TOWN OF GLASTONBURY

STORMWATER MANAGEMENT PLAN

2004

TABLE OF CONTENTS

SECTION 1

EXISTING CONDITIONS AND BACKGROUND INFORMATION

I. EXISTING CONDITIONS IN THE PLANNING AREA

A. INTRODUCTION

The information contained in this Section defines and describes the existing physical conditions and demographics within the planning area. This information provides the basis for the proposed initiatives in the following sections, and the descriptions of current practices pertinent to each minimum control measure.

B. PROJECT LOCATION AND PLANNING AREA

The Town of Glastonbury encompasses a total area of 52.5 square miles and is located in the center of the state approximately 9 miles southeast of Hartford in Hartford County. It is bordered to the east by Hebron and Bolton, to the south by Portland, East Hampton, and Marlborough, to the north by Wethersfield, East Hartford and Manchester and to the west by the center of the Connecticut River and the towns of Wethersfield, Rocky Hill, and Cromwell. See Figure 1-1 for a map of the planning area and the relationship of Glastonbury to nearby communities.

The study planning area includes the entire Town of Glastonbury. Some measures documented will apply only to the urbanized areas as shown in Figure 1-2 while others will pertain to the entire Town.

C. LAND USE

The Town of Glastonbury is divided into three land use categories consisting of open space, residential (with lot sizes ranging from 15,000 square feet to 80,000 square feet), and industrial/office/retail.

The 1995 Plan of Development, as amended, presents the policies for separate planning areas in Glastonbury. The land use map presented in Figure 1-3 shows the various Planning areas discussed in the 1995 Plan of Development, and include the following:

- Residential Planning Area 1: is designated as the ‘suburban’ area of town and is located in the north and west portion of the town. Residential land use in this area consists of 2 to 3 dwelling units per acre.

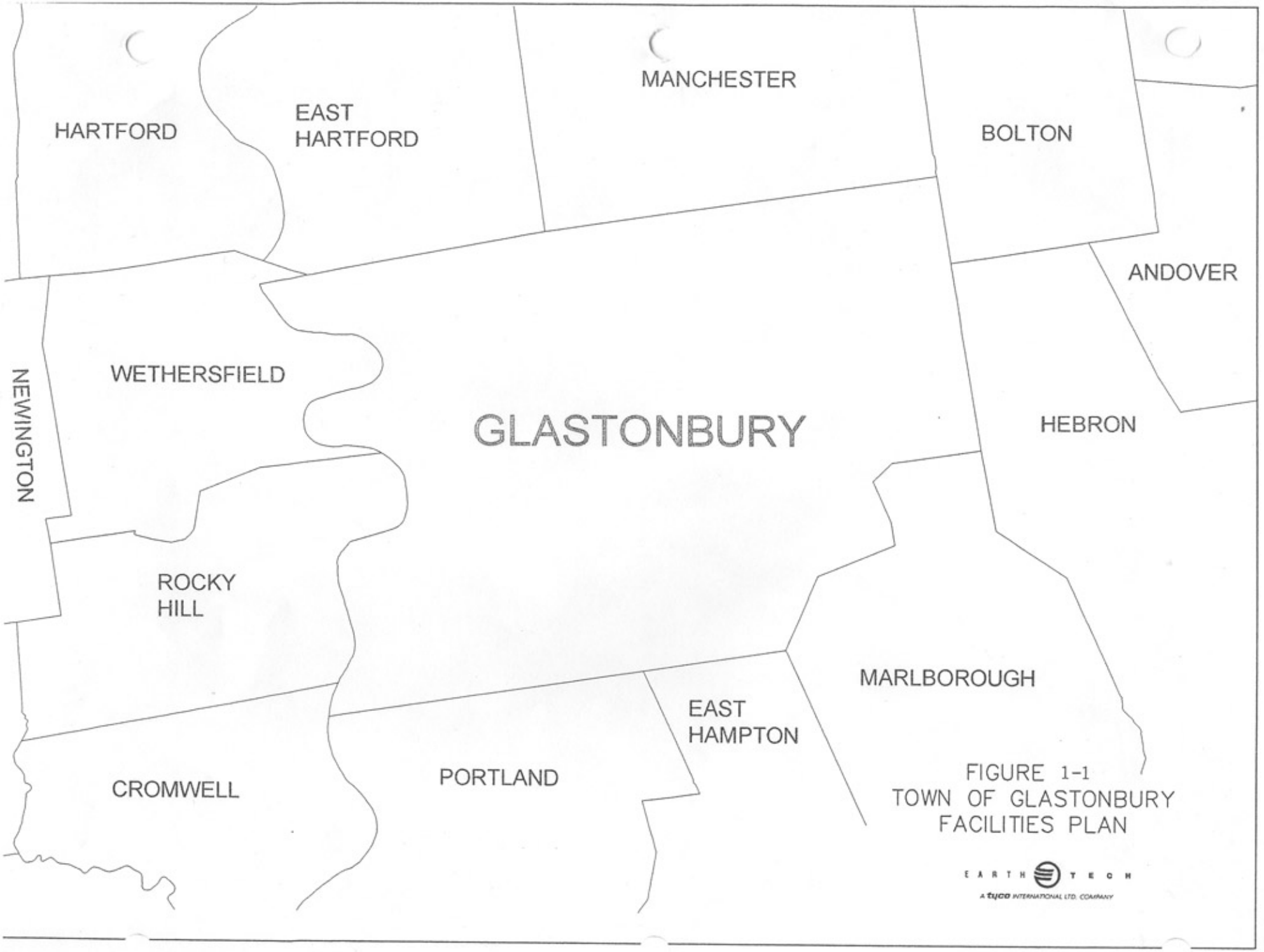

FIGURE 1-1
TOWN OF GLASTONBURY
FACILITIES PLAN

EARTH TECH
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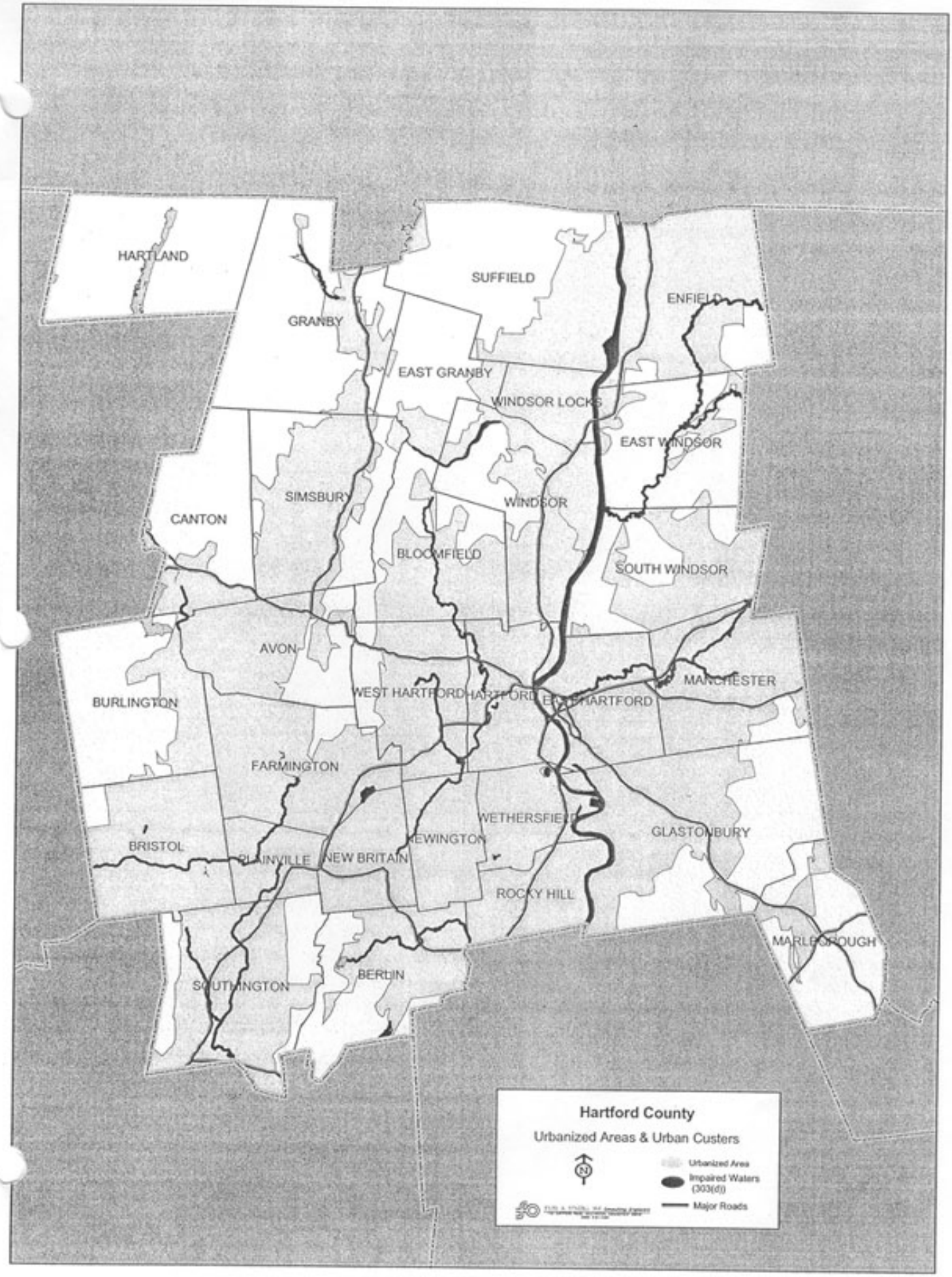

HARTLAND
SUFFIELD
ENFIELD
GRANBY
EAST GRANBY
WINDSOR LOCKS
EAST WINDSOR
SIMSBURY
WINDSOR
CANTON
BLOOMFIELD
SOUTH WINDSOR
AVON
MANCHESTER
BURLINGTON
WEST HARTFORD
HARTFORD
EAST HARTFORD
FARMINGTON
WETHERSFIELD
GLASTONBURY
BRISTOL
NEW BRITAIN
ROCKY HILL
MARLBOROUGH
BERLIN
Hartford County
Urbanized Areas & Urban Custers
Urbanized Area
Impaired Waters (303(d))
Major Roads

Figure 1-2

- Residential Planning Area 2: is designated as 'fringe suburban' area, and includes the areas south and east of the suburban area. This land contains residentially zoned land of 1 dwelling unit per 1-2 acres and a large amount of designated open space. The variation in topography creates difficulties in extending public sewer and water to this area.

