



**Town of South Bethany
Delaware**

**2016
COMPREHENSIVE PLAN
(CP)**

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A. INTRODUCTION

1. OVERVIEW OF TOWN AND STRATEGIC INTENT

The Town of South Bethany's (Town) strategic intent is to be "The Best Little Beach in Delaware."

The Town plans to continue to leverage the successes of past development, sound financial management, excellent town administration and owner talents to enhance the desirability of property ownership and attractiveness to seasonal visitors.

The Town believes that the Goals contained in this Comprehensive Plan (CP) are achievable because of the unique combination of owner demographics, resources, scale and sense of community which are already among the best in Delaware.

South Bethany differentiates itself from neighboring Delaware coastal towns in the following ways:

- It is:
 - Centrally located along the Delmarva coast. As such, the Town has access to the historical, cultural and diverse offerings of Bethany Beach, Lewes and Rehoboth to the north, and the variety of family and golf-oriented activities provided by Fenwick and Ocean City, Maryland to the south.
 - The only beach-front town that has over 70% of its plats located on navigable canals with access to the Inland Bays and Atlantic Ocean
 - Unique in zoning homogeneity with 95% or more of the Town zoned single family. It attracts families, weekenders, and rental groups. The Town has minimal commercial development.
- Over 20% of the property owners are full-time residents, forming a solid base of involved citizens – many of whom are members of the robust South Bethany Property Owners Association (SBPOA).
- Town residents have the highest level of education and highest yearly income among incorporated Sussex County towns, the third highest in the State according to the 2014 Bureau of Census.
- Town residents form a volunteer cadre for both SBPOA sponsored activities and Town Committees.
- The Town actively promotes projects and activities that support family principles and enhanced property values.

The Comprehensive Plan (CP) presented here is intended to serve as a guideline for the future development of South Bethany. In addition it contains Goals, Objectives and Implementation Strategies which define policies and actions that serve to improve the quality of life in the community. The CP has been finalized and adopted by the Town Council. It is officially recognized as a guide for future planning efforts and serves as a reflection of the wishes of the community and its representatives.

The legal means for the implementation of the Goals and Objectives of this plan are included in the Town zoning codes and other municipal codes and ordinances. This plan is intended as a flexible guideline, and the updating and or revision of the goals and objectives is essential to keep the planning program responsive to the changing needs of the community. Public input via periodic Town Surveys is used to ensure that the CP is aligned with the public interest. Commitment to planning will contribute to a higher quality of life for the citizens of South Bethany.

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This plan also serves as an informational document for the public. Residents, commercial interests, and government officials can turn to the Plan to learn more about Town policies for future land use. Potential new property owners can use the documents as a resource about the Town, including its characteristics and facilities to help them make decisions about relocating to South Bethany. This document also contains the most current information on population, housing, and environmental issues.

The CP is a legal document. The Delaware code (section 702 title 22) specifies that any incorporated municipality under this chapter shall prepare a CP for the city or town. The code further specifies after a CP has been adopted by the municipality in accordance with Delaware code it shall have the force of law.

One of the primary sources for preparation of this CP was the 2015 South Bethany Community Survey (2015 Survey), which was developed by the Planning Commission during a series of public meetings and revised and approved by the Town Council during a number of public meetings. Comments from owners at Town Council meetings were always considered and included in part. Once Council made a final decision on the Survey content, it was produced and mailed to all owners in the Town in September of 2015. Responses were returned for the most part by October 16, 2015 and late arrivals were considered in the professional compilation of the responses performed in December of 2015. The Survey results were published on the Town website in January of 2016 and these results are included in *Attachment A*.

2. DEVELOPMENT PROCESS

In preparing the 2016 CP the South Bethany Planning Commission (SBPC) used the following process:

- a. SBPC met with a representative from the State Planning Office to brief the SBPC on the expectations and requirements for the new Comprehensive Plan.
- b. The State's recommended outline and checklists were reviewed and assignments made for content development for the SBPC.
- c. The SBPC reviewed, revised and published a Town Vision Statement, Mission Statement, and a list of Core Values, which were reviewed and vetted by the Council. These were later posted on the Town website for public comment.
- d. SBPC initiated the Town Goal development process by reviewing current and ongoing goals. A "SWOT" analysis was conducted to compile and define the Town's Strengths, Weaknesses, Opportunities and Threats (SWOT).
- e. From the new Vision Statement and SWOT, SBPC developed a set of 6 Key Goals, facilitating Objectives and the Implementation Strategies required to achieve them.
- f. The list of Goals was submitted for Council and key Town Committee review in December 2014 requesting comments.
- g. To assure alignment with property owner concerns, SBPC drafted a Survey for the Council and obtained property owner input through the conduct of a Survey sent to all property owners. The Survey was completed in October 2015.
- h. Following conclusion and receipt of the Survey, The SBPC drafted the CP with Town Committee and Town Survey input. The final draft CP was submitted to the Council for final editing and approval.
- i. Ocean View, Bethany and Dewey Beach Mayors reviewed the proposed Comprehensive Plan. All responded in a positive manner with no objections to content or 10 year projections.

B. TOWN PROFILE

1. TOWN HISTORY, MAJOR EVENTS

From its early years in 1952 when Mr. and Mrs. Richard Hall purchased 130 acres of land from the Delaware Shore Land and named it South Bethany, the area has experienced remarkable growth and maturation. Led by the Halls and a cadre of other determined individuals, the Town has evolved into a thriving year-round coastal town. The Town's rich history, depicted in a timeline of Key Events and Dates in *Attachment B*, reflects the strong resolve of the people who own property in South Bethany and their vision and foresight to develop the community.

The Cat Hill Cemetery is mentioned as a historic property and is privately held. The Town encourages residents to connect with the history of the area through the South Bethany Historical Society and its publication "The Best Little Beach In Delaware".

This one square mile town, bordered by beautiful beaches along the Atlantic Ocean on the east side and engaging wetlands on the west side, lures visitors from many surrounding states. The official Town map showing the municipal boundaries is in *Attachment J*. Visitors frequently do not retain their "visitor status" for long, as they are unable to resist the urge to make a transition to South Bethany property owner. Known as the "Best Little Beach in Delaware," generations of families have watched the area progress from small "summer only" cottages, to year-round three story homes with wonderful ocean and bay views, while still retaining the charm of those early years.

2. SOUTH BETHANY IN THE 21ST CENTURY

Two major factors influenced the Town in the 21st century:

- (1) Significant growth of surrounding areas: Despite world-wide economic crisis in 2008, communities near South Bethany have experienced dramatic growth. There was a rather long pause in building in the Town which severely limited revenues and necessitated a tax increase, but that has largely diminished and remodeling and some building has taken place at near pre-recession rates. This trend is expected to continue and is likely to accelerate according to 2014 estimates by the real estate and tourism industries.
- (2) Superstorm Sandy: Most of the houses on the west side of the Town suffered significant damage in Sandy. Due to the unusual nature of the storm, there was little impact on oceanside properties. Sandy was a "wake up" call to the Town. Subsequently, the Town established the Sea Level Rise and Storm Surge Committee to estimate the impact of continued Sea Level Rise, and to plan strategies for specific action the Town might take to ensure its resiliency for future weather events. A complete discussion of the Town's Sea Level Rise activities is covered elsewhere in this Plan. The Town has recovered from the impact of the storm.

3. WEATHER AND CLIMATE

South Bethany is located in the mid-latitudes of the east coast and is primarily influenced by migratory weather patterns from the west. This weather pattern is variable. Air masses that influence South Bethany are primarily maritime tropical during summer and continental polar in winter. Over 40% of the low-pressure areas in the U.S. pass directly northeastward; close enough to influence weather conditions locally. The general climate is mild. Summers are warm (typically, July is the hottest month with a maximum afternoon temperature average of 85 degrees F) and

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humid with only a few brief hot, humid periods. Winters are cool to cold with small amounts of snow. The mean annual temperature has varied from 55-58 degrees F with no significant change measured during the last 75 years.

Precipitation averages about 42 inches for the year, which is well distributed, ranging from ½ inch to between 5 and 7 inches reported monthly. Severe thunderstorms usually occur between May and August. The ocean temperature is controlled primarily by air temperature. The temperature of the ocean off the coast of South Bethany varies from 33–38 degrees F in the winter to 70–75 degrees F in the summer. The depth of South Bethany’s coastal waters varies from ten feet, near the shore, increasing gradually to 60 feet in the offshore shipping lanes.

Climate Change and Sea Level Rise Adaptation maps are included in the Sea Level Rise Vulnerability Assessment (Phase 1 Study). *See Attachment L.*

4. SOUTH BETHANY DEMOGRAPHICS AND STATISTICS

According to the most recent US Census Bureau estimates in 2014, South Bethany has a total year-round population of 485. That figure, while reasonably accurate, does not account for the fact that a significant number of the year-round residents spend substantial time away from Town in winter. There are a large number of retirees and very few younger adults and children in the Town. Therefore, the percentage of persons above age 65 in South Bethany is much higher than in Delaware. The Census bureau estimates that the percentage of persons above 65 in state as a whole is 16.6%, and number of persons below age 18 is 21.6%. The Town estimates the percentage of persons over age 65 is about 85% and the percentage under 18 is 1%. This is based purely on observation and estimation.

The following figures are derived from the US Census Bureau American Factfinder:

As of 2016, there are 1227 housing units. All are single family. The median household income is \$72,396.00. The percentage of individuals below the poverty level is 3.1%, the percentage of those with a high school education or better is 98.9%. Only 3.3% do not have health insurance.

Census figures count all persons, though errors, omissions and over-counts often occur. Such errors have a minimal effect on large populations but are magnified in small populations. Consequently, the figures should be viewed with that in mind. They are, however, reasonably accurate according to Town estimates.

South Bethany continues to maintain its single-family residential character. One parcel, York Beach Mall, is designated as C-1 commercial use. There have been no annexations and none are planned.

South Bethany issued the following building permits in recent years:

<u>Year</u>	<u>Renovations</u>	<u>New Dwellings</u>
2010	9	4
2011	10	10
2012	5	6
2013	7	14
2014	7	10
2015	19	16

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In 2015, a Community Survey was mailed to all property owners. The majority of responders who answered the questions indicated that their South Bethany property was a Secondary Home (80%) and that Seasonal Rental was the predominant rental type (90%). This reflects historical records.

The Survey indicated that South Bethany property owners had these intentions over the next 5 years:

- 10% additional are considering residing full-time in South Bethany
- 25% plan to improve their property
- 45% have no plans for change

These Survey results indicate that the Town will continue to generate revenue from three main sources: property tax; rental tax, and realty transfer taxes. Other sources of revenue such as building permits, licenses, and grants are variable and augment the Town's revenue.

5. EFFECTS OF CHANGING DEMOGRAPHICS

Population growth and build-out in South Bethany over the past ten years can be described as follows:

- (1) Although renovation of existing homes continues, the Town is over 95% built. All land has been subdivided into single, residential lots with a small number of two-lot parcels. The Town's only commercial zone consists of 1.86 acres. Consequently, land use within the Town is fixed without pattern for growth.
- (2) Building activity slowed to a virtual standstill in Sussex County and in South Bethany due to the recession that began in 2008. As the economy has slowly improved, building in both the Town and in Sussex County has increased. Population growth may be impacted more by the increase in the number of year-round residents than any resulting from increases in the number of housing units.

In the past 2 years, the area west of town in Sussex County has been rapidly developing. Major single-family home developments, like Bay Forest, Bishop's Landing and Millville by the Sea, and Beach Club have already affected the traffic through South Bethany, with many more homes and people to come. Development in the Ocean View area may bring another 3,000 plus homes to the South Bethany area. Also projected are 2,200 new homes west of Fenwick Island. The South Coastal area is now the fastest growing area in the State.

Delaware Route 26, a major tourist route into the area, which has been in need of widening and modernization, is now undergoing a major renovation and rebuilding and likely to be finished in the fall of 2016. This will further stimulate growth and business activity in the area.

6. IMPLICATIONS

The beach is a major draw for people moving to the area as seasonal and year-round residents. The number of people visiting and living near the beach may increase substantially due in part to the increased residential construction in the nearby areas. The areas mentioned above, surrounding South Bethany east of U.S. Route 113, are designated for development in the County Land Use Plan. This may further impact beach usage and the Town. This increase may require additional municipal services such as parking, road maintenance, lifeguard services, and beach maintenance. The increase in summer and year-round population in the surrounding areas could also stress local road capacity, safety, and emergency evacuation plans for storm events, which may need to be updated.

C. 2016 VISION AND MISSION STATEMENTS

1. VISION STATEMENT

South Bethany is a quiet, single-family, oceanside and bayside community with a network of canals, that provides a safe and welcoming environment for property owners and visitors. The Town is committed to maintaining and enhancing its character and resources, both natural and man-made. The residents enjoy a quality of life that fosters pride in ownership and encourages families to remain for generations. Through sound government, South Bethany seeks to preserve and improve its unique character to ensure it remains “The Best Little Beach in Delaware.”

2. MISSION STATEMENT

It is the mission of all South Bethany owners and other interested parties to continue to develop the Town into a well maintained, single-family community serving residents, property and business owners, and visitors with an inclusive, transparent and responsive government. We will provide the services and infrastructure that support a safe, healthy and attractive lifestyle, while preserving and improving our natural and man-made assets. Our collective efforts support the Vision Statement of South Bethany in the future by implementing the key strategies developed by our staff, committees, and commissions and approved by Town Council and higher-level government.

3. COMMUNITY VALUES

- We strive to maintain our single-family residential character.
- We protect its natural resources; keep beaches and waterways clean and plan for future environmental challenges.
- We promote appropriate landscaping, property designs and building codes to support the above and to maintain the character of our Town.
- We recognize the importance of public involvement in civic affairs.
- We value the importance of a strong public safety program.
- We value sound financial management and planning.
- We recognize the value of intergovernmental relations.
- We value transparency in Town decision-making.
- We value and require the strongest ethical behaviors of its employees, elected and appointed officials and volunteers.

D. GOALS AND OBJECTIVES AND IMPLEMENTATION STRATEGIES

1. OVERVIEW

The 2016 CP Goals are:

- Informed by the results of the past decade’s experiences.
- Aligned with the Town’s Vision, Mission and Community Value Statements.
- Responsive to the 2011 and 2015 Surveys.

Generally, the Town goals are representative of a small mature town with modest development and re-development, slowly changing demographics and few serious challenges other than those as a result of weather events. Challenges are predominately internal/community driven, environmental and weather event issues, or external/regional in nature. As such, the Town strives for continuous

improvement in its existing programs, management, finances and processes to continue to provide responsive, cost-effective infrastructures and services to its owners and visitors while being proactively engaged in future and regional challenges.

South Bethany's Goals underpin a set of Objectives and Implementation Strategies for the forthcoming ten-year Planning Period. These form the basis for committee plans, capital budgeting, and the required annual report.

2. GOALS AND OBJECTIVES

The Goals, Objectives and the Strategies recommended by the Planning Commission and approved by the South Bethany Town Council constitute the best-intended actions of the current government in the context of its existing circumstances. As such, the Town will pursue these strategies within existing known or anticipated constraints but, may be affected by the unexpected future actions of others or natural occurrences. Such situations and effects will be reported in the required annual report.

The following are the key Goals and Objectives for the Planning Period. While these are the suggested objectives, they are not considered to be mandatory. Implementation Strategies for each are contained in Section 3 that follows.

Goal 1: Provide for a Well-Maintained Town

Objectives:

1. Sustain relationships with State and Federal Agencies to ensure continued beach replenishment, maintenance and repair and nourishment programs.
2. Improve and maintain canal water quality, depth and accessibility. We have considered establishing a Tax Lagoon Association to fund canal dredging and other improvements, and do not feel it is practical for the Town at this time. All canal improvements in the Town are paid from Town tax dollars.
3. Consider the need and justifications for improving or expanding Town offices and infrastructure to support growing public use and needs of expanded Town staff, i.e., administrative and police staff.
4. Continue efforts to improve common areas, including streets, wetlands and public open spaces.
5. Ensure that code, tax and fee planning and enforcement create a positive environment for property owners to engage in property maintenance and improvement.

Goal 2: Continue to Enhance the Attractiveness of the Town to Families, Investors and Vacationers

Objectives:

1. Develop and practice pro-active public relations efforts that educate and inform all interested parties on issues affecting them respectively.
2. Promote support for community and family (adult and child) social activities.
3. Annually review and fund approved social activity plans that promote volunteer interest and activities for Town improvements and attractive family activities.
4. Ensure that consistent and equitable Town codes are adopted.
5. Make sure that public messaging and actions support Town interests.

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Goal 3: Maintain a Safe Public Environment for Town Residents and Visitors

Objectives:

1. Provide daily 24-hour police protection and services.
2. Provide safe and improved access to and use of the beach.
3. Provide public awareness information to support safe vehicle, bike, and boat operation
4. Sustain cooperative agreements that enhance emergency services to the community.
5. Plan for and improve Town lighting to meet modern standards for safe communities while meeting concerns for light pollution. The Community Enhancement Committee plans lighting initiatives, which are then reviewed and approved by Council. The Town works closely with Delmarva Power Consultants to optimize Town street lighting and efficiency. The use of LED lamps is a feasible solution and may be considered in the future.
6. Explore the need for a Town policy on the use of drones.

Goal 4: Continuously Improve Town Services

Objectives:

1. Revise and implement new policies, procedures, and guidelines for Town management and committee activities, processes and reports as required to improve efficiency and effectiveness of services.
2. Continue to pursue competitive pricing and sourcing for Town utilities and other services, within regional constraints.
3. Consider use of qualified professional consultants to advise committees and Council on issues where engineering, technical or process expertise will enhance the objective development of alternatives for the proposed issue/project.
4. Pursue initiatives to clean-up the visual impact of Town utilities.
5. Coordinate with state and other localities for any potential cooperative long-range community service plans.
6. Improve Town communication services and strive to stay abreast with technology and evolving homeowner expectations.

Goal 5: Maintain South Bethany's Fiscal Soundness

Objectives:

1. Maintain and fully utilize the current accounting software.
2. Assure that the operating budget; reserve and accounting practices lead to successful annual review and audit.
3. Strive to maintain cash-based annual operations and a balanced budget.
4. Assure adequate fiscal reserves are available for operating variances, replacement and maintenance of Town assets, and emergencies.
5. Implement multi-year modeling for future costs and revenue projections, including but not limited to a comprehensive review of Town employee total compensation growth over the plan period.

