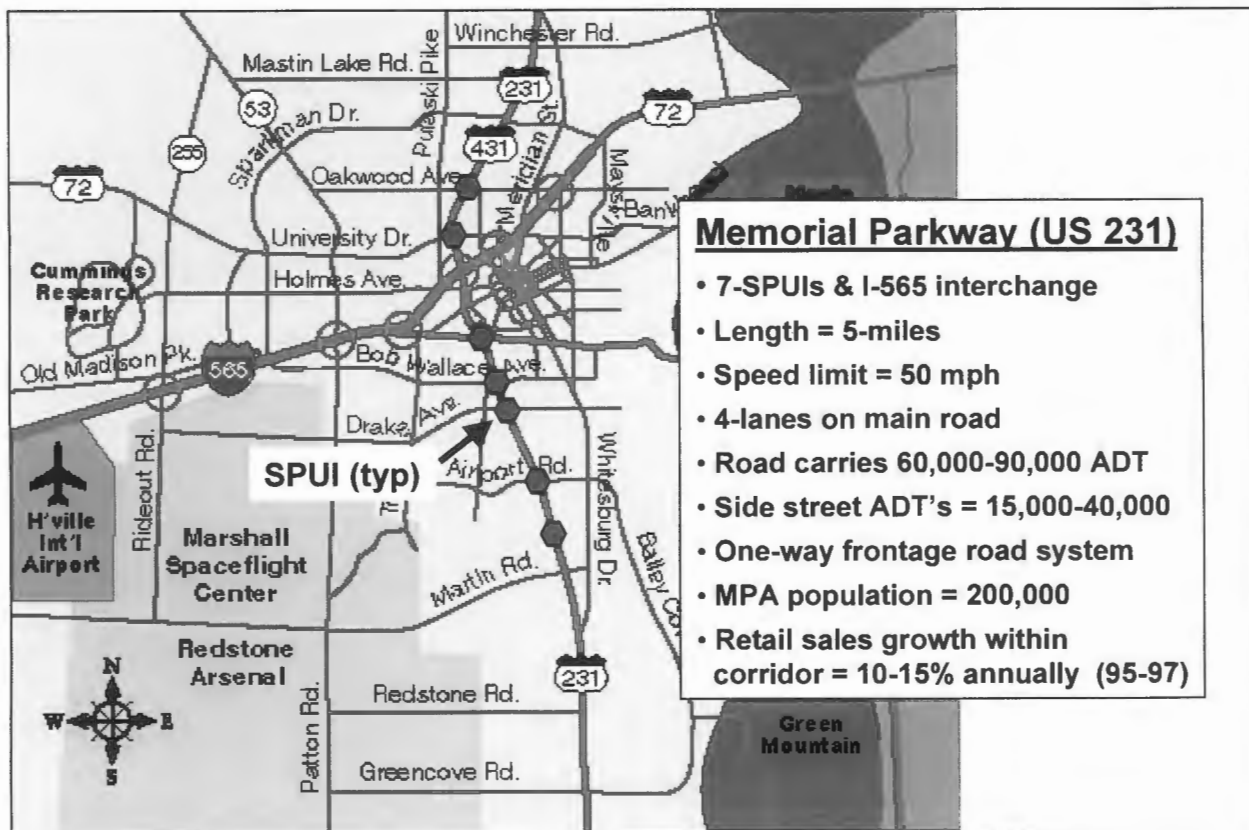


Figure 11 – Benchmark Comparison with US 231 in Huntsville, Alabama

VIII. Findings and Recommendations

Existing at-grade improvements, designed as part of the Bowman Road widening project, are anticipated to accommodate an approximate ten year growth in traffic at the US 17 intersection, beyond which motorists will experience excessive delay at this important location situated at the heart of north-south and east-west traffic movements in the Town of Mount Pleasant. Creation of a long-term solution at this important crossroads within the roadway network will require additional improvements and most likely incorporate grade-separated structures configured within the confines of an interchange layout. Design and construction of an interchange at US 17 and Bowman Road will need to be developed and incorporated within the context of other considerations along the US 17 corridor. Similar interchanges at other locations along the US 17 corridor, extending from the New Cooper River Bridge northward to Hungry Neck Boulevard/ I-526 ramp intersection, also will be needed to insure adequate capacity for accommodating future traffic flows, estimated to range from 50,000 to 60,000 vehicles per day. Additional findings and recommendations identified in this evaluation study are summarized as follows:

Interchange Configuration – For Bowman Road/US 17 (and other locations along the US 17 corridor) the two most practical interchange configurations are a Single Point Urban Interchange (SPUI) and a Diamond. Both of these layouts would be useful in accommodating future traffic demands and reducing right-of-way impacts on adjacent properties. Other comparisons are summarized in Table 3.