- Residential Planning Area 3: the 'rural residence' area, includes the southern and parts of the eastern portion of town and consists mainly of rural residential areas with 1 to 2 acre lots in addition to a large amount of open space and conservation land.

- Urban Planning Area 4: includes the Town Center and Central Business District, which consists of many commercial and retail establishments and some residential housing. This area is mostly located along Main Street and New London Turnpike.

- Urban Planning Area 5: includes the South Glastonbury Village center, which consists of some retail and residential development. This area is generally defined as near the intersection of Route 17 and Hopewell Road.

- Urban Planning Area 6: known as the 'employment' area, and consists of a wide variety of employment services such as corporate offices, professional services and some manufacturing. This area is located near the Route 2, Hebron Avenue, and Oak Street area of town.

- Public and Quasi-Public Area: these are areas, the majority of which are located in the eastern part of town, that are open space and conservation areas.

The majority of the land area that is still available for development is residentially zoned and lies mostly within the rural residence zone. These land areas are situated mostly along the eastern and southern portions of Glastonbury and are generally outside of the sewer service area. Lots in this zone are 1-2 acres in size, which is usually of sufficient size to support an on-site subsurface disposal system.

D. CLIMATE

Precipitation

The mean annual precipitation over Glastonbury is approximately 44 inches, uniformly distributed throughout the year. The maximum and minimum annual precipitations at Hartford for 86 years, through 1963, are 62.9 inches in 1955 and 32.2 inches in 1957. Maximum

monthly precipitation of 21.9 inches occurred in August 1955. Minimum monthly precipitation of only 0.09 inches occurred in May 1887. The mean annual snowfall is about 45 inches.

The Soil Conservation Service Hydrology techniques use the maximum 24 hour duration rainfalls, for which the following values have been reported.

Rainfall Frequency	24 Hour Rainfalls, Inches U.S. Weather Bureau
25 Years	5.5
50 Years	6.4
100 Years	7.0

E. WATER QUALITY AND WATER RESOURCES

There are eight major drainage basins in Connecticut. They include the following:

- Pawcatuck Major Basin
- Southeast Coast Major Basin
- Thames Major Basin
- Connecticut Major Basin
- South Central Coast Major Basin
- Housatonic Major Basin
- Southwest Coast Major Basin
- Hudson Major Basin

Glastonbury lies within the Connecticut Major Basin, which includes the Connecticut River and extends from north of Vermont and New Hampshire to Long Island Sound.

Some of the larger surface water bodies in town include Wood Pond, Rosers Pond, Treat Pond, Angus Park Pond, Smutt Pond, Great Pond, Diamond Lake, Pasture Pond, the Buckingham Reservoir and the Cold Brook Reservoir. The Connecticut River (into which the treatment plant discharges) creates the western town border and drains the entire Town of Glastonbury by way of a number of tributary streams. Significant streams include Salmon Brook, Cold Brook, Roaring Brook, Porter Brook, Wildcat Brook, Black Ledge River, Dark Hollow Brook, Wickham Brook, Smith Brook, Holland Brook, Grindle Brook, and Hubbard Brook.

Surface waters and groundwaters are classified by the Department of Environmental Protection based on their current and long term goals for water quality. The water quality classifications for surface waters and groundwaters are described in Figure 1-5.

F. HISTORY OF FLOODS

The Town of Glastonbury has had a long history of serious flooding, primarily due to high water elevations on the Connecticut River. There is no clearly defineable flood season during the year, but rather, flooding can be expected any season of the year. Melting snow combined with early spring rains have caused frequent spring flooding. On numerous occasions, heavy rains during the summer and fall months, particularly those associated with tropical storms, have resulted in major floods. A history of flooding on the Connecticut River is shown on Table 1.

G. FLOOD ZONES

Flood insurance studies have been prepared for all communities in the country by the Federal Emergency Management Agency (FEMA). These studies investigate the existence of flood hazards and present the data on a map, which denotes flood zones. These zones are defined as follows:

Zone A: Special flood hazard area inundated by the 100-year flood.

Zone B: Areas between the Special Flood Hazard Area and the 500-year flood plain. These areas may be subject to shallow water flooding in the 100-year interval

Zone C.: Area of minimal flooding.

H. WETLANDS

Glastonbury has identified wetland soils within the Town boundaries on an undated map entitled “Inland Wetlands and Watercourses Map”. The map shows the location of designated wetlands (including wetland soils), water and watercourses. Wetland soils are typically identified as alluvial soils, poorly drained soils. Wetland soils are scattered throughout Glastonbury.

Wetland soils prevalent within Glastonbury are the Saco series, and to a lesser extent, the Limerick series. The Saco series is designated by a thin 8-inch layer of muck over a 50-inch

TABLE 3-1
DEP WATER QUALITY CLASSIFICATIONS

CLASS	DESCRIPTION	NAME OF WATER BODY
SURFACE WATER QUALITY CLASSIFICATIONS		
AA	Uncontaminated surface waters designated for use as a potential public water supply; fish and wildlife habitat; Recreational use; agricultural, industrial supply and other purposes. Recreational uses may be restricted. All surface waters within existing or potential water supply watersheds are Class AA unless otherwise classified.	Cold Brook Reservoir, Buckingham Reservoir, (*add streams that supply water to reservoirs*)
A	Surface waters designed for potential drinking water supply, fish and wildlife habitat; recreational use; agricultural and industrial supply and other legitimate uses including navigation.	All other Surface Waters not classified elsewhere.
B.	Surface waters where the water quality goal is in fishable and swimmable condition. Wastewater discharges may be allowed under permit	None
Bc	The 'c' indicates this brook meets water quality criteria for cold water fisheries in this case.	Roaring Brook
B/A	The goal of this river is Class A, however, the river is not meeting Class A water quality criteria for one or more designated uses listed above.	Hubbard Brook
GROUNDWATER QUALITY CLASSIFICATIONS		
GAA	Groundwaters within public water supply watershed or within the area of influence of public water supply wells. Suitable for direct human consumption without the need of treatment. The goal is to maintain drinking water quality by banning all discharges to the groundwater.	Areas surrounding the Cold Brook Reservoir and the Buckingham Reservoir
GA	Groundwaters within the area of influence of private and potential public water supply wells. Presumed suitable for direct consumption.	All groundwater not classified elsewhere
GA/GB	Water quality may be deteriorated due to a previous or existing land use activity. This indicates that although the water quality is currently designated as GB, the water quality goal is GA.	Two areas adjacent to Hubbard Brook and three small areas adjacent to Roaring Brook
GB	May not be suitable for direct human consumption due to waste discharges, spills or leaks of chemicals or land use impacts. The goal is to prevent further degradation by preventing any additional discharges which would cause irreversible contamination and to restore these waters through cleanup actions.	None
COASTAL AND MARINE SURFACE WATER QUALITY CLASSIFICATIONS		
SA	Uncontaminated coastal and marine surface waters designated for marine fish, shellfish and wildlife habitat, shellfish harvesting for direct human consumption, recreation and all other legitimate uses including navigation. All coastal and marine surface waters are Class SA unless otherwise classified.	None
SB	Coastal and marine surface waters designated for marine fish, shellfish and wildlife habitat, recreation, industrial and other legitimate uses including navigation.	None
SB/SC	The current designation is SC, but the goal is to upgrade the water quality to SB. Designated uses for class SB surface waters include marine fish, shellfish and wildlife habitat, recreation, industrial and other legitimate uses.	Connecticut River
SC	Coastal and marine surface waters designated for certain marine fish, shellfish and wildlife habitat, recreation, industrial and other legitimate uses including navigation. The state policy is to upgrade these waters to Class SA or	None

HISTORICAL FLOODS ON THE CONNECTICUT RIVER, HARTFORD, CONNECTICUT

YEAR	DATE	STAGE (FEET)
1683	July-August	26.0
1692	Feb.-March	26.2
1801	March 20	27.5
1841	January 9	26.3
1843	March 29	27.2
1854	May 1	29.8
1859	March 20	26.4
1862	April 21	28.7
1869	April 23	26.7
1869 (1)	October 6	26.3
1901	April 9	26.4
1913	March 29	26.3
1927 (1)	November 6	19.0
1933	April 21	26.0
1936 (2)	March 21	37.6
1938 (3)	September 23	35.4
1955 (3)	August 20	30.6
1984		

(1) Resultant Flood from Rainfall

(2) Resultant Flood form Rainfall and Snow Melt

(3) Resultant Flood form Hurricane

Data from U.S.G.S. Records

gray silt loam material and then underlain by silt loam and stratified sand and gravel. The Limerick series is a poorly drained alluvial soil.

The Town of Glastonbury Conservation Commission & Inland Wetlands Commission has adopted general policies with regards to development projects requiring wetlands permits. Refinement, enhancement and formalization of these policies will be addressed as required within proposal made part of the applicable minimum control measures.

Figure 1-6 shows the wetland locations in Glastonbury.

I. WATER SUPPLY

Potable water is supplied to Glastonbury by three different commercial water companies. The Metropolitan District Commission (MDC) serves the largest portion of town. The Town of Manchester Water Department serves a small area in the northeast corner of Town and the Neipsic Woods Water Association serves approximately twenty-five single-family homes.

The area served by the MDC includes the northern and western portion of Town. There are reservoirs and public groundwater wells that are part of this water supply. According to the MDC records, the average daily demand for the entire District service area is approximately 61 million gallons per day (MDG). The available volume of water, or safe yield, is estimated to be 77.1 MDG. Therefore, water supply will not limit growth in the town.

The MDC provides potable water to approximately 72% of the residences in Glastonbury and is projected to remain at 72% to the year 2040, according to the most recent long-range demand study by the MDC. The majority of the commercial and industrial buildings are served by this same water supply.

The Town of Manchester Water Department serves a number of homes in the northeast corner of Town. The Buckingham Reservoir is located approximately 1.5 miles south of the Manchester border and is the source for the water supply. Average daily demand of the total system is 5.558 MGD and the average day available supply is 9.927 MGD. The existing demand from Glastonbury is .0086 (MGD). It is expected to increase to .0090 MGD during the planning period.

It is difficult to economically extend commercial water service to homes in the central and eastern part of Town due to the varying topography in the area. Properties that are not served or will not be served by commercial sources obtain water from individual on-site wells.