Goal 6: Promote South Bethany as a “Healthy Community”

Objectives:

1. Implement State Guidelines for Promoting Health in Local Communities (See attached Checklist, *Attachment C*.) The attachment includes appropriate parts of the list of most needed outdoor recreation facilities in the Region 5 public opinion survey for SCORP.
2. Align South Bethany smoking regulations with other local communities and owner feedback from the 2015 Survey. This will also include improving air quality. As a town with a population under 2,000 South Bethany would not implement transportation alternatives, urban planting, or alternative fueling.

3. IMPLEMENTATION STRATEGIES

Goal 1: Provide for a Well–Maintained South Bethany

Strategies:

1. Continue canal water quality initiatives and consider funding time-based comprehensive canal water quality strategy which would include provisions for circulation improvements to canals, improvements to the Anchorage Canal Forebay storm water treatment, canal depth surveys and dredging, if needed.
2. Participate as needed with nearby communities in regional planning for unexpected and periodic beach replenishments.
3. Consider funding and/or pursuing grants and participating with other agencies to continue the Phase 1 SLR Study. Consider developing a regionally consistent, Town specific strategy with a plan to address and mitigate the impact of SLR, storm surge and nuisance flooding.
4. Schedule debris removal from the Town waterways on periodic basis.
5. Establish a periodic survey plan to measure water depths at critical canal accesses and known silt accumulation areas.
6. In 2016, coordinate a strategy with DNREC to conduct surveys and dredge Jefferson Creek water accesses to Town canals and access to Little Assawoman Bay and schedule periodic surveys to measure changes and fund dredging of owned canals as determined by survey.
7. Continue the comprehensive review and update of the Town codes, including permit requirements and permit fees, for consistency, equity, alignment with emerging issues, and ensure enforceability. Utilize widely accepted standard codes and where reasonable implement performance based codes.
8. Consider a review of bulkhead height and alignment limitations to address the expected impacts of SLR.
9. Consider implementing the recent street maintenance study recommendations by University of Delaware and begin preventative maintenance efforts.
10. Consider elevating streets when street replacement is necessary, taking into consideration SLR mitigation.
11. Continue to conduct traffic studies for areas impacted by local development growth outside the Town and changing traffic patterns. Determine the most feasible mitigation efforts for traffic related issues.

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Goal 2: Continue to Enhance the Attractiveness of South Bethany to Families, Investors and Vacationers

Strategies:

1. Continue participation in regional community sponsored events: (e.g., Polar Bear Plunge (January), Beach Grass Planting (spring), Fourth of July Parade (July), Coastal Clean-Up (September)).
2. Continue to conduct Town-sponsored events for adults and families: (e.g., at least one adult event per summer season, Town Boat Parade, Movie Nights, Yoga on the Beach, off-season socials).
3. Continue to enhance community information awareness through realtor relations, upgraded Town website, message boards/boxes, and investigate the use of social media.
4. Provide an annual budget with funds reserved to support above and other opportunities.
5. Consider appropriate improvements to public spaces to benefit Town residents.
6. Promote family-oriented Town in external communications (advertisement, press releases).
7. Support and promote South Bethany as a preferred resort: "The Best Little Beach in Delaware."

Goal 3: Maintain a Safe Public Environment for Residents and Visitors

Strategies:

1. Investigate with DNREC and consider developing, funding and implementing incremental improvements that ease beach access (e.g., via walkways, railings, mats, grading, etc.). Include this in the Capital project plan.
2. Continue pedestrian and biking safety initiatives to support safety and Healthy Community.
3. Consider expanding the Town safety program to include boating safety presentations and implement voluntary USCGA boat safety inspections in early season, also in support of Goal #6.
4. Continue responsible speed and traffic enforcement.
5. Develop a lighting plan for future implementation considering previous South Bethany lighting practices, policies, 2015 Survey responses to the lighting question and modern community standards.
6. Consider actions that would reduce the standing water in un-drained and slow draining low areas within the Town. If necessary, consider revising the associated Town Code.
7. Continue to assure high level of expertise in beach patrol hires.

Goal 4: Continue To Improve Town Services

Strategies:

1. Work with local utility company providers to determine alternatives for incrementally improving visual impact of utility lines; investigate utility options and costs.
2. Cyclically review and ensure that Town employee position descriptions and compensation is appropriate and revise these to document desired capabilities and skills that will reduce workload and enhance staff assistance to committees and Council work. Continue to provide training opportunities for Town staff
3. Improve capability in Town Hall to support reliable remote participation in Town meetings.
4. Annually review and improve beach vendor services as required.
5. Consider the viability and feasibility of combining necessary Town services with other local communities, provided an acceptable level of service and control can be maintained.
6. Continue public outreach programs and seminars for Town property owners.
7. Determine funding and improvement alternatives for possible Town office facility additions.

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8. Consider adopting process improvements that could reduce Town workload and streamline issue processing.
9. Continue to work with the Charter and Code Committee to review, update and when appropriate revise or create code based on the report by the University of Delaware in 2015.

Goal 5: Maintain South Bethany's Fiscal Soundness

Strategies:

1. Consider implementing a 10-year capital project plan and pro-forma budgeting process that annually determines and reviews key projects for the next 3-5 budget years and their effect on reserves.
2. Consider establishing an annual Council priority list of major topics, efforts and expenditures to be undertaken. Update the list and add new priorities on an annual basis prior to providing budget guidance for budget preparation and approval.
3. Maintain sufficient committed monies to adequately fund known depreciation and anticipated capital replacements.
4. Continue to evaluate costs and quality of services provided to the Town relative to similar regional towns.
5. Implement life cycle cost estimating for any major additions to the asset base of the Town. The Budget & Finance Committee should review this estimate and advise Council on the impact to future annual budgets.
6. When possible, continue to pursue and provide matching funds for Council approved grant applications for Town priorities.
7. When possible, budget and provide Town funds for priority work when grants are not available on a timely basis.

Goal 6: Promote South Bethany as a "Healthy Community"

Strategies:

Through the use of the Delaware Healthy Community Checklist, develop planning elements that encourage a healthy community.

1. The Town may identify and expand opportunities for walking, biking, and water sports including canoeing, paddle boarding, kayaking, and social activities
2. The Town may support healthy activities by providing information and education concerning safety. Bicycle use and safety checks and pedestrian safety events are held by the South Bethany Police Department to support this activity.
3. The Coast Guard Auxiliary assists the Town by holding boating safety classes. Personal watercraft safety classes are also available. The Town continues to support the South Bethany Junior Lifeguard Program for children ages 9 through 15 to enhance swimming skills and promote water safety education.
4. The Town intends to develop and implement smoking restrictions on the beach.

Note: *Attachment C* is the required and completed Healthy Community Checklist with each element described in the attached consolidated explanation.

E. LAND USE PLAN

1. SMALL TOWN AND BEACH RESORT CHARACTER

The 2011 and 2015 Surveys reflect that property owners in South Bethany want to maintain the Town as a single-family community with no expansion, annexation, or growth of its small commercial area. The majority of property owners came here because of the beautiful beach. They want to continue to enjoy free access to the beach and maintain high water quality in the canals. Many originally purchased a second home in South Bethany with the intention of relocating to the area in the future. This trend is expected to continue.

2. LAND USE

The Town Charter has defined the nature of land use planning in South Bethany. The Articles of Incorporation for the Town and the Town Charter specifically state that South Bethany shall be a single-family, residential community.

The Town has adhered to its original subdivision plan, and thus, the precedence has been established for South Bethany to allow only single-family housing. Almost all the Town is zoned R-1, single-family, detached residential. The Planning Commission has mapped the Town and found a total of 1,399 building lots in the Town (about fifteen percent on oceanside). Of those, about 120 remain undeveloped. The timetable for total build-out of the Town cannot be predicted, as new building varies with the general economy. Many of the original homes in Town, dating to the 1960's, are being replaced with multi-level, larger single-family dwellings. Since it has been recently permitted, most of the new homes are being constructed with optional freeboard to protect against flood and storm surge damage.

The Town continues to be vigilant that current zoning ordinances are being enforced. Additionally, the Town needs to be aware of a phenomenon, which is occurring in the suburbs of nearby metropolitan cities, whereby a single buyer is grouping lots and very large houses are being built. Ordinance 122-03 was passed in 2004, which limits the size and the character of single-family residential dwellings.

The Town has five areas of public space as follows: The beach, the canals, the Town Hall complex, an undeveloped wooded area - the Richard A. Hall Memorial Park (RHP) immediately near Town Hall, and a wetlands west of Canal Drive. The first three items are addressed in the environmental section of this report. The wetlands are being maintained as outlined in the donors' wishes. The Town purchased RHP from the donors in 2010. There is presently little expressed desire to improve this space, but the Town may consider some improvements in the future.

3. ANNEXATION AND SURROUNDING LAND USES

South Bethany is surrounded by the Atlantic Ocean on the east, a Delaware State Park and Bay View Park on the south, the Assawoman Canal on the west, and the community of Middlesex on the north. The Town and surrounding area are in the Environmentally Sensitive Developing Area according to the 2007 Sussex County Comprehensive Plan update. While it may be possible to annex property across a body of water, there are no current plans for any annexation to be considered at this time.

The Town is subdivided. Other than a few larger residential lots there is no land for further subdivision. The Town is bordered to the north by the private community of Middlesex Beach, to the south by state owned wetlands/wildlife area, to the east by the Atlantic Ocean, and to the west by the Assawoman Canal. There are no annexation plans for the Town, therefore no Annexation Map

exists. *Attachment J*, Existing Land Use Map, shows the one Commercial District, Residential Districts, and Public Lands District (Open Space), which includes the Wildlife Preserve. *Attachment K* is the Future Land Use Map.

4. STATE AND COUNTY DEVELOPMENT PHILOSOPHY AND INTERGOVERNMENTAL RELATIONSHIPS

Both state and county land use plans and documents advocate the clustering of development around existing municipalities in the interest of preserving farmland and natural areas and controlling the cost of infrastructure and services. South Bethany has no annexation plans at this time or any under future consideration.

The Town participates in other regional groups, which affect South Bethany surrounds, such as:

- Sussex County Association of Towns (SCAT).
- Various inland bay committees under the auspices of the Center for the Inland Bays.
- Bethany-Fenwick Chamber of Commerce.
- Delaware League of Local Governments – statewide issues.
- ICMA - International City Managers Association
- ICC - International Code Council
- DMCA - Delaware Municipal Clerks Association
- IIMC - International Institute of Municipal Clerks
- LDMBOA - Lower Delaware Municipal Building Official Association
- ASBPA - American Shore and Beach Preservation Association
- DFIT – Delaware Founders Insurance Trust

F. NATURAL RESOURCES, INFRASTRUCTURE, AND UTILITIES

1. NATURAL RESOURCES

South Bethany's location between the Atlantic Ocean on the east and Little Assawoman Bay on the west makes canal water quality and Sea Level Rise important issues. The Town formed committees to address water quality and Sea Level Rise (SLR) concerns in June 2007 and June 2013 respectively. Over the past eight years, the Town has participated and continues to participate in programs, pilot projects, and grants to improve canal water quality and address Sea Level Rise. Town owned wetlands must also be protected to comply with provisions of the Federal Clean Water Act and the Code of the State of Delaware. The Existing Land Use Map (*Attachment J*) shows the Wildlife Preserve (Open Space) area, which is owned by the Town. It also shows the beach area, State of Delaware wetlands area to the south and the State owned Assawoman Canal area at the western border of the Town.

a. Canals

(1) Water Quality

South Bethany's canal system provides an excellent recreational opportunity for many homeowners and guests. The 2011 and 2015 Surveys continue to show residents are concerned about canal water quality.

The goal of the Water Quality Committee is to review, consider steps and make recommendations to improve water quality so that canals are swimmable (low bacteria

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count) and fishable (adequate dissolved oxygen). In order to accomplish this goal the committee's activities and recommendations strive to:

- Educate the community on canal water quality issues and provide them with strategies that can be used to help clean up the canals.
- Work with the Town, State, and Federal Government to eliminate pollutants entering our canals.
- Review current Town ordinances and, if necessary, create/recommend new ones that would eliminate or minimize pollutants entering our canals.
- Work closely with the Center for the Inland Bays (CIB).
- Find ways to improve canal circulation.
- Continue participation in the University of DE Citizen Monitoring Program.

The Town has no open water or storm management ponds. Green technology implementation is not applicable. However, the Town does recognize the need to employ green approaches to storm water management, such as rain barrels, reduced impervious surfaces, etc. The Town restricts the foot print of property and requires pervious areas of appropriate size. Zoning calculations are in the Town Code and are used for permitting of construction. The Town has a population under 2,000 and does not have a central business district, so there is no impervious surface mitigation plan for a central business area.

A history of water quality improvement projects is provided in *Attachment E*.

Improving water quality in South Bethany's canals requires a long-term effort and sizable funding. Increased water circulation at the canal dead ends may require substantial modifications. One proposal is to first study the opening and allowance for free water flow of the York and Carlisle Canals to the adjacent wetlands and open bays to the south. Another concurrent proposal is to also consider connecting other dead end canals together and determining the impact of the open canal ends to the bays to the south. A further alternate is to investigate the use of low horsepower pumps to promote circulation in conjunction with the proposed openings at the end of the York and Carlisle Canals to the outer bays. These concepts could be modeled to determine their feasibility. The Town should endeavor to find grant sources for these studies or consider internally funding them to increase circulation and improve water quality, especially at canal dead ends. If the studies prove to be beneficial and feasible, the Town should consider pursuing grants or self-funding the work indicated. (*See Attachment F*)

Total Maximum Daily Loads (TMDLs)

Under Section 303(d) of the 1972 Federal Clean Water Act (CWA), states are required to identify all impaired waters and establish Total Maximum Daily Loads (TMDLs) to restore their beneficial uses (e.g., swimming, fishing, drinking water, and shellfish harvesting). A TMDL defines the amount a given pollutant (i.e., or the pollutant loading rate reduction for a given pollutant) that may be discharged to a waterbody from all point, nonpoint, and natural background sources, thus enabling that waterbody to meet or attain all applicable narrative and numerical water quality criteria (e.g., nutrient bacteria concentrations, dissolved oxygen, and temperature) in the State of Delaware's Water Quality Standards. The Town of South Bethany is located within the greater Inland Bays Basin. Within this Basin, the designated nutrient (nitrogen and phosphorus and bacterial TMDL load reduction requirements are displayed in the following Table:

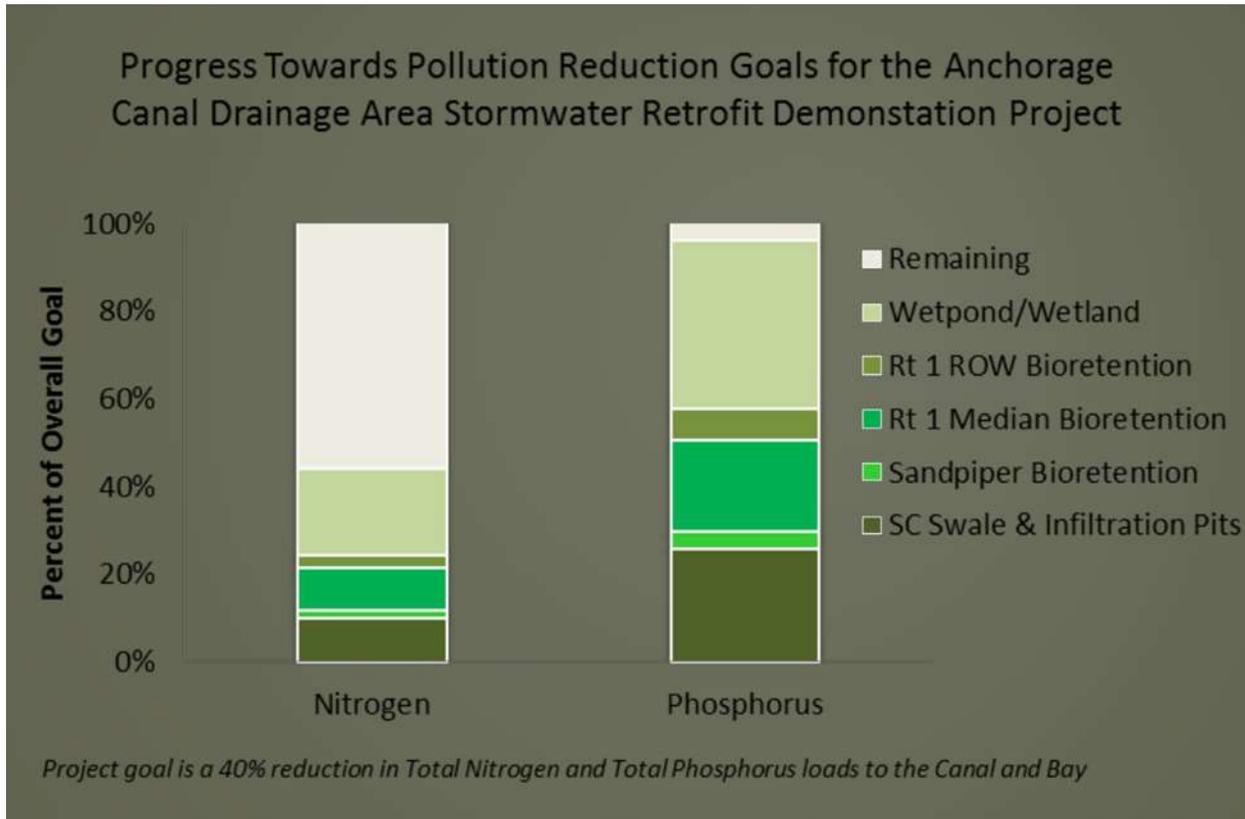
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	N	p	Bacteria
Inland Bays Basin	40% Low Reduction zone	40% Low Reduction zone	40% Fresh

South Bethany participated in the Anchorage Canal Drainage Area Stormwater Retrofit Demonstration Project from 2011-2015. It was funded by DeIDot, DNREC, CIB, Sea Colony, Middlesex Beach, Delaware Forest Service, as well as South Bethany, and involved building bio-retention ponds and modifying storm drains to permit more stormwater to be absorbed by the ground prior to discharging into the canal system. The drainage area is 65 acres along the Route 1 corridor north of South Bethany that discharges stormwater into the Anchorage Canal and the Little Assawoman Bay through runoff from Route 1. In addition stormwater retrofits in Sandpiper Pines were completed in 2016.

The progress made to date toward the 40% reduction in nitrogen and phosphorus loading is shown below. The wetpond/wetland near Sea Colony is in the planning stage.



To further reduce the Total Maximum Daily Load, the Town may consider either funding or seeking grant funds together with DeIDOT, and performing the study and implementation of improvements to increase the performance of the forebay storm water retention basin at Anchorage Canal. If possible, the Town may consider obtaining the property at the east end of Anchorage canal to allow for a larger and more effective forebay.

