

APPENDIX A:

**BATTERY PARK ROAD
CORRIDOR STUDY**



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Adopted by Town Council
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Appendix A:
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Description of Project Area:

Introduction and Background

The Town of Smithfield requested LandMark Design Group to complete a roadway alignment study for Battery Park Road. The study includes a base map utilizing information provided by the Town, a proposed horizontal alignment, intersection layouts, cursory review of utilities systems, cursory review of right-of-way information, and preliminary costs projection. Traffic impact analysis and forecasts are not included in the study. Recent traffic studies completed for this area include Epmark Community by URS; Smithfield Commons by URS, and Battery Park Road Carrollton Boulevard Corridor Study by Hampton Roads Planning District Commission (HRPDC) were reviewed. Based on the HRPDC study for the projected build-out, the anticipated ADT is 31,000 on Battery Park Road between Nike Park Road and South Church Street on a daily basis, and 9,000 on Battery Park Road between Nike Park Road and Gatling Pointe.

Battery Park Road serves as a primary transportation corridor for traffic to the east section of Smithfield and the Northeastern section of Isle of Wight County. The corridor for Battery Park in the Town of Smithfield runs from the intersection with South Church Street to the Town limits near the entrance to Gatling Pointe South, a residential subdivision. The Town limits run adjacent to the eastern side of Battery Park Road from Nike Park Road to the north towards Gatling Pointe South. See Sheet C-1 for the project area of Battery Park Road.

Description of Existing Facilities:

Existing Conditions

Battery Park Road is an aging two-lane a rural collector street with minimal landscaping serving as an entrance corridor to the central business district. The typical cross section of the road includes an average 50-foot right-of-way with an average pavement width of 25 feet. The speed limit for the street is 35 MPH near the intersection of South Church Street, and increases to 45 mph as you travel east. The typical asphalt pavement section appeared by visual inspection to be adequate. No large crack or potholes were noticed. The majority of traffic is leaving the central business district (downtown) Smithfield area traveling to Gatling Pointe or to Nike Park Road for a quicker access to Route 17 and to the James River Bridge. Route 17 leads to Portsmouth and Suffolk, and the James River Bridge provides access to the Peninsula. Battery Park Road has shown a greater than average increase in traffic volume over the last several years. This growth rate is expected to continue.

The storm sewer system on Battery Park Road consists of curb and gutter between South Church Street and John Rolfe Drive, and a ditch system along the remainder of the corridor. Turn lanes, such as the entrance leading into Kendall Haven, enter a piped system or culvert. Also, culverts span the entrances to both commercial and residential dwellings. Battery Park Road drains via ditches through several outfalls to Moon Creek and Town Farm Creek before joining the Pagan River (James River, Chesapeake

Bay). Moon Creek is within the Town of Smithfield limits, and Town Farm Creek is in Isle of Wight. Only one stormwater management basin currently exists for Battery Park Road. The basin is near the entrance of Kendall Haven on the south side of the road. The basin appears to be a dry basin and accepts runoff from the west, towards South Church Street.

The 16-inch sanitary sewer force main system runs adjacent to the edge of pavement on Battery Park Road. The age of the system is unknown. The water distribution system on Battery Park Road an 8-inch C900 pipe. Fire hydrants are aged, and may need to be replaced and relocated. Columbia Gas mains run underground along Battery Park Road. A natural gas substation is adjacent to the road. The power, telephone, and communications systems are overhead. Poles are located on both sides of the roadway.

Suitability of Continued Use

The continued use of the existing roadway between Nike Park Road and the Town limits is feasible. The immediate use of two-lanes between Nike Park Road and South Church Street is feasible. The level of service this section of road experiences will decrease with development, and we anticipate that at least a four-lane road will eventually be required. The addition of a turn lane at Nike Park Road and other intersections will improve the current level of service of the Road. The development of land near the intersection with South Church Street could result in a large number of vehicles at John Rolfe Drive. The distance between John Rolfe Drive and South Church Street is approximately 350 feet, and relocation of that intersection may be desirable. The minimum distance between intersections should be limited to 500 feet. The ditch system does have standing water a few days after a rainfall event, but provides adequate drainage for the Roadway and immediate vicinity. Continued use of the watermain and sanitary sewer forcemain is feasible until development or age requires upsizing or replacement.

