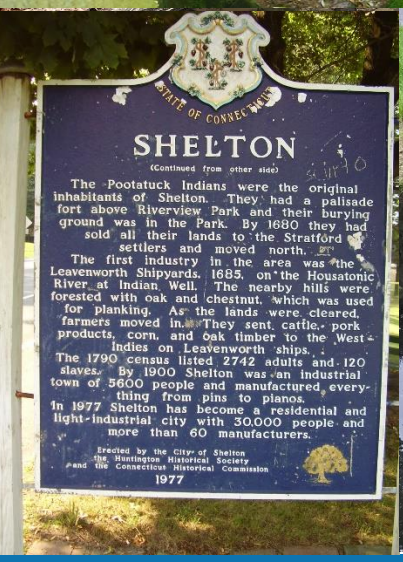


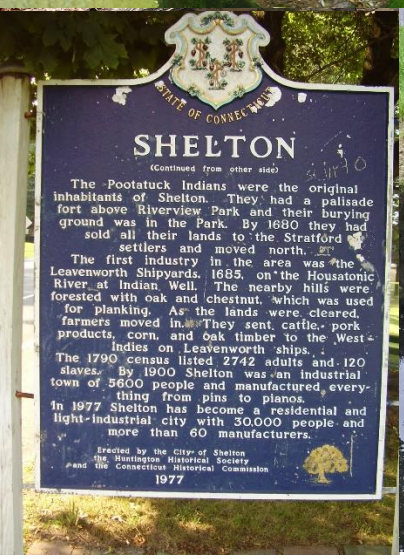
CTDEEP General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems

IMPERVIOUS AREA DISCONNECTION PLAN

City of Shelton

September 15, 2021

Tighe&Bond
Engineers | Environmental Specialists



CTDEEP General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems

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City of Shelton

September 15, 2021

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Abbreviations

ac	acres
BMP	Best Management Practice
CTDEEP	Connecticut Department of Energy and Environmental Protection
DCIA	Directly Connected Impervious Area
HSG	Hydrologic Soil Group
IC	Impervious Cover
LID	Low Impact Design
MEP	Maximum Extent Practicable
MS4	Small Municipal Separate Storm Sewer System
sq	square
WQC	Water Quality Criteria
WQV	Water Quality Volume

Section 1
Introduction

1.1 Plan Purpose

The City of Shelton retained Tighe & Bond to prepare an Impervious Coverage Disconnection Plan for the City.

The purpose of the City of Shelton's Impervious Coverage Disconnection Plan is to develop a strategy for the disconnection of impervious surfaces as required by the Connecticut Department of Energy and Environmental Protection's (CTDEEP) General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems, more commonly known as the MS4 General Permit, effective July 1, 2017.

Disconnection of impervious coverage to vegetated surfaces and stormwater treatment practices has been identified by CTDEEP as a means of improving stormwater quality, which in turn, improves the quality of lakes, rivers, and streams.

1.2 Permit Requirements

The MS4 General Permit identifies six minimum control measures to improve the quality of municipal stormwater. Two of these minimum control measures, Post-Construction Stormwater Management in New Development and Redevelopment, and Pollution Prevention/Good Housekeeping address disconnection of impervious coverage to improve stormwater quality.

1.2.1 Establishing a Baseline

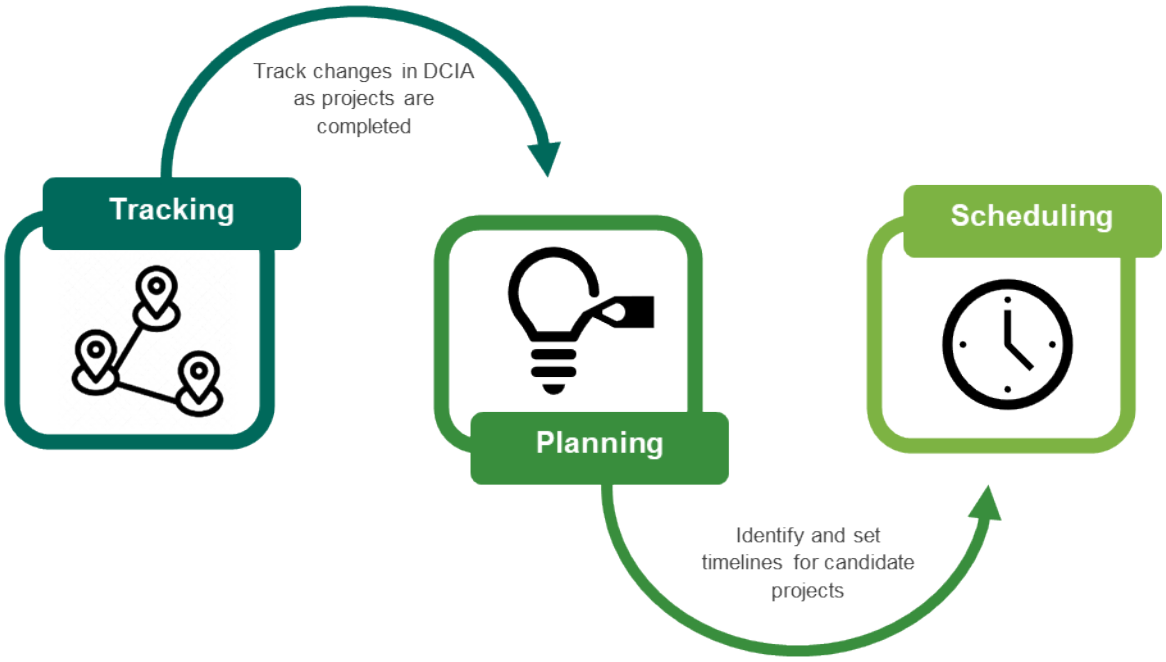
Minimum Control Measure 5, Post-Construction Stormwater Management in New Development or Redevelopment, requires municipalities to develop an inventory of Directly Connected Impervious Area (DCIA). More specifically, Section 6(a)(5)(C) of the MS4 General Permit requires that using data provided by CTDEEP, permittees shall calculate the Directly Connected Impervious Area within their community, and revise it accordingly as changes are made within the watershed.

1.2.2 Plan Development

The Minimum Control Measure 6, Pollution Prevention/Good Housekeeping includes developing a strategy to disconnect the impervious coverage. Section 6(a)(6)(B) of the MS4 General Permit requires permittees to fund and implement a program for repairing, retrofitting or upgrading the conveyances, structures and outfalls of the MS4. This program shall be updated based on new information on outfalls discharging pollutants, impaired waters, inspection observations or observations made during outfall mapping.

The goal of the retrofit program is to "disconnect" existing Directly Connected Impervious Areas (DCIA). The DCIA calculation performed pursuant to Section 6(a)(5)(C) shall serve as the baseline for the retrofit program required by the permit, and tracking progress toward impervious disconnection goals specified in the permit.

The Impervious Coverage Disconnection Plan consists of three elements: Tracking, Planning, and Scheduling.



1.2.2.1 Tracking

The MS4 General Permit requires municipalities to track on an annual basis the total acreage of DCIA that is disconnected as a result of redevelopment or retrofit projects within the MS4. Tracking the disconnection of DCIA documents, on a per project basis, the amount of existing DCIA that is disconnected. The MS4 General Permit allows credit for disconnections of DCIA implemented as of July 1, 2012.

1.2.2.2 Planning

The MS4 General Permit requires the municipality to develop a plan to implement retrofit projects to help meet the DCIA reduction goal. As part of the plan, the municipality shall identify and prioritize sites that may be suitable for retrofit. Considerations for prioritizing retrofit projects may include outfall catchment areas that discharge to impaired waters, areas within the Urbanized Area of the MS4 or catchment areas with greater than eleven percent (11%) DCIA. The municipality is required to report on the selection of the projects to be implemented, the rationale for the selection of those projects and the total DCIA to be disconnected upon implementation of the projects.

1.2.2.3 Schedule

The MS4 general permit requires that by June 30, 2022, the municipality shall commence the implementation of the retrofit projects with a goal of disconnecting one percent (1%) per year of the permittee's DCIA for 2021 and 2022, or a total of 2%, to the maximum extent practicable. If the two percent (2%) goal will not be met, the municipality shall include in the Annual Report a discussion of what percentage of DCIA will actually be disconnected and why the remainder of the two percent (2%) goal could not be achieved. The General permit requires a goal of 1% disconnection for each year beyond 2022 as well.

Section 2
Impervious Coverage

2.1 Impervious Coverage and Directly Connected Impervious Coverage

2.1.1 Impervious Cover

Impervious cover is any type of horizontal or sloped human-made surface that doesn't absorb rainfall, including:


Rooftops


Patios


Driveways


Sidewalks


Roadways


Parking lots

Vertical surfaces, such as walls, although impervious in nature, are not considered to be impervious coverage. Unpaved driveways, roads, and parking lots typically are considered impervious coverage because they are sufficiently compacted that absorption is mostly precluded.