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Major improvements to the Route 1 storm drains located in the median and right of ways have been accomplished with participation in the Anchorage Canal Drainage Area Stormwater Retrofit Demonstration Project. South Bethany does not plan to form a stormwater utility at this time.

Canal dredging could also have a positive impact on canal water quality for two reasons: 1) in addition to making it easier for boaters to get in and out, dredging would improve canal water flow and 2) dredging removes bottom sludge and contaminants on the floor of the canal. Studies performed in Maryland have indicated that the removal of canal sludge can have a positive impact on water quality.

Several citizen comments in the 2015 Survey mentioned canal debris as an issue, particularly at some dead-end locations. The Town will explore ways to remove canal debris periodically.

(2) Canal Dredging

Periodic dredging of the Town's access and canals is necessary to remove silt deposited during storms and sludge to improve water circulation, possibly improve water quality and maintain adequate depth for boat navigation. A survey of the canal depths was conducted in 2008 to identify areas with a depth less than 4 feet at mean low tide. The average depth of the main body of water that supplies the canals, which is 4 feet, set the permitted depth of dredging. The identified shallow areas were dredged to that depth in April 2008. Some canals and waterway accesses need to be dredged again due to asymmetric shoaling in canals (i.e., one side is shallow and the other deep) and the entrances to the Town's canals have begun to silt-in.

Most urgently, the water depth at the entrance to the Town's canal infrastructure at low tides is less than 2 ft. and requires a coordinated Plan with DNREC to assure access to one of the key determinants of Town property values, its canals.

To resolve state project budget shortfalls the last segment of the Assawoman Canal between Jefferson Creek and Little Bay was not dredged as part of the Assawoman Canal dredging project. As such, passage thru this canal to any of the southern bays is now becoming restricted and requires DNREC funded dredging. South Bethany should coordinate its canal dredging plans, responsibilities and financial liability to maintain access to the state maintained waters.

To maintain access to the Assawoman Bay, the Town shall re-establish communication with DNREC regarding possible future dredging of the Snap Gut area, the canal extension, and the southern cut from Jefferson Creek to the Little Bay, to use or create a channel to the Assawoman extension. Since some of the waters are within South Bethany limits and others are DNREC's, it would be necessary to conduct a survey and to discuss budgetary implications. It is important to plan to periodically sound the critical waterways/accesses owned by both parties, establish criteria for periodic maintenance and agreement on cost sharing.

(3) Canal Maintenance.

In addition to dredging, the Town has the responsibility to manage other physical elements of the canal infrastructure. Those are comprised of:

- a. Street-end canal bulkhead maintenance: The Town has reserves set aside for canal

- bulkhead maintenance. Additional study will be required to determine the options for Town bulkhead design to integrate with solutions to best address SLR.
- b. Vegetation control over canal waters: Vegetation control is not a major issue, but numerous instances of trees and /or plants overhanging the canals lead to sediment additions, which are undesirable. The Town should survey its canals relative to vegetation overgrowth and enforce or change Code related to this issue.
 - c. Storm drainage into canals: Storm drainage into canals is a recurring issue. The Town currently relies on voluntary disconnection or diversion of grandfathered properties but may consider an ordinance that mandates property owners divert rainwater to environmentally suggested alternatives, such as rain gardens, barrels, ground drains, etc.
 - d. Watercraft operations: The Town does not manage watercraft operations, however, it may consider establishing an information program that addresses incidental spills and/or sewage discharges, and selection of environmentally sensitive bottom paints.
 - e. Boat lifts, ramps, modular lifting platforms: Consistent with the state guidance on use of modular floating platforms, the Town may initiate a Code change to allow floats to reduce bottom painting and associated leaching of anti-fouling chemicals.

Respondents in the 2011 Survey placed “Maintain Dredged Canals” second in a list of 15 future needs. Ninety percent of those with an opinion said maintaining dredged canals was either needed or very much needed. Of the 322 respondents who selected “Maintain Dredged Canals” as a top priority, 57% were willing to increase taxes for that purpose. Although canal dredging was not a separate topic on the 2015 Survey, 7 of 75 comments concerning water quality suggested dredging was needed to improve water quality.

b. Beach

The beach is South Bethany’s most treasured, valuable and vulnerable asset. It is the reason most property owners choose to either live or invest here and why thousands of visitors come here. The beach is vulnerable to the forces of nature. Ever since the historic March storm of 1962 Delaware, in partnership with the federal government has prevailed in maintaining its beaches and the quality of coastal life.

(1) Beach Replenishment

South Bethany like many Delaware coastal communities participates in beach replenishment projects funded by the US Army Corps of Engineers (USACE) and the State of Delaware. A 50-year maintenance period is included with the original restoration, with maintenance work contingent on available funding. The first major beach replenishment and construction of the present day dune began in 2008. The dune was rebuilt in 2011 after Hurricane Irene. Most recently, in 2013, the USACE began beach replenishment projects along the Delaware coast from Fenwick Island to Rehoboth Beach. Congress, as part of the 2012 Superstorm Sandy Recovery Appropriations Bill funded this project called the “Coastal Storm Risk Management Project.” This project rebuilt portions of the damaged dune system and dune crossovers and pumped approximately 476,000 cubic yards of sand as part of the Bethany Beach and South Bethany project. Dune grasses were also planted on the rebuilt dunes. Re-planting sea grass continues annually under DNREC guidance. The project was similar to the earlier project in 2008 when sand walkways were constructed to cross over the dune at various locations. This improved the dune crossing to the ocean in South Bethany by making them easier to traverse.

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After the initial reconstructed dune was completed, a Nor-Easter storm in 2011 inflicted additional damage to the south end of the dune, but it was promptly repaired. The beach and dune were again seriously damaged by a Nor-Easter in October 2015 that lasted for four days and 35 to 40% of the dune was lost. This was followed closely by winter storm Jonas in January 2016. The storm, along with high tides and high northeast winds, inflicted very serious damage to the already compromised beach and dune.

Although the scheduled beach maintenance for 2017 is in the current USACE budget, there is no guarantee that federal or state funds will be made available. The Town should consider and prepare for additional funding sources for future beach replenishment.

(2) Beach Services

a. Patrol:

- The Beach Patrol is a continuing source of pride to South Bethany and its residents. It continues to provide a full professional staff comprised of well trained, certified lifeguards. Additional equipment such as a rescue ATV and digital radios have been great additions to the South Bethany Beach Patrol in 2015.
- The Beach Patrol should continue the South Bethany Junior Lifeguard Program into future summers. This program offers children between the ages of 9-15 valuable training in first-aid, CPR, ocean safety, rescue techniques, and physical fitness. Up to 16 classes are held in July and August.
- The Beach Patrol received an average 4.58 rating (on a scale of 5) in the 2015 Survey. The Town should plan to continue this high level of service and protection.

b. Cleanliness: The 2015 Survey showed a 4.25 rating for beach cleaning. The Town should continue to maintain a clean beach.

c. Accessibility:

- The Town beach is nearly 1 mile long and according to the Town Survey, good beach accesses is a high priority for residents who are most satisfied with existing conditions. The Town has experimented with various methods to improve footing over the dune such as mobi-mats. This was moderately successful, but no recent action or additions have been pursued. The Lower Sussex and Ocean City Rotary Club donated a new beach wheel chair in 2015. This brings the number to 4 beach wheel chairs that are available, upon request, for access to the beach.
- The Town should continue to improve beach access. One wooden walkway is in place and the Town may consider adding another, to better facilitate access for persons in need along the mile long stretch of beach in South Bethany. The Town should also consider a phased plan to add additional beach walkway improvements as part of its Capital plan.

c. Wetlands

The Town owns environmentally sensitive wetlands on the west side of Town that must be protected. Regulatory protection of wetlands is mandated under Federal 404 provisions of the Federal Clean Water Act. The State of Delaware Code under Title 7, Chapter 66, also protects tidal wetlands. Compliance of these statutes may require approval of the Army

Corps of Engineers and/or DNREC. Development is prohibited.

A wetlands inspection was conducted by DNREC in September 2015. It noted that some ponds in the Town date to the 1930's, and some ponds have expanded since the 1990's. DNREC stated that if the Town is concerned about the stability of the wetland shoreline near West 1st and 2nd streets, a living shoreline is the preferred method of stabilizing the bank and absorbing the impact of storms, as opposed to hard structures such as bulkheads and rip rap that deflect the wave energy to other areas. Otherwise, DNREC stated there were no other concerns regarding the wetlands. No action on the wetlands shore stabilization is required at this time but it may be necessary to reconsider this at some time in the future if nuisance flooding or Sea Level Rise issues occur and are validated.

d. Flooding and Sea Level Rise

As a coastal community, South Bethany is concerned about its vulnerability to Sea Level Rise, nuisance flooding, and storm surge. There have been several severe storms that have resulted in major home damage over its history, the most recent being Hurricane (Superstorm) Sandy in October 2012 that flooded approximately 800 homes on the bayside. In order to address SLR issues and to better prepare the Town for flood events in the future, a Sea Level Rise & Storm Surge (SLR&SS) Committee was formed in June 2013 with the following mission statement:

“Given the increasing information about future concerns that coastal communities like South Bethany may face from SLR and Storm Surge, as demonstrated by Hurricane Sandy in October 2012, the SLR & SS Committee was formed to address, identify and obtain funding for the following actions:

- Conduct a SLR & SS Vulnerability Assessment that will identify property elevations, infrastructure and public spaces that may be at risk for SLR & SS;
- Gather relevant data and expertise to understand the possible hazards and costs associated with SLR & SS;
- Identify, evaluate and recommend, potential adaptation options; and
- Develop a response based on information and research.”

The overall goal is to determine the challenges of SLR & SS along with possible mitigation steps to protect both the property owners' and the Town's assets. A history of the work completed to date is provided in *Attachment G*.

New codes conforming to current FEMA requirements in coastal flood zones have already been drafted and implemented. Additional input may be addressed in the proposed Phase 2 Study.

Current nuisance flooding issues are being addressed now and some backflow check valves have been installed and are being tested. Funding for additional check valves is in the budget and more may be installed over the next 2-3 years. The Town has completed Phase 1 of a comprehensive study of Sea Level Rise and flooding issues; it may seek grant resources to complete Phase 2 in the future.

The Town has begun planning for SLR and the first phase of a SLR study has been completed (see *Attachment L*, Sea Level Rise Vulnerability Assessment Town of South

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Bethany). It was based on the best information available. Existing flooding issues are included in the Phase 1 study; and future flood issues may be included in the proposed Phase 2 study related to SLR. If the Phase 2 study is undertaken, it will be added to the Comprehensive Plan. Near term, it is important to consider funding and continuing the study. This future study would continue to refine the main SLR challenges over the next 50 years, and identify and recommend necessary code changes, trigger points (and projected timing) and costs to implement necessary mitigation actions. Future flood issues would be included in the Phase 2 study related to flooding and SLR. See page 21 of this Plan. The Town has emergency preparedness measures in place, and may consider longer term solutions in the future. The impact of SS would also be evaluated in the next phase of study. When the most feasible SLR mitigation strategies are determined, the Town should identify funding sources to implement the accepted adaptation strategies.

In January 2016, a proposal was submitted to DNREC to partner with them to determine a suitable mitigation strategy plan that could be used over the next 50 to 100 years. Although this proposal was not successful, the Town may now review the SLR adaptation recommendations in the multi- criteria evaluation study sponsored with a DNREC grant and consider action.

At the June 2016 Town Council Organizational Meeting action was taken to disband the SLR&SS Committee and place its initiatives under the Planning Commission. With a 50 year projected outlook the Town Council agreed that monthly committee meetings were not needed but awareness of any state or local action was critical for the Town to stay abreast of key issues and strategies. The Planning Commission could facilitate keeping a SLR&SS focus through its yearly update of the Comprehensive Plan. The Commission will remain engaged with developments in the area of SLR&SS and will advise the Town Council of significant trends and developments that might occur.

Climate Change and Sea Level Rise Adaptation maps are included in the Sea Level Rise Vulnerability Assessment (Phase 1 Study). See *Attachment L*. There are no conflicts in the South Bethany Comprehensive Plan and the County Hazard Mitigation Plan.

2. INFRASTRUCTURE

a. Town Hall and Police Facilities

The first Town Hall building, which was built in 1977, was replaced by two new structures in 2007. The use of Town Hall has significantly increased because the number of Town committees has grown from 2 to 6, there are more community activities and events and the police force has expanded. Meeting rooms in both buildings are multi-functional and are sometimes used at the same time for different purposes. A preliminary design for expansion of both buildings was completed in 2015 using grant money. Estimated construction cost to expand both facilities is approximately \$400K. Since this represents a substantial commitment by the Town, careful consideration will be made to the financial impact on the Town. Should the Town decide to move forward with an expansion, a phased development plan could be considered.

b. Streets

South Bethany has 82 road corridors with a total length of approximately 9.8 miles. Issues concerning drainage, speed, evacuation routes, landscaping, parking, walkways, maintenance, volume, and lighting are discussed below.

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c. Drainage

Storm water from all South Bethany's streets, open areas and Route 1 drain into the canals. Many of the low-lying streets on the bayside are vulnerable to flooding at extreme high tides. The 2015 Survey showed lower satisfaction with street drainage than the 2011 Survey.

The location and condition of all street drains were documented in 2012. In 2014, a baseline elevation survey was conducted to document the elevation of street centerlines and drainage catch basins. Check valves were installed at several locations to prevent backflow from the canals during high tides. As discussed in the Canal Water Quality section (Para a.1) and *Attachment E*, bio-retention areas were installed in the median and on the east and west sides along Route 1 and in the Sandpiper Pines section to reduce pollutants entering the canals. As part of the SLR mitigation efforts, the Town may consider funding additional check valves in storm drains (connecting street drains to the canals) on the west side of Route 1 to prevent flooding during extreme high tide and major rain storm events. If approved, these costs may be included in the 10-year capital budget. The recent SLR study inundation maps identify the early priorities; however, if the Town considers further study, this could be refined to account for SS and nuisance flooding events.

The Town will pursue drainage easements as situations occur necessitating improved drainage. Where individual drainage pipes are required, the Town obtains agreement from the property owner prior to installation.

d. Speed/Volume

The 2015 Survey indicated speed limit enforcement by the police was satisfactory. The Town will continue to review speed issues and has begun a study in conjunction with DelDOT to monitor and analyze the volume of traffic from Kent Road to Route 1 now going through Town streets and the speeds experienced in the Town, with particular impact on the Cat Hill section of South Bethany. The study includes monitoring traffic during four periods in 2016 – April, May, July and October. The Town has established an Ad Hoc Traffic Committee that is comprised of the Chief of Police, Town Manager, two Council members, two Cat Hill owners, one bayside owner, two representatives from DelDOT, and chaired by a Cat Hill owner who is a former transportation planner.

e. Evacuation Routes

Emergency evacuation routes for the Bethany Beach area have been established by Sussex County and the State of Delaware. The three primary routes are: Route 1 north to Kent County; Route 26 west to US 113 north; and County Road 361 (Kent Avenue) west to State Route 20.

The State of Delaware ordered a mandatory evacuation of all areas within 0.75 miles of the coast for Hurricane Irene in late August, 2011 and during Superstorm Sandy in October 2012. The evacuation was safely executed in South Bethany.

f. Landscaping

In 2011, the Beautification Committee was renamed the Community Enhancement Committee (CEC) to reflect its increased focus on initiatives that will improve the Town's

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appearance and enhance the community; promote community pride and volunteerism; and increase individual property and community value. The committee's scope includes:

- Town beautification
- Community maintenance, improvements and landscaping
- Environmental improvement efforts

The committee's initiatives include the Adopt-A-Canal/Road End Program; Route 1 Median and Walkway improvement; York Beach Mall landscaping; the Ocean Drive Blueprint; and the development of community education flyers designed to engage South Bethany homeowners in improving their properties and surroundings. These efforts have resulted in trees, shrubs, and flowers planted in the bio-retention areas along Route 1; flowers and shrubs planted at bulk-headed canal ends adopted by homeowners; coastal-themed artworks mounted on outdoor public trash receptacles along Ocean Drive and Seaside Drive; and new street signs along Ocean Drive and throughout Town.

CEC initiated landscaping received the third highest approval score for Town services on the 2015 Survey.

g. Parking

The 2015 Survey showed general satisfaction with beach parking with the primary issue of insufficient parking spaces for beach access during the summer season was expressed.

Oceanfront parking for beach access may become more challenging in the future as residential real estate development west of South Bethany increases. Currently, parking permits are not required on the west side of Route 1. If residential growth west of South Bethany does impact parking, the Town may wish to consider implementation of permit parking near Route 1 on the west side.

h. Bicycle Paths and Street Walkways

Bicycle paths are located along the east and west sides of Route 1. Pedestrian walkways are located along the west side of Route 1, the north side of Russell Road, and the short southern side of York Road. Additional bike paths and walkways along Town streets are not planned due to the limited street width but walkways could be added in some areas. See *Attachment D* for further details.

The State of Delaware completed the mile-long first phase of a trail along the Assawoman Canal adjacent to the Town for bikes and pedestrians in August 2015. The trail extends from just west of Cedar Neck Road to Route 26 in Ocean View. The 2011 concept plan shows the next phase extends south to Cat Hill in South Bethany, funding for the design of this phase was approved in 2016. The Town should continue to advocate for completion of the trail to representatives of both the Federal and State government.

i. Street Maintenance

The University of Delaware Center for Transportation conducted a "Pavement Stress Evaluation" for South Bethany's 82 streets in April 2015. The visual assessment included settlement, cracking, patching, and crack sealing deficiency characteristics using a system that provided a score for each street. The results showed 80.6% of the streets were in very

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good condition, 18% were in good condition, and 1.4% (Bristol Road) was in poor condition due to settlement. The report recommended crack sealing to extend the life of the roads, minimizing utility penetrations of road surfaces that require patching and aggressive rehabilitation of Bristol Road that would require subgrade improvements including drainage.

The Town should develop a 10-year plan to maintain, repair or replace Town roads where necessary, including provisions for SLR, drainage and check valves. Given the amount of flooding that occurs on Bristol Road and other streets in similar condition, the Town should plan to repair them and consider including check valves as necessary. SLR recommendations may be factored into these efforts since many of the roads on the west side of Route 1 are low and may need to be raised in the future. The Town currently has an on-going plan to maintain and repair roads using available MSA (Municipal Street Aid) funding.

Ocean Drive that runs parallel to the beach and is considered our “Gateway to the Beach,” was repaved in 2011 at a cost of \$88,341.88. The 2015 Survey showed general homeowner satisfaction with street maintenance.

j. Street Lighting

The 2015 Survey shows that 60% of primary homeowners and 45% of secondary homeowners say streetlight improvements are needed. However, only 28% of primary homeowners and 22% of second homeowners supported a tax increase for this purpose. Primary homeowners favored using solar light while the secondary homeowners equally favored pole and solar lights. Side glare and light pollution from streetlights can be an issue. Consequently, improvements that reduce glare without compromising vision at street level are always considered.