Design Alternatives and Recommendations:

The design alternatives and recommendations for the improvements to the roadway and drainage system are limited by costs and safety. The existing roadway is generally in good condition, but will provide an inadequate level of service as the Town continues to experience accelerated growth.

The typical sections included in the study are a three-lane, five-lane, as well as a four-lane divided roadway.

- The three-lane layout provides a center turn lane for vehicle turning left, and one travel lane in each direction. The advantages include a smaller rights-of-way requirement, and less stormwater to treat. In addition, the existing road can be used for a portion of the completed road. One disadvantage is that a three-lane road may not provide an adequate level of service at complete buildout of the area, and continuous center turn lanes increase the risk of vehicle accidents.
- A five lane typical section would provide two travel lanes in each direction with a continuous turn lane in the center. Again, safety is a concern with typical sections that provide a continuous left turn lane. Five lanes of traffic would also result in the largest amount of pavement, which increases the size of the stormwater management facility (pipes, inlets, ditches, and ponds) and the cost. Five lanes would also have over 60' of continuous pavement with no breaks or

landscaping. The construction of five lanes can utilize the existing pavement for the future highway. Additional right turn lanes would be provided as necessary for entrances for both three-lane and five-lane roads.

- A four lane divided highway would allow for minimizing pavement while maintaining an adequate level of service. Turn lanes would be provided as necessary, and the highway cross section can be softened by landscaping in the median. The construction of four-lanes centered in the existing Right-of-way will utilize a very small portion, if any, of the existing roadway. Off setting construction to one side and utilizing the existing two-lane roadway would place the majority of the right-of-way impacts to one side.

General Description of Proposed Facility:

Site Location

The proposed project involves the upgrade of existing road. Improvements to Battery park Road adjacent to Isle of Wight should be coordinated with the County and VDOT. Further evaluation of alternative typical sections based on traffic volumes is beyond the scope of this report.

Proposed Roadways

For the purpose of this study, the anticipated typical section is a four lane divided highway designed to function as a minor arterial. The right-of-way required for this section will be 100 feet, expanding the existing 50' right-of-way by 25 feet on each side. The four lane divided highway provide two travel lanes in each direction separated by 16' wide median. The median is wide enough to provide a left turn lane when developments meet the industry standard. The proposed roadway shall be in accordance with the Virginia Department of Transportation's subdivision street standards for a street with a projected average daily traffic volume as determined by a traffic study. A four lane divided highway provides safety and landscaping in the median will enhance this entrance corridor. The disadvantages include a larger right-of-way requirement. Turn lanes would also be added as necessary. Intersections should have a minimum separation of 500 feet. Signals would be added to intersections upon meeting traffic warrants. A multi-use path for bicyclist, runners, walkers, and recreational users may also be added within the 100-foot right-of-way. According to VDOT standards, the minimal width of the multi-use path is 10 feet.

Proposed Stormwater Drainage

The stormwater drainage system on Battery Park Road will be constructed to provide adequate capacity for improvements to Battery Park Road. This will include ditches, culverts, and pipes draining to stormwater management ponds for treatment of water quality and water quantity. The culverts will be used for entrances to commercial development and private residences. Short runs of pipe and inlets will be constructed under turn lanes. A curb and gutter system will be used for the more densely developed areas, such as near South Church Street, and turn lanes. A ditch system will be constructed for the remainder of Battery Park Road.

Permits, Rights-Of-Ways, and State Requirements

Permits and regulatory approvals that must be obtained for this project are those that are normally required by the Town or VDOT. The construction plans will require approval of the Virginia Department of

Transportation. Environmental issues will need to be reviewed carefully with design. Wetlands are expected to border the existing right-of-way (Moon Creek) just east of the existing stormwater management facility.