J. SANITARY SEWER SERVICE

Sanitary sewer service within the Town is provided to approximately 59% of the residents. The sewer system consists of approximately 90 miles of sanitary sewer mains and generally serves the more densely populated areas in the northern and western portion of town. The oldest sewers were built in 1960 in the "center area" of town. South Glastonbury and the Apple Hill area were sewered in the 1970's and newer sections of pipe were installed in 1988 along the Salmon Brook Interceptor. Most of the wastewater in the sewer system flows by gravity, however, the town also maintains eight wastewater pumping stations. A plan of the current sewer service area is included in Figure 1-7.

K. ON-SITE WASTE DISPOSAL SYSTEMS

On-site wastewater disposal is used by all of those not served by sanitary sewers. This amounts to approximately 41% of the residents in Town. Subsurface disposal systems are regulated by the State Health Code whose requirements are implemented by the Town Health Director. Current Health Code requirements for sizing of subsurface disposal systems dictate that each residence provide a minimum 1,000 gallon septic tank for settling out heavy solids and a leaching field with at least 375 square feet of effective area (larger depending on the number of bedrooms in the house and the type of soil conditions). In addition, 100% reserve areas are required to be located on-site.

II. PHYSICAL CHARACTERISTICS

A. SURFICIAL GEOLOGY

The topography of Glastonbury is dominated by two distinct regions, the central Connecticut lowlands and the eastern Connecticut highlands. (Figure 1-8)

Lowlands

The northwestern half of Glastonbury is part of the central Connecticut lowlands that run from Long Island Sound to Massachusetts, and include in this area the Connecticut River. The lowlands are formed over soft Triassic bedrock which has been eroded to a relatively low level, and subsequently covered by glacial deposits. The lowlands in Glastonbury have mild slopes and generally drain from east to west.

The sedimentary subsoil deposits in the lowland area include:

(a) Glacial Lake Margin Deposits – These consist of various combinations of sand and gravel deposited in several phases along the perimeter of the ancient Lake Hitchcock (the present Connecticut River Valley).

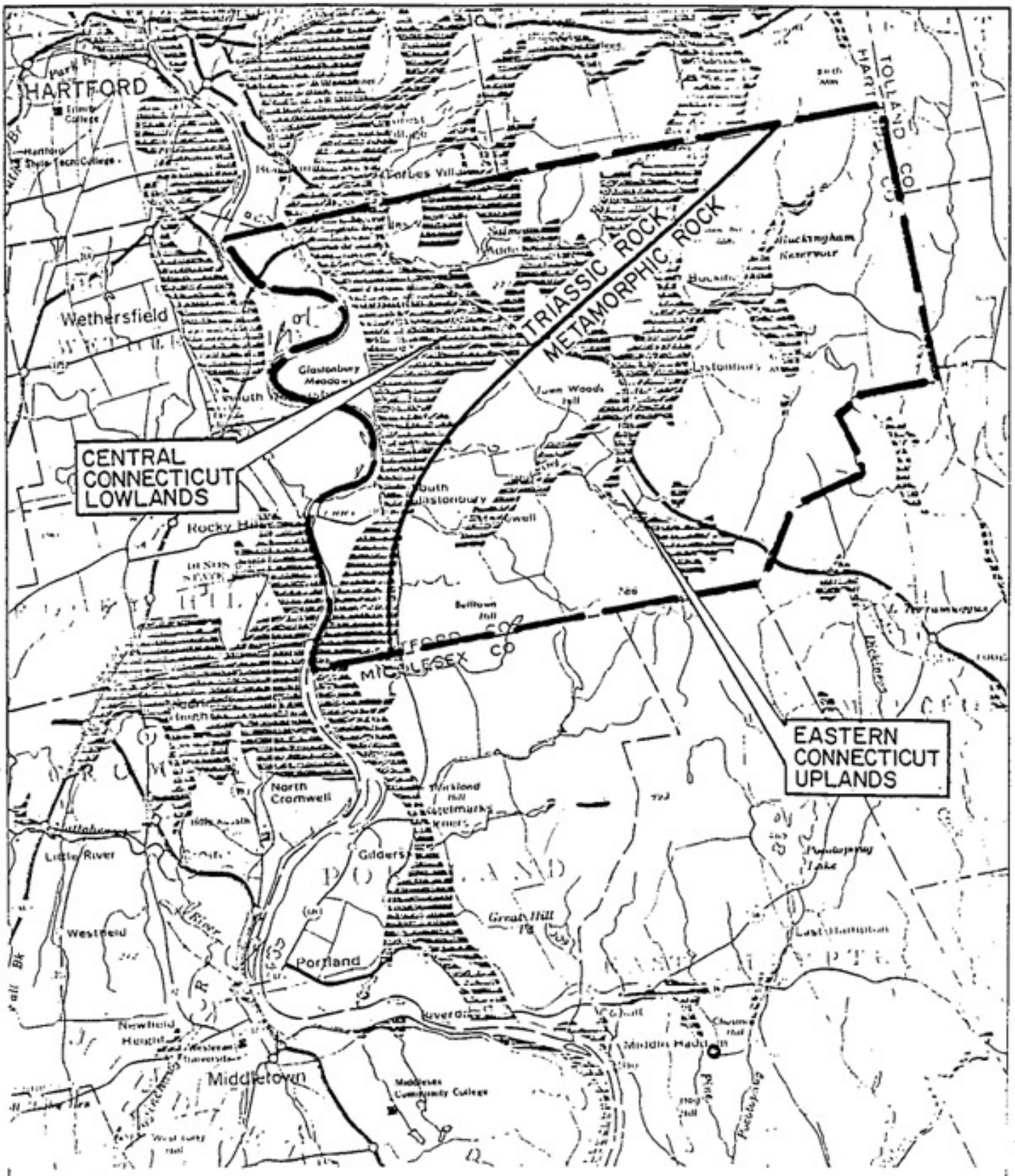
(b) Glacial Lake Bottom Deposits – Consist of clay, silt and sand deposited on the bed of ancient Lake Hitchcock.

(c) Stream Terrace Deposits – Consist of sedimentary material, mainly sand, that has been reworked by the Post Glacial Connecticut River on former floodplains.

(d) Alluvium – Recent deposits of sedimentary material on the active floodplains.

The Connecticut River flows through the lowlands from north to south, forming the western boundary of Glastonbury. The river has an alluvial channel that meanders across its floodplain.

Major streams flowing across the lowlands to the Connecticut River include Salmon Brook, Hubbard Brook, Smith Brook, Holland Brook, and a short length of Roaring Brook. They generally have the headwaters along the front face of the highlands, and flow from east to west away from the highlands. They have had only minor impact on the post-



CROSSHATCHED AREAS ARE SAND AND GRAVEL AQUIFERS.

SURFICIAL GEOLOGY OF GLASTONBURY

glacial landscape. However, the streams are slowly dissecting the lowland sand and gravel deposits by eroding deeper channels. Salmon Brook and Hubbard Brook are beginning to form modern floodplains of alluvial soils on top of the glacial deposits.

The inland wetlands of the lowlands generally consist of floodplain and alluvial soils adjacent to streams and rivers, with only a few independent wetlands where old kettle holes or isolated depressions intersect groundwater.

Uplands

The southeastern part of Glastonbury is part of the eastern Connecticut highlands. The highlands are underlain by hard metamorphic rocks consisting of schist and gneiss that dominate the topography. Elevations range from 300 ± to 900 ± feet above mean sea level. The rolling hills of the uplands are covered by thin layers of glacial till, of varying thickness.

The southern part of Glastonbury is physically separated from the adjacent Town of Portland by a series of high hills extending from west to east, including Belltown Hill, Clark Hill, and Meshomasic Mountain. The eastern portion of Glastonbury has an almost continuous ridge of high ground with elevations of about 800 feet which separates Glastonbury from Marlborough and Hebron. Connecticut Route 2 passes through the only well-defined break in ridgeline.

The river gradients are generally controlled by bedrock, except where glacial lakes and streams have deposited sand and gravel. In these areas, river channels are occasionally incised by eroding vertically into the deposits, or are meandering alluvial streams with modern floodplains across the top of the glacial deposits.

The larger wetlands in the highland area consist of streamside floodplains and alluvial soils. There are also numerous isolated wetlands on glacial till due to perched water tables, irregular topography, and man-made ponds.

Glastonbury's surface drainage system, together with its groundwater flow, gives rise to a wide variety of inland wetlands and watercourses. Watercourses are the free-flowing brooks, their minor tributaries and the Connecticut River. Wetlands include swamps, bogs, ponds, vernal pools, meadows, marshes and some areas of groundwater discharge such as seeps and springs. Wetlands occur where topographic depressions

bring the water table to the surface. All watercourses are lined with and surrounded to some degree by alluvial soils. Wetlands contain alluvial, poorly drained and very poorly drained soils. These soils are characterized by water saturation, flooding or ponding of sufficiently long duration to develop anaerobic (lacking oxygen) conditions in the upper soil layer. Typically they have a noticeable organic content and tend to be gray to dark brown in color. Wetlands support a variety of hydrophilic (water-loving) vegetation such as cattails, skunk cabbage, swamp maple and peripheral vegetation (willows, cottonwood). Wetlands are of significant wildlife importance since they provide habitat, water, forage, cover and food. Wetlands also provide a measure of flood control by absorbing, storing and slowly releasing storm water. Other important functions include nutrient retention, sediment trapping, scenic and aesthetic quality, recreational and educational value.

B. GROUNDWATER RESOURCES

Glastonbury has abundant deposits of sands and gravel soils which, where located below the water table, can store and yield large quantities of groundwater. The U.S. Geological survey has mapped groundwater aquifers throughout the lowlands portion of Town, as well as, significant aquifers in the upland river valleys.

The largest aquifer consists of the sands and gravels along the Connecticut River Valley centered along Route 17, east of the Lake Hitchcock fine grain soils and current floodplain deposits. The lowlands also have major aquifers along the north and south forks of Salmon Brook.

The primary groundwater resources of the uplands consist of sand and gravel aquifers along Roaring Brook, particularly east of Route 2, and along Cold Brook south of Cold Brook Reservoir.