Operation and Level of Service – Both the SPUI and Diamond interchange layouts would accommodate future traffic demands at Bowman Road/US 17 and provide adequate Level of Service (LOS) with reasonable vehicle delays. As shown in Table 2, the SPUI would realize a slight advantage in LOS over the Diamond configuration.

US 17 Overpass/Underpass – Based on a host of factors, it is recommended that US 17 pass over Bowman Road (and other side streets within the corridor.) This provision would reduce conflicts with existing driveway connections, reduce right-of-way impacts, consolidate construction limits, reduce utility relocations and simplify construction phasing as well as accommodate a 50 mph design speed on US 17 upon project completion.

Impact on Frontage Roads – It is recommended that the existing frontage roads be converted to a one-way pattern of circulation. This will be extremely beneficial at interchange locations, be highly useful in diverting US 17 traffic during periods of reconstruction and improve access via reduction of travel time to/from commercial properties through provision of free flowing u-turn lanes at selected interchange locations.

Other Interchange Locations – Five other at-grade intersections have been identified as likely candidates for interchange improvements along the US 17 corridor extending from the New Cooper River Bridge to the Hungry Neck Boulevard/I-526 ramp intersection. These included McGrath Darby

Boulevard, Houston Northcut Boulevard, Shellmore Drive, Anna Knapp Boulevard and Hungry Neck Boulevard/I-526 ramp. Other locations at Dragoon Drive and Wando Crossing shopping center are likely to require additional consideration for some type of modifications to enhance capacity along the US 17 corridor.

Ramp Configuration – A system of on and off ramps connecting the main flow of traffic on US 17 with the frontage road system and intersecting side streets will need to be configured to enhance traffic flow and access. Along the corridor, the plan will need to be repetitive to address driver expectancy issues and may require further refinement in locations where cross streets are spaced close together such as Bowman Road/Anna Knapp Boulevard and McGrath Darby Boulevard/Houston Northcut Boulevard.

Roadway Typical Section – Provision of grade separations at cross street locations will serve to reduce travel lane widening requirements on US 17 and should allow preservation of some of the natural landscaping features along this aesthetic and highly visible roadway in the community. Use of curb and gutter in conjunction with closed drainage system components may further allow preservation of the attractive visual elements of the roadway environment.

Benchmark Comparison – Through knowledge in the field and professional contacts, a similar roadway reconstruction project was identified along Memorial Parkway (US 231) in Huntsville, Alabama. Review of the physical features, traffic flow characteristics, construction methods, and commercial vitality along the corridor will be useful to glean lessons learned for use in developing an improvement strategy within the Mount Pleasant US 17 corridor.

Construction Costs – Based on preliminary tabulations and estimates, construction costs for interchanges along the corridor are likely to fall in the range of \$20 to \$25 million per interchange. This figure does not include right-of-way costs and additional funding would be required for relatively minor improvements needed along roadway sections between interchange locations. See Appendix B for Construction Cost Estimate for Bowman Road/US 17 SPUI.

Construction Phasing – Conversion of the existing frontage road system to one-way circulation and then subsequent use of these roads to accommodate traffic during bridge and ramp construction, will greatly enhance and facilitate the build phases of such extensive improvements along the busy corridor.

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Appendix A

Photos from Huntsville, AL, June 2002

<u>Photo Description</u>	<u>Page</u>
Oakwood Avenue Exit looking south at northern terminus of interchange/frontage road system.....	A-2
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Exit Ramp/Frontage Road system south of Oakwood Ave. underpass	A-5
Frontage Road system north of University Blvd. (US 72) underpass.....	A-5
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Exit Ramp/Frontage Road system north of I-565 interchange.....	A-6
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Airport Road underpass at Memorial Parkway, looking east.....	A-9
Frontage Rd. U-turn grade separation between Airport Rd. & Drake Ave.....	A-10
Looking south at frontage road and ramp exit near Drake Avenue.....	A-10
Looking south towards landscaped grade separation at Drake Avenue.....	A-11
Governors Drive (US 431) underpass at Memorial Pkwy., looking east	A-11
University Blvd. (US 72) underpass at Memorial Pkwy., looking west.....	A-12
Aerial view of Airport Road/Memorial Parkway interchange	A-12