Pole mounted lights are installed on many streets within the Town. Most of these date back to the early days of the Town and use of Delmarva fixtures. In 2013, the Town installed low wattage level solar lights on Ocean Drive at intersections.

The Town has worked with Delmarva Power to upgrade and change 12 existing freestanding streetlights in the Cat Hill area, Tern Drive, and Bayshore Drive. These lights are leased from Delmarva Power.

As a result of the 2015 Survey results, the Community Enhancement Committee is reviewing the Town’s current lighting request practice and policy and the Survey lighting requests and will present to the Town Council recommendations for responding to the requests. The Town Council may consider a complete study of street lighting if determined to be beneficial, necessary and/or desired by the community.

3. PUBLIC UTILITIES

Public utilities are listed in *Attachment H*.

a. Public Water Supply

The South Bethany water system is owned and operated by Artesian Water Company and provides water service to over 98% of the Town’s residents. The underground distribution system and the water tower were constructed in 1999. Two wells, each with a capacity of

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1500 gallons per minute (GPM) is located near Town Hall on Evergreen Road. Water is pumped from confined aquifers to the 500,000-gallon storage tank in the tower. The system is capable of supplying 2.0 million gallons per day. Water is treated for iron removal, disinfection (chlorine), corrosion control (phosphate), pH control (sodium hydroxide), and it is treated with fluoride. Water quality is tested and reported annually.

When water demand is reduced in the off season, the South Bethany facility goes off line and water is provided by Artesian's Bayville facility located off Route 54 west of Fenwick Island. The Bayville facility has two wells, each with a capacity of 700 GPM and a storage tank with a capacity of 1.0 million gallons.

The Town should continue to review water quality closely and ensure that the well point sources within the Town are protected from infiltration of any pollutants and salt water that could have a negative impact on the system.

b. Wastewater

South Bethany is one of 12 Sewer Districts that use the South Coastal Region wastewater treatment facility operated by Sussex County. The treatment facility is located at Beaver Dam Road and has a capacity of 9 million gallons/day. Treated wastewater is discharged into the ocean, approximately one mile offshore at a location between Bethany Beach and Sea Colony.

Sussex County has re-lined and grouted some of the older sewage lines in Town. The pump station located at Route 1 and Anchorage Drive was replaced and updated during the winter/spring of 2015. Sussex County landscaped the surrounding area and has agreed to maintain it in the future as it is very visible from Route 1.

c. Electricity

Nearly 40 percent of the Town residents are now served with fully underground electric, telephone, and cable. Provided the transformer is placed above Base Flood Elevation (BFE), underground electric service could reduce outages during storms and improve an aesthetic environment. Sussex County regulations and the Delaware Public Service Commission require all new services be installed underground. The 2015 Survey indicated that most homeowner's favor placing all utilities underground.

An initial discussion with Delmarva Power indicated underground placement of existing wires in the foreseeable future is unlikely due to cost and coordination issues with Verizon and Mediacom who also use the existing poles. However, the Town is working with Mediacom and Verizon who are actively engaged in clearing up old and unused wires.

The Town should continue discussions with Delmarva Power, Verizon and Mediacom to determine the potential costs to relocate overhead lines from individual houses before proceeding further. Once that information is acquired and with homeowner input, the Town could determine what the next steps might be for implementation.

d. Cable and Telephone

Mediacom provides cable service for television, telephone, and Internet. Verizon provides competing landline service and satellite carriers provide competing television service. The towns of South Bethany, Bethany Beach, Millville, and Ocean View formed the Southern Delaware Cable Consortium and contracted with the Cohen Law Group to negotiate a new cable franchise agreement with Mediacom for the individual towns. The 2013 agreement

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reduced the term of the contract from the previous 15 years to 7 years and outlined steps for improved relations with Mediacom.

Since the rating of homeowners for the Mediacom service was very low in the 2015 Survey, the Town should continue to review options for alternate provision of this service and determine if a more suitable alternate provider could be utilized. The current agreement with Mediacom, negotiated in 2013 has a 7 year duration.

e. Propane

Propane is delivered to homes either in underground pipes owned by Sharp Energy Company or by truck from another provider that refills tanks mounted outside the home. The underground pipes deliver propane from an underground tank located near Town Hall. This arrangement eliminates the gas tank at individual homes and reduces truck traffic on Town roads.

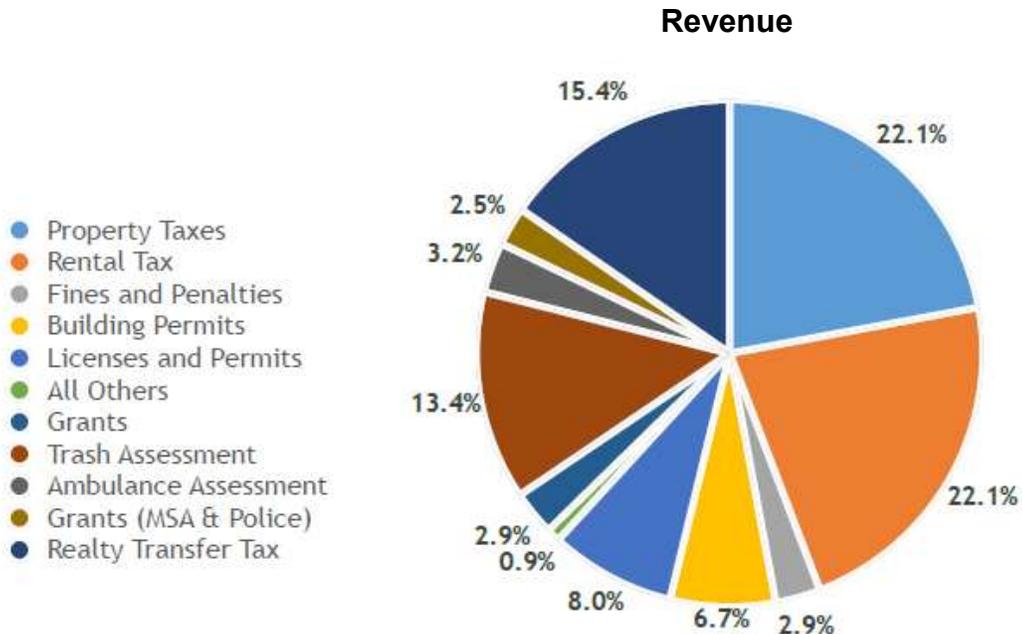
G. TOWN FINANCES

1. GENERAL STATEMENT OF FINANCIAL CONDITION

The Town of South Bethany is currently in sound financial condition. The last set of audited data for FY 2015 showed the Town had \$3,768,301 in Total Assets and \$207,426 in Total Liabilities. The Total Net Assets were \$3,560,875.

a. Sources of Revenue

The Town relies primarily on three sources of annual revenue for the General Fund: 1) Property Tax; 2) Rental Tax; and 3) Realty Transfer Tax which represent approximately 60% of the annual revenue. Other sources of revenue such as building permits, licenses, and grants are variable and augment the Town's revenue. The following pie chart represents a breakdown of General Fund revenues by percentage budgeted for FY 2017.

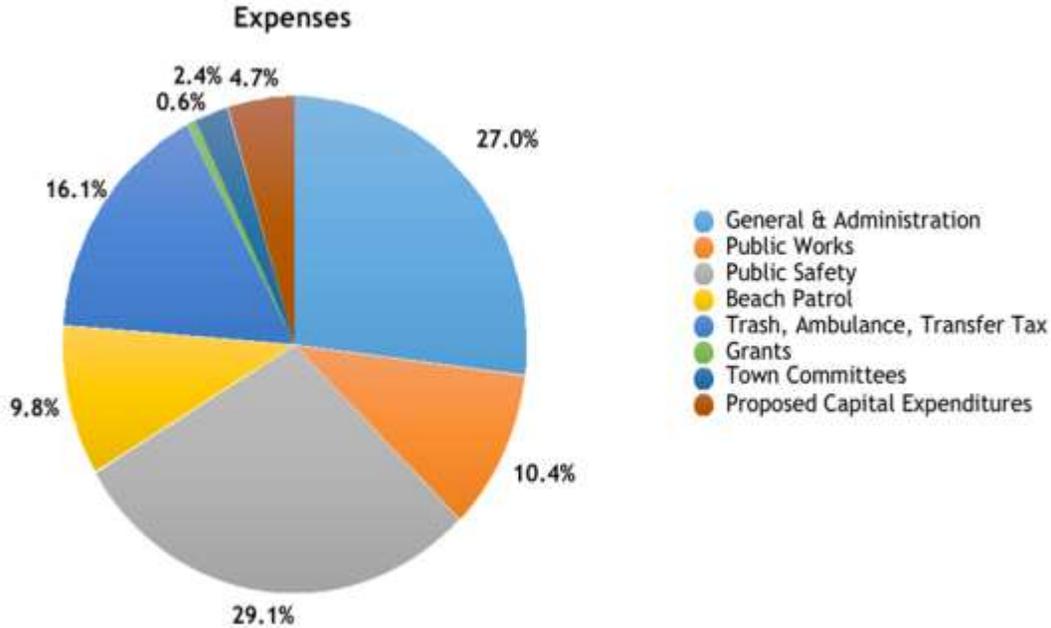


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b. Expenses

The Town of South Bethany has four major expense categories: 1) General and Administrative; 2) Public Safety; 3) Beach Patrol; and 4) Public Works. The breakdown of expenses budgeted for FY 2017 is presented in the pie chart below.



c. Reserves

The Town maintains multiple Reserves for the Operational Budget as necessary. In addition it maintains unassigned funds for a similar purpose and use in areas not having an assigned Reserve.

- Capital Reserve:
The Town adopted a Capital Asset Replacement and Maintenance (ARM) Fund and Depreciation Policy in FY2016. The Town Council allocated \$988,606 to the Capital (ARM) Reserves in FY2016. This should continue until sufficient funds are reserved for future needs.
- Operation Reserve:
The Town adopted an Operational Reserve Policy in FY2016 which requires three to five months of operating expenses be allocated to an Operational Reserve account. This fund currently has a balance of \$588,000.
- Unassigned Funds:
There are uncommitted funds in excess of \$300,000 that could be allocated to Reserve funds or any other use designated by the Town Council.

d. Capital Projects

Initial plans have been drafted for the expansion of Town Hall and the Police Department buildings. In late 2015, the Budget and Finance Committee was tasked to explore various funding sources for two separate building expansion projects. These projects are expected to cost approximately \$400,000 and the timeline is 3-5 years

2. CHALLENGES

The Town relies on property driven revenues, especially Real Estate Transfer Taxes and Rental Income (nearly 37% of revenue) to fund a large portion of Town expenses. Without these two revenue sources, property taxes would have to be increased exponentially. These two revenue sources are variable and correlated to the health of the overall economy. Therefore, the Town is at risk to cyclic economic turns and could consider planning its overall expense structure and a Reserve fund planning on a longer-term basis.

The Town should review all potential revenue sources both current and newly conceived to determine ways to increase future revenues to meet inflation and Capital budgeting.

A University of Delaware paper states that Sussex County is experiencing huge growth and development in areas west of the beach. This development impacts key elements of the infrastructure, particularly roads. To offset the additional costs of this growth, the County collects a .25% impact fee on new construction. The administration of these Impact fees requires long range project planning and periodic input from those affected.

South Bethany's roads were designed for the expected loads of a seasonal residential community. The roads are narrow, uncurbed, and used by pedestrian, bike, and vehicular traffic. The seasonal surge in traffic coupled with the older design creates a challenge for the community. South Bethany finds itself now even more challenged due to the growth of the communities to its west. Vehicles now use some Town roads as a shortcut between Route 1 and Kent Avenue to avoid congestion on Route 26 and Route 1.

DelDOT's Planning Office has provided the results of the Traffic Impact Study that was required for the rezoning and new development occurring on Kent Avenue west of the Assawoman Canal. However the intersection of Kent Avenue and Black Gum Drive was not included in the study. Consequently, South Bethany has contacted DelDOT and initiated a Traffic Volume/Safety study to evaluate traffic patterns most affected by the increased volume, particularly the Cat Hill area. When the Town completes this study, it will submit it to Sussex County as an input to the County Impact Fee plan, and South Bethany may request impact funding for any costs associated with any new measures that may be required to assure the safety of its residents as a result of County development.

3. RECOMMENDATIONS

The Town could consider to do a benchmark review of job content and compensation for both Administrative and Police personnel every two years. The Town should also consider the implications of long-term personnel cost growth over the plan period.

The Town could consider conducting a long term budgeting process that includes revenue projections along with operational and capital expenditures.

SOUTH BETHANY COMPREHENSIVE PLAN

July 2016

The Town, acting in conjunction with the B&F Committee should assure that life cycle costs are estimated, reviewed and considered and the project/expenditure should provide a complete cost estimate of the asset over the expected life prior to seeking Council approval for such acquisition.

The Town could explore combining Town provided services with other local jurisdictions if and when it becomes economically necessary.

The Town could continue to review permits and fees to encourage and provide property owners with maintenance incentives.

H. SUMMARY

While the CP contains a comprehensive list of objectives and strategies for each goal, the following summarizes the primary recommendations and priorities to be immediately considered for implementation for the 2016-2026 Comprehensive Plan:

1. The following key issues require further Town planning and/or revisions to achieve the goals identified in this Plan.
 - a. Sustain beach and dune structure in the face of periodic storms, potentially reduced federal and state support and the need to coordinate with neighboring towns.
 - b. Improve and maintain water quality of the Town's navigable canals and waterway accesses.
 - c. Plan to address the following:
 - 1) Improve lighting to modern community standards;
 - 2) Perform annual street maintenance;
 - 3) Improve traffic flows in key areas;
 - 4) Reduce the visual impact of overhead utility wires;
 - 5) Improve beach access;
 - 6) Survey and dredge Town waterways; and
 - 7) Develop a strategy tailored to Town needs consistent with regional approaches to mitigate the effects of Sea Level Rise.
2. To achieve the above, the Planning Commission recommends that:
 - a. Council consider assigning the Planning Commission with the development of a 10-year major project plan.
 - b. Council annually reviews actual achievements, plans and challenges.
 - c. Council tasks the Planning Commission with annually updating the CP and adjusting goals, objectives and action items based on Council and public input. The Planning Commission will consider changes needed to the 10 year plan and submit to Council. Upon Council approval or amendment these will be included in the Comprehensive Plan Annual Report update to OSPC and will be submitted by July 1.
3. Review Town Codes, permit and fee requirements in consideration of community input, removal of inconsistencies and obstacles to homeowner improvement and/or maintenance of properties.
4. Consider using independent professional consultants to complete the baseline assessments and recommendations for the SLR Plans in #1 above and to complete the SLR study begun in 2015.
5. Due to lead times and permitting issues, consider expediting coordination with DNREC and begin the process leading to dredging necessary to improve canal accesses to Jefferson Creek, Little Bay and Little Assawoman Bay.

SOUTH BETHANY COMPREHENSIVE PLAN

July 2016

Mayor:	<u>Pat Voveris</u>	e-mail address:	patvoveris@gmail.com
Town Manager:	<u>Maureen Hartman</u>	e-mail address:	townmanager@southbethay.org
Chair, Planning Commission:	<u>Richard Oliver</u>	e-mail address:	dormoliver@msn.com
Town Clerk:	<u>Janet Powell</u>	e-mail address:	townclerk@southbethany.org

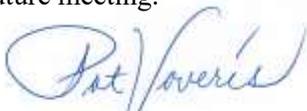
SOUTH BETHANY TOWN COUNCIL MEMBERS

Sue Callaway	Mayor Pro-Tem
Don Boteler	Treasurer
Tim Shaw	Secretary
Wayne Schrader	Member
Carol Stevenson	Member
Frank Weisgerber	Member

PLANNING COMMISSION MEMBERS

Joseph Conway
George Reese
John Whitney
David Wilson
Linda Lewis
Sharon Polansky
Scott Fischer
John Janowski

On behalf of the Town of South Bethany, I respectfully submit this Comprehensive Plan report to the Delaware Office of State Planning Coordination. The information contained in the report is correct and complete. This Comprehensive Plan has been made available to our owners and residents for review and comment and will be adopted by the South Bethany Town Council at a future meeting.