The glacial till soils that are widely found on the rolling hills of the uplands often have groundwaters at shallow depths. These groundwaters are frequently found above the dense impervious soil strata commonly known as “hardpan”, and in areas of shallow bedrock with limited vertical permeability. The shallow depth and low permeability of most glacial till soils generally render them as being unsuitable for large scale water sources. The high groundwater levels in glacial tills can be a major problem with respect to the operation of subsurface sewage disposal systems and the construction of roads and buildings.

C. DRAINAGE BASINS

The Town of Glastonbury can be divided into five major drainage basins. Each drainage basin is the area surrounding particular watercourse or watercourses whose runoff is contributory to that watercourse. The major drainage basins are shown in Figure 1-9. The extent of previously delineated sub-watersheds are also identified.

Southwest Drainage Basin

The area designated the Southwest drainage basin includes two watercourses; Grindle Brook and Hales Brook. The total drainage basin has an area of 4.82 square miles. Grindle Brook, having a drainage area of 1.12 square miles, flows generally in a westerly direction through Glastonbury and discharges into the Connecticut River just north of the Town-line. Hales Brook, located in the remainder of the drainage area, flows generally in a southerly direction and outlets into the Connecticut River in Portland.

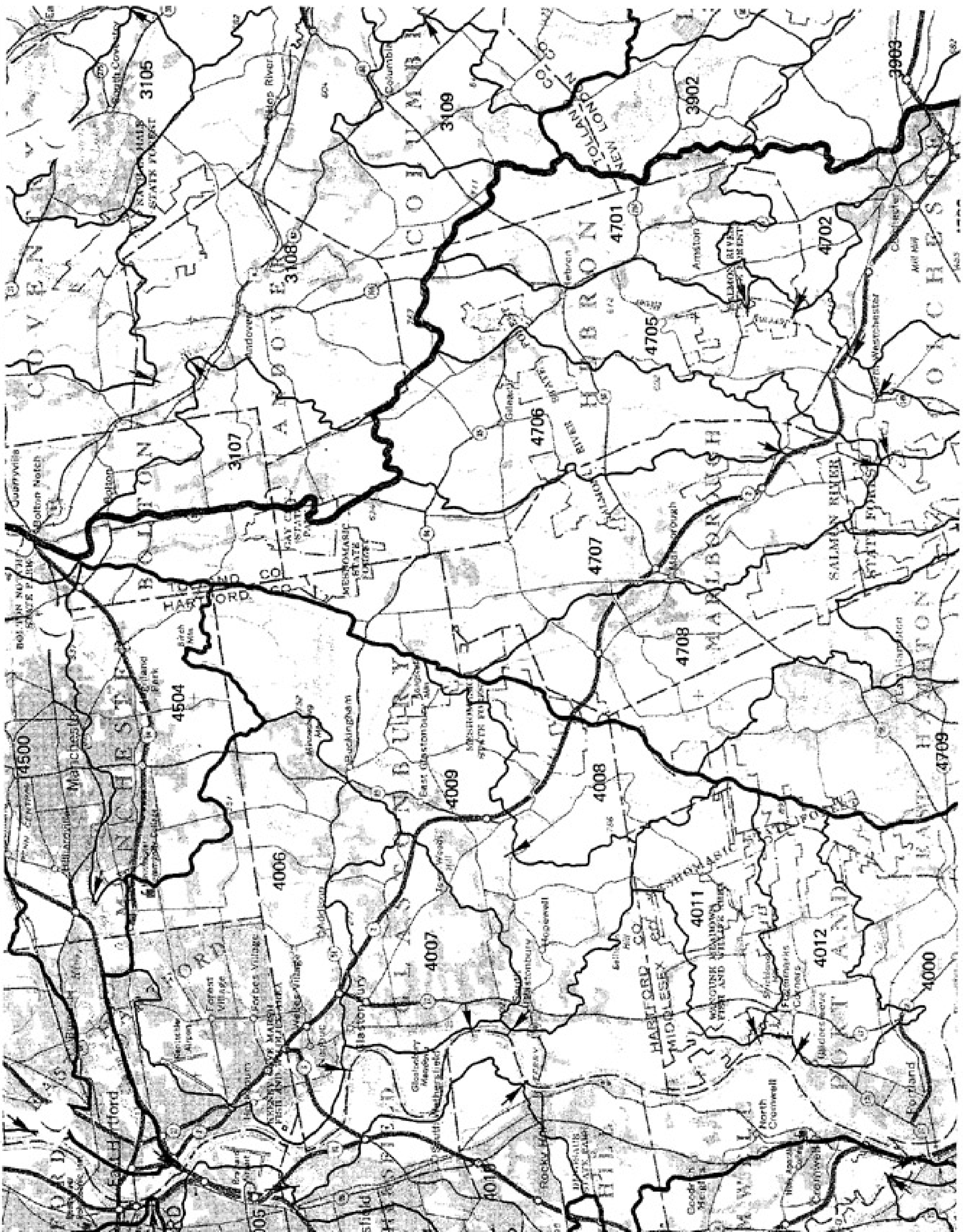
Southeast Drainage Basin

The area entitled the Southeast drainage basin consists of land draining into Blackledge River and Dickinson Creek. Dickinson Creek, with a total drainage area of 15 square miles (mostly outside the Town's limits), flows generally in a southerly direction and ultimately discharges into the Salmon River in Glastonbury. Only the uplands area of this watershed is within Glastonbury. This area, approximately 0.8 square miles, consists of lands of the Meshomasic State Forest, north of Route 2 and south of Windham Road.

The Blackledge River, having a drainage area of nearly 40 square miles mostly outside Glastonbury, flows in a southerly direction and discharges into the Salmon River in Colchester. The remaining part of the Southeast Drainage Basin, approximately 3.7 square miles, consisting of the Diamond Lake and Marlborough Road areas and the area along the Town line north of Hebron Avenue, contributes stormwater runoff to the Blackledge River and its tributaries including Flat Brook.

Salmon Brook Drainage Basin

The Salmon Brook drainage basin consists of 8.5 square miles and is the northern-most drainage basin in Glastonbury. The northwest and north-central sections of Glastonbury as well as the southwest portion of Manchester drain via the Salmon Brook and its



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Manchester
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4000
4005
4006
4007
4008
4009
4011
4012
Bolton
Andover
Columbia
Hebron
Amston
Marlborough
Buckingham
Salmon River
Glastonbury
Rocky Hill
North Cromwell
Cromwell
Portland
HARTFORD CO
MIDDLESEX CO
TOLLAND CO
NEW LONDON CO
HARTFORD

Figure 1-9

tributaries, including wildcat and Meyers Brooks. Salmon Brook flows generally in a westerly direction through Glastonbury and discharges in the southern portion of Keeney Cove about 500 feet from the Connecticut River.

The Salmon Brook drainage basin is one of the most developed drainage basins in town. The western portion of the watershed along the Route 2 and Route 17 corridors is nearing ultimate development.

"Meadow Drain" Drainage Basin

The "Meadow Drain" Drainage Basin, consisting of 8.2 square miles, is located in the west-central portion of Glastonbury along the Connecticut River. The main watercourse, Hubbard Brook, flows in a westerly direction through the watershed. Meadow Drain is a watercourse that flows north to south near the edge of the Connecticut River floodplain. Along the southerly portion of Hubbard Brook, its tributaries include Wickham, Smith and Holland Brooks which emanate easterly from the lowland terraces.

Roaring Brook Drainage Basin

The Roaring Brook drainage basin consists of 26.1 square miles, nearly fifty percent (50 %) of the town's 55 square miles of area, and is the largest drainage basin within the town. The southwest portion of Manchester, the northern portion of East Hampton and nearly all of the southern and eastern sections of Glastonbury are contained within the drainage basin. The main water course, Roaring Brook, flows in a southerly direction from a point north of the Buckingham Reservoir to the Connecticut River.

Roaring Brook's numerous tributaries include Slab Gut Brook, (A.K.A., Slab Gutter Brook), Cold Brook, Dark Hollow Brook, Mott Hill Brook and Wintergreen Brook.

D. STORMWATER, QUANTITY AND QUALITY

Due to its varied topography, its extensive system of lowland and upland streams, its flood-prone areas, erodible solids, and continuing land use development, Glastonbury has adopted strategies for the mitigation of stormwater peak flows, the control of runoff volume and the stormwater quality impacts on wetlands and watercourses. These impacts are interrelated. Erosion and flooding can cause damage to wetlands and watercourses from uncontrolled stormwater peak flows. Water quality can harm wetlands

and watercourses as a result of erosion-generated sedimentation and the transport of pollutants from paved surfaces, landscaped areas as well as the improper disposal of water-polluting substances.

E. STORM DRAINAGE MANAGEMENT

This involves the comprehensive management of surface water runoff to reduce such adverse impacts as loss of life, property damage, channel erosion, habitat destruction, water quality degradation and damage to roads and utilities.

In recognition of the importance of a comprehensive, Town-wide storm drainage management program, the Town contracted in 1980 with a consultant to prepare a detailed inventory and analysis of each watershed. Each report was based on an investigation of the local geology, soils, climate, flood problems, drainage systems and land use. The primary goal of each report was to provide guidance on how to reduce the impact of urbanization on natural and man-made drainage systems. Since their adoption by the Town, the following master drainage management reports provide a Town-wide coverage and serve as policy guidelines for development within the following watershed:

- Salmon Brook and its tributaries
- Roaring Brook, including Wintergreen Brook and several other tributaries
- Grindle Brook

Policies of the Inland Wetlands & Conservation Commission Include:

1. Storm drainage systems to be upgraded or newly constructed should adhere to guidelines set forth in the master drainage management reports adopted for each watershed.

2. Storm drainage systems to be upgraded or newly constructed in the Blackledge River and Dickinson Creek vicinity should be installed according to the engineering principles established in the Town's master drainage management reports and those established in the Blackledge River Watershed Study.

3. The Town should continue to require upgraded or newly constructed storm drainage systems to use stormwater detention or retention (where needed) and

outfall velocity attenuation structures to manage peak flows from reaching wetlands and watercourses.

4. Storm drainage systems should also follow the guidelines found in the Town's regulations for flood zones and wetlands and in the specifications listed in the soil erosion and sediment control ordinance, as required by the Physical Services Department.

