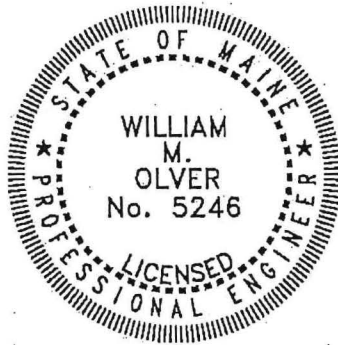


MASTER PLAN FOR
LONG TERM INFRASTRUCTURE IMPROVEMENTS
TOWN OF SOUTHWEST HARBOR, MAINE
JANUARY, 2011



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EXECUTIVE SUMMARY

The Town of Southwest Harbor owns and operates a municipal infrastructure system that includes roadways, drainage systems, collector and interceptor sewers, wastewater pumping stations and a treatment plant, a water filtration plant, two water storage reservoirs, and a water distribution system consisting of pipes, valves and hydrants. The infrastructure has evolved to its present configuration over the last 100 years with some water mains dating back over a century. Other components, such as the wastewater treatment plant and the majority of the sewer system, are newer having been constructed in the last forty years. Much of the Town's roadways and drainage systems follow original routes that were established decades ago on gravel bases and with drainage systems that do not meet current design standards.

Maintaining and operating this complex network of infrastructure components becomes more challenging as parts of the infrastructure deteriorate with constant use and age. Many parts of the Town's infrastructure are in need of significant repairs and improvements. The Town has limited financial resources to meet all of the many concurrent infrastructure needs. To assist in its infrastructure planning process, the Town retained Olver Associates Inc. to prepare this Master Plan for long term infrastructure improvements. The purpose of a Master Plan is to assess the overall condition of each infrastructure component, to identify deficiencies that require remediation, to define capital improvement projects that will address the deficiencies, to estimate the cost of these improvements in current dollars, and to prioritize the proposed projects such that the Town can implement these improvements in phases over time.

Southwest Harbor has about eleven miles of Town-owned, paved streets. About half of these streets are in good to very good condition and require minimal work at this time. The remaining half are in fair to very poor condition and will need major improvements in the near future. These roads are characterized by failed pavement surfaces, inadequate gravel roadbases and poor drainage systems which keep the roadbeds saturated and lead to their pavement failure during freeze/thaw cycles and under the weight of vehicular loadings.

The Town's roadway drainage systems consist of a series of open ditches in less developed areas with some catchbasins and piped drains downtown. Drainage systems are generally designed to have sufficient capacity to convey a twenty-five year frequency storm event. Each of the Town's drain systems were modeled in this study to compare their in-place capacity with their required design capacity. About one-third of the Town's roadways were found to have inadequate drainage. This has contributed to localized ponding and flooding problems. Many of the most deteriorated sections of the Town's roadways are associated with areas of concurrent poor drainage. This issue is somewhat complicated by the fact that MDOT controls Routes 102 and 102A which bisect the village. Several of the State's drains and culverts are also inadequate which impacts the flow of the Town's drains that must pass their water below the MDOT streets.

The Town's wastewater infrastructure consists of about 8.5 miles of gravity sewers, three major pumping stations, and a secondary wastewater treatment plant which is located off Apple Lane. The Town's sewer system has a significant excess flow problem which overloads the wastewater treatment plant beyond its design capacity during one-third of all rainfall events. Long term improvements to the sewer system should identify the sources of these excess flows in order to reduce peak loadings to the plant. The Town still has a small percentage of active clay sewers in use and some undersized sewer pipes that do not meet the current 8"Ø minimum standard. However, a larger issue is the fact the two-thirds of the Town's sewers were constructed of asbestos cement pipe (ACP). This material is no longer used and historically has not shown the type of long term structural strength and water tightness that is found in other sewer materials such as ductile iron or PVC pipe. Sewer gases can cause the cement in ACP pipe to deteriorate over time which results in a loss of structural strength and allows leakage to occur. As the Town improves its overall infrastructure, it should consider replacing or relining areas of ACP pipe that are found to be defective. Most of the pipe is now approaching forty years of age and should be examined in more detail by a program of excess flow monitoring and television inspection. Clay sewer pipes and undersized sewer pipes should be eliminated and replaced in all locations in which they are present.

The Town's three major wastewater pump stations have been rebuilt in the past decade and are in good condition. They would benefit from having emergency power generators installed to allow both pumps to operate simultaneously during power outages. The wastewater treatment plant is approaching forty years of age, or twice its originally intended design life of twenty years. It remains in good condition, but is in need of a major upgrade in the near future in order to extend its useful life. Significant capital needs at the treatment plant include new final clarifiers, improved sludge storage and management systems, upgrades to several critical pumping systems and general improvements to the plant's buildings and support systems.

The Town has made significant investments at its water filtration plant in recent years to meet stricter EPA water quality standards and the facility is in good condition. Several automatic control valves at the plant need to be replaced. One of the Town's water storage reservoirs is fifty years old, made of steel, and in poor condition. It will need to be replaced in the near future since the Town needs the storage volume contained in both of these reservoirs to meet minimum storage standards.