Oakwood Avenue Exit looking south at northern terminus of interchange/frontage road system



Oakwood Avenue underpass with free flowing u-turn lane, looking south





Oakwood Avenue underpass at Memorial Parkway, close-up view 3



Oakwood Avenue underpass at Memorial Parkway, close-up view 4





Frontage Road system south of University Blvd. (U.S. 72) underpass



Exit Ramp/Frontage Road system north of I-5







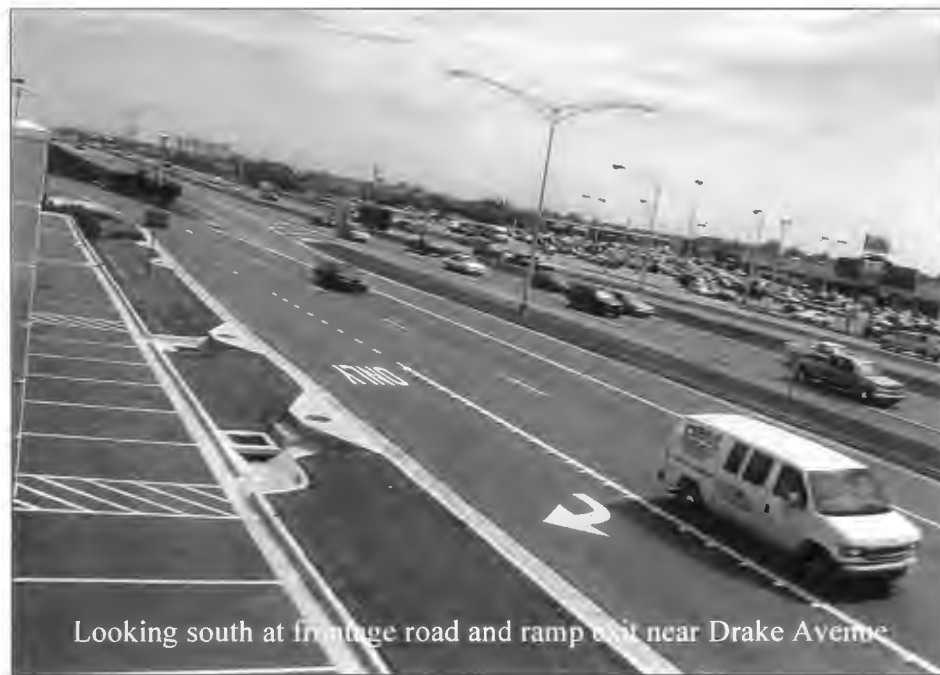
Memorial Parkway, south of interchange/frontage road system



Airport Road underpass at Memorial Parkway, looking east



Frontage Rd. U-turn grade separation between Airport Rd. & Drake Ave.



Looking south at frontage road and ramp exit near Drake Avenue





University Blvd. (U.S. 72) underpass at Memorial Pkwy., looking west



Aerial view of Airport Rd. Memorial Parkway Interchange

Appendix B

Construction Cost Estimate for Bowman Road/US 17 SPUI

Construction Cost Estimate for Bowman Road/US 17 SPUI

Construction Costs	
Description	Amount
As-Built Construction Plans	45,000
Drainage	700,000
Embankment	565,000
Hot Mix Asphalt Aggregate Base Course (Type 1)	1,695,000
Liquid Asphalt Binder	535,000
Bituminous Surface Course (Type 1-C)	315,000
Binder Course	315,000
Striping	70,000
Concrete Curb & Gutter	150,000
Concrete Sidewalk	60,000
Guardrail	50,000
Pavement Removal and Disposal	640,000
Concrete Median	40,000
Sediment Control	300,000
Sign Structures	450,000
Signalization	200,000
Retaining Walls	2,600,000
Bridge Structure	5,000,000
Interchange Lighting	100,000
Subtotal Construction Cost	\$13,830,000
Mobilization	414,900
Construction Stakes, Lines & Grades	414,900
Construction Engineering Inspection	414,900
Traffic Control	1,383,000
Moving Items	69,150
Landscaping	414,900
Total Construction Costs	\$16,941,750
Contingency (15%)	\$2,541,263
Total Estimated Construction Cost	\$19,483,013

Construction cost does not include right-of-way, topsoil, grassing and fertilizer costs. Right-of-way acquisition will require purchasing an Arby's and a McDonalds. Costs are based on 2001 dollars.