F. STORMWATER QUALITY CONTROL

Unless renovated, stormwater discharged into Glastonbury's wetlands and watercourses presents a pollution threat. Water Quality Standards and Criteria are established by the Connecticut Department of Environmental Protection's Water Compliance Unit. These include surface water classifications, uses and allowed discharges, with stormwater being one such discharge. The State's and the Town's goal is to use best management practices (BMPs) appropriate for treating storm drainage before it enters wetlands and watercourses. According to the D.E.P., "Water quality standards have been designed to manage water quality with special regard to balancing the many legitimate uses required of the State's water resources (i.e., potable water supply, habitats for fish, other aquatic life and wildlife recreation and waste assimilation)." The Town has long required drainage systems to reduce stormwater peak flows and velocity when released into the natural drainage system. Detention basins accomplish this. They also remove sediment, their plant life stabilizes the basin and provides pollution filtration as certain plants metabolize and/or trap the pollutants.

An artificial wetland or vegetated basin water filtration system is known to possess water treatment capabilities. It is designed to impound stormwater long enough to remove and trap much of the sediment and suspended pollutants. Such treatment is essential for maintaining and improving water quality of natural wetlands and watercourses, particularly of such sensitive wetlands as bogs and class AA streams suitable for fishing and recreation.

Policies of the Inland Wetlands & Conservation Commission Include:

1. Adhere to guidelines and engineering principles established in the Town's stormwater management reports for the control of storm drainage discharge volume, peak flow and velocity. These guidelines must be combined with

requirements in existing Town regulations for wetland and flood zone protection and the control of erosion and sedimentation.

2. Upgraded and newly-designed drainage systems should be constructed in accordance with specific mitigation measures outlined in the D.E.P.'s Water Quality Standards and Criteria.

3. Storm drainage system outfalls (points of discharge), where detention or retention is not required by the stormwater management reports for each watershed, should be designed to incorporate sedimentation basins or created wetland filtration systems.

4. Prevent stormwater runoff at commercial and industrial land uses from polluting wetlands and watercourses by the installation of wetland systems for filtering pollutants that are designed specifically for each site.

5. Encourage cautious use or no use of road salt, lawn fertilizers, herbicides, pesticides and other sources of pollution commonly used around residential properties.

6. Follow recommendations established in the Blackledge River Watershed Study.

7. Inform the public not to dispose of any potential pollutants into storm drains since most stormwater eventually ends up in wetlands and watercourses, and ultimately in the Connecticut River.

SECTION 2

MINIMUM CONTROL MEASURE #1

Public Education and Outreach on Stormwater Impacts

I. Requirements

A. Required Throughout the Municipality:

1. Implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on waterbodies and the steps that the public can take to reduce pollutants in stormwater runoff.

II. Existing Programs

A. Currently there is very little Town-sponsored educational material that has any relation to stormwater quality. The Town Health Department does distribute information to new homeowners regarding septic system maintenance when applicable. This program will be continued for all new non-sewered single-family homes.

III. Selected Best Management Practices

A. Partner with the Town Board of Education to implement an educational program for school children. Said program to focus on stormwater system functions and means of ensuring good stormwater quality.

1. Measurable Goal: Provide five hours of instruction to students in Grades 3 through 5 on an annual basis. Total students affected is approximately equal to 125 per year.

2. Responsible Position: Town Engineer - Manager of Physical Services

B. Produce an educational brochure targeting homeowner lawn maintenance and its relationship to groundwater and stormwater quality. Partner with businesses that sell lawn care products to disperse said brochure.

1. Measurable Goal: Disperse 5,000 brochures as described above via combination of business participation and/or direct mailing.

2. Responsible Position: Town Engineer - Manager of Physical Services

C. Utilize local print media to publicize and educate the public on storm drainage system function and various topics related to maintenance of groundwater and stormwater quality.

1. Measurable Goal: Run four articles/advertisements in the local print media.

2. Responsible Position: Town Engineer - Manager of Physical Services

D. Provide selected web links from the Town's web page. Links shall be to other governmental or non-profit organizations that provide educational information related to various aspects of stormwater management.

1. Measurable Goal: Research and approve four web sites that can fulfill the above-described purpose.

2. Responsible Position: Town Engineer – Manager of Physical Services

IV. Implementation Schedule

TARGET	ACTIVITY
Year 1	Utilize print media to educate the general public on stormwater maintenance.
Year 2	Research and provide educational website links from Town's web page.
Year 3 - 5	Lawn maintenance brochure development/distribution.
Year 4	Partner with the Board of Education to educate children relative to stormwater management.

SECTION 3

MINIMUM CONTROL MEASURE #2

Public Involvement/Participation

I. Requirements

A. Required Throughout the Municipality:

1. Comply with State and local public notice and Freedom of Information requirements when implementing a public involvement/ participation program. Where notice requirements are inconsistent, the notice provisions providing for the most notice and opportunity for public comment shall be followed.

2. Develop a public involvement/participation program that includes the public in developing, implementing, and reviewing a stormwater management plan.

II. Existing Programs

A. The Town, in cooperation with Connecticut Light & Power (CL&P) and volunteer groups, has purchased and installed approximately 1,600 storm drain markers on catch basins within the urbanized area. A portion of the cost for the materials was provided by CL&P and all installation was performed by volunteers. Town staff provided coordination services. A sample marker is provided for informational purposes.

The Town has purchased an additional 3,400 ± markers. Placement of these markers is anticipated over a multi-year period and in a manner similar to previous installations. This is noted below in the proposed "Best Management Practices".

III. Selected Best Management Practices

A. Utilize volunteer labor to place markers on an additional 3,400 storm drains, both within and outside the urbanized area. Said markers inform residents that catch basins drain to wetlands and water courses. This volunteer effort will be publicized via print media and the Town web site to the extent practicable.

1. Measurable Goal: Install approximately 850 markers per year until supply is exhausted.

2. Responsible Position: Town Engineer – Manager of Physical Services

B. Hold a public meeting specifically pertaining to the Town's Stormwater Management Plan. Said meeting will be well publicized and shall be for the

purpose of explaining and gaining feedback on the Town's stormwater management plan. Comments from the public will be actively solicited. Based on comments received, the Town may choose to seek to amend the plan submitted to the Connecticut Department of Environmental Protection.

1. Measurable Goal: Notice of public meeting in different print media, meeting held, and minutes generated. Amend stormwater plan as deemed appropriate based on public input.

2. Responsible Position: Town Engineer – Manager of Physical Services

C. Recruit and establish volunteers to walk and clean a selected streambelt or wetland/waterbody on an annual basis.

1. Measurable Goal: Recruit a core group of volunteers and complete a clean-up of one streambelt/watercourse/wetland per year following establishment. Provide photo documentation of results.

2. Responsible Position: Town Engineer – Manager of Physical Services

IV. Implementation Schedule

TARGET	ACTIVITY
Year 1	(1) Advertise and hold public meeting as noted above. Generate meeting minutes and transcript. (2) Install approximately 850 storm drain markers utilizing volunteer groups.
Year 2	(1) Analyze public meeting comments and revise stormwater management plan as appropriate. (2) Install approximately 850 storm drain markers utilizing volunteer groups.
Year 3	(1) Recruit a core group of volunteers to clean streambelts. Select and clean one area. (2) Install approximately 850 storm drain markers utilizing volunteer groups.
Year 4	(1) Select and clean one streambelt utilizing volunteer groups. (2) Install approximately 850 storm drain markers utilizing volunteer groups.
Year 5	Select and clean one streambelt utilizing volunteer groups.

SECTION 4

MINIMUM CONTROL MEASURE #3

Illicit Discharge Detection and Elimination

I. Requirements

A. Required Throughout the Municipality:

1. Implement an ordinance or other regulatory mechanism to effectively prohibit non-stormwater discharges, except as provided in Section 3(a)(2), into the MS4, as well as sanctions to ensure compliance, to the extent allowable under State or local law.

2. Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste.

3. By the end of the third year of the general permit, expand the map required by subsection (B)(1) below to identify on such map all outfalls of 15" or greater where such outfalls are located anywhere within each municipality.

B. Required Within the Urbanized Area:

1. By the end of the second year of the general permit, develop a map or series of maps at a minimum scale of 1" = 2000" and maximum scale of 1" = 100' showing all stormwater discharges from a pipe or conduit with a diameter of 15" or greater (or equivalent cross-sectional area) owned or operated by the municipality. For each discharge the following information shall be included:

a. Type, material, and size of conveyance, outfall, or channelized flow (e.g. 24" concrete pipe).

b. The name and Surface Water Quality Classification of the immediate surface waterbody or wetland to which the stormwater runoff discharges.

c. If the outfall does not discharge directly to a named waterbody, the name of the nearest waterbody to which the outfall eventually discharges.

d. The name of the watershed in which the discharge is located.

2. By the end of the fourth year of the general permit, expand the map required by subsection (B)(1) above to identify on the map all outfalls of 12" or greater that are located within an urbanized area.

3. Develop, implement, and enforce a program to detect and eliminate existing illicit discharges, as defined in 40CFR 122.26(b)(2), into the MS4.

4. Develop and implement a plan to detect and address future non-stormwater discharges, including illegal dumping, to the MS4.

II. Existing Programs/Regulations

A. The Town Ordinance most closely related to the requirement as stated in A(1) of the General Permit can be found in Section 19-206 (copy included). This ordinance will be amended per requirements of the General Permit and in accordance with the implementation schedule noted later in this section.

B. No formal program exists relative to A(2) at the present time with the exception of Town employees who work at the Town-owned sites subject to a stormwater management plan. These employees receive training annually.

C. The level of Town stormwater mapping is documented below. Available information is extensive, but only current to 1995. The implementation schedule for this measure incorporates updating of the existing mapping along with provisions for remaining current. Supplementation of existing mapping information as needed to comply with the General Permit is also incorporated into the schedule.

D. Stormwater Drainage – Existing Mapping

1. The Town of Glastonbury has compiled a fairly sophisticated electronic map of its entire storm drainage system. The map was developed in AutoCAD and DWG format and has been converted to allow for viewing via a Geographic Information System (GIS) layer. The GIS utilizes ESRI ArcView/ArcInfo and can be viewed by the public via standard internet connections. Stormwater data has not been updated since 1995 and outlets have not been specifically identified, although attribute data is available for structures and pipes. Measures to bring this mapping up-to-date, and to continue with a regular schedule of updates, is included within the most applicable minimum control measure. Likewise, storm drain outlets will be field-verified and located on the Town's map as required within Minimum Control Measure #3.

   An overall map depicting the Town of Glastonbury storm drainage system is available. In addition, a sample map depicting available data from a random section of the overall map is provided to demonstrate the detail available at present.