When it rains, the rainfall that lands on impervious coverage cannot absorb into the ground so it runs off over the impervious surface until it is intercepted by a storm drain, runs off edge of the surface, or runs into an adjacent watercourse.

2.1.2 Directly Connected Impervious Cover

The MS4 General Permit defines directly connected impervious cover as an impervious area from which stormwater runoff discharges directly to waters of the state or directly to a storm sewer system that discharges to waters of the state without treatment by a best management practice that treats the appropriate water quality volume.

Not all impervious coverage is directly connected. For example, if an impervious surface discharges to a stormwater best management practice sized to treat the appropriate water quality volume, or a sufficiently wide vegetated buffer, it is considered to be disconnected because of the intermediate treatment before discharging to a watercourse.

2.2 Impervious Cover and the Environment

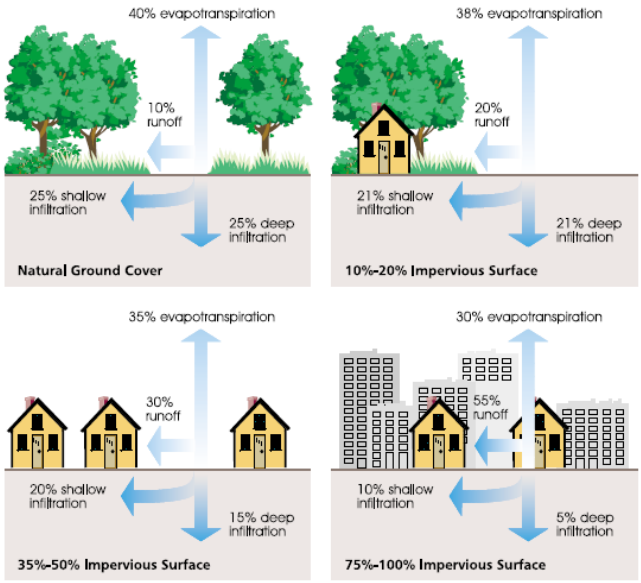
When impervious surfaces remain connected, not only do they prevent the natural soaking of rainwater into the ground, rainwater runs off rapidly into storm drains, which carries the runoff to a local stream, river or lake. This results in adversely impacts streams in three important ways. CTDEEP has determined that one of the largest contributors of aquatic life impairment in impaired waterbodies is the array of pollutants transported by stormwater. Three specific impacts of impervious coverage on waterbodies are listed below:

Water Quantity. Storm drains deliver large volumes of water to streams much faster than would occur naturally, causing flooding and bank erosion. Fast moving water poses threats to humans and wildlife, and carries debris and sediment into our waterways.

Water Quality. Pollutants such as sand, gasoline, oil, antifreeze, brake dust, and fertilizers accumulate on impervious surfaces and are washed into the streams during rainfall events.

Water Temperature. During warm weather, rain that falls on impervious surfaces quickly heats up, and the additional heat can stress or even kill stream inhabitants.

As impervious coverage increases, runoff increases along with the amount of pollutants into streams, as shown in the following figure:



Source: CT Impervious Cover Watershed Response Plan

11%
DCIA Threshold

The MS4 General Permit stipulates that basins containing DCIA exceeding 11% are part of the priority area for the implementation of the permit.

The 11% threshold is obtained from studies done by CTDEEP as documented in its Connecticut Watershed Response Plan for Impervious Cover. Studies by CTDEEP and the Center for Watershed Protection show that as the amount of directly connected impervious coverage exceeds 12%, unacceptable impacts to aquatic life can be predicted to occur in surface waters. From these studies, stormwater pollution has also been identified as probable contributing cause to the impairment. The threshold was set at 11% percent to allow for a margin of safety.

Therefore, implementation of disconnection efforts should concentrate on areas where DCIA exceeds 11% to the maximum extent practicable.

Figure 2-1 below shows a scatter plot from the Connecticut Impervious Cover Watershed Response Plan, that shows all streams with impervious coverage exceeding 12 percent failed to meet water quality criteria.

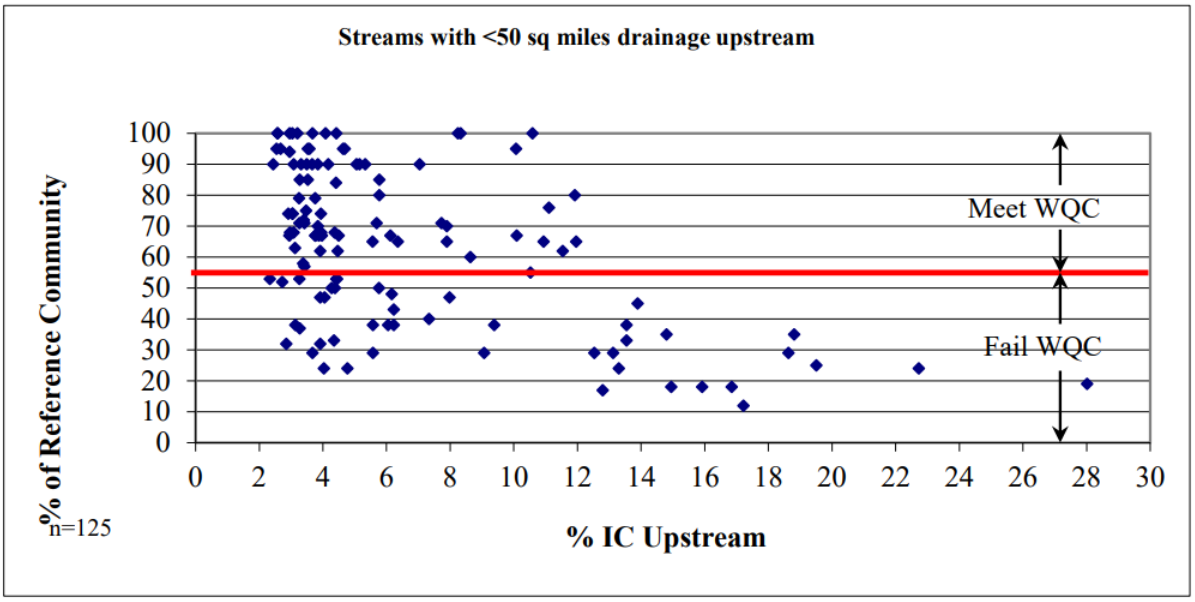


Figure 2-1. Scatter plot of impervious coverage relationship to water quality criteria.

2.3 Disconnection

Stormwater treatment practices, often referred to as stormwater best management practices, are used to improve the quality of stormwater discharged from a site. These practices typically slow the flow by capturing the runoff and encouraging infiltration, infiltration also reduces the overall volume of stormwater discharged. Practices that rely on naturalized approaches, such as vegetated bioswales and biofiltration basins, typically referred to "low impact design" are preferred for their effectiveness and scalability. LID practices help maintain natural hydrologic cycles through site grading, vegetation,

soils and natural processes that absorb and filter stormwater onsite. They also help minimize erosion, flooding and water pollution downstream from the discharge location.

Examples of low impact development practices include:

Green roofs

Rain barrels and cisterns

Permeable pavements

Bioretention areas

Vegetated swales

Curb and gutter elimination

Vegetated Filter Strip

Sand Filters

Constructed wetlands

Although low impact development practices are preferred, other traditional stormwater treatment practices, such as wet retention ponds, underground stormwater chambers and gross particle separators can also provide sufficient treatment to qualify as a disconnection of impervious coverage.

2.3.1 Water Quality Volume

An area of DCIA is considered disconnected when the required portion of the Water Quality Volume has been retained in accordance with the requirements of Section 6(a)(5)(B)(i) or (ii) of the MS4 General Permit. In general, the Water Quality Volume is the volume of runoff generated by one inch of rainfall on a site as defined in Chapter 7 of the 2004 Connecticut Stormwater Quality Manual.

Sites with DCIA Coverage 40% and Greater. Where on-site directly impervious coverage equals or exceeds 40 percent, retain one-half of the prescribed water quality volume. The rationale is that these sites are already disturbed, and requiring full retention of the water quality volume would require significantly larger systems that would be very costly to construct and maintain.

Sites with DCIA Coverage Less Than 40%. Where on-site directly connected impervious cover is less than 40 percent, retain the full water quality volume on the site. The rationale is that these sites are less developed, and play a more important role in the recharge of groundwater because of the larger area of pervious surface.

Sites Where On-Site Retention is Not Feasible. There may be sites where land uses, such as gas stations, or underlying conditions such as shallow groundwater or bedrock, would make on-site retention infeasible. In these instances, the MS4 General Permit requires that the reason be documented, and to retain the runoff volume to maximum extent achievable and treat remaining volume up to the WQV using treatment best management practices. The treatment shall address sediment, floatables, and nutrients.