Appendix D

Copies of Agency/Municipality Letters of Support

CITY OF
ISLE
OF
PALMS

South Carolina

Mayor:
Mike Sottile

City Council:
Bob Abele
Marty Bettelli
Ryan Buckhannon
Leola Hanbury
John Marino
Bob Miller
Carol Rice
Dee Taylor

March 31, 2003

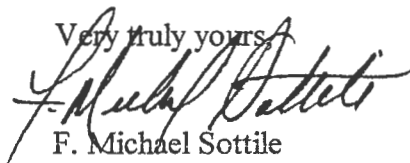
The Honorable Henry Brown
United States Congress
5900 Core Avenue, Suite 401
North Charleston, South Carolina 29406

Dear Congressman Brown:

I have recently learned that the Town of Mount Pleasant has requested funds to improve the intersection of US 17 and Bowman Road. This intersection has regional significance to those of us who travel the East Cooper area daily. It is the intersection adjacent to our link to vital emergency services at East Cooper Hospital and is within just several hundred yards of the Interstate 526.

I hope that you and others will give their request a favorable reaction. The improvement is consistent with area-wide studies and plans for the Charleston, South Carolina metropolitan area.

Very truly yours,



F. Michael Sottile
Mayor

cc The Honorable Harry Hallman, Mayor, Town of Mount Pleasant
Members of the Isle of Palms City Council

Program Coordination ♦ James C. Hutto
Members-At-Large ♦ Robert H. Dunlap, Jr.
Willie Frazier, Sr.
W. O'Brien Limehouse



Technical Members ♦ Laura S. Cabiness, P.E.
City of Charleston

Michael D. Dalrymple, P.E.
City of N. Charleston

Chairman ♦ Howard R. Chapman, P.E

Joel P. Ford
Town of Mt. Pleasant

James C. Hutto
James C. Rogers
County of Charleston

March 20, 2003

Mr. R. Mac Burdette, Town Administrator
Town of Mount Pleasant
100 Ann Edwards Lane
P.O. Box 745
Mt. Pleasant, South Carolina 29465

Dear Mac:

Thank you for your letter of February 13, 2003, regarding the proposed federal funding for the intersection improvements of US 17 @ Bowman Road. The Charleston County Transportation Committee has worked very hard to develop plans for improving transportation throughout Charleston County. One of the main bottle necks for the County is the intersection of US 17 @ Bowman Road in Mount Pleasant. This intersection, immediately adjacent to the terminal interchange for I-526 @ US 17, carries not only an inordinate amount of traffic on a daily basis but is also a primary access point for the East Cooper Area Hospital. As such, it must be kept open at all times for emergency vehicles.

The Charleston County Transportation Committee stands ready to work with the Town of Mount Pleasant as funding becomes available; however with the cost of these intersection improvements exceeding \$30 million, the ability of the CTC to undertake this improvement project without substantial federal funding is in serious question.

We look forward to working with you to improve not only the intersection of US 17 @ Bowman Road but the entire portion of US 17 north of Mount Pleasant, also known as Johnnie Dodds Boulevard.

If I can be of additional assistance to you in the future, please do not hesitate to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read "Howard R. Chapman".

Howard R. Chapman, P.E.
Chairman

HRC/srw



Berkeley-Charleston-Dorchester Council of Governments

CHAIRMAN: Barrett S. Lawrimore • VICE CHAIRMAN: James H. Rozier, Jr. • SECRETARY: Joseph E. Myers, Jr. • TREASURER: Judith K. Spooner • EXECUTIVE DIRECTOR: Ronald E. Mitchum

February 18, 2003

Honorable Henry E. Brown, Jr.
U.S. House of Representatives
5900 Core Avenue - Suite 401
North Charleston, SC 29406

Dear Congressman Brown:

On behalf of the Berkeley-Charleston-Dorchester Council of Governments, I am writing to endorse the Town of Mt. Pleasant's request for federal funds to improve the intersection at US 17 and Bowman Road. This intersection is critical to the efficient flow of traffic on both US 17 and Interstate 526. Interstate 526 terminates in Mt. Pleasant within 200 yards of this critical intersection. The improvement is consistent with area-wide studies and plans for the Charleston, South Carolina metropolitan area.