Signature of Mayor

August 4, 2016

Date

Pat Voveris

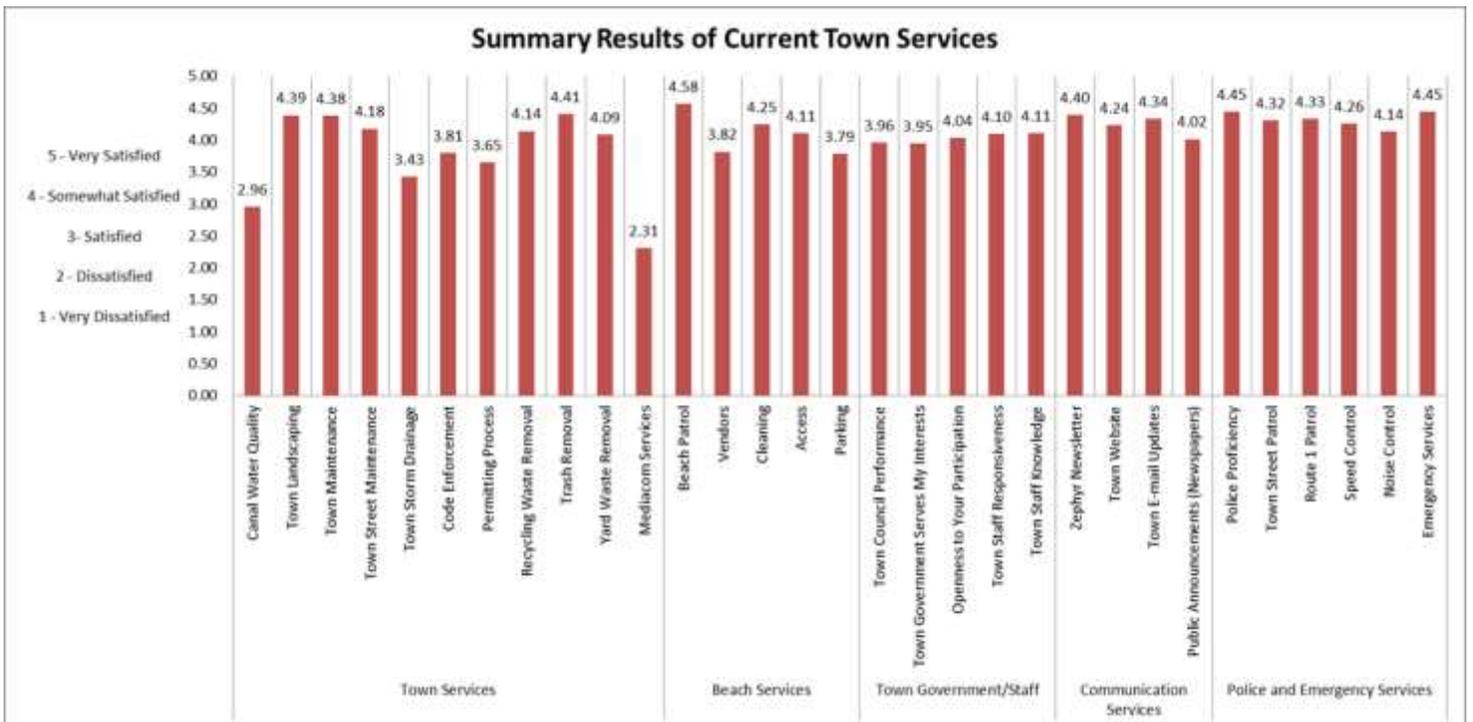
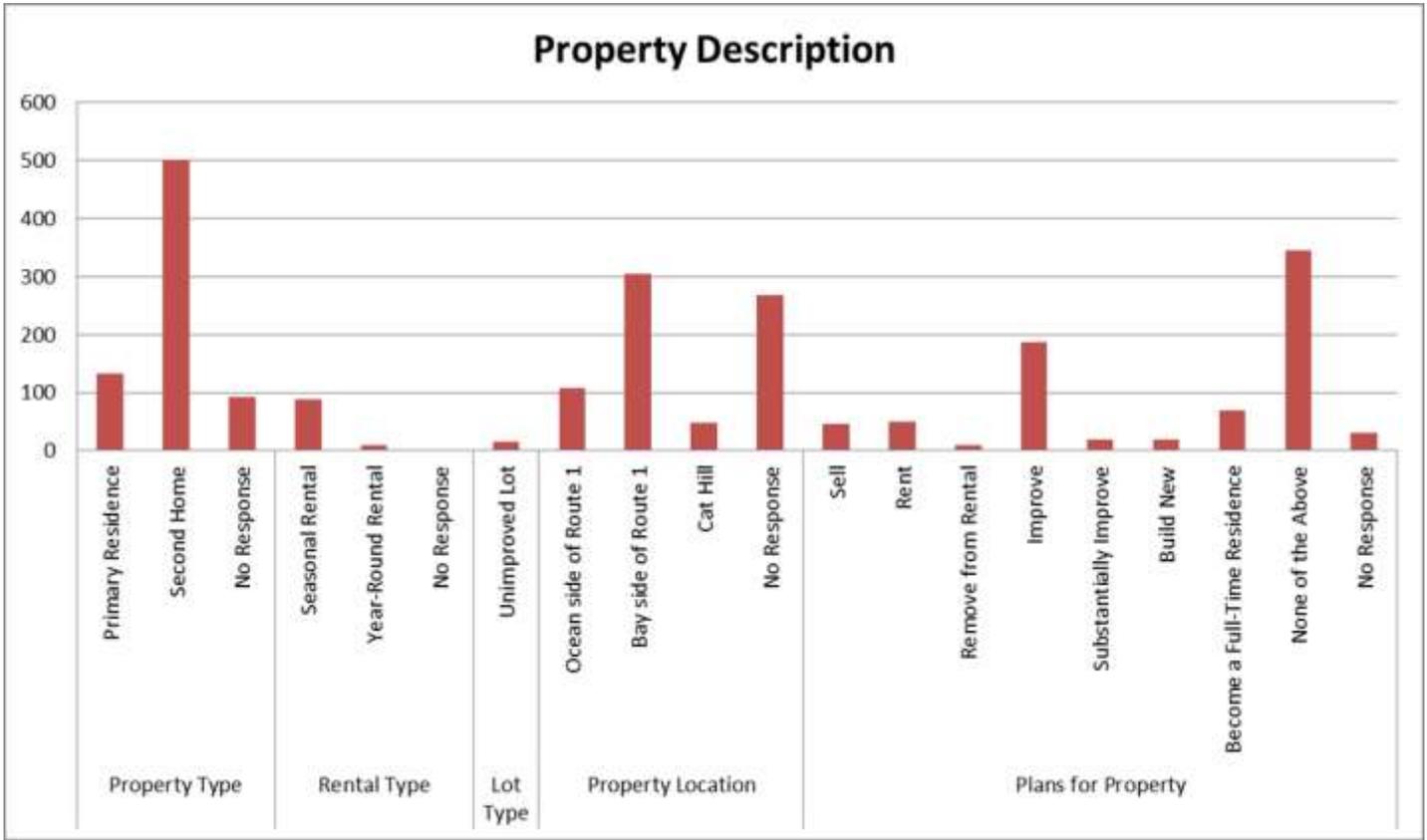
Printed Name of Mayor

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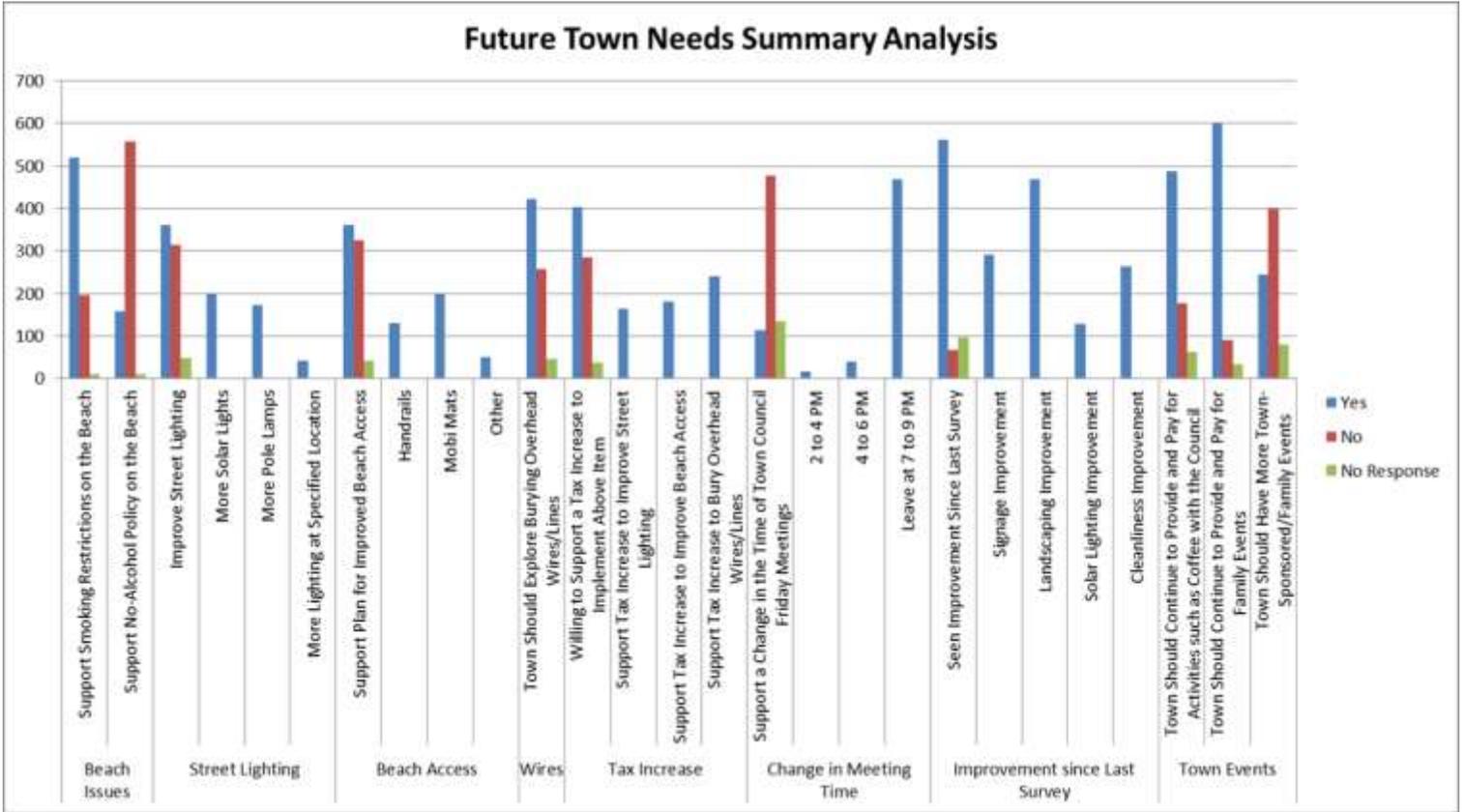
ATTACHMENT A

2015 TOWN SURVEY SUMMARY



SOUTH BETHANY COMPREHENSIVE PLAN

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ATTACHMENT B**Key Dates and Events in the Town's History**

- 1952 Mr. & Mrs. Richard Hall purchase 130 acres and name it South Bethany
- 1952 Construction of the South Bethany canals begins and lasts until 1962
- 1959 Property owners number 500
- 1962 "The Perfect Storm" aka "Storm of the Century" devastates Delaware's entire coast
- 1965 Governor Charles Terry Jr. signs a bill allowing the incorporation of South Bethany
- 1966 Homeowners defeat first referendum to incorporate
- 1969 Homeowners approve referendum to incorporate the Town of South Bethany and the State approves
- 1969 First Town Election held for 7 Commission seats, including the first Mayor
- 1969 "Town Office" opens in May Felerski's house (5 N 2nd St.) and remains there until 1978
- 1969 Homes number 250 with 15 full-time residents
- 1971 Life Guards first hired to protect beach and bathers
- 1972 Sussex County places a moratorium on building permits within 1000 feet of the ocean to ensure restoration of the primary dune
- 1972 Installation of sewer lines starts and all homeowners required to participate
- 1972 York Beach and Paradise Shores annexed in August
- 1974 Severe Nor'easter buffets beach with considerable beach & street damage
- 1974 Bayside Tennis Club opens; initially known as the "Iggie Hall Tennis Club"
- 1977 Sewer system completed
- 1977 First two traffic lights installed at the North and South ends of Town on Route 1
- 1977 Town receives a federal grant to build a Town Hall on land donated by Mrs. Hall
- 1978 First Town Hall and office dedicated on the land where today's Town Hall is located
- 1980 Ocean freezes and canals freeze over – a recorded first
- 1981 Delaware Supreme Court lifts the moratorium on permits for construction on the dune
- 1981 And 1982, Nor'easters plague beach & severely damage Ocean Drive
- 1982 Sharp Energy begins providing underground propane gas to residents
- 1983 Sandpiper Village annexed in April
- 1983 South Bethany Property Owners Association (SBPOA) formally organized
- 1983 Another serious Nor'easter pounds Town and drops over a foot of snow
- 1983 1,282 pieces of property, homes number 748 with 105 full-time residents
- 1985 Rip rap mandated for all ocean front homes to protect Ocean Drive
- 1985 Beach replenishment program gives Town an engineered beach to recover lost sand
- 1985 Cat Hill area annexed and Cat Hill Development opens
- 1986 Cat Hill Water Company constructed
- 1992 Cat Hill conveys 22 acres of wetland to the Town
- 1992 Neighborhood Watch formed and becomes part of SBPOA
- 1992 Worst Nor'easter in living memory to date; mandatory evacuation is declared
- 1998 Artesian Water constructs water tower and begins providing water service from street
- 1998 Chesapeake Utilities installs lines for future ability to provide gas by Sharp Energy
- 1998 Severe storm pounds beach and a mandatory evacuation is declared
- 1999 First beach replenishment implemented by Army Corp of Engineers
- 2003 Nor'easter strikes again and the National Guard helps South Bethany
- 2004 Underground gas storage facility installed behind the Town
- 2008 Current Town Hall and separate Police building dedicated
- 2008 "Fifty Year" beach replenishment includes 16 foot protective dune
- 2010 The Town purchases Richard Hall Memorial Park from the Hall family heirs
- 2011 Bio-retention gardens and extensive landscaping added to Route 1
- 2012 "Superstorm Sandy" brings worst bayside flooding in memory with 800 homes affected

ATTACHMENT C

**HEALTHY COMMUNITY CHECKLIST
AND EXPLANATIONS**

The Comprehensive Plan Healthy-Community Checklist

Pedestrian/Bicycle Accessibility	Check	Page #
1 Community or town goal that emphasizes pedestrian and/or bicycle facilities		
2 Community or town goal to enhance children’s pedestrian and bicycle safety		
3 Encouragement to start or enhance Safe Routes to School Programs		
4 Future development recommendation for increased pedestrian infrastructure		
5 Future development recommendation for increased bicycle infrastructure		
6 Recommendation for a pedestrian and/or bicycle study		
7 Inclusion of or future recommendation for a Master Pedestrian Plan		
8 Inclusion of or future recommendation for a Master Bicycle Plan		
9 Prioritization of pedestrian improvements		
10 Prioritization of bicycle improvements		
Mixed Use/Compact Development	Check	Page #
11 Future development recommendation for additional elements of a pedestrian-friendly built environment**		
12 Recommendation for a Traditional Neighborhood Development Ordinance*		

Complete Streets Principles	Check	Page #
13 Community or town goal to reduce automobile traffic throughout the town		
14 Development regulations requiring sidewalks		
15 Future development recommendation for streetscaping features		
16 Future development recommendation emphasizing pedestrian improvements in the CBD or downtown area to increase business and create a sense of place		
17 Future development recommendation for traffic-calming measures on local streets		
18 Recommendation for multi-modal infrastructure supporting transit use		
19 Recommendation to identify service gaps and deficiencies in mobility for people of all ages and abilities		
20 Recommendation to develop a prioritization plan for addressing mobility issues for people of all ages and abilities in the transportation system		
Access to Healthy Food	Check	Page #
21 Community or town goal to locate shopping facilities near residences		
22 Community or town goal emphasizing public health, including physical activity and access to healthy food		
Open Space and Recreation	Check	Page #
23 Community or town goal that emphasizes parks and recreational facilities		
24 Recommendation for open-space policies and conservation-oriented land use plans		

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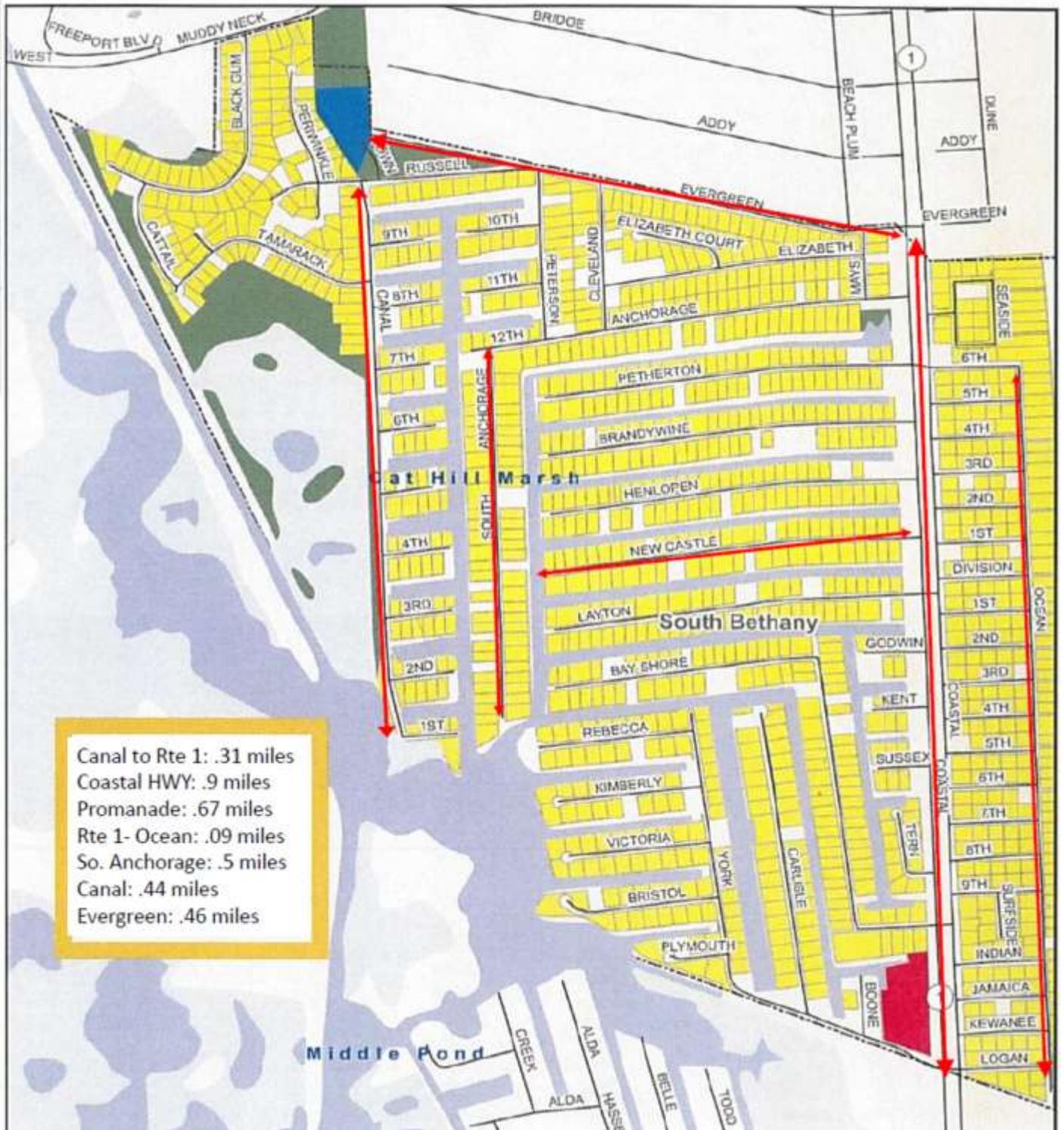
1. The Town continues to maintain roads, sidewalks, and waterways which support pedestrians, bicycling, and watersports. In addition, it is situated close to Delaware hiking and biking trails and inland waterways which encourages healthy activities. (p.15)
2. The Town provides education and safety checks to enhance safety for children walking or biking.
3. The Town encourages school age children to attend Town provided education and safety checks.
4. The Town encourages future development of infrastructure that may enhance pedestrian safety.
5. Bicycle racks at beach access and commercial locations continue to encourage biking to Town attractions. Access information for the Assawoman Canal Trail will be made available as the trail is completed.
6. No undeveloped land is currently available for additional exercise opportunities. Existing roads, walkways, bicycle lanes, the nearby Assawoman Canal Trail, beaches and waterways are used to create opportunity for exercise.
7. N/A
8. N/A
9. The Town works to provide walking and bicycling course information for current courses.
10. There are no current Town plans to prioritize bicycle improvements.
11. South Bethany has developed a program to create beautified street canal ends owned by the Town. Volunteers donate monies, labor and materials to enhance these small “garden- like” settings. Over 30 have been completed and attract residents and visitors alike to walk to them for a respite on the canals. Future development of additional canal end enhancements will further the strategy to attract walking by providing local “targets.”
12. N/A
13. The Town continues to study and employ measures to reduce automobile traffic throughout the Town. The Traffic Committee continues to address pedestrian safety, speed, and volume concerns particularly in the Cat Hill area.
14. N/A
15. SAME
16. The Town continues to offer walkable recreational and social activities for the community to provide a sense of place.
17. The Town continues to address traffic calming in high volume areas, particularly where pedestrian safety is a concern.
18. N/A
19. Mobility and access to the beach continue to be addressed with beach wheelchairs, mobi-mats, and a wooden access ramp.
20. N/A
21. N/A
22. The Town provides an open beach and pathways for physical activity. Summer exercise programs including yoga are held as available. Briefings concerning health and safety are provided by the Town News Update service. Access to healthy food at local grocery stores and farmer’s markets is available.
23. There are no plans to create additional exercise space other than the beach areas.
24. The Town maintains one open space area as a conservation land use. It is not approved for recreational development.