2.4 Impervious Coverage in Shelton

Section 6(a)(5)(C) of the MS4 General Permit requires that communities develop Stormwater Retrofit Plan by end of Year 3 of the permit (June 30, 2020), and to implement retrofit projects by end of permit Years 4 and 5 (June 30, 2021 and June 30, 2022).

Retrofitting can be defined as expanding, modifying, or otherwise upgrading existing stormwater management measures. As such, retrofitting stormwater management measures can reduce some of the adverse groundwater recharge and stormwater quantity and quality impacts caused by existing land developments.

Most communities choose to retrofit stormwater infrastructure as part of a larger project, such as roadway or facility improvements. In an environment where most municipalities

struggle to balance competing needs and limited resources, retrofitting as part of planned capital projects maximizes the efficient use of resources while meeting the maximum extent practicable language of the MS4 General Permit. This Disconnection Plan identifies potential retrofit projects on properties owned by the City of Shelton that could be used to help the City achieve its disconnection goal.

The goal of the retrofit program is to "disconnect" existing Directly Connected Impervious Areas (DCIA). An area of DCIA is considered disconnected when the appropriate portion of the Water Quality Volume has been retained in accordance with the MS4 Genera Permit, as described in Section 2.3 above.

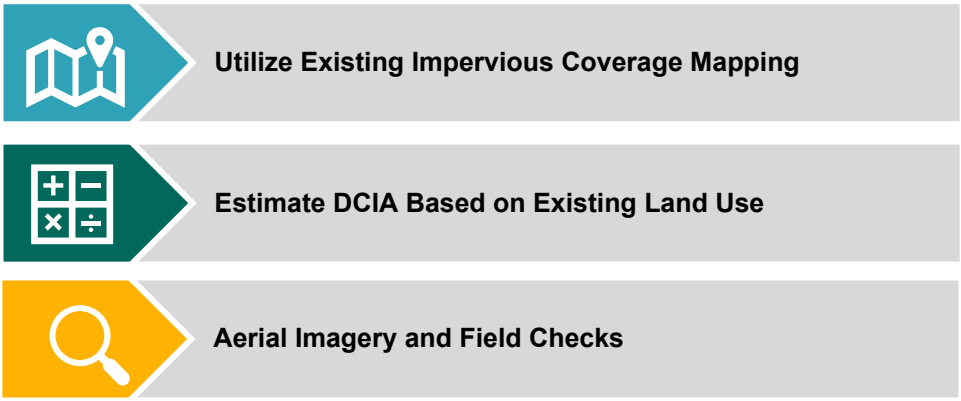
2.4.1 MS4 General Permit Requirements

The MS4 General Permit has a goal of a 2% reduction in DCIA by the end of 5-year permit, with a goal of 1% in Year 4 (2021) and 1% in Year 5 (2022), followed by a 1% reduction per year after Year 5 (2022).

The MS4 General Permit allows a municipality to take credit for all disconnections implemented since 2012, public and private, that reduce the impervious coverage discharging to the municipal MS4.

2.4.2 Determining Baseline DCIA

There are three basic approaches to determining the baseline DCIA for the purposes of measuring progress toward the 2% disconnection goal by the end of Permit Year 5.



Utilize Existing Impervious Coverage Mapping. CTDEEP in 2012 compiled a GIS data layer that approximates impervious coverage statewide with 1-foot resolution. The impervious coverage (IC) data layer may be used as the baseline data for directly connected impervious coverage (DCIA), but generally overestimates the level of DCIA because the IC data layer assumes all impervious cover is directly connected. Using the existing IC data as the baseline makes meeting the 2% disconnection goal more challenging because the incremental goals are based off the overestimated baseline number.

Estimate DCIA Based on Existing Land Use. A more refined estimate of DCIA can be made by evaluating existing land use in a particular watershed. Once baseline IC has been established, DCIA can be estimated using empirical formulas developed by Sutherland as a function of IC for various watershed types (Center for Watershed

Protection, 2000). Estimating the DCIA using the Sutherland Equations provides a meaningful reduction in the baseline that is informed by land uses, and is a relatively simple and straightforward computation that can be done without detailed field investigation. **Table 2-1** summarizes appropriate equations to apply for average, highly connected, fully connected, somewhat connected, and mostly disconnected watersheds.

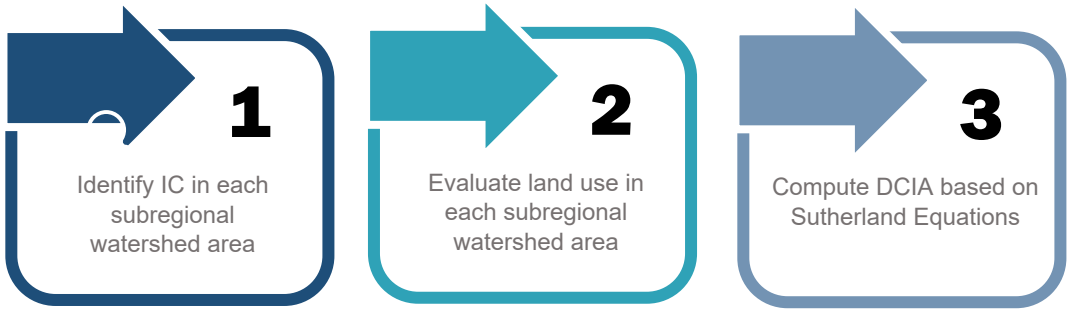
Table 2-1
Sutherland Equations for Estimating DCIA

Connectivity Level	Description of Contributing Area	Land Use Type	Equation	Example for a Watershed with 20% IC
1. Fully Connected	100% storm sewered with all IC	High density mixed use, commercial	None. DCIA% = IC%	DCIA = 20%
2. Highly Connected	Mostly storm sewered with curb and gutter, residential rooftops connected to MS4	High density residential, commercial, industrial, institutional	$DCIA\%=0.4(\%IC)^{1.2}$	DCIA = 14.6%
3. Moderately Connected	Mostly storm sewered with curb and gutter, residential rooftops not connected to MS4	Medium density residential, commercial, industrial, institutional, open land	$DCIA\%=0.1(\%IC)^{1.5}$	DCIA = 8.9%
4. Somewhat Connected	50% storm sewered with some infiltration and residential rooftops not connected to MS4	Low density residential, open land	$DCIA\%=0.04(\%IC)^{1.7}$	DCIA = 6.5%
5. Mostly Disconnected	Small percentage of urban area storm sewered or mostly infiltration	Agricultural, forested, natural areas	$DCIA\%=0.01(\%IC)^{2.0}$	DCIA = 4%

Aerial Imagery and Field Checks. A more detailed method to estimate DCIA would be to combine aerial imagery with field checks, supplemented by existing as-built drawing review. Although the aerial imagery and field check method would provide the most precise estimate of DCIA, it is also the most resource-intensive method, and the benefit of the more precise data needs to be balanced against the cost to produce the data. In most instances, municipality-wide application of the aerial imagery and field check approach will be prohibitively expensive, however, the method could be used to supplement other DCIA computational methods for exceptionally complex watersheds

where the existing IC coverage or Sutherland Equations may not be sufficient to estimate DCIA.

Tighe & Bond performed an analysis of Shelton's DCIA by applying the Sutherland Equations. We began our analysis using the 2012 IC data layer, and then evaluated the land use in each subregional watershed area within the City, applying the appropriate equation from Table 2-1.



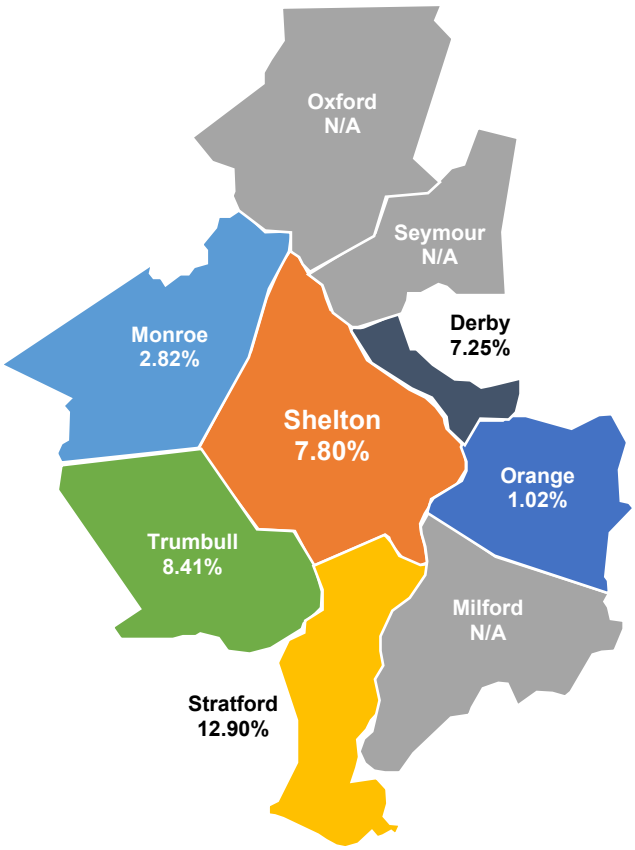
We applied the Sutherland equations to the 2012 CTDEEP IC value in each subregional watershed within the City. Where a subregional watershed extended into another municipality, we clipped the impervious coverage to the City's border so that only the portion within the City would be reflected in the computation. The analysis for each subregional watershed appears in **Appendix A.**

1,591.96
acres
DCIA

The net result for the baseline DCIA after application of the Sutherland Equations is 1,591.96 acres, compared with a total IC area of 3,098.85 acres.