2. The Town has no existing formal program to detect and eliminate existing illicit discharges. Stormwater testing is performed at four Town-owned sites subject to a Connecticut Department of Environmental Protection Stormwater Management Plan testing procedures and parameters as required under the general permit for the discharge of stormwater associated with industrial activity.

III. Selected Best Management Practices

A. Modify or replace existing Town Ordinances to effectively prohibit no stormwater discharges except as provided in Section 3(a)(2). A number of model ordinances will be reviewed for applicability to the Town of Glastonbury ordinance to include sanctions/penalties of severity sufficient to deter willful illicit discharge.

1. Measurable Goal: Creation and passing of ordinance by the date as stated in the implementation schedule below.

2. Responsible Position: Town Engineer – Manager of Physical Services

B. Develop a formalized program for informing public employees, businesses, and the general public about the hazards associated with illicit discharges. This program will include expansion of the existing training program for public employees via information provided in employee newsletters. Further, the Town will develop an informational brochure on this topic and work with the Town of Glastonbury Chamber of Commerce to distribute such to member businesses. Lastly, the Town will inform the general public of associated hazards via a combination of sewer bill inserts of an informational brochure and articles in the local print media.

1. Measurable Goal: Generation of quantifiable written materials distributed as indicated above.

2. Responsible Position: Town Engineer – Manager of Physical Services

C. Update existing stormwater mapping to present and supplement existing information as required in the General Permit. Said updated and supplemental information is to be included and merged electronically with the existing database.

1. Measurable Goal: Generation of updates and mapping required in accordance with the implementation schedule depicted below.

2. Responsible Position: Town Engineer – Manager of Physical Services

D. Develop, implement, and enforce a program that detects and traces illicit stormwater discharges within the implementation period of this permit and annually thereafter. This program is envisioned to contain several components.

1. Utilizing existing mapping and local knowledge of activities/land use in Town, develop a list of areas that may be most likely to contain illicit discharges, either direct or indirect. Use stormwater mapping to identify the discharge points of systems to which these areas drain. For example, certain commercial/industrial or agricultural areas may be targeted.

2. Place these discharges on a priority list for inspection by Town personnel. Priority inspections will be combined with random, but systematic, inspection of non-priority areas on an annual basis.

3. Inspection results will assist in determining which and how many discharges are tested in accordance with parameters outlined in the General Permit. Wet and dry weather testing will be conducted.

4. Those discharges that exceed allowances will be further investigated to determine source. The Town will then work with the source originator to eliminate the offending discharge utilizing appropriate enforcement measures available.

    a. Measurable Goal: Specific identification of priority locations followed by inspection and testing of discharges in accordance with the implementation schedule below. Documentation of such shall be retained.

    b. Responsible Position: Town Engineer – Manager of Physical Services

IV. Implementation Schedule

TARGET	ACTIVITY
Year 1	- Identify priority areas for illicit discharge inspection. - Inspect 50% of priority discharges. - Test a minimum of six priority discharges.
Year 2	- Implement an ordinance or other regulatory mechanism to effectively prohibit non-stormwater discharges absent allowable exceptions. - By the end of the second year of the General Permit, develop a map or series of maps at a minimum scale of 1" = 2000' and maximum scale of 1" = 100' showing all stormwater discharges from a pipe or conduit with a diameter of 15" or greater (or equivalent cross-sectional area) owned or operated by the municipality. For each discharge the following information shall be included: Type, material, and size of conveyance, outfall, or channelized flow (e.g. 24" concrete pipe). a. The name and Surface Water Quality Classification of the immediate surface waterbody or wetland to which the stormwater runoff discharges. b. If the outfall does not discharge directly to a named waterbody, the name of the nearest named waterbody to which the outfall eventually discharges. c. The name of the watershed in which the discharge is located. d. Maps to include updates of existing maps to present configuration. - Inspect 50% of priority discharges. - Test a minimum of six priority discharges.

Year 3	- By the end of the third year of the General Permit, expand the map required by subsection B(i) to identify on such map all outfalls of 15" or greater where such outfalls are located anywhere within each municipality. - Inspect a minimum of forty-five discharges outside priority areas. Re-inspect priority discharges based on past experience. - Test a minimum of six discharges.
Year 4	- By the end of the third year of the General Permit, expand the map required by subsection B(i) to identify on such map all outfalls of 15" or greater where such outfalls are located anywhere within each municipality. - Inspect a minimum of forty-five discharges. Re-inspect priority discharges based on past experience. - Test a minimum of six discharges. - Develop an informational brochure for education of public employees, businesses, and the general public explaining the hazards associated with illegal discharges and improper waste disposal. Distribute via appropriate means.
Year 5	- Inspect a minimum of forty-five discharges and re-inspect priority discharges based on past inspection experience. - Test a minimum of six discharges. - Update stormwater maps to include new installations. - (These measures are to be continued beyond the five-year implementation period on an annual basis indefinitely.)

continuous flow of water seeping into buildings or excavation from soils or other underground sources, flows of natural springs or groundwaters, surplus from flowing wells, the discharge from roofs, roof conductors, yard drains, street or highway drains.
(Ord. of 10-25-88)

Sec. 19-206. Approved discharges for stormwater drains.

(a) Stormwater drains (also referred to as storm drains, storm sewers, conduits, or similar terms) are in general intended to be used for conveying surface and stormwaters from streets, yards and other ground surfaces from roofs and other places. They shall also be used for conveying subsoil drainage waters, the flow of natural springs, groundwater, surplus from flowing wells, clean cooling water as defined in section 19-17 of this article and, subject to approval by the manager or an authorized agent thereof, inoffensive industrial wastes.

(b) No persons shall discharge or permit to be discharged from property under his control into a storm drain, any waste or water which is polluted with organic or other matter which can decay, which is odorous, oily or unsightly, or for any other reasons is likely to or does give offense or cause damage or injury to nearby persons or property when discharged into an open natural stream. No wastewater which is poisonous to persons, animals or fish when discharged into a natural stream shall be discharged through any storm drain. No coarse rubbish, sticks, large solids, offal, feathers, straw, cinders, ashes, scraps, leaves, oil, grease, combustible substance or similar materials shall be permitted to enter any storm drain. No material, the discharge of which into natural streams, ponds or lakes is prohibited by state or federal laws or regulations, shall be discharged into any storm drain.
(Ord. of 10-25-88)

Sec. 19-207. Discharge of cooling water restricted.

No large quantity of cooling water, as defined in section 19-17 of this article or similar wastewaters in large volumes or discharged in large quantities at one (1) time shall be discharged into any sanitary sewer without specific permission from the manager or an authorized agent thereof. Such permission, if granted in any case, shall be revocable by said manager, or an authorized agent thereof, upon proper notice. In general, such permission shall not be granted at locations where there is conveniently available a storm drain, natural watercourse or other convenient and suitable means of disposal for such large volumes of clean wastewater. Before permitting such discharge into a sanitary sewer at any given location, the manager, or an authorized agent thereof, shall consider whether the discharge in question may cause excessive flows in the sanitary sewer or sanitary sewers through which it is to be discharged and whether such discharge will occasion a burden on any pumping equipment, sewage treatment plant, or other appurtenance of the sanitary sewer system, out of proportion to the other needs of the community and to the contribution which the property from which the discharge comes makes or has made toward the costs of providing, maintaining and operating sewerage services by the town.
(Ord. of 10-25-88)

SECTION 5

MINIMUM CONTROL MEASURE #4

Construction Site Stormwater Runoff Control

I. Requirements

A. Required Throughout the Municipality:

1. Develop, implement, and enforce a program, or modify an existing program, to reduce pollutants in any stormwater runoff to the MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of stormwater discharges from construction activity disturbing less than one acre shall be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more. The program shall include, but not be limited to, the development and implementation of:

a. An ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions for non-compliance, to the extent allowable under state or local law.

b. Procedures for notifying construction site developers and operators of the requirements for registration under the General Permit for the Discharge of Stormwater and Dewatering Wastewaters Associated With Construction Activities.

c. Requirements for construction site operators to implement appropriate erosion and sediment control best management practices in accordance with the Guidelines.

d. Requirements for construction site operators to control waste at the site such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste that may cause adverse impacts to water quality.

e. Procedures for site plan review that incorporate consideration of potential water quality impacts.

f. Procedures for receipt and consideration of information submitted by the public.

g. Procedures for site inspection and enforcement of control measures.

II. Existing Programs/Regulations

A. There are several Town regulations that address issues pertinent to construction site stormwater runoff control. Below is a list of pertinent regulations and a summary of relevant issues that are addressed in those regulations. Although entire texts have not been provided, these regulations are available to the general public.

1. Town of Glastonbury Zoning Regulations, Section 19: This regulation closely follows the model regulation formulated by the State of Connecticut.

a. Complies with State Law mandate.

b. Requires certified control plan when disturbed area is more than 0.5 acre.

c. Establishes minimum requirements and standards.

d. Requires use/conformance to CT Guidelines for Soil Erosion and Sediment Control (1985), as amended, manual.

e. Includes monitoring and inspection provisions.

2. Town of Glastonbury Zoning Regulations, Section 20:

a. Regulates proposed land uses by Town-wide design standards and specifications, by overlay protections zones, by special design standards and specifications in the overlay protection zones, and by special permit process.

b. Prohibits new or replacement underground fuel storage tanks.

c. Prohibits certain floor drain connections to storm sewers.

d. Very conservative (exceeds State Health Code) standards and requirements concerning sites served by well and septic systems.

e. Prohibits specified potentially polluting land uses in certain overlay protection zones.

f. Requires specified land uses to be allowed only if connected to sanitary sewers or holding tanks.

g. Requires nitrogen loading computations and sets loading limits in overlay protection zones, thus controlling long-term nitrogen inputs to water systems.

h. Requires at least 50% maintenance of site's infiltration potential in overlay protection zones, thus attenuating imperviousness concerns that degrade surface water quality.

i. Requires special considerations for proposed stormwater management facilities in overlay protection zones.

j. Provides inspection and enforcement provisions.

k. Exemption for farmers.

l. Requires conformance to the Town's 1995 Plan of Conservation and Development which comprehensively details all natural resource/environmental concerns and goals.