SOUTH BETHANY COMPREHENSIVE PLAN

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ATTACHMENT D

WALKING AND BICYCLE PATHS AND DISTANCES
TOWN OF SOUTH BETHANY



ATTACHMENT E

HISTORY OF SOUTH BETHANY WATER QUALITY PROJECTS

Water quality in the South Bethany canals is adversely affected by the discharge of storm water and non-specific source nutrients into the canals, the addition of nutrients from lawn maintenance and animal waste and outdoor shower and roof gutter discharge into the canals, and by poor circulation of the canals, particularly at canal dead ends.

The largest source of storm water runoff into the canals is a 65-acre corridor along Route 1 from north of Sea Colony to York Road on the south. Most of that area drains into the Anchorage Forebay located at the east end of Anchorage Canal. The Forebay acts as a “holding pond” to allow pollutants in the storm water to settle out before discharging into the canal. The effectiveness of the Forebay is insufficient to meet the storm water treatment demand because it is limited by its small size relative to the amount of storm water discharging into it.

The Center for the Inland Bays (CIB) conducted a study in 2010 to determine the best method for mitigating the nutrient load into the canals from the 65-acre corridor at that time. As a result of this study, the Town, in partnership with the CIB, DelDOT, the University of Delaware, and surrounding communities of Middlesex Beach and Sea Colony, built bio-retention areas in front of Sea Colony, on the west side of Route 1, and in the median to collect and retain storm water before it reaches the canals to allow more pollutants to be absorbed by the ground. The 13 bio-retention areas at catch basins were landscaped with native trees and shrubs to stabilize the soil and improve the performance of the bio-retention areas. DelDOT, the CIB, the EPA, and the Delaware Department of Agriculture Forestry Service provided grants, and the Town of South Bethany contributed additional funding and in-kind services for this work. The tree planting and landscaping plan was developed with the assistance of the University of Delaware.

In addition to installing bio-retention areas along the west side of the Route 1 corridor and in the median, eleven bio-retention areas were installed on the east side in 2014. The Town in partnership with the CIB, DelDOT, the University of Delaware and neighboring communities supported this work.

A comparison last year of the canal water at the east end of Anchorage Canal before and after the bio-retention area installation showed a 35% reduction in the nitrate content for the short period of time that information is available. While it is too early to tell the specific long-term water quality improvement levels, it is hoped that these efforts will help to improve the water quality in our canals.

In addition to the Route 1 corridor projects, the Town was awarded a DNREC grant for the treatment of 10 acres of storm water runoff from the Sandpiper Pines section of South Bethany. Six in-situ bio-retention/infiltration trench areas and two infiltration trenches will be installed within Sandpiper Pines. The estimated pollutant load reduction into Anchorage Canal and the Little Assawoman Bay is 15 pounds of nitrogen, 2 pounds of phosphorus and 453 pounds of sediment per year. Detail design is complete and construction may be completed by June 2016. However, the work that can be done to treat all storm water entering the canals is yet to be completed. This is contingent on funding sources.

The Town has also completed several storm drain retrofits on Town roads that slow storm water runoff to allow more ground absorption of pollutants. Modifications were made to some catch basins and some check valves were installed to prevent back flow from the canals during high tides.

SOUTH BETHANY COMPREHENSIVE PLAN

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The secondary objective is education of the community to water quality issues with South Bethany canals and the Little Assawoman Bay. The Town is trying to accomplish this through newsletters, targeted mailings, and educational outreach workshops and seminars. At least one seminar open to all members of the Community has been held annually during the past few years.

Residents have been advised to avoid discharging grass clippings into the canals, to use fertilizer sparingly, and to incorporate rain gardens where possible to capture pollutants from the first flush of storm water. Additional voluntary actions requested include disconnecting downspouts and outdoor showers from drains leading directly to the canals. Ordinances address these last issues for new construction.

The Town is currently working with the Center for Inland Bays on a project to investigate possible improved water quality in dead end canals using oysters and floating wetlands. Approximately 22 bushels of oysters in 100 cages and 8 floating wetlands with three different types of vegetation were installed in the York Canal in June 2015. Each floating wetland is 75 square feet. Three continuous monitors measure dissolved oxygen, salinity, turbidity, and temperature. The project will continue for two years to determine the effect of the oysters and floating wetlands on water quality in the York Canal.

Some bayside residents (west of Route 1) participate in an oyster gardening program sponsored by the CIB. The CIB provides floats and cages with oyster spat to resident volunteers who tie the float to their dock or bulkhead. The oysters are periodically rinsed over a 2-2 ½ years when they are removed and “planted” in a suitable location in the bay for regeneration. The oysters filter the water as they are growing and make what is thought to be modest improvements to the water quality. Participation in this program is growing.

A two-year pilot project to evaluate air diffusers as a means to increase dissolved oxygen in the canal water was completed in 2014. In April 2013, six diffusers were installed in Petherton Canal, 200 ft. apart, and each was supplied with air from a compressor. The adjacent Brandywine Canal served as a control. Dissolved oxygen was measured three ways: weekly by boat; continuously by a bulkhead mounted monitor; and weekly by a hand held monitor at the canal dead end. Results showed no significant increase in average dissolved oxygen, although the distribution of dissolved oxygen over the canal depth was more uniform. The project was terminated in November 2014.

Low dissolved oxygen is caused by nutrients in the water and also caused by poor circulation in canals, particularly those located farthest away from the opening to the Outer Bay and canals with dead ends. The Town conducted a study in 2007 that identified a tidal pump concept that would be effective in improving circulation for many of the dead end canals. The concept was to connect the canal system with the ocean to allow water exchange through tidal height differences and improve circulation. The estimated cost of \$7 million was prohibitive for the Town and DNREC declined to support it.

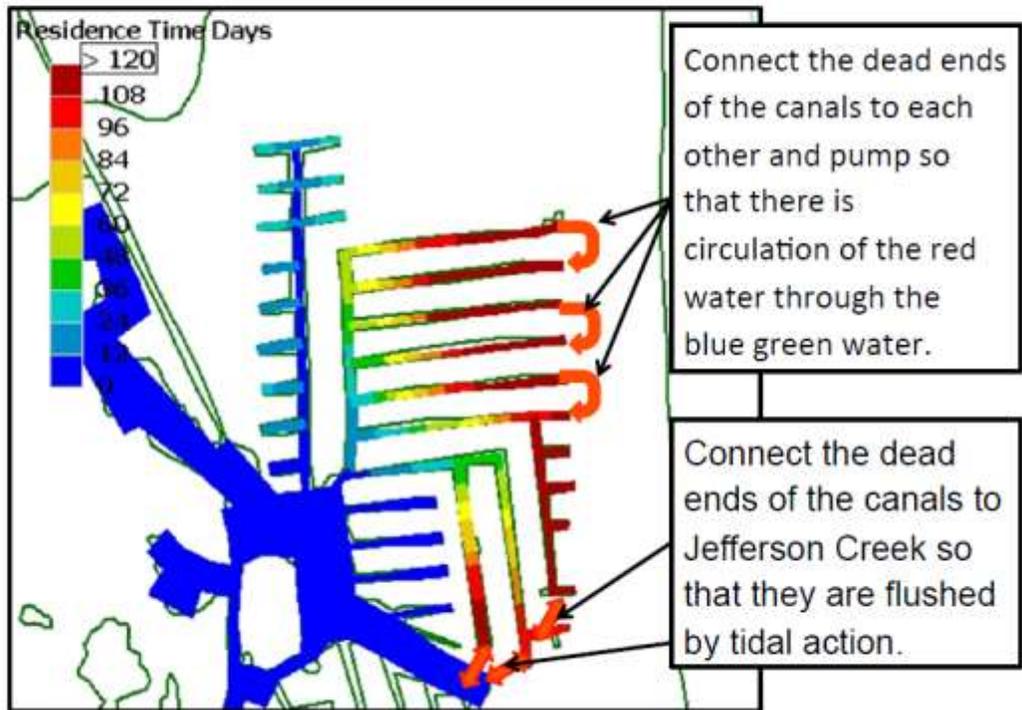
Volunteers have been participating in the Citizen Monitoring Program administered by the University of Delaware for 24 years. Currently, seven volunteers in South Bethany measure dissolved oxygen, salinity, temperature, and turbidity at 11 sites in Town. Water samples are collected for nutrients, bacteria, and harmful algae blooms once a week in the summer and once a month in the winter. The University of Delaware oversees the Citizen Monitoring Program and collects the data from many towns in the inland bay area and reports results once a month in the summer. The data provide a record of the canal water quality as well as a basis for comparison with other segments of the Inland Bays. South Bethany should continue to participate in the Citizen Monitoring Program.

ATTACHMENT F

CANAL CIRCULATION



Study is Required to Evaluate Potential Circulation Concepts



ATTACHMENT G

HISTORY OF SOUTH BETHANY SEA LEVEL RISE PROJECTS

In 2013, as a first step in developing Sea Level Rise adaptation strategies, the Town, in partnership with the South Bethany Property Owners Association and the URS Corporation, received a matching Coastal Management Assistance Grant from DNREC to establish a baseline elevation survey to assist in further defining protection and accommodation options. The work included conducting centerline surveys along 46 road corridors and associated bulkheads and catch basins and developing a GIS map from the data. Work was completed in 2014.

Using the elevation data generated in 2014, the Town is currently developing a multi criteria evaluation for Sea Level Rise adaptation. This work has been contracted with Anchor QEA, LLC and is sponsored by DNREC in the form of a Coastal Management Assistance Grant. The tasks include: developing an extensive GIS data base, selecting Sea Level Rise scenarios and evaluation criteria; conducting Sea Level Rise inundation mapping; and presenting results in two public meetings. This work was completed in 2016.

In August 2014, the Town approved an ordinance to provide incentive to build the first floor of houses to higher elevations. It raised the allowable maximum house height by two feet provided the house has at least two feet of freeboard. Freeboard is the distance from the Base Flood Elevation to the first floor of the house. The floodplain ordinances in the Town Code were also updated to comply with FEMA and DNREC recommendations in 2015.

Three public outreach meetings have been held since the Sea Level Rise and Storm Surge Committee was formed:

- Meet the Mayor Meeting May, 2013, “Sea Level Rise and Storm Surge”
- Public Outreach May 23, 30, June 6, 2014, “Sea Level Rise and Storm Surge Issues”
- Public Outreach September 25, 26, 2015, “Flood Damage Mitigation and Insurance Costs”

ATTACHMENT H

LIST OF PUBLIC UTILITIES

1. Electricity —Delmarva Power
2. Public Water—Artesian Water Company
3. Waste Water—Sussex County
4. Propane—Sharp Energy
5. Telephone (Landline)—Mediacom, Verizon
6. Telephone (Cellphone)—ATT, Verizon, Sprint
7. Internet—Mediacom, Verizon
8. Television—Mediacom, DIRECTV, DISH

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ATTACHMENT I

TOWN WEBSITE – WWW.SOUTHBETHANY.ORG



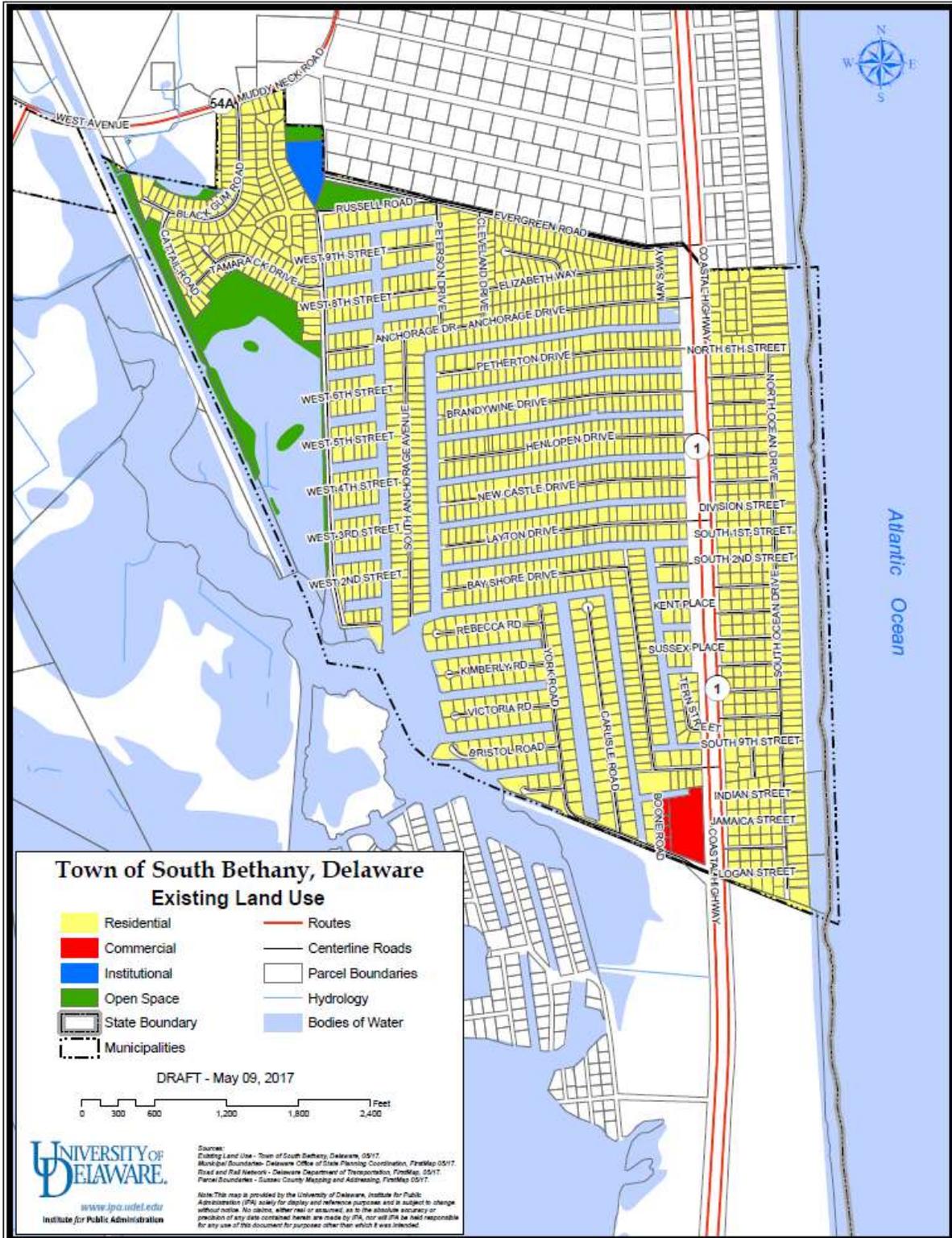
SOUTH BETHANY COMPREHENSIVE PLAN

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ATTACHMENT J

EXISTING LAND USE MAP

TOWN OF SOUTH BETHANY



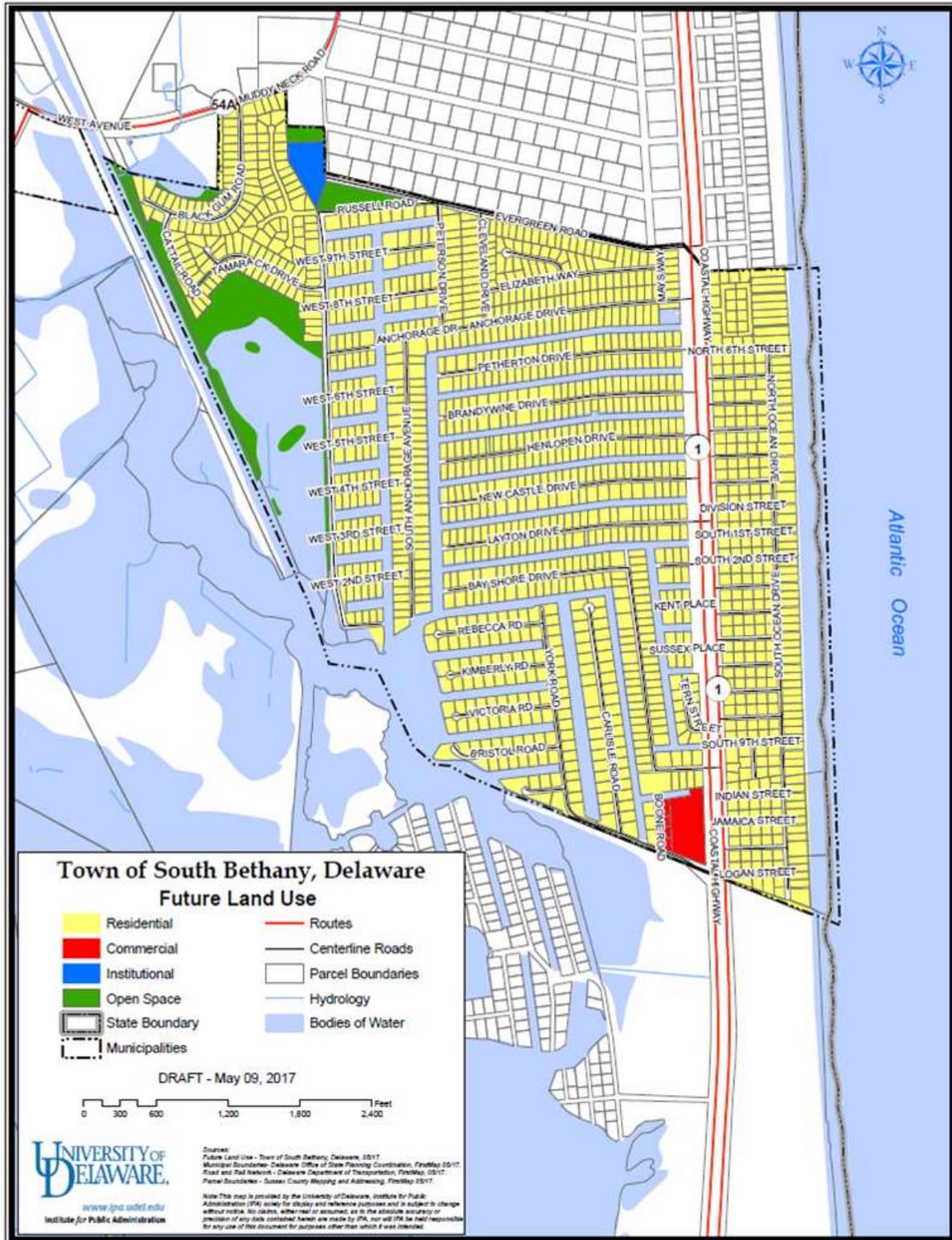
SOUTH BETHANY COMPREHENSIVE PLAN

July 2016

ATTACHMENT K

FUTURE LAND USE MAP

TOWN OF SOUTH BETHANY



July 2016

ATTACHMENT L

**SEA LEVEL RISE VULNERABILITY
ASSESSMENT
TOWN OF SOUTH BETHANY**

Prepared for

The Town of South Bethany

Prepared by

Anchor QEA, LLC

This document was prepared by Anchor QEA, LLC, for the Town of South Bethany (Town) using federal funds under award NA14 NOS 419 0123 from the Delaware Coastal Programs (Delaware Department of Natural Resources and Environmental Control [DNREC]), and the Office for Coastal Management (OCM), the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the authors, and do not necessarily reflect the views of the OCM, NOAA, or the U.S. Department of Commerce.