2.4.3 Baseline Comparison to Surrounding Communities

We reviewed the Annual Reports of communities surrounding Shelton to compare their baseline DCIA and DCIA coverage to determine if the computations for Shelton were reasonable. Reviewing the surrounding communities, we believe that the coverage is reasonable given the size and land uses within the City.

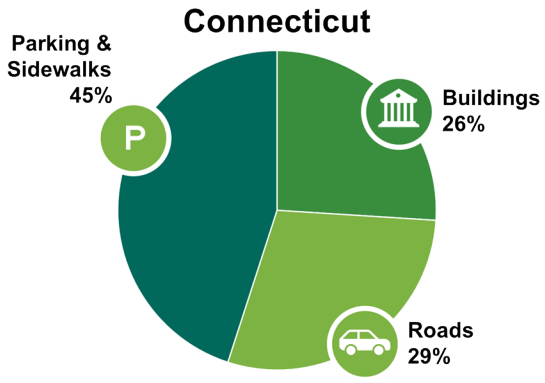


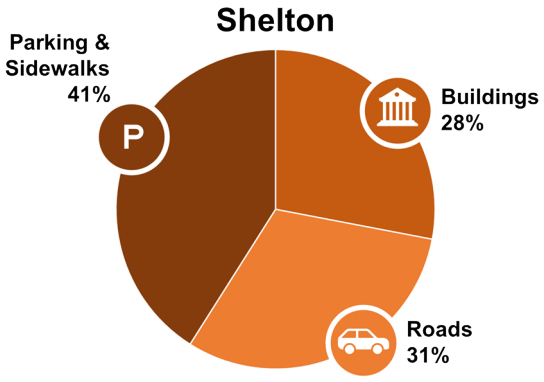
Community	DCIA, acres	DCIA, %
Shelton	**1,591.96**	**7.80%**
Derby	252	7.25%
Monroe	475.48	2.82%
Orange	112.7	1.02%
Stratford	1,492	12.90%
Trumbull	1,269.83	8.41%

Note: Coverage for Milford, Seymour, and Oxford was not available in their annual reports.

2.4.5 Breakdown of Impervious Cover

The following graphic compares the impervious coverage breakdown in Shelton as compared to the State of Connecticut as a whole:





2.4.6 Tracking DCIA

The MS4 General Permit requires that changes in DCIA be tracked by communities. This can be tracked in a number of ways, such as through GIS, or through Excel spreadsheets. Tighe & Bond recommends Excel spreadsheets since they are easily accessible and most staff would be familiar with their use.

As projects are completed, their cumulative impact would be recorded on the spreadsheet to track progress toward the 2% reduction goal by the end of the permit term. Although the City could measure the amount of directly connected impervious cover itself, these computations, while not difficult, would require time resources. We recommend that the City require project proponents provide information on existing and proposed DCIA at the time of project application to facilitate the process of tracking the information. Project consultants are in the best position to provide this data since it can be easily extracted from their computations.

Examples of DCIA reporting forms and tracking spreadsheets appear in **Appendix B**.

2.5 Existing City Requirements

The City of Shelton follows the provisions of the 2004 Stormwater Quality Manual and in some instances exceeds the requirements. Although the City requires retention of the first inch of rainfall for single family residential, it has a more stringent requirement of retaining the first two inches of rainfall for non-residential and multifamily condominiums and apartments.

Section 3
Retrofit Planning

3.1 Developing a Stormwater Retrofit Plan

The City, in this report, shall identify prioritized list of stormwater retrofit projects to help meet the 2% DCIA reduction goal. The retrofit projects shall meet the goals of the MS4 General Permit by providing water quality and quantity benefits.

Retrofits are more cost effective when implemented in conjunction with planned infrastructure projects, and ideally should be integrated into the municipal capital planning process.

The general process is outlined below:

- Identify objectives
- Gather data
- Review available data
- Reinforce with site visit
- Prioritize sites
- Develop concept designs
- Identify construction and maintenance costs

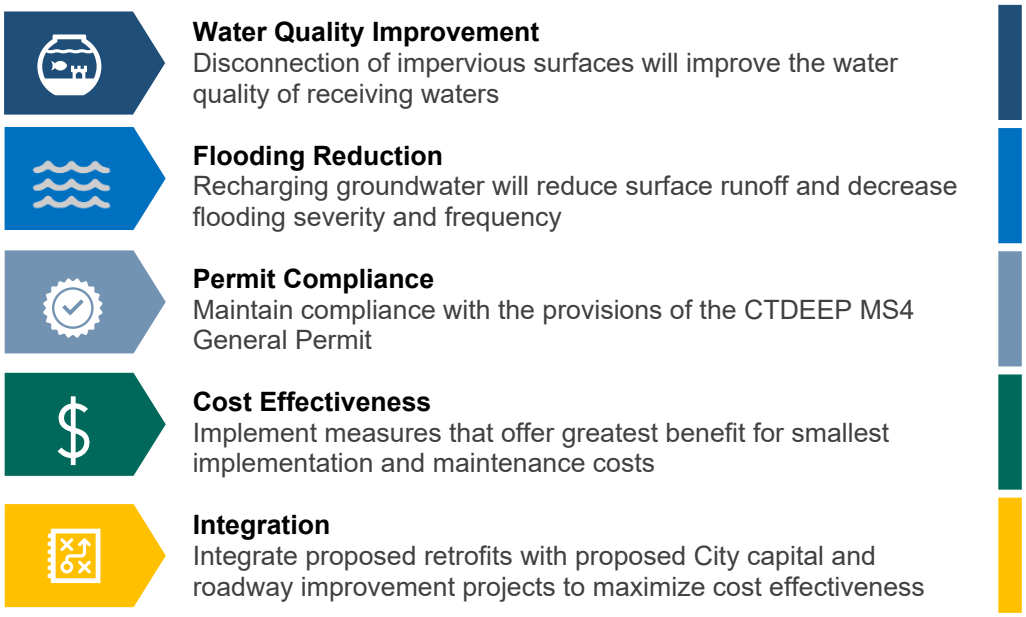
3.2 Municipal Retrofits

Although the City operates its MS4, a large portion of the contributions come in the form of runoff from private property, including residences, commercial parking lots, and industrial properties. Municipally-owned contributions typically include the following types of sites:

- **Schools**
- **Libraries**
- **Police Stations**
- **Fire Stations**
- **Parks**
- **Public Works Facilities**
- **Roads**
- **Sidewalks**

3.3 Plan Objectives

The primary objective of the City of Shelton's plan is to reduce DCIA within the City, which will improve the quality of stormwater discharge. Additional objectives include:

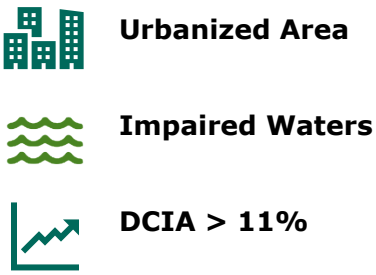


3.4 Data Gathering

3.4.1 Priority Area

DCIA retrofits should be concentrated in priority areas as defined by the permit, since the priority areas are the most impacted by existing DCIA.

The MS4 General Permit defines priority areas as watersheds discharging to any one of the following areas:



The entirety of the City of Shelton is in an Urbanized Area as defined by the 2010 U.S. Census, therefore the entire City is a MS4 Priority Area.

3.4.2 Drainage System Mapping

The City contracted with Environmental Partners to develop a system-wide mapping of its storm drainage network. Tighe & Bond utilized the mapping in the development of this plan and in executing the City's illicit discharge detection and elimination program.

3.4.3 Impaired Waters

The following watercourses within the City of Shelton were identified as Impaired Water Bodies on the 2018 State of Connecticut's Integrated Water Quality Report prepared under Section 303(d) and 305(b) of the Clean Water Act.

Table 3-1 below lists the impaired waters within the City.