3. Subdivision Regulations.

a. Section 15 utilizes the same language as stated in the Zoning Regulations relative to erosion and sedimentation control.

b. Requires conformance with 1995 Plan of Conservation and Development, as amended.

c. Section 12 addresses storm drainage for streets and individual lots and addresses permits required for development within inland/wetlands regulated areas. Inspection and enforcement provisions are also included.

4. Policies

a. Town's 1995 Plan of Conservation and Development, as amended.

(1) Creates planning areas and policies.

(2) Creates resource categories and comprehensive and detailed concerns and goals for streambelts, wetlands and watercourses, floodplain management, groundwater protection, and stormwater management, especially dealing with water quality.

b. Conservation Commission's 1995 Open Space and Conservation Policies Plan. Some of these policies are detailed in Section 1.

(1) This document is similar to the aforementioned Plan of Conservation and Development, but is more detailed in natural resource and environmental protection that guides the Conservation Commission/Inland Wetlands and Watercourses Agency in their actions, approvals, and recommendations.

5. Existing Site Plan Review Procedures

a. Administrative review process (staff level preliminary review).

b. Informal review process by Conservation Commission/ Inland Wetlands and Watercourses Agency and Town Plan and Zoning Commission.

c. Formal review process by Town Plan and Zoning Commission – public hearings as required by regulation.

d. Filing of subdivision plans and special permits.

e. Pre-construction meeting requirements.

III. Selected Best Management Practices

A. Perform a detailed audit of existing regulations as outlined above. Issue a report that identifies outdated portions and identifies revisions/additions/ deletions necessary to achieve full compliance with the General Permit for discharge of stormwater from MS4. Determine if revised regulation suffices for compliance and study EPA model ordinances as an addition and/or alternative. Enact regulation revisions/ordinances as required for compliance.

1. Responsible Position: Town Engineer – Manager of Physical Services

NOTE: Regulation revision/ordinance creation require action by various Town policymakers).

B. Develop a Town-preferred library of technical Best Management Practices relative to construction site runoff control. Distribute to permit holders.

1. Responsible Position: Town Engineer – Manager of Physical Services

C. Develop a written checklist of items for staff reviewing site plans prior to approval.

1. Responsible Position: Town Engineer – Manager of Physical Services

D. Develop a written inspection checklist for field personnel during construction.

1. Responsible Position: Town Engineer – Manager of Physical Services

E. Measurable Goals

1. Measurable goals for the Best Management Practices listed above shall be the generation of written documents, as required, and actual enactment of pertinent Town regulations, as necessary, for

General Permit compliance and in conformance to the implementation schedule below.

IV. Implementation Schedule

TARGET	ACTIVITY
Year 1	Audit all relevant existing regulations and policies and issue a report that identifies deficiencies relative to General Permit requirements and makes recommendations for achieving total compliance.
Year 2	Study model ordinances and/or develop recommended language for regulation revision which, if implemented, will bring the Town into compliance with the General Permit.
Year 3	Enact regulation revisions and/or ordinances to bring the Town into compliance with the General Permit.
Year 4	Develop a written library of Town-preferred technical Best Management Practices pertinent to construction site stormwater runoff control. Distribute to those granted construction permits.
Year 5	Develop written checklists for Town staff involved in review of site plans prior to approval and for staff involved in site inspection during construction.

SECTION 6

MINIMUM CONTROL MEASURE #5

Post-Construction Stormwater Management In New Development and Redevelopment

I. Requirements

A. Required Throughout the Municipality:

1. Develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the MS4 or directly to waters of the State. This program shall ensure that controls are implemented to require appropriate infiltration practices, reduction of impervious surface, creation of or conversion to sheet flow, measures and/or structures to reduce sediment discharge and any other innovative measures that will prevent or minimize water quality impacts.

2. Develop and implement strategies that include a combination of structural and/or non-structural Best Management Practices (BMPs) appropriate for the municipality.

3. Use an ordinance or other regulatory mechanism to address the elements of subsection (1) above regarding post-construction runoff from new development and redevelopment projects to the extent allowable under State or local law.

4. Ensure adequate long-term operation and maintenance of BMPs.

II. Existing Programs/Regulations

A. The following regulatory mechanisms currently exist in the Town of Glastonbury. Entire texts have not been provided, but are available to the general public.

1. Building-Zone Regulations

a. Section 6.7 (Open Space Subdivision) – results in greater vegetated areas and reduced infrastructure (roads).

b. Section 19 (Erosion and Sediment Control) – provides mechanism for protection of wetlands/watercourses.

c. Section 20 (Groundwater Protection) – provides infiltration requirements and provides mechanism for protection of groundwater resources.

d. Section 9 (Parking) – provides for deferral of parking areas for commercial projects and use of gravel parking for certain municipal uses.

2. Subdivision and Resubdivision Regulations

a. Section 6 (Open Space Subdivison).

b. Section 15 (Erosion and Sedimentation Controls).

3. Wetlands Regulations: Provide for wetland area protection and regulatory powers for upland review area. Includes review and action on stormwater management designs.

4. Master Drainage Plan: Provides for review and action regarding stormwater management plans associated with development projects.

5. Plan of Conservation and Development: Provides policy statements/BMPs for management and protection of wetlands and watercourses, floodplains, aquifers and relative to stormwater management. Encourages cluster/open space subdivision design for reduced infrastructure/paved areas and enhanced water quality.

III. Selected Best Management Practices

A. Perform a detailed audit of existing regulatory mechanisms as outlined in (II) above. Issue a report that identifies outdated portions and identifies possible revisions/additions/ deletions that will ensure compliance with the language and intent of the General Permit as it relates to post-construction stormwater management.

1. Responsible Position:

B. Study the effectiveness and feasibility of implementing or requiring implementation of various stormwater management techniques Techniques to be considered include, but are not limited to, the following:

1. Review all aspects of potential impacts associated with a development proposal relative to stormwater management (i.e. stormwater quantity, quality, erosion/sedimentation potential, potential off-site/downstream impacts, flooding, etc.

2. Utilize a wide variety of designs/detention facilities (such as “wet” basins – providing treatment of pollutants and potentially enhanced habitat conditions).

a. Incorporate multi-purpose stormwater treatment systems within development project designs (water quality biofilter treatment, wetlands/wildlife habitat

enhancement). For example, use of linear grassed swales, incorporating filter berms, vegetation, plunge pools, etc. to reduce stormwater velocity, treat pollutants and trap sediments, leading to a double or multi-stage detention basin that would further trap sediments/ provide treatment of stormwater, in addition to control peak runoff.

b. Provide pre- and post- detention treatment (i.e. also provide overland swale/vegetative treatment/artificial wetland between discharge from a detention basin and discharge into watercourse).

c. Incorporate recreated or artificial wetlands in stormwater management systems to provide habitat/ wetlands enhancement.

3. Consider/utilize new technology for structural controls (catch basin, sedimentation structures) for improved sediment/pollution containment and groundwater recharge (i.e. infiltration systems, multi-chamber basins).

4. Utilize groundwater recharge techniques (dry wells, infiltrators, porous pavement); incorporate where feasible (based upon soil conditions); incorporate in large commercial projects; provide for deferral of parking, evaluating need over a period of time; keep deferred parking in vegetative state.

5. Allow for some form of storage of stormwater runoff on commercial sites for reuse for landscape irrigation.

6. Incorporate into stormwater management plan landscaping elements (or underground storage) within parking areas and in/ along treatment areas to provide cooling of stormwater runoff prior to discharge into a watercourse.

7. Establish “no cut” parameters adjacent to wetlands/watercourses to allow for improved vegetative treatment of overland flows, in combination with use of such elements as plunge pools and level spreaders.

8. Establish/require treatment standards and parameters for application of chemicals and fertilizers for commercial and residential development.

9. Where feasible, upgrade existing stormwater systems and require upgraded systems in redevelopment projects (commercial building expansion, parking lot expansion).

10. Utilize plunge pool/level spreader stormwater discharge designs to minimize point discharge.

11. Structural BMPs that receive favorable review can be incorporated into private and public development plans during the Town staff review component of the local developmental regulatory process.

C. Responsible Position:

D. Recommend revisions of pertinent local regulatory mechanisms resulting from BMP 1 above. Consider and recommend the appropriateness of an over-arching ordinance that summarizes objectives and references the detail present in other regulatory documents. Review model ordinances for this purpose. Enact ordinance and/or regulation revisions to ensure compliance with the General Permit.

1. Responsible Position: Town Engineer – Manager of Physical Services

(NOTE: Regulation revision/ordinance creation requires action by various Town policymakers.

E. Measurable Goals

1. Measurable goals for all Best Management Practices stated above shall be the generation of written documents and reports as required, stated, and actual enactment of pertinent ordinances and/or regulation revisions, as necessary, for General Permit compliance and in conformance to the implementation schedule.

IV. Implementation Schedule

TARGET	ACTIVITY
Year 1	Audit all relevant existing regulations and policies and issue a report that identifies deficiencies relative to achieving compliance with the language and intent of the General Permits requirements associated with Section 6, Item (5).
Year 2	Study and issue a report detailing the feasibility of incorporating various structural and non-structural BMPs in private and public development and redevelopment projects. Distribute to appropriate Town staff, developers and local regulators.
Years 3-5	Recommend and enact regulation revisions and/or ordinances to ensure compliance with the General Permit language and reference approved portions of prior reports issued.

SECTION 7

MINIMUM CONTROL MEASURE #6

Pollution Prevention/Good Housekeeping for Municipal Operations

I. Requirements

A. Required Throughout the Municipality:

1. Develop and implement an operation and maintenance program that includes a training component for municipal employees and contractors and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations.

2. Using training materials that are available from the EPA, the State or other or other organizations, this program shall include employee training to prevent and reduce stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance.

3. Develop and implement a program to sweep all streets at least once a year as soon as possible after snowmelt.

4. Develop and implement a program to evaluate and, if necessary, clean catch basins and other stormwater structures that accumulate sediment at least once a year, including a provision to identify and prioritize those structures that may require cleaning more than once a year.

5. Develop and implement a program to evaluate and, if necessary, prioritize for repairing, retrofitting, or upgrading the conveyances, structures, and outfalls of the MS4.

B. Required Within the Urbanized Area

1. Develop and implement a program to evaluate and prioritize those streets that may require sweeping more than once a year.

II. Existing Programs/Practices

A. The Town Highway Division sweeps all Town roads (approximately 185 miles) and Town-owned parking areas at least once during an eight-week window, typically beginning in late March. The downtown business areas and several identified areas of environmental sensitivity are swept more frequently.