Sincerely,

Ronald E. Mitchum
Executive Director



Mount Pleasant Business & Professional Association

Post Office Box 1635

Mount Pleasant, South Carolina 29465

www.mpbpa.com

January 27, 2004

To Whom It May Concern:

As President of the Mount Pleasant Business and Professional Association, I'm writing to urge you to help support our Mayor, Harry Hallman, and Senator Arthur Ravenel as they prepare to present a proposal to the State Infrastructure Bank to secure the funding needed for critical improvements to our local roadways. Please call, write or email your legislators to let them know you are in favor of the following projects:

- Project 1 - Overpass at the intersection of I-526 and US-17 \$40 million
- Project 2 - Overpass at Bowman Road and Johnnie Dodds Blvd. \$35 million
- Project 3 - Overpass at Houston Northcutt Blvd and Johnnie Dodds Blvd. \$35 million

Total project cost is \$110 million with a match amount of \$30 million.

Our Mayor, Harry Hallman, has worked relentlessly on ways to get and keep us moving on roads that have become crowded with the businesses, residents and visitors in this bustling town. He has shown his willingness to partner with other government entities to create win-win outcomes. What he's asking will provide great value to those of us who live and work in this area. This will also be the first time a municipality has presented such a proposal.

The State Infrastructure Bank was the innovative means developed with Mayor Hallman and Senator Ravenel at the helm to provide the funding needed for the new bridge currently being built. If not for their perseverance, we would still be looking for ways to pay for the bridge.

These projects are critical to our community if we are to continue to enjoy the lifestyle which brought us to and keeps us in the area. It is also urgent that we support this effort in order to bring businesses to the area that take little support other than roads on which to travel. These provide a huge tax base and many dollars in impact fees which keep the taxes low in Mt. Pleasant. The economic development in our area will be smart, well planned and provide the funds necessary as we move into the future of this wonderful town.

January 27, 2004
Page Two

I've found Mount Pleasant to be the kind of place where people understand that you give first before you get. That's exactly how our Association operates and that's why 70 member businesses and professional practices supported us last year. We give back to our community in the form of financial support to local charitable organizations and award scholarships to local high school seniors planning to continue their education. Harry Hallman lives by the same philosophy of giving first. Most of us live, work and play here in Mount Pleasant and realize and appreciate the importance of what Mayor Hallman is trying to accomplish.

I ask that you simply listen to what Mayor Hallman is asking and give him the chance to make this a win-win for you and for the Town of Mount Pleasant.

If I may be of service in any way during this process, please be sure to call me at (843) 881-8815. I'll be glad to help.

Sincerely,

A handwritten signature in cursive script that reads "John Carroll".

John Carroll
President
Mount Pleasant Business and Professional Association

Copy: MPBPA Board

April 25, 2003

2004 Earmark and Reauthorization Request
Intersection of US 17 and Bowman Road (S-10-1271)
Town of Mount Pleasant , Charleston County

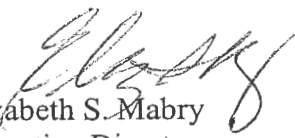
The Honorable Harry Hallman, Jr.
Town of Mount Pleasant
Post Office Box 745
100 Ann Edwards Land
Mount Pleasant, South Carolina 29465

Dear Mayor Hallman:

Thank you for your March 6th letter regarding the Town's interest in improving the intersection of US 17 and Bowman Road. We share your concerns about the traffic problems at the intersection, especially the increasing congestion for westbound traffic on Bowman Road.

The South Carolina Department of Transportation supports your request for funding to provide a long-term solution for improving the safety and traffic operations of the intersection. I will have a letter prepared and sent to Congressman Henry Brown. You will receive a copy.

Sincerely,


Elizabeth S. Mabry
Executive Director

ESM: mmb
cc: State Highway Engineer Don Freeman
Commissioner Robert Harrell, Sr.
File: Pln/MDP
CTS: No. 20582





South Carolina
Department of Transportation

April 22, 2003

The Honorable Henry E. Brown, Jr.
House of Representatives
1124 Longworth House Office Building
Washington, DC 20515

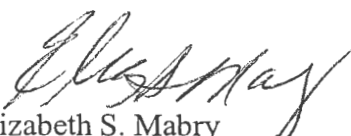
RE: Appropriations for US 17 and Bowman Road Intersection

Dear Representative Brown:

Recently, Mayor Hallman of Mt Pleasant contacted us expressing the Town's interest in the intersection of US 17 and Bowman Road (S-10-1271). This is a much-needed project for the area, which will help eliminate traffic congestion and address safety needs at the intersection. We are in support of this request for \$20 M to provide a long-term solution for this intersection.

Attached is a copy of the detailed request sent to your office by Mayor Hallman on February 13, 2003. As always, thank you for all of your efforts in meeting the transportation needs of our state. If I can be of any assistance on any matter, please do not hesitate to give me a call.