Additional rights-of-ways will be required for road widening. The increase of 25 feet is shown in the Exhibits on both sides of Battery Park Road, and may require the acquisition/relocation of several dwellings, both residential and commercial. Several properties that could be considered to be impacted include:

- Battery Park Grill, 201 Battery Park Road
- James River Mechanical
- Import Car Service, 213 Battery Park Road
- Colonial Rental Center
- Dentist Hal S. McCarter, 225 Battery Park Road
- Residence, 173 Lane Crescent
- Residence, 165 Lane Crescent
- Residence, 18449 Battery Park Road
- Residence, 18461 Battery Park Road
- Residence, 19180 Battery Park Road
- Residence, 12089 GreenBrier Lane
- Residence, 19217 Battery Park Road
- Residence, 19225 Battery Park Road
- Columbia Gas substation
- Commercial, 19351 Battery Park Road
- Commercial, 13351 Battery Park Road

Of the property impacts, one home would almost certainly need to be acquired and the residents would be forced to relocate.

Proposed Water Facility

Any upgrades to the water main system can be constructed in the median or within the right-of-way of the four-lane highway. The anticipated size for the future watermain is 16 inches from Battery Park Road to Nike Road, and 12-inches from Nike Park Road to the Town Limits. The size of the future watermain will also depend on the Town's need to loop this watermain with other watermains as determined by additional studies. Fire hydrants along Battery Park Road will be relocated at a spacing coordinated with your Fire Department and Town Ordinance.

Proposed Sewer Facility

The anticipated size for the future sanitary sewer force main is 16-inches. The age of the forcemain is undetermined at this time.

Proposed Gas

A substation for Columbia Natural Gas is located on the south side of Battery Park Road. Underground gas mains exist along Battery Park Road. Size, age, and precise location are unknown. Several above ground markers locate the existence of the main. Coordination with Columbia Gas will be required to determine if relocation is necessary and where future improvements will be desired.

Proposed Electrical Service and Telephone

The realignment of Battery Park Road impacts the existing power poles. The poles may have additional utilities that may be affected by the relocation of the poles. New electrical services and lights will be provided in accordance with Town policy.

Estimated Cost for Development and Construction:

The construction cost estimate is included in Appendix B. A cost for the engineering design based on a percentage of the construction costs is included. The inspection costs shown reflect daily inspections completed by the City, and an additional Inspector visiting the site on a routine basis during construction. Additional Rights-of-ways may need to be purchased for widening the road and stormwater management. The cost estimate does not include any costs associated with purchasing additional land.

Construction Constraints:

One of the construction constraints for this site is the existing soil. Poor subgrades may exist in the project area. The cost estimate includes a cost for soil amendment essential in providing proper support for pavement.

Another constraint on the site is stormwater management for both water quality and quantity. Portions of Battery Park are at minimal slopes due to the flat topography. Deeper ditches or larger pipes at minimum slopes may be required to convey the stormwater runoff away from the roadway to stormwater management facilities. Deeper ditches require an increase in the width of the road Right-of-way.

Based on the Town GIS information the existing right-of-way for Battery Park is on average 50 feet wide. Any increase in pavement width will require an increase in the proposed right-of-way. The location of several structures will need to be reviewed and examined in relationship to a new road alignment.

Additional Studies or Evaluations:

It is highly recommended that a complete geotechnical investigation, environmental due diligence, and traffic studies be performed prior to the preparation of construction drawings. At a minimum, the study shall include testing for the suitability of the subgrades soil's usage as utility trench backfill, soil borings to identify the types of existing soils, and a California Bearing Ration (CBR) test to verify the subgrade's traffic load bearing capacity. Further studies of traffic analysis at intersections will be required as the adjacent land is developed. A full topographic survey and environment review should also be completed prior beginning construction documents.

Phasing:

The widening of Battery Park Road can be completed in phases. One alternative would include Phase 1 from South Church Street to Nike Park Road, and Phase 2 from Nike Park Road to Gatling Pointe, but depending on growth and adjacent development, multiple phasing options could be considered.

Recommendations:

Battery Park Road serves as an entrance corridor, which conveys an initial perception of the Town of Smithfield. As per Smithfield's Comprehensive Plan, the importance of the functional and aesthetic character of these corridors should reflect the citizen's aspirations concerning the improvement and of the design, appearance and image of each corridor. Smithfield's Comprehensive Plan also lists Battery Park Road on the Sidewalk and Bicycle Path Improvement Plan. As development in Smithfield and Isle of Wight County continues, the level of service on Battery Park Road will decline. The Town should work with the developers, VDOT and others to assure adequate planning and design for the increase traffic on Battery Park Road. To adequately meet the goals of a functional roadway, scenic entrance corridor, sidewalk path, and bicycle path as described in the Smithfield Comprehensive Plan, a minimum of 100' of right-of-way should be set aside for the widening of Battery Park Road.