Table 3-1
Impaired Waterbodies

Waterbody and CTDEEP 303d ID	Impairment	Testing Parameter
Cemetery Pond Brook (CT6026-03_01)	Bacteria	E. coli Total coliform
Curtiss Brook (CT6000-73_01)	Bacteria	E. coli Total coliform
Farmill River (CT6025-00_02)	Bacteria	E. coli Total coliform
Farmill River (CT6025-00_04)	Bacteria	E. coli Total coliform
Housatonic River (CT-C1_021-SB)	Nutrients	Nitrogen Phosphorus
Housatonic River (CT6000-00_01)	Bacteria	E. coli Total coliform
Housatonic River (CT6000-00_02)	Bacteria	E. coli Total coliform
Housatonic Lake (CT6000-00-5+L4)	Bacteria Nutrients	E. coli Total coliform Nitrogen Phosphorus

3.4.4 Hydrologic Soil Groups

Soils are classified by the Natural Resource Conservation Service into four Hydrologic Soil Groups (HSG) based on the soil's runoff potential. The four Hydrologic Soils Groups are A, B, C and D. Group A soils generally have the smallest runoff potential, while Group D soils have the greatest runoff potential. HSG Group A soils are most conducive to infiltration practices, while those in HSG Group D are least conducive to infiltration practices.

Group A. Soils in this group have low runoff potential when thoroughly wet. Water is transmitted freely through the soil. Group A soils typically have less than 10 percent clay

and more than 90 percent sand or gravel and have gravel or sand textures. Some soils having loamy sand, sandy loam, loam or silt loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.

Group B. Soils in this group have moderately low runoff potential when thoroughly wet. Water transmission through the soil is unimpeded. Group B soils typically have between 10 percent and 20 percent clay and 50 percent to 90 percent sand and have loamy sand or sandy loam textures. Some soils having loam, silt loam, silt, or sandy clay loam textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.

Group C. Soils in this group have moderately high runoff potential when thoroughly wet. Water transmission through the soil is somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than 50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures. Some soils having clay, silty clay, or sandy clay textures may be placed in this group if they are well aggregated, of low bulk density, or contain greater than 35 percent rock fragments.

Group D. Soils in this group have high runoff potential when thoroughly wet. Water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas, they also have high shrink-swell potential.

Dual Group Soils. Certain wet soils are placed in group D based solely on the presence of a water table within 24 inches of the surface even though the saturated hydraulic conductivity may be favorable for water transmission. If these soils can be adequately drained, then they are assigned to dual hydrologic soil groups (A/D, B/D, and C/D) based on their saturated hydraulic conductivity and the water table depth when drained. The first letter applies to the drained condition and the second to the undrained condition.

Table 3-2 breaks down the approximate Hydrologic Soil Group distribution in the City of Shelton.

Table 3-2
Hydrologic Soil Group Distribution – Shelton, CT

HSG	% Percent	Infiltration Potential
A	1.5%	High
A/D	1.0%	Mixed
B	41.7%	Good
B/D	7.1%	Mixed
C	9.7%	Fair
C/D	8.0%	Mixed
D	31.1%	Poor

Regardless of soil type, soil exploration such as borings or test pits will be required for the final design of stormwater management measures, but the hydraulic soil groups can be used as a screening method to identify potential stormwater management best practices to be used at a particular location.

3.4.5 Depth to Restrictive Layer

The use of stormwater best management practices to retrofit existing infrastructure is not only limited by the hydrologic characteristics of the soil, but the potential for underlying restrictive layers, such as groundwater and bedrock. Stormwater infiltration BMPs require a minimum separation between the bottom of the system and groundwater or bedrock in order to minimize the risk of groundwater contamination.

3.4.6 Parcel Ownership

Although the greatest component of the City's DCIA is along rights-of-way for roadways, the opportunity to implement stormwater BMPs within the right-of-way are often limited due to narrow widths and roadside safety guidelines. Therefore, the best opportunities are typically provided at municipally-owned facilities.

3.5 Desktop Screening

We performed a desktop analysis of City-owned properties and rights of way to identify potential disconnection opportunities, as identified in **Table 3-3**.

Table 3-3
Desktop Screening Analysis

	Facilities	Right-of-Way
Priority Area	✓	✓
Water Quality	✓	✓
Impaired Waters	✓	✓
Soils	✓	✓
Restrictive Layers	✓	✓
Impervious Cover	✓	✓
Right-of-Way Width		✓
Roadside Safety		✓
Aquifer Protection	✓	✓
Topography	✓	✓

The desktop screening assessments are useful in immediately ruling out certain sites due to site-specific challenges, such as steep slopes that would make siting infiltration practices difficult, poor underlying soils which would decrease the likelihood of the site being suitable for disconnection practices, or hotspot activities that would make a particular site inappropriate for stormwater infiltration as further discussed in Section 3.6.1.

Other visual cues from aerial photography can also assist in the process, such as visual evidence of wetlands or rock outcroppings.

The intent of the desktop screening is to quickly narrow down the list of potential sites by ruling out sites with unfavorable characteristics, or focusing attention to more promising opportunities.

3.6 Site Assessment and Reconnaissance

Field reconnaissance and site visits are necessary in many instances in order to observe or verify site characteristics that may not be readily apparent from aerial photography or contour mapping. Some of these items include:

Site constraints

Spatial suitability for proposed measures

Site drainage patterns

Potential for Utility conflicts

Existing stormwater management features

Site access

Curbing

Potential impact on site operations

3.6.1 Limitations on Site Infiltration

Some areas, although they may have favorable site soils, access, and disconnection potential are unsuitable for stormwater infiltration practices. Understanding current and historic land uses, the extent of potential underlying soil and groundwater contamination is important. Infiltration of stormwater through contaminated soils, or sites with potential for high pollutant loads, known as stormwater "hotspots" may adversely impact groundwater and downstream surface water bodies. Additionally, infiltrating stormwater into aquifer and drinking water protection areas could increase the potential for contamination in the event of a spill that is discharged to the stormwater treatment practice. Some examples of land uses that may require additional investigation for stormwater infiltration, are shown in **Table 3-4:**

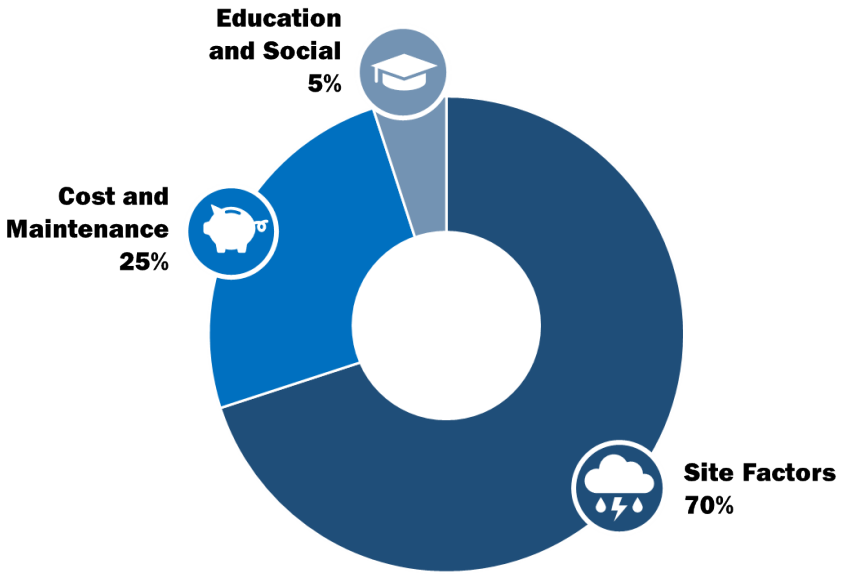
Table 3-4
Land Uses with Possible Stormwater Infiltration Limitations

Stormwater Hotspots	Drinking Water Supply Areas
▪ Sites on Connecticut's brownfields list ▪ Auto recycler facilities and junkyards ▪ Commercial laundry and dry cleaning facilities ▪ Commercial nurseries ▪ Landfills ▪ Motor vehicle fueling stations ▪ Public works garages	▪ Public watershed water supply areas ▪ Drinking water wellhead areas

3.7 Prioritization

During the screening process, a number of candidate projects will be identified. We will apply a scoring system to assist the City in prioritizing the proposed projects for funding, design, and implementation.

We divided the scoring system into three categories: Site, Cost, Education, weighting the categories as shown below:



The Site component is the most critical, since it often dictates the feasibility of a measure on any given site. The cost and maintenance component was given the middle weighting so that projects that are relatively low cost and low maintenance for the area disconnected would be prioritized. Finally, projects that had an educational benefit received a small scoring bonus to help distinguish between potential projects that had otherwise similar site and cost factors.

The scoring system is outlined in **Table 3-5**.

Table 3-5
Prioritization Scoring

	Metric	Criteria
Site Factors	Urbanized Area	2 points
	DCIA > 11%	2 points
	Discharge to Impaired Waters	2 points
	Suitability of Underlying Soil	HSG A = 3 point HSG B = 2 point HSG C = 1 point HSG D = 0 point (Dual groups are scored as the average of the two component HSGs)
Cost & Maint.	Design and Construction Cost	Sliding scale based on inverse proportion of most costly project, maximum 3.5 points.
	Area Disconnected	Area in acres disconnected multiplied by 2, maximum 3.5 points
	Maintenance Requirements	Low = 2 Medium = 1 High = 0
Education & Social	Aesthetic Benefit	High = 3 point Medium = 2 point Low = 1 point
	Education Value	High = 3 point Medium = 2 point Low = 1 point
	Public Engagement	High = 3 point Medium = 2 point Low = 1 point

The prioritization system is intended to favor projects with more suitable site characteristics and lower implementation and maintenance costs per area of disconnection with additional points for MS4 education efforts.