March 2016

July 2016



6 Penns Trail, Suite 201
Newtown, Pennsylvania 18940
Phone 267.753.6301
Fax 267.753.6306
www.anchorqea.com

MEMORANDUM

To:	George Junkin, Town of South Bethany	Date:	March 16, 2016
From:	Ram Mohan, Ph.D., Matthew Henderson, and Brandon Raymond, Anchor QEA, LLC	Project:	151308-01.01
Cc:	Jack Whitney and Dick Oliver, South Bethany Sea Level Rise & Storm Surge Committee Danielle Swallow, DNREC		
Re:	Town of South Bethany Sea Level Rise Vulnerability Assessment		

INTRODUCTION

The changing climate, local geography, and elevation of the Town of South Bethany (Town) put it at increasing risk to coastal flooding resulting from sea level rise (SLR) and storm surge (Note that the storm surge is not addressed in this study). Currently, the Town experiences periodic tidal flooding and occasional ocean over-wash flooding during the worst coastal storm events. In order to determine and prioritize SLR risks faced by the Town, a GIS-based inundation analysis was used to simulate the effects of SLR over varying scenarios and evaluate the level of inundation to various types of critical infrastructure.

The general methodology for the inundation analysis and supporting evaluations were as follows:

1. A review of published guidance on SLR and historical SLR rates was performed to develop planning-level SLR scenarios for the Town.
2. A qualitative evaluation of infrastructure types was performed to prioritize critical infrastructure for vulnerability assessment.
3. Infrastructure survey data were used in conjunction with the projected SLR scenarios to specifically evaluate critical infrastructure that is most vulnerable to SLR.

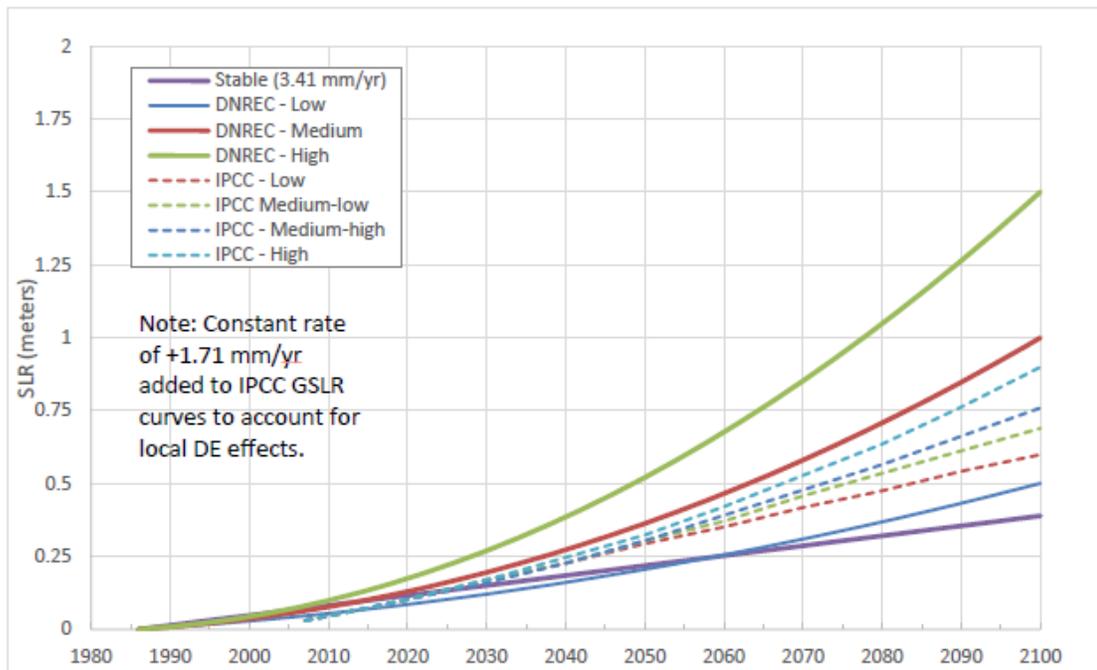
The details of the scenario selection, infrastructure prioritization, and inundation analysis are summarized in the following sections.

SEA LEVEL RISE SCENARIOS

SLR is a combination of global trends, as well as local effects, as discussed in the following sections.

Global Sea Level Rise

Global SLR (GSLR) is the projection of estimated future SLR due to the effects of climate change, including increased sea water temperature and ice sheet melt. A wide range of estimates have been developed by scientists throughout the world, including predictions by the Delaware Department of Natural Resources and Environmental Control (DNREC) and the Intergovernmental Panel on Climate Change (IPCC), as depicted in the figure below.



Comparison of DNREC to IPCC SLR Predictions

For this analysis, two comprehensive studies were reviewed to determine the most appropriate GSLR scenarios for the Town. The first was a review summary document from the DNREC Sea Level Rise Technical Workgroup, written to support the DNREC Vulnerability Assessment report, *Preparing for Tomorrow's High Tide* (DNREC 2012). The

document, *Recommended Sea Level Rise Scenarios for Delaware* (DNREC 2009), provides a summary of various studies and guidance, in order to determine an appropriate range of SLR scenarios for Delaware. The report summarizes the review and final recommendations.

Based on the Technical Workgroup’s review, DNREC recommends the use of three planning scenarios for SLR by the year 2100: 0.5, 1.0, and 1.5 meters. These scenarios correspond to the GSLR scenarios recommended by the U.S. Army Corps of Engineers (USACE; 2009). For intermediate time horizons, the projection curves are described by the following equation:

$$E(t_2) - E(t_1) = 0.0017(t_2 - t_1) + b(t_2^2 - t_1^2)$$

where:

- t_1 = time between the project’s construction date, or the current year, and 1986
- t_2 = time between a future date at which one wants an estimate for SLR and 1986 (USACE 2009)
- b = 2.36E-05, 6.20E-05, and 1.01E-04 for the low, medium, and high projection curves, respectively

For planning purposes for the Town, a 50-year time horizon is recommended because this is the practical design life for typical municipal civil works projects. Thus, 2065 was selected as the target year for assessment of inundation due to SLR.

The second study reviewed for this analysis was *Climate Change 2013: The Physical Science Basis* from the IPCC Fifth Assessment Report (AR5; IPCC 2013), which considers a range of emission scenarios and provides GSLR projections up to the year 2100. A key difference between AR5 and the previous assessment report (IPCC 2007), which was reviewed in DNREC (2009), is the inclusion of land-ice contribution estimates. For this reason, more weight is given to AR5 in this analysis. The results of AR5 show a range of SLR projections between 0.6 and 0.9 meters by 2100.

A comparison of the two studies shows that the entire range of the AR5 GSLR scenarios falls within the low and medium DNREC-recommended scenarios. Therefore, the low and

medium projection scenarios from DNREC (2012), with a 50-year time horizon (2015-2065), are recommended for this analysis. The resulting 50-year GSLR projections are provided in Table 1.

Table 1
Recommended 50-year Global Sea Level Rise Scenarios

Scenario	Global Sea Level Rise (feet)
Lower Bound	0.7
Upper Bound	1.4

Local Sea Level Rise

Local SLR (LSLR) can be determined based on local historical tide gage data. This LSLR rate is estimated as a linear trend based on historical water level data and includes local/regional land subsidence or uplift, and regional oceanographic changes such as changes in circulation patterns.

The National Oceanic and Atmospheric Administration (NOAA) tide gage station in Lewes, Delaware (NOAA Station ID 8557380; NOAA 2015), which contains data from 1919 to 2014, was selected for LSLR estimates for the Town due to its relatively long data record (96 years). According to Houston and Dean (2011), seasonal and decadal fluctuations can affect the accuracy of SLR trend analysis on gages with records less than 50 to 60 years. Thus, in SLR analysis, it is customary to rely on established longer time frame data records for extrapolating trends. The U.S. Geological Survey (USGS) water level gage in South Bethany (USGS Station ID 01484696; USGS 2016) and the NOAA tide gage in Ocean City, Maryland (NOAA Station ID 8570283; NOAA 2016) are closer to South Bethany than Lewes, but only contain data records of 16 years and 39 years, respectively. Therefore, the Lewes tide gage provides the most reliable and documented timeline for historical LSLR rates in South Bethany.

By comparing the GSLR historical rate of 1.7 millimeters per year (mm/yr) (IPCC 2013) and the LSLR historical rate in Lewes of 3.41 mm/yr (NOAA 2015), local/regional effects (such as land subsidence) were estimated to be approximately 1.7 mm/yr ($3.41 - 1.7 = 1.7$ mm/yr). This equates to an approximately 0.3 feet increase over the 50 year study timeline. This

LSLR amount was added to the upper bound GSLR scenario discussed above in order to account for local/regional effects, such as land subsidence or any potential changes in regional circulation patterns. The final recommended SLR scenarios are summarized in Table 2.

Table 2
Recommended 50-year Sea Level Rise Scenarios

Scenario	Sea Level Rise (feet)
Lower Bound	0.7
Upper Bound	1.7

Note:

- 1 The upper bound GSLR scenario includes the effect of LSLR (+1.7 mm/yr) as computed from the Lewes tide gage, which corresponds to approximately 0.3 feet, over the 50-year study timeline evaluated.

CRITICAL INFRASTRUCTURE

Following selection of the SLR scenarios, it was necessary to identify and prioritize critical infrastructure to be evaluated for vulnerability to SLR. Nine separate infrastructure types were identified and prioritized according to five evaluation criteria. The infrastructure types identified for initial screening were transportation (streets), electrical/power (ground-mounted transformers), drinking water systems, sanitary sewer systems, bulkheads, Town buildings, stormwater systems (catch basins and outfalls), dunes/beaches, and open space/wetlands. The evaluation criteria considered for prioritization were public safety, influence on town operations, effects on property value, quality of life impacts, and cost effectiveness as it pertains to adaptation.

Each infrastructure type was given a score between 1 and 4 as it relates to each of the evaluation criteria, with 4 being the most important. The individual scores for each infrastructure type were summed up to a total score and subsequently ranked. The results of the prioritization evaluation are provided in Table 3.

The conclusion of this evaluation showed that the top four infrastructure types were transportation (streets), electrical/power (ground-mounted transformers), drinking water systems, and sanitary sewer systems. The drinking water and sanitary sewer systems were

subsequently ruled out due to being closed systems, largely underground. Instead, bulkheads and the stormwater system were added to the assessment due to their anticipated suitability to adaptation and direct impact on flooding.

Table 3
Prioritization Evaluation Results

Infrastructure Type	Public Safety	Town Operations	Property Value	Quality of Life	Cost Effectiveness	Total Score
Transportation (Streets)	4	4	4	4	4	20
Electrical/Power (Ground-mounted Transformers)	4	3	3	3	3	16
Drinking Water System	3	2	3	4	3	15
Sanitary Sewer System	3	2	3	3	3	14
Bulkheads	2	2	3	3	3	13
Town Buildings	3	3	2	2	3	13
Stormwater System (Catch Basins and Outfalls)	2	2	2	3	3	12
Dunes/Beaches	2	2	3	3	2	12
Open Space/Wetlands	1	1	2	2	1	7

Note:

- 1 This table was developed by averaging inputs from five Sea Level Rise & Storm Surge Committee members at the November 16, 2015 meeting.

INUNDATION ANALYSIS

Methodology

The inundation analysis was performed by adding the upper and lower bound SLR scenarios to the current estimated mean higher high water (MHHW) to obtain projected MHHW conditions for 2065.

The closest continually operating water level gage to the Town is the USGS Jefferson Creek gage located at the end of West 1st Street. As discussed, the data record of this gage is from 1999 to 2015 (16 years). To accurately compute tidal statistics, a tidal data record must cover at least one National Tidal Datum Epoch, which NOAA defines as 19 years. Therefore, the Jefferson Creek water level gage does not contain sufficient data to accurately compute tidal statistics.

Following the methodology outlined in DNREC (2012), MHHW was estimated using the NOAA VDatum tool (<http://vdatum.noaa.gov/>), and the published latitude and longitude of the USGS Jefferson Creek gage. The result of this exercise showed that MHHW is approximately 0.33 feet above North American Vertical Datum of 1988 (NAVD 88) at the Jefferson Creek gage. This estimation of MHHW agrees with the computed MHHW for Assawoman Bay (0.0995 meters [0.33 feet] NAVD 88) provided in DNREC (2012).

To evaluate the sensitivity of local MHHW estimates, the full data record at Jefferson Creek was analyzed to determine the average daily high water. The result of this analysis showed an approximate MHHW of 0.65 feet NAVD 88. This analysis shows that local water levels in the Town may be slightly higher than predicted by VDatum. This could be considered as an uncertainty in the analysis, which could be verified as additional water level data are collected at this location, in the upcoming years. However, due to potential uncertainty in computing tidal statistics on short data records, this analysis will use the MHHW of 0.33 feet as computed by VDatum and verified by DNREC (2012). The final recommended projected MHHW scenarios are provided in Table 4.

Table 4
Recommended 50-year Sea Level Rise Scenarios

Scenario	Relative Sea Level Rise (feet)	Current MHHW (2015) (feet, NAVD 88)	Projected MHHW (2065) (feet, NAVD 88)
Lower Bound	0.7	0.33	1.03
Upper Bound	1.7	0.33	2.03

Utilizing survey data obtained by URS in 2013, as well as as-built drawings for the stormwater system along Coastal Highway, the projected depth of inundation at MHHW was computed for the critical infrastructure as discussed above. This was accomplished by subtracting the surveyed elevations for each infrastructure element from the projected MHHW scenarios. Figures 1 through 12 show the inundation mapping results for bulkheads, outfall inverts, catch basin inverts, catch basin grates, street centerlines, and ground-mounted transformers.

Results

Through examination of Figures 1 through 12, several qualitative observations can be made. For example, bulkheads and street centerlines in the Southwest corner of the Town (off of York Road), along with areas around Layton Canal and New Castle Canal appear to show relatively high vulnerability to SLR. Similarly, outfalls and catch basin inverts along Coastal Highway appear to be vulnerable.

Although catch basin grates along Coastal Highway are unaffected by the upper bound SLR scenario, the catch basin inverts at these locations remain impacted. This suggests that, although no flooding would occur during dry conditions, the capacity of the stormwater system along Coastal Highway is substantially reduced at MHHW for the upper bound SLR scenario, and thus Coastal Highway could be prone to flooding in the event of a storm.

Only 7 of 100 ground-mounted transformers are impacted by the upper bound SLR scenario. This suggests that only minimal adaptation is required to improve the resiliency of the electrical system to SLR.

Table 5 provides a summary of the extent of impacts to the critical infrastructure for each SLR scenario.

**Table 5
Summary of Percent of SLR-impacted Infrastructure at MHHW**

Infrastructure Type	Lower Bound (1.03 feet NAVD 88)	Upper Bound (2.03 feet NAVD 88)
Outfall Inverts	96	100
Catch Basin Inverts	61	89
Catch Basin Grates	4	35
Bulkhead Survey Points	1	28
Ground-mounted Transformers	0	7
Street Centerline Survey Points	0	8

Note:

- 1 An infrastructure element was considered "impacted" if the projected MHHW elevation minus the infrastructure elevation was greater than zero.

RECOMMENDATIONS

The analysis presented in this memorandum should provide a good planning-level tool for the Town to begin considering prioritization of its resources for SLR adaptation. It should be noted that the impact of storm surge, nuisance flooding, and trigger points for implementation is not included in these analyses. From a review of the results (Figures 1 through 12), it is evident that the following steps are prudent next steps:

- Allow bulkheads to be raised by property owners in areas showing high vulnerability to SLR
- Install backflow preventers on Town stormwater outfalls
- Raise streets levels in areas showing high vulnerability to SLR
- Raise ground-mounted transformers that are deemed vulnerable.

In addition to these steps, the Town should also consider developing a specific SLR adaptation plan. Such a plan would include an evaluation of the potential for combined SLR and storm surge impacts, even if conceptually done, using existing Federal Emergency Management Agency and USACE models. Implementation trigger points and timing, as well as other options for potential coastal resiliency, could be evaluated as part of such a future study. This could include specific resiliency measures such as perimeter flood control berms, where applicable, and wetlands enhancement (on the west side of the Town) to provide improved resiliency. There are several grants from federal agencies that the Town could apply for, to implement such measures; however, the specific resiliency measures and a timeline for these remain to be developed. We strongly recommend that the Town implement a plan to develop such an adaptation plan to advance the findings of this study, and put them into practice.

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George Junkin, Town of South Bethany

March 16, 2016

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USGS (U.S. Geological Survey), 2016. *Measured Water Levels at Jefferson Creek, South Bethany, Delaware*. Accessed: January 2016. Available from: <http://waterdata.usgs.gov/usa/nwis/uv?01484696>.