Smithfield Comprehensive Plan

Item	Quantity	Units		Price	Total	Subtotal
Multi-use Path (10' Wide):	9950	LF	@	\$15.00		\$149,250.00
S. Church St. to Nike Park Rd.	7,667	SY	@			
Nike Park Road to Gatling Pointe	3,389	SY	@			
2" Asphalt SM-9.5A	0.20	TONS	@	\$35.00	\$7.00	
8" Aggr.21A	0.50	TONS	@	\$16.00	\$8.00	
Roadway w/curb and gutter	1,675	LF	@	\$413.25		\$692,193.75
2" Asphalt SM-9.5A	0.85	TONS	@	\$40.00	\$34.00	
8" Asphalt BM-25.0	2.30	TONS	@	\$35.00	\$80.50	
12" Aggr.21A	3.00	TONS	@	\$20.00	\$60.00	
Overlay	0.15	TONS	@	\$45.00	\$6.75	
Storm Sewer	1	LF	@	\$100.00	\$100.00	
Curb & Gutter	2	LF	@	\$16.00	\$32.00	
16" Watermain	1	LF	@	\$50.00	\$50.00	
12" Sanitary Sewer	1	LF	@	\$50.00	\$50.00	
Roadway w/shoulders	8,275	LF	@	\$333.75		\$2,761,781.25
2" Asphalt SM-9.5A	0.85	TONS	@	\$40.00	\$34.00	
8" Asphalt BM-25.0	2.30	TONS	@	\$35.00	\$80.50	
12" Aggr.21A	3.00	TONS	@	\$20.00	\$60.00	
Shoulders	1.50	TONS	@	\$35.00	\$52.50	
Overlay	0.15	TONS	@	\$45.00	\$6.75	
16" Watermain	1	LF	@	\$50.00	\$50.00	
12" Sanitary Sewer	1	LF	@	\$50.00	\$50.00	
Turn Lanes						
Left Turn Lane:						
New Pavement	500	SY				
2" Asphalt SM-9.5A	85.00	TONS	@	\$35.00	\$2,975.00	
8" Asphalt BM-25.0	230.00	TONS	@	\$30.00	\$6,900.00	
12" Aggr.21A	36.00	TONS	@	\$16.00	\$576.00	
MS-1	115	SY	@	\$115.00	\$13,225.00	
Storm Sewer	500	LF	@	\$50.00	\$25,000.00	
Storm Structures	3	EA	@	\$2,500.00	\$7,500.00	
Left Turn Lane Subtotal	6	EA			\$56,176.00	\$337,056.00
Right Turn Lanes:						
New Pavement	500	SY				
2" Asphalt SM-9.5A	83.00	TONS	@	\$35.00	\$2,905.00	
8" Asphalt BM-25.0	230.00	TONS	@	\$30.00	\$6,900.00	
12" Aggr.21A	36.00	TONS	@	\$16.00	\$576.00	
Curb & Gutter	250	LF	@	\$15.00	\$3,750.00	
Storm Sewer	475	LF	@	\$50.00	\$23,750.00	
Storm Structures	4	EA	@	\$2,500.00	\$10,000.00	
Right Turn Lane Subtotal	6	EA			\$47,881.00	\$287,286.00
Stormwater management basin	5	EA	@	\$20,000.00		\$100,000.00
Nike Park Road/South Church Street	1	LS	@	\$200,000.00		\$200,000.00
Fire Hydrant Assembly	13	EA	@	\$3,500.00		\$45,500.00
CONSTRUCTION TOTAL						\$4,573,067.00
Engineering			+/-	10.00%		\$457,306.70
Inspection			+/-	5.00%		\$228,653.35
TOTAL						\$5,040,000.00

NOTE: Projected cost do not include of rights-of-way acquisition.
Some turn lanes may utilize existing pavement milling & overlay will be required.