Since the projects are being evaluated against each other, we added up the total scores and then scaled them based upon a percentage of the highest scoring project.

3.8 Concept Designs

The next step is to develop concept designs based on the field reconnaissance and available mapping to develop preliminary sizing criteria and establish feasibility of the proposed disconnection method.

3.9 Retrofit Costs

Establish the amount of area that will be disconnected if the proposed best management practice were implemented, and identify probable construction and design costs so that the proposed retrofit can be funded.

In order to estimate costs, we took the estimated impervious area disconnected, and assumed a water quality volume of one inch over the disconnected area as the required volume of the practice.

We estimated the costs based on The University of New Hampshire's Stormwater Center study that published guidance on the costs of stormwater retrofits per cubic foot of volume treated, as defined in **Table 3-6**.

Table 3-6
Retrofit Costs per Cubic Foot of Volume

				
Infiltration Trench	Infiltration Basin	Rain Garden	Porous Pavement	Water Quality Swale
$ 13 - $38	$ 7 - $19	$ 16 - $ 46	$ 19 - $ 25	$ 15 - $ 22

Section 4
Potential Retrofit Projects

4.1 Municipal Facilities

4.1.1 Huntington Fire Company

The Huntington Fire Company is located at 44 Church Street in the Huntington section of the City, just south of the Huntington Green. The site separates travel direction on Church Street (CT Route 108), with the west side of the site generally level with the roadway, and a retaining wall separating the east side of the site from the northbound travel lane of Church Street.

The site is mostly impervious, consisting of the fire department building and surrounding parking areas. There is a triangular pervious lawn area on the southern portion of the site where a small brick memorial walk and plaza is located. The site is underlain by HSG Group B soils which makes it suitable for infiltration practices. Infiltration practices should be set back from the eastern portion of the site to avoid introducing hydrostatic pressure against the adjacent retaining wall.

The site lends itself well to a rain garden sized for the water quality volume, which would work well with the landscape elements of the plaza, since rain gardens offer water quality and aesthetic benefits. We estimate that a 30 foot square, 2- foot deep rain garden would treat runoff from a 20,000 square foot area, which would encompass the south half of the building and the parking area.

Another potential BMP that could be considered in this area would be porous pavement, for the parking area, though the placement of porous pavement near the retaining wall would need to be evaluated. Additionally, the load supporting capabilities of porous pavement would also need to be evaluated because of the weight of the fire apparatus.

Huntington Fire Department
44 Church Street

Recommended BMPs: Rain Garden

Area disconnected: 0.46 acres

Probable Cost: $ 54,000

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%

4.1.2 City Hall Annex – Echo Hose Fire Company

The City owns two contiguous properties at the corner of White Street and Coram Avenue. The property at 377 Coram Avenue is occupied by the Echo Hose Fire Company, while the 40 White Street parcel houses the City Hall Annex/Probate Court and a parking area. The sites are nearly completely impervious, except for the corner of White Street and Coram Avenue, where a small, steeply sloped lawn area exists.

There is a significant elevation difference from southwest to northeast across the parcels, with much of the elevation difference made up within the buildings themselves, which have walk-out levels on the northeast side one floor below the street levels on the south southwest side.

The underlying soils are classified as Urban Land, which is classified as HSG Group D, which would ordinarily limit infiltrative capacity of the soil. Soil exploration will be necessary to determine depth to restrictive layer and to determine infiltrative capacity of the soil. We have assumed that loss of parking spaces would be undesireable. Similarly, due to the steepness and proximity of the lawn area to the City Hall Annex, rain gardens would not be an effective solution at this location. Porous pavement may be a possibility for the parking area.

We noted that there are roof downspouts along the rear of the buildings which could be directed into drywells that could be constructed in the parking lot. Assuming that the rear of both buildings can be directed into drywells, we estimate four 8 foot deep, 8-foot diameter drywells would be required to treat the water quality volume from the rear roofs of these structures.

City Hall Annex
40 White Street

Echo Hose Fire Company
377 Coram Avenue

Recommended BMPs: Drywells

Area disconnected: 0.14 acres

Probable Cost: $32,000

Supplemental BMPs: Porous Pavement

Area disconnected: 0.33 acres

Potential Cost: $268,500

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%
- Discharges to Impaired Waters (Housatonic River)

4.1.3 City Hall

City Hill is located on a parcel of property at 54 Hill Street in downtown Shelton. The site is mostly impervious with the building and some parking areas, with lawn and landscaped areas around the perimeter.

The site sits on a topographic high point relative to the streets to the north and east. The parking lots on the south and east sides of the building are terraced with the prevailing grade, which runs from west down to the east. Since the slopes between tiered parking areas are relatively steep, curbing is required to prevent runoff from sheeting off the pavement and eroding downstream slopes, therefore vegetated swales or infiltration trenches along the edge of the parking area will be ineffective.

The NRCS Soil Survey indicates that the underlying soils are HSG B, which are suitable for infiltration practices, but the steepness of the site limits the ability to site large-scale practices. Instead, small scale practices could be applied individually around the building.

For example, a rain garden or planter box could be constructed at the corner of Hill Street and Prospect Street to treat runoff discharging from the accessible parking spaces.

Unfortunately, due to the steepness of the ability to site stormwater BMPs will be limited. For example, porous pavement placed on steep slopes would require several subgrade berms to prevent the captured runoff from bleeding out at the lowest point of the pavement.

An alternative approach would be to construct drywells within the parking areas to treat the water quality volume, and have piped overflow into the drainage system on adjacent City streets.

City Hall
54 Hill Street

Recommended BMPs: Rain Garden

Area disconnected: 0.03 acres

Probable Cost: $4,000

Supplemental BMPs: Porous Pavement

Area disconnected: 0.63 acres

Potential Cost: $140,000

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%
- Discharges to Impaired Waters (Housatonic River)

4.1.4 Booth Hill Elementary School

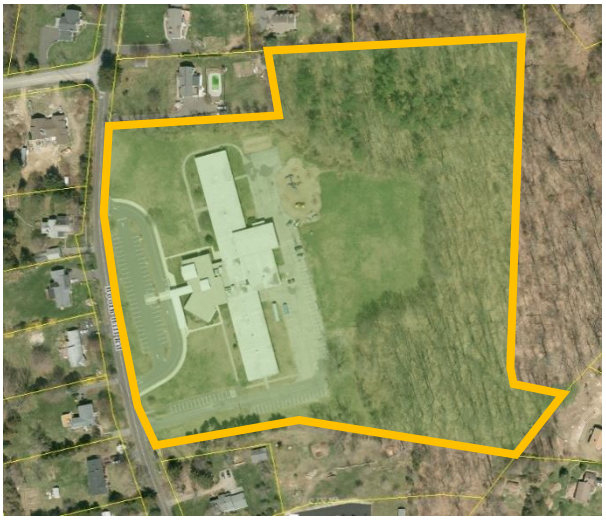
Booth Hill Elementary School is located at 544 Booth Hill Road. The school is constructed on a relatively level portion of land.

The school building is surrounded by driveways and parking lots on its western, eastern, and southern sides, with the building sitting at the highest point on the parcel. Runoff from the southern, northern and eastern sides sheets off the parking lot across athletic fields and into surrounding woodlands. The length of the flow across the vegetated buffer is sufficient enough for the flow to be considered disconnected in these directions.

Runoff from the western side of the site is directed into storm drains in Booth Hill Road, so runoff in this direction is not considered disconnected under existing conditions. There are multiple options for disconnection for the parking lot in front of the school. The NRCS Soil Survey indicates that most of the underlying soils are HSG Group B soils, which lend themselves well to infiltration.

The existing parking lot is curbed, and the curbing on the western edge of the parking lot could be removed in favor of an infiltration trench running the length of the edge of the parking.

Alternatively, rain gardens could also be used to infiltrate runoff from the building, provided that the location of the rain gardens does not interfere with outside school programming.



Booth Hill Elementary School
544 Booth Hill Road

Recommended BMPs: Infiltration Trench
Area disconnected: 0.36 acres

Potential Cost: $ 59,000

Supplemental BMPs:

Porous Pavement – Front Driveway
Area disconnected: 0.33 acres
Potential Cost: $ 269,000

Rain Gardens – Front Roof Leaders
Area disconnected: 0.66 acres
Potential Cost: $ 72,000

Selection Criteria

- Urbanized Area
- Discharges to Impaired Waters (Far Mill River)

4.1.5 Bridgeport Avenue Pump Station

The Bridgeport Avenue Pump Station is located in front of 514 Bridgeport Avenue. The site is located between commercial shopping center buildings and adjacent to a watercourse.