The Town operates about 18.5 miles of water distribution mains throughout the community. About fifteen percent of these lines are over 100 years old and forty percent are at least fifty years old. Most of the old pipes are constructed of unlined cast iron which can become brittle with age and subject to breakage. In addition, these old lines often lose their effective cross-sectional area as they become filled with scale and debris. About ten percent of the water mains are made of asbestos cement pipe which is no longer used. In order to deliver

adequate fire flow volumes and pressure, water mains are generally designed to meet a current standard of at least 8"Ø. About half of the Town's present water lines are smaller than 8"Ø. Over time, the Town should begin to replace its old and small diameter pipes with new 8"Ø ductile iron mains.

In this Master Plan, each component of the Town's infrastructure was evaluated in detail on a street-by-street basis. Specific projects to address the major deficiencies that were noted are proposed. These projects and their estimated costs in current dollars are summarized below and grouped by suggested priority. High priority projects should be considered for implementation over the next one to eight years. Medium priority projects should be considered over an eight to fifteen year period and low priority projects are associated with infrastructure needs that are not imminent, but should be considered perhaps in fifteen to twenty years. It should be noted that some of the low priority projects on streets that are currently in good condition include line items for crack sealing of the pavement. The Town may wish to accelerate its crack sealing program to conduct this work early in its capital improvement program. This will help to preserve good condition pavement for a much longer period.

As discussed in detail in this report, the following long term capital improvement projects and priorities were recommended:

PROPOSED INFRASTRUCTURE IMPROVEMENT PROJECTS, PRIORITIES AND COSTS

I. HIGH PRIORITY PROJECTS (1 TO 8 YEARS)

1) Mansell Lane	\$ 610,000
2) Wesley Avenue	585,000
3) Steel Water Tank Replacement/Chloramination	870,000
4) Kings Lane	220,000
5) Shore Road (Segment 1)	330,000
6) Shore Road (Segment 2)	805,000
7) Seal Cove Road (Segment 2)	475,000
8) Blueberry Field Water Line	590,000
9) Long Pond Road (Segment 2)	810,000
10) Robinson Hill Road	315,000
11) Forest Avenue	480,000 (PARTIAL)
12) Dirigo Road	910,000
13) East Ridge Road	515,000
14) Fernald Point Road (Segment 2)	910,000
15) Sewer System Excess Flow Assessment	75,000
16) Wastewater Treatment Plant Upgrade	5,190,000
17) Lawler Lane	180,000
SUBTOTAL HIGH PRIORITY PROJECTS	\$13,870,000

II. MEDIUM PRIORITY PROJECTS (8 TO 15 YEARS)

1) Clark Point Road (Segment 3)	\$ 315,000
2) Seal Cove Road (Segment 1) (STATE ROAD)	930,000
3) Long Pond Road (Segment 1)	95,000
4) Claremont Road	415,000
5) Spring Brook Lane	135,000
6) Cedar Lane	65,000
7) Wood Street	295,000
8) Seal Cove Road (Segment 3)	245,000
9) Freeman Ridge Road	750,000 (PARTIAL)
<u>SUBTOTAL MEDIUM PRIORITY PROJECTS</u>	<u>\$ 3,385,000</u>

III. LOW PRIORITY PROJECTS (15 TO 20 YEARS)

1) Maple Lane	\$ 185,000
2) Clark Point Road (Segment 2)	185,000
3) Clark Point Road (Segment 1)	100,000
4) Robinson Lane	3,000
5) Salem Town Road	35,000
6) Hillcrest Circle	19,000
7) Ledge Road	11,000
8) Harbor Avenue	240,000
9) Herrick Road	155,000
10) North Interceptor Sewer	165,000
11) South Interceptor Sewer	195,000
12) Village Green Way	6,000
13) Fernald Point Road (Segment 1)	300,000
14) High Road	-
15) North Causeway Lane	-
16) Alder Lane	-
17) Shore Road (Segment 3)	-
18) Ocean House Road	-
19) Ridge Acres (PRIVATE ROAD)	180,000
<u>SUBTOTAL LOW PRIORITY PROJECTS</u>	<u>\$ 1,779,000</u>

IV. MDOT COORDINATION PROJECTS

1) Main Street Utilities (Segment 2)	\$ 185,000
2) Main Street Utilities (Segment 1)	1,350,000
3) Seawall Road Utilities	1,410,000
<u>SUBTOTAL MDOT COORDINATED PROJECTS</u>	<u>\$ 2,945,000</u>

TOTAL INFRASTRUCTURE IMPROVEMENT NEEDS \$21,979,000

As shown above, the Town has about \$13.870 million dollars in high priority infrastructure improvement needs, \$3.385 million dollars in medium priority needs, \$1.779 million dollars in low priority needs, and \$2.945 million dollars in utility replacement work under MDOT roadways for a total of \$21.979 million dollars in identified infrastructure improvement needs. These projects should be phased over the next twenty years as funding allows. The Town recently implemented a policy of funding its capital improvement projects through general taxation. If the Town schedules these projects in groups that average \$1.0 to \$1.5 million dollars in scope, each group of projects would add about \$92,000 in annual debt service to the Town's budget assuming twenty-year debt service at two percent interest. This would add \$0.14 per thousand dollars of assessment to the Town's mil rate for each group of added projects. For specific water and sewer related projects, the Town may also be eligible for outside funding through various programs that are available for this type of work.

The project priorities defined in this Master Plan should be viewed as being flexible and subject to modification to meet the Town's current and future priorities. In addition, cost estimates should be updated periodically to reflect normal inflation and changes in the construction market economy that will occur over time.