B. Vehicle washing is performed in a free-standing Town-owned truck washing structure. Wash water is directed to drains connected to an underground

holding tank. Tanks are periodically pumped and the resulting wastewater is disposed at the Town-owned Wastewater Treatment Facility.

C. The Town has stormwater management plans in effect for three sites as required by the Connecticut Department of Environmental Protection.

D. Salt and sand/salt mixtures are housed within a dedicated covered salt storage facility at the Town Highway Garage.

E. A private consultant was retained in 2001 to generate an environmental compliance audit for the Highway/Fleet Maintenance Facility as well as the Town Parks and Recreation Facility. All recommendations have been satisfied.

F. The Town has developed a spill prevention and countermeasure plan for the Highway/Fleet Maintenance Facility as required by the U.S. EPA.

G. The Town owns a catch basin cleaner and has requested supplemental funding in the 2004/2005 budget for contractual assistance to clean catch basins.

H. Town staff has developed a Power Point presentation for assisting in training staff in stormwater pollution prevention techniques.

III. Selected Best Management Practices

A. Review existing Town plans related to preventing or reducing pollutant runoff from municipal operations and expand/revise said plans to achieve compliance with the language and intent of the General Permit, Section 6, Item 6. Assess the need for developing additional plans for Town operations not currently covered under existing stormwater pollution prevention plans. Issue a report on findings and develop additional plans for these sites or operations as determined by the aforementioned assessment.

1. Responsible Position: Town Engineer – Manager of Physical Services

B. Investigate and assess training materials available from the U.S. EPA, Connecticut Department of Environmental Protection, or other organizations for inclusion within and expansion of existing employee training programs. Assess the need to expand employee training beyond groups currently trained. Issue a report on the findings of said assessment. Modify existing training programs and develop new training programs as determined by this assessment.

1. Responsible Position: Town Engineer – Manager of Physical Services

C. Continue to implement the current street sweeping program in accordance with the General Permit, including increased frequency of sweeping in parts of the urbanized area.

1. Responsible Position: Town Engineer – Manager of Physical Services

D. Develop a formal written program that categorizes and evaluates catch basins and other structures (including detention/retention). Cleaning priorities and written cleaning schedules will then be developed based on this evaluation. A database will be developed for this purpose. Structures within and outside the urbanized area will be evaluated and cleaned according to schedules developed.

1. Responsible Position: Town Engineer – Manager of Physical Services

E. Measurable Goals

1. Measurable goals for the Best Management Practices listed above will include generation of written documents and obtaining of data necessary to populate new databases. Written documents are to include:

2. Report on audit and assessment of written Town employee training programs. Revisions of said written programs and generation of any needed new training programs.

3. Creation of catch basin outfall and drainage structure database that documents structure condition, sediment load, date of cleaning, etc. Written cleaning schedules will be developed on the evaluation program generated.

4. Complete Spring sweeping within eight (8) weeks. Results to be tracked.

IV. Implementation Schedule

TARGET	ACTIVITY
Year 1 - 5	Sweep all streets within eight-week window beginning in late March.
Year 1	Review existing Town employee training materials along with EPA/State materials available. Revise accordingly.
Year 1 – 5	Train necessary employees annually utilizing selected training materials.
Year 1	Develop an evaluation form for field personnel involved in inspecting or cleaning drainage structures and outfalls.
Year 3	Develop a catch basin and outfall database and begin to populate with information from field evaluation form. Data to be obtained on an ongoing basis during and beyond the implementation period.
Year 5	Develop and implement a catch basin and drainage structure cleaning schedule based on field data obtained in prior years.

SECTION 8

ADDITIONAL REQUIREMENTS

I. Proper Operation and Maintenance

A. The permittee shall at all times properly operate all facilities and systems of treatment and control, including related appurtenances, which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes adequate laboratory controls and appropriate quality assurance procedures. Proper operation and maintenance requires the operation of backup or auxiliary facilities or similar systems, installed by a permittee when necessary to achieve compliance with this permit.

II. Keeping Plans Current

A. The permittee shall amend the Plan whenever:

1. There is a change that has the potential to cause pollution of the waters of the State.

2. The actions required by the Plan fail to ensure or adequately protect against pollution of the waters of the State.

3. The Commissioner requests modification of the Plan. The amended Plan shall be completed and all actions required by such Plan shall be completed within a time period determined by the Commissioner.

B. The Commissioner may notify the permittee in writing at any time that the Plan does not meet one or more of the requirements of this general permit. Within 30 days of such notification, unless otherwise specified by the Commissioner in writing, the permittee shall respond to the Commissioner indicating how they plan to modify the Plan to address these requirements. Within 90 days of this response or within 120 days of the original notification, whichever is less, unless otherwise specified by the Commissioner in writing, the permittee shall then revise the Plan, perform all actions required by the revised Plan, and shall certify to the Commissioner that the requested changes have been made and implemented. The permittee shall provide such information as the Commissioner requires to evaluate the Plan and its implementation.

III. Monitoring Requirements

A. Schedule of Monitoring

1. Stormwater monitoring shall be conducted by the Regulated Small MS4 annually starting in 2004. At least two outfalls apiece shall be monitored from areas of primarily industrial development, commercial development and residential development, respectively, for a total of six (6) outfalls monitored. Each monitored outfall shall be selected based on an evaluation by the MS4 that the drainage

area of such outfall is representative of the overall nature of its respective land use type.

2. The municipality may submit a request to the Commissioner, in writing, for implementation of an alternate sampling plan of equivalent or greater scope. The Commissioner will approve or deny such a request in writing.

B. Parameters to be Monitored

1. The parameters to be monitored for each discharge point shall include:

- pH (SU)
- Hardness (mg/1)
- Conductivity (umos)
- Oil and grease (mg/1)
- Chemical Oxygen Demand (mg/1)
- Turbidity (NTU)
- Total Suspended Solids (mg/1)
- Total Phosphorous (mg/1)
- Ammonia (mg/1)
- Total Kjeldahl Nitrogen (mg/1)
- Nitrate plus Nitrite Nitrogen (mg/1)
- E. coli (col/100ml)

In addition to this list of parameters, uncontaminated rainfall pH shall be measured at the time the runoff sample is taken.

C. Stormwater Monitoring Procedures

1. Samples shall be collected from discharges resulting from a storm event that is greater than 0.1 inch in magnitude and that occurs at least 72 hours after any previous storm event of 0.1 inch or greater. Runoff events resulting from snow or ice melt cannot be used to meet the minimum annual monitoring requirements. Grab samples shall be used for all monitoring. Grab samples shall be collected during the first six (6) hours of a storm event discharge. The uncontaminated pH measurement shall also be taken at this time. Samples for all discharges shall be taken during the same storm event.

2. Storm Event Information

a. The following information shall be collected for the storm events monitored:

(1) The date, temperature, time of the start of the discharge, time of sampling, and magnitude (in inches) of the storm event sampled.

(2) The duration between the storm event sampled and the end of the previous measurable (greater than 0.1 inch rainfall) storm event.

3. Test Procedures

a. Unless otherwise specified in this permit, all pollutant parameters shall be tested according to methods prescribed in Title 40, CFR, Part 136 (1990).

D. Reporting and Recordkeeping Requirements

1. The permittee shall keep records required by this permit for at least five (5) years following its expiration or longer if requested by the Commissioner in writing. Such records, including the Stormwater Management Plan, shall be available to the public at reasonable times during regular business hours.

2. By January 1, 2005 and annually thereafter by January 1, the permittee shall submit an Annual Report to:

STORMWATER PERMIT COORDINATOR
BUREAU OF WATER MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 ELM STREET
HARTFORD, CT 06106-5127

The report shall include:

a. A municipal plan review fee of $187.50

b. The status of compliance with this general permit, an assessment of the appropriateness of the identified best management practices and progress toward achieving the implementation dates and measurable goals for each of the Minimum Control Measures.

c. All monitoring data collected and analyzed pursuant to Section 6(g).

d. All other information collected and analyzed, including data collected under Section 6(a)(3), during the reporting period.

e. A summary of the stormwater activities the permittee plans to undertake during the next reporting cycle.

f. A change in any identified measurable goals or implementation dates that apply to the program elements.

E. Other Requirements

1. There shall be no distinctly visible floating scum, oil, or other matter contained in the stormwater discharge. Excluded from this are naturally occurring substances such as leaves and twigs provided no person has placed such substances in or near the discharge.

2. The stormwater discharge shall not result in pollution due to acute or chronic toxicity to aquatic and marine life, impair the biological integrity of aquatic or marine ecosystems, or result in an unacceptable risk to human health.

3. All requirements as itemized in Section 7 of the State of Connecticut General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems.

IV. Authorized Non-Stormwater Discharges

A. This permit authorized the following non-stormwater discharges provided they do not contribute to a violation of water quality standards and such discharges are identified in the Stormwater Management Plan and approved, in writing, by the Commissioner as discharges that are not significant contributors of pollutants to any identified MS4:

1. Landscape irrigation.

2. Uncontaminated groundwater discharges such as pumped groundwater, foundation drains, water from crawl space pumps and footing drains.

3. Irrigation water.

4. Lawn watering runoff.

5. Residual street wash water.

6. Discharges or flows from fire-fighting activities (except training).

7. Naturally occurring discharges such as rising groundwaters, uncontaminated groundwater infiltration (as defined at 40 CFR 35.2005(20), springs, diverted stream flows, and flows from riparian habitats and wetlands.

V. Certification and Signature

A. Certification Requirements

1. This plan and any document, including but not limited to, any notice, information or report, that is submitted to the Commissioner of the CTDEP under the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems shall be signed by the chief elected official or principal executive officer, and by the individual or individuals responsible for preparing such document as defined in Section 22a-430-3(b) (2) of the Regulations of Connecticut State Agencies.

2. "I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate, and complete to the best of my knowledge and belief. I understand that a false statement made in this document or its attachments may be punishable as a criminal offense, in accordance with Section 22a-6 of the Connecticut General Statutes, pursuant to Section 53a-157b of the Connecticut General Statutes, and in accordance with any other applicable statute."

Preparer's Signature

Daniel A. Pennington, P.E.
Manager of Physical Services/
Town Engineer
Town of Glastonbury, Connecticut

_____
Signature and Date

Chief Executive Officer
Richard J. Johnson
Town Manager
Town of Glastonbury

_____
Signature and Date