Sincerely,


Elizabeth S. Mabry
Executive Director

Attachment

ESM: scj

CC: Commissioner Bob Harrell
Mayor Hallman ✓
Mr. Bob Probst

CTS#10696/20713



Appendix E

Town of Mount Pleasant Transportation Capital Improvement Program

CAPITAL IMPROVEMENT PROGRAM - MAJOR TRANSPORTATION IMPROVEMENTS

January 2003

Project Name	Project Description	Project Location	Project Status	Project Cost	Project Funding	Project Start	Project End
Belle Point Drive (PE/construct)	Belle Point Drive						
\$164,000** (\$120,000 CTC Funds)	Complete Construction						
Patriots Point widening -Phase I (PE Assistance /construction)	Patriots Point Widening-Phase I Construction completed	Patriot's Point /Coleman Intersection	Patriot's Point / Coleman Intersection				
\$428,000* - Town Share (Total \$1,924,806 MID & TIP)	\$305,000* Town Share	Improvements - Phase II \$567,000 *	Improvements - Phase II	\$430,000 Unfunded			
Mathis Ferry Rd realignment (ROW/construction) \$1,148,000** (\$508,000 02 GO Bond & \$640,000 TIP)	Mathis Ferry Rd realignment (construct) \$769,225 (\$249,225* + \$520,000** 02 GO Bond	Mathis Ferry Rd realignment (construct)		\$502,775 *			
Mathis Ferry/Whipple Rd Interchange (PE complete/begin construction) \$350,000** (02 GO Bond)	Highway 41/17 Intersection improvement Match \$250,000 HT						
	Mathis Ferry Rd/Anna Knapp Intersection (PE,ROW/Construct) \$125,000** 02 GO Bond						
	Mathis Ferry Rd/Muirhead Intersection (PE,ROW/Construct) \$375,000** 02 GO Bond						
RRR/Venning Rd Intersection improvements (ROW/construction) \$400,000** 02 GO Bond	Rifle Range/Porcher Bluff Intersection (ROW) \$75,000 02 GO Bond	Rifle Range/Porcher Bluff Intersection (ROW) \$75,000** (Construct) 02 GO Bond					
	RRR/Six Mile intersection (PE) \$25,000** 02 GO Bond	RRR/Six Mile intersection (ROW/Construct) \$200,000** 02 GO Bond					
Hungry Neck Blvd-Phase I (PE/ROW) \$3,452,000 *	Hungry Neck Blvd-Phase I (begin construction) \$3,548,000* + \$125,335 HT	Hungry Neck Blvd-Phase I (construction complete 12-03) \$500,000* + \$374,665 HT					
Bowman Rd widening Mathis Ferry to Rifle Range including Chuck Dawley Intersection (PE) \$350,000*	Bowman Rd from Mathis Ferry to Rifle Range (ROW) \$112,775*	Bowman Rd from Mathis Ferry to Chuck Dawley (ROW/construct) \$1,062,225*	Bowman Rd widening from Chuck Dawley to Rifle Range (construct) \$800,000** (\$1.9m Unfunded)				
US17/S26 Turn Lane Ext.(cash) \$50,000 HT							
Whipple Rd widening with bike lanes (PE/ROW) \$124,970** 02 GO Bond	Whipple Rd widening (Construct) \$750,030** 02 GO Bond	Signal Coordination Coleman Blvd. \$30,000 GF					
		Hungry Neck Rd West ext.thru Adco Mining (PE/ROW) \$800,800**	Hungry Neck West extension (Construct) \$900,000**				
Bike Path network Tea-21 Improvements As awarded - Coleman, Mathis Ferry, Ben Sawyer 703 \$175,000	Bike network Tea-21 Improvements As awarded. \$175,000	Bike network Tea-21 Improvements As awarded \$350,000					
Long Pl./US17 Turn Lane(Cash)\$60,000 HT	Long Pl./US17 Turn Lane (Cash/HT) Construction \$200,000						
SC41/Dunes West Blvd. Int (PE) \$75,000**		McGrath Darby Widening Including bike path (PE/Construct) \$100,000*					
South Hampton/Beaucaastle Frontage Rd. (PE)(Cash/HT) Design \$51,000	South Hampton/Beaucaastle Frontage Rd - ROW/Construction (PE/CASH/HT) (\$55Unfunded)						
\$8,324,776	\$6,835,365	\$4,661,665	\$4,010,000	\$3,159,000	\$4,580,000	\$25,600,000	