FIGURES

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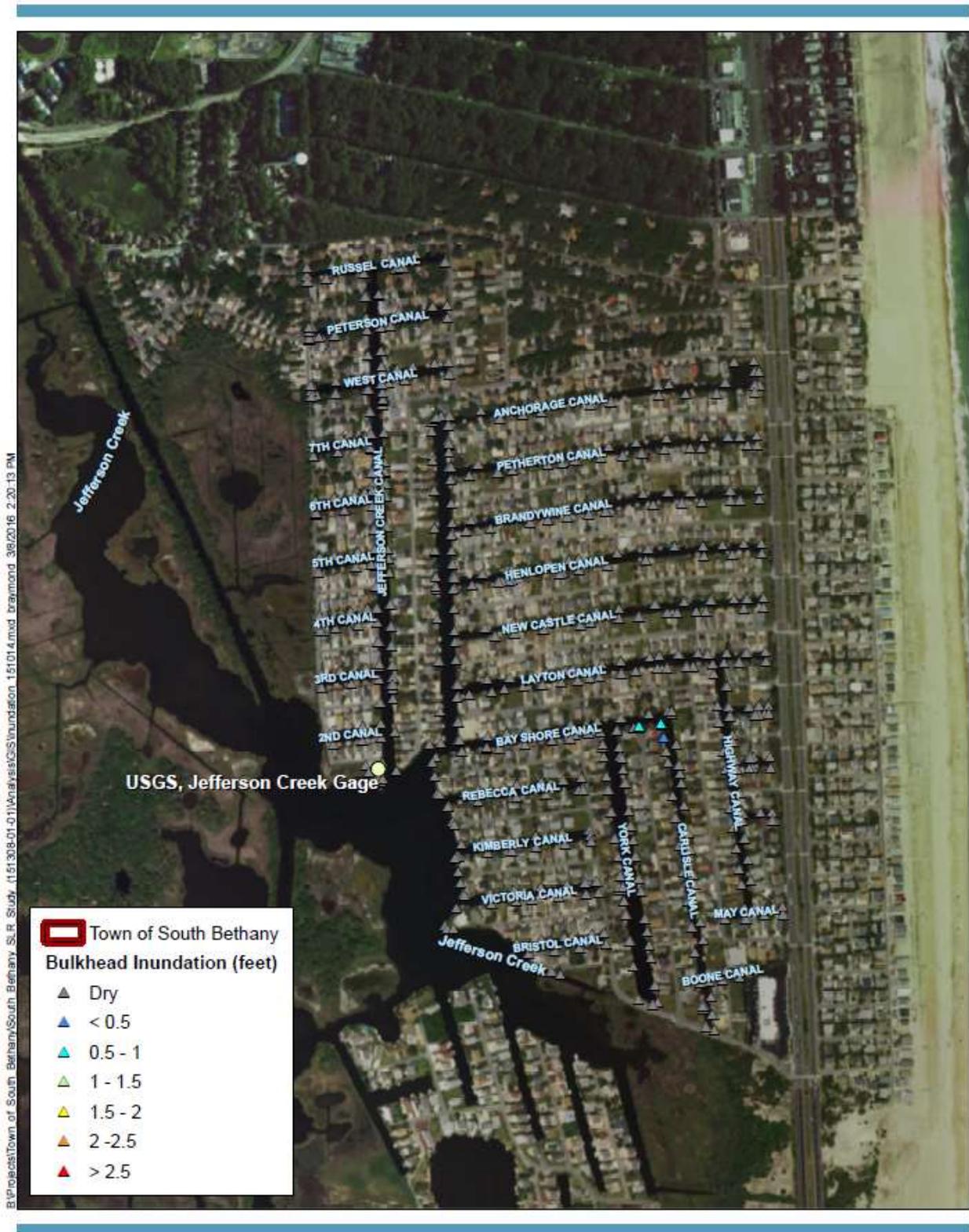
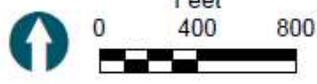


Figure 1
 Bulkhead Projected 2065 Inundation Levels for
 Lower Bound Mean Higher High Water Level
 of 1.03 feet NAVD 88
 Note: Mean Higher High Water equal to
 0.33 feet NAVD 88 in 2015.



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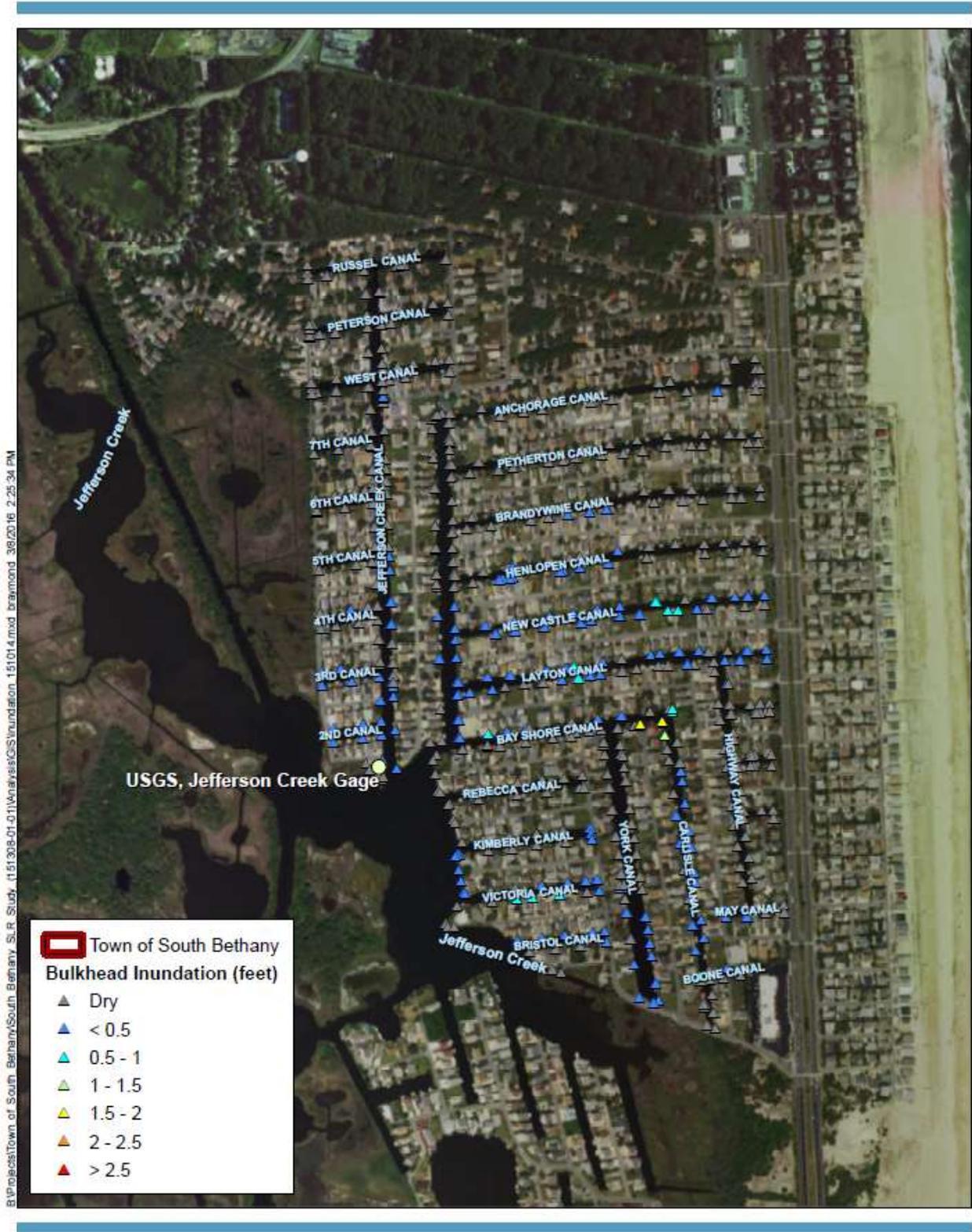


Figure 2
Bulkhead Projected 2065 Inundation Levels for
Upper Bound Mean Higher High Water Level
of 2.03 feet NAVD 88

Note: Mean Higher High Water equal to
0.33 feet NAVD 88 in 2015.



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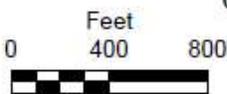


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Figure 3

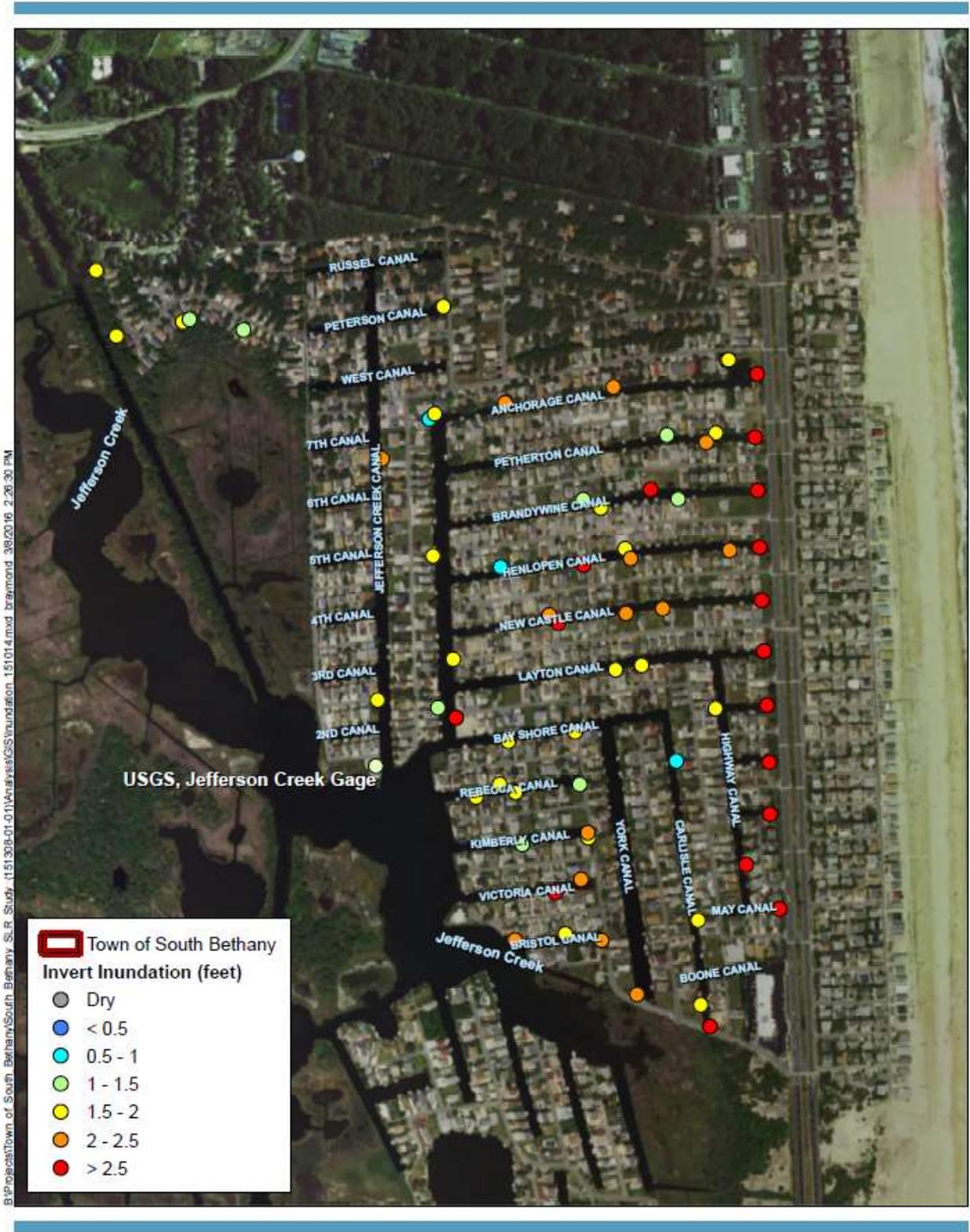
Outfall Invert Projected 2065 Inundation Levels for Lower Bound Mean Higher High Water Level of 1.03 feet NAVD 88

Note: Mean Higher Higher Water equal to 0.33 feet NAVD 88 in 2015.



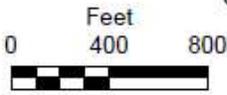
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Figure 4
 Outfall Invert Projected 2065 Inundation Levels for
Upper Bound Mean Higher High Water
 of 2.03 feet NAVD 88
 Note: Mean Higher High Water equal to
 0.33 feet NAVD 88 in 2015.



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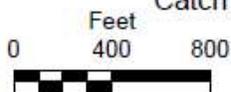
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Figure 5

Catch Basin Invert Projected 2065 Inundation Levels for Lower Bound Mean Higher High Water Level of 1.03 feet NAVD 88

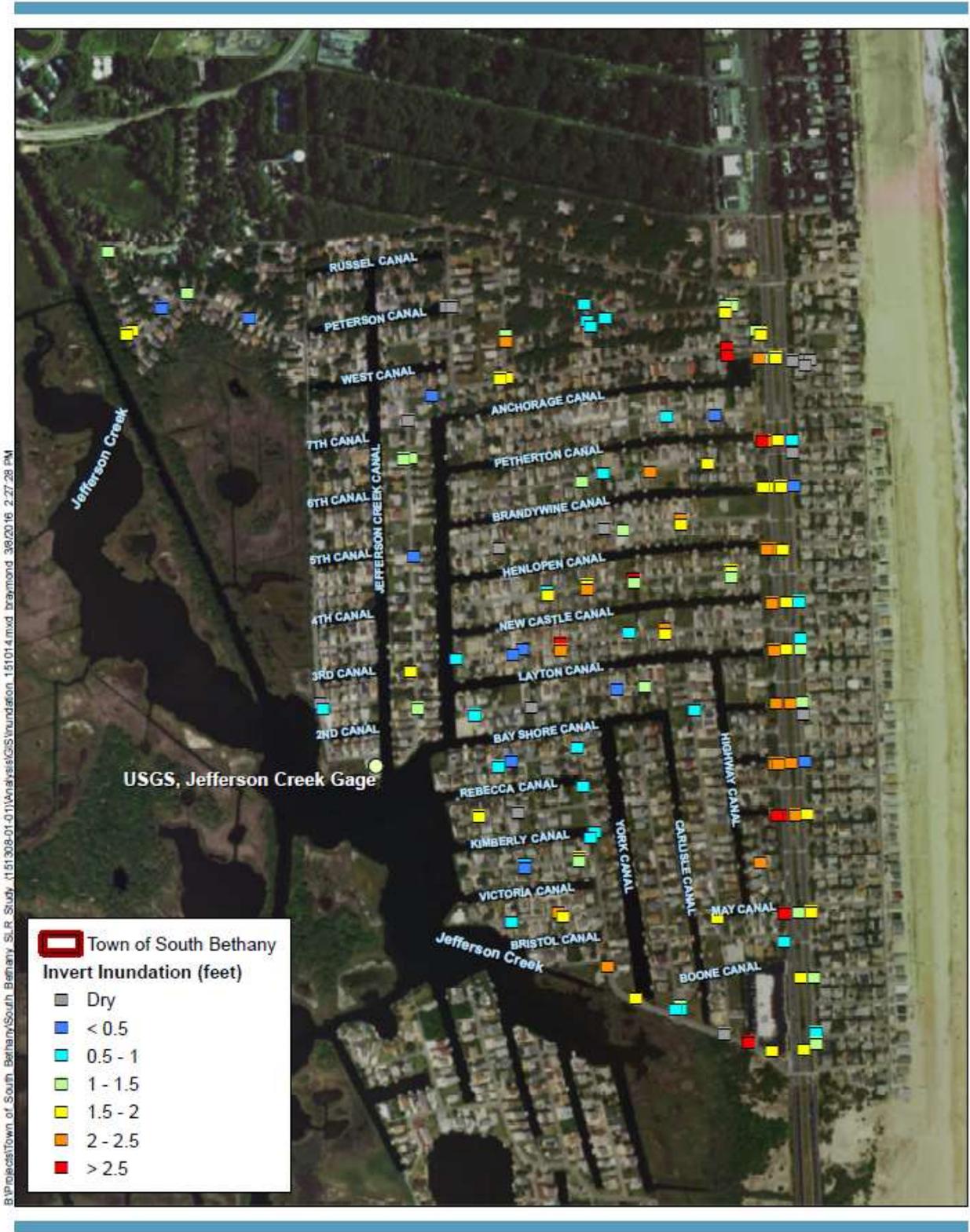
of 1.03 feet NAVD 88

Note: Mean Higher High Water equal to 0.33 feet NAVD 88 in 2015.



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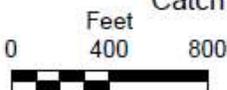
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Figure 6

Catch Basin Invert Projected 2065 Inundation Levels for Upper Bound Mean Higher High Water Level of 2.03 feet NAVD 88



Note: Mean Higher High Water equal to 0.33 feet NAVD 88 in 2015.

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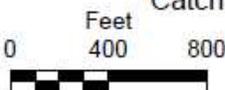


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Figure 7

Catch Basin Grate Projected 2065 Inundation Levels for Lower Bound Mean Higher High Water Level of 1.03 feet NAVD 88

Note: Mean Higher High Water equal to 0.33 feet NAVD 88 in 2015.



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Figure 8

Catch Basin Grate Projected 2065 Inundation Levels for Upper Bound Mean Higher High Water Level of 2.03 feet NAVD 88

Note: Mean Higher Higher Water equal to 0.33 feet NAVD 88 in 2015.



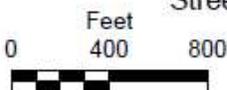
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Figure 9
 Street Centerline Projected 2065 Inundation Levels for
 Lower Bound Mean Higher High Water Level
 of 1.03 feet NAVD 88

Note: Mean Higher High Water equal to
 0.33 feet NAVD 88 in 2015.



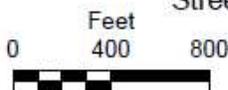
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Figure 10
 Street Centerline Projected 2065 Inundation Levels for
 Upper Bound Mean Higher High Water Level
 of 2.03 feet NAVD 88

Note: Mean Higher High Water equal to 0.33 feet NAVD 88 in 2015.



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Figure 11

Ground Transformer Projected 2065 Inundation Levels for Lower Bound Mean Higher High Water Level of 1.03 feet NAVD 88

Note: Mean Higher High Water equal to 0.33 feet NAVD 88 in 2015.



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Figure 12

Ground Transformer Projected 2065 Inundation Levels for Upper Bound Mean Higher High Water Level of 2.03 feet NAVD 88

Note: Mean Higher Higher Water equal to 0.33 feet NAVD 88 in 2015.