The site sheets runoff toward the wetland area for a distance of approximately 30 feet, which is less than the contributing length, so it does not count as disconnected area.

The driveway could be disconnected if an infiltration trench were placed along the edge of the parking area closest to the watercourse, provided that the trench were sized to accommodate the infiltration of the water quality volume.

The NRCS Web Soil Survey shows that the underlying soils are HSG B and D, which indicates that infiltration potential may be limited.

Should soil exploration indicate that underlying soils are not conducive to infiltration, an alternative may be to replace the crushed stone with stabilized grass pavement to extend the buffer wide enough so that the width of the buffer exceeds the width of the contributing area.

Bridgeport Avenue Pump Station
514 Bridgeport Avenue

Recommended BMPs: Infiltration Trench
Area disconnected: 0.07 acres

Potential Cost: $ 12,000

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%
- Discharges to Impaired Waters (Far Mill River)

4.1.6 Shelton Community Center

The Shelton Community Center is located at 41 Church Street, just to the west of Huntington Green. It is situated on a 5.91 acre parcel containing the community center building, parking, and a baseball field. The site has access drives on the north, east and south sides of the building, with limited parking along the east side, and a larger parking lot to the west of the building.

The site slopes from west to east. The underlying soils are HSG B, which makes them favorable for infiltration practices. However, since the parking lot generally slopes toward the building, opportunities for retrofits are more difficult, since infiltration trenches and similar practices are best placed along edges of parking away from the building due to pedestrian traffic.

There is a courtyard between two wings of the building, which could be modified to include rain gardens to accept the drainage from portions of the building roof, approximately 13,200 square feet.

The southern edge of the west parking area is not curbed, running off toward the baseball field to the south. Since the length of the flow across the baseball field exceeds the length of flow across the southern portion of the parking area, parts of the existing parking can be considered to be disconnected.

An additional BMP that may contribute significantly to disconnection at this location is converting the northern portion of the parking area to porous pavement.

Shelton Community Center
44 Church Street

Recommended BMPs: Rain Garden
Area disconnected: 0.30 acres

Potential Cost: $ 33,000

Supplemental BMPs:

Porous Pavement – North Half of Rear Parking
Area disconnected: 0.47 acres
Potential Cost: $ 270,000

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%

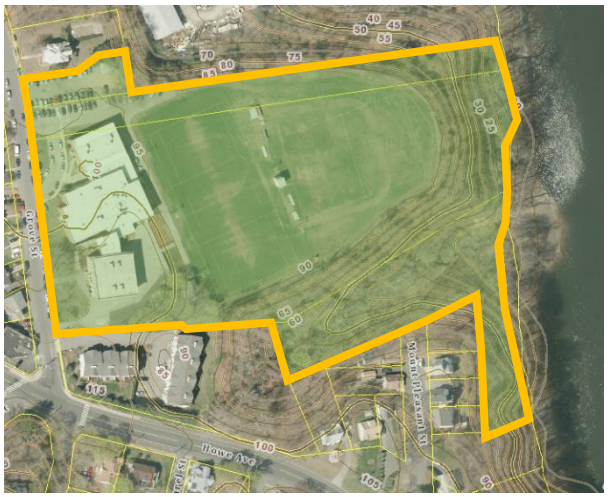
4.1.7 Former Lafayette Elementary School

The City owns a collection of four parcels containing and adjoining the former Lafayette Elementary School at 54 Grove Street. The parcels include a parking area, a parking area and a strip of land extending to the Housatonic River, the former school school itself, and a wooded area to the southeast of the former school.

The building, which sits on the high point of the site, has several fields located behind it. The landscaped area in front of the school along Grove Street varies topographically, with steep sections and flatter areas. The area immediately surrounding the school has HSG Group B soils, while the parking areas to the two parcels to the north sit atop HSG Group D soils, making them less conducive for infiltration practices.

The northernmost parcel drains directly to Grove Street, but since it lies on poor draining soils, disconnection may not be possible. The parking area immediately north of the building on the narrow parcel, and the front portions of the building roof itself are better candidates for disconnection using several small rain gardens scattered around the Grove Street side of the building. Several downspouts on the building discharge directly to grade under existing conditions.

We considered the potential for a water quality swale in the island of the northern parking lot, but the swale in the island could potential pose a barrier to pedestrian travel from the parking area toward the building.



Former Lafayette Elementary School
44 Church Street

Recommended BMPs: Rain Garden
Area disconnected: 0.29 acres

Potential Cost: $ 32,000

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%
- Discharges to Impaired Waters (Housatonic River)

4.1.8 Shelton Board of Education Building

The Shelton Board of Education Building is located on a 3.31 acre parcel at 382 Long Hill Road. The parcel contains the building and associated parking on the west side of the parcel, while the east side is wooded and mostly undeveloped.

The western part of the site, where the impervious cover is located, slopes from east to west toward Long Hill Road, with a steep slope and partial berm at the lowest edge of the parking area, which would make any perimeter stormwater BMPs, such as infiltration trenches or swales difficult to install due to their disruption of the berm or being located at the top of the slope.

The area immediately around the building and eastern area of the main parking lot is atop HSG B soils, while the perimeter of the site lies above HSG C soils.

There is a sufficient area on the west side of the building that could house a rain garden for disconnected roof top. Approximately 5,000 square feet of rooftop maybe eligible for disconnection.

Due to the relative steepness of the parking area, the parking area is likely a poor candidate for conversion to porous pavement.

Shelton Board of Education
382 Long Hill Avenue

Recommended BMPs: Rain Garden
Area disconnected: 0.12 acres

Potential Cost: $ 14,000

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%

4.1.9 Long Hill Elementary School

Long Hill Elementary School is located at 565 Long Hill Avenue. The site is composed of seven contiguous parcels roughly bounded by Long Hill Avenue, Laurel Wood Drive, and Long Hill Cross Road. Together, the parcels encompass 92.1 acres, most of which are undeveloped and wooded.

The elementary school sits along the center of the frontage of the combined parcels along Long Hill Avenue, and has two one-way driveways that access Long Hill Avenue, with a large lawn area at the street, and a parking lot and pick-up/drop-off loop connecting the two driveways. There is a service drive off the entrance drive that accesses the rear of the school.

The area between Long Hill Avenue and the school slopes toward the school, while the area behind the school slopes westward toward the athletic fields. The underlying soils immediately under the school are HSG B, while those to the east and west of the building are a dual group HSG C/D, where long-term infiltration would be challenging, but infiltration for only water quality volume could likely be accommodated.

Due to the slope of the site, and available on-site drainage infrastructure, water quality swales may be a good candidate at this location. We propose a swale located on the west side of the front parking area, where the existing curb would be removed. The swale would require accommodation for a pedestrian crossing. The proposed would disconnect approximately 11,000 square feet of DCIA.

We considered a swale on the western edge of the service drive, but the slope down to the athletic field is approximately 15 percent, which would require significant regrading to accommodate the swale, which would only steepen the slope.

Long Hill Elementary School
565 Long Hill Avenue

Recommended BMPs: Water Quality Swale
Area disconnected: 0.26 acres

Potential Cost: $ 36,000

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%
- Discharge to Impaired Waters (Far Mill River)

4.1.10 Pine Rock Park Fire Station

The Pine Rock Park is located at 722 Long Hill Avenue on a 3.08 acre parcel at the corner of Murphy's Lane. The parcel contains the fire station, with parking to the north and east, and an access drive wrapping around the building to the south. A secondary crushed stone driveway provides access to Murphy's Lane, and an additional paved secondary driveway provides access to Kyle's Way to the east.

Portions of the west parking and the length of the south driveway are not curbed and sheet to adjacent woodlands, and are therefore, already connected. The balance of the site parking is curbed, and therefore connected.

An infiltration trench along the northern edge of the north parking area between the Murphy's Lane secondary driveway and Long Hill Avenue, would disconnect approximately 6,800 square feet of pavement and the northwest corner of the building rood since downspouts discharge directly to grade. However since underlying soils are HSG D, the underlying soils will need to be evaluated in greater detail.

Pine Rock Park Fire Station
722 Long Hill Avenue

Recommended BMPs: Infiltration Trench
Area disconnected: 0.16 acres

Potential Cost: $ 27,000

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%
- Discharge to Impaired Waters (Housatonic River)

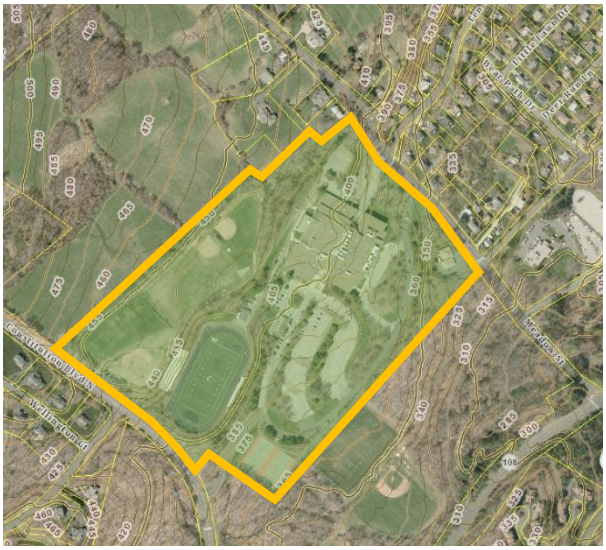
4.1.11 Shelton High School

Shelton High School is located at 120 Meadow Street, on a 50.4 acre parcel. The site contains the existing high school, driveways, parking, athletic fields, and the Echo Hook and Ladder Company Ambulance Corps. The site is moderately sloped from northwest to southeast, with the school and parking lot underlain by HSG B soils, and the athletic fields underlain by HSG C/D soils. Due to the prevailing slope direction, the best disconnection opportunities lie on the eastern side of the site.

The site driveway that connects the high school loop driveway to Constitution Boulevard South is already partially disconnected due to the existing swale on the west side of the driveway. The east side of the driveway is curbed, but is not a suitable disconnection canidate because of the walkway that abuts the driveway along its northern half, and the steep slope along the southern half of the driveway.

The parking areas south of the high school building offer a disconnection opportunity if the easternmost curb along each of the three parking bays were eliminated, and a water quality swale installed to intercept runoff before discharge into the on-site storm drainage system. Additionally, the eastern edge of the loop driveway in front of the soccer field could also similarly be changed to a curbless and water quality swale configuration. The proximity of woods, steep slopes, and tennis facilities would preclude the swale from being extended the length of the roadway. Combined, these two areas cold disconnect up to 3.92 acres.

A supplemental measure that could also be explored is a rain garden in the lawn area at the southeast corner of the Ambulance Corps parking to treat runoff from the parking lot, which is mostly without curbing. Additional study will be required since this area of the property is a Class A aquifer protection area.



Shelton High School
120 Meadow Street

Recommended BMPs: Water Quality Swales
Area disconnected: 3.92 acres

Potential Cost: $ 285,000

Supplemental BMPs:

Rain Garden at Echo Hose Ambulance Corps
Area disconnected: 0.16 acres
Potential Cost: $ 18,000

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%

4.1.12 Nike Site Little League Fields / Mohegan Elementary School

The Shelton Nike Site Little League Fields and Mohegan Elementary School are located on two neighboring parcels, totaling 34.26 acres at 47 and 53 Mohegan Road.

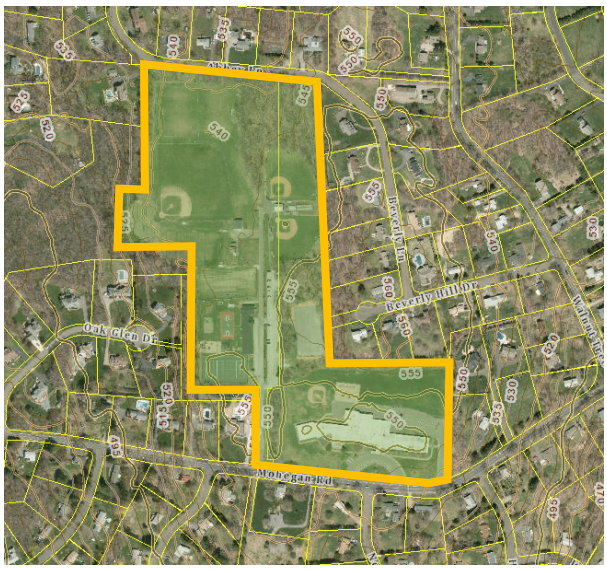
The eastern parcel consists of the elementary school, with a pick-up/drop-off driveway in the front, and staff parking in the rear. Athletic fields are located on the narrow northerly projection of the parcel. The site slopes from the elementary school toward Mohegan Road, and from the elementary school northerly to the playground behind the school.

The western parcel contains a driveway, parking, and several athletic fields. There is an existing one-story building for youth services known as "The Hide Out". The prevailing slope runs from east to west across the property.

Underlying soils range from HSG B to HSG D. The most favorable soils, HSG B, are located around the elementary school, the "Hide Out" and the parking to the east of the hideout.

There is an existing grassed swale between the parking area and Nike Site driveway. Improvements could be made to the existing swale to promote water quality treatment. This could disconnect up to 58,000 square feet of parking lot and driveway.

There are also some opportunities at the elementary school. For example, the curb could be removed from the south edge of the pick-up/drop-off loop, and an infiltration trench could be placed along its length, disconnecting up to 11,500 square feet of directly connected impervious surface.



Mohegan Elementary School
47 Mohegan Road

Nike Site Athletic Fields
53 Mohegan Road

Recommended BMPs: Water Quality Swale
Area disconnected: 1.33 acres

Potential Cost: $ 97,000

Supplemental BMPs:

Infiltration Trench
Area disconnected: 0.26 acres
Potential Cost: $ 42,500

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%

4.1.13 Shelton Police Department and Senior Center

The Shelton Police Department, at 85 Wheeler Street, and the Shelton Senior Center at 81 Wheeler Street occupy a 9.1 acre parcel. The property slopes from William Street on the west side, easterly to Wheeler Street. The buildings and parking are located on a level area benched into the slope between the two roadways.

The parking lots and drives serving both buildings are curbed. Due to the topography, the best opportunities for disconnection exist on the east side of the property, along the frontage of Wheeler Street. Parking islands are generally oriented with their longest axes perpendicular to the slope, and therefore do not lend themselves well to infiltration practices.

Underlying soils are mostly HSG B, which makes them suitable for infiltration. The most suitable areas are slightly sloping to flat areas at the lower end of the site's topography.

We evaluated a potential rain garden feature along the frontage of the police department, but there are a significant number of mature trees that would be impacted, so we ruled that out. The grassed areas along the front of the Senior Center offer the best opportunity. There is an existing swale that runs along the front of the Senior Center along Wheeler Street that could be converted to a water quality swale, with the front roof leaders piped to the swale, disconnecting 0.22 acres of roof area. We do not recommend removing the curbing because of the proximity and steepness of the adjacent slope.

Shelton Police Department
85 Wheeler Street

Shelton Senior Center
81 Wheeler Street

Recommended BMPs: Water Quality Swale
Area disconnected: 0.22 acres

Potential Cost: $ 16,000

Selection Criteria

- Urbanized Area
- Watershed DCIA > 11%

4.2 Municipal Sites Already Disconnected

4.2.1 Beard Saw Mill Pump Station

The Beard Saw Mill Pump Station is located on Beard Saw Mill Road, immediately west of Route 8, on the south side of Beard Saw Mill Road. The Far Mill River runs through the southern portion of the parcel, and is listed on the State's Impaired Waterbodies List.

The pump station is served by a driveway, which is not curbed, allowing runoff to discharge off the driveway. The building has downspouts that discharge to grade.

The site is fairly flat, and the distance to the Far Mill River is significant enough to allow for water quality treatment along the vegetated buffer.

4.2.2 Riverview Park

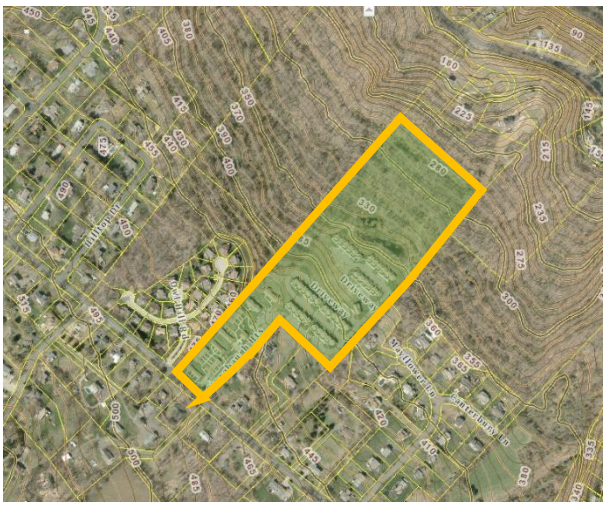
Shelton Riverview Park is a 17.7 acre parcel between Howe Avenue and the Housatonic River. The parcel contains a few small buildings, but they are generally surrounded by larger grassed areas which essentially disconnects them. There is a mixture of paved and gravel parking areas, a baseball and softball fields, and a basketball court. All impervious surfaces drain northeastward toward the river and across a wide, wooded buffer, disconnecting the site.

4.2.3 Sinsabaugh Heights Housing

The Sinsabaugh Heights site is owned the by the City of Shelton Housing Authority providing 80 units for elderly and disabled adult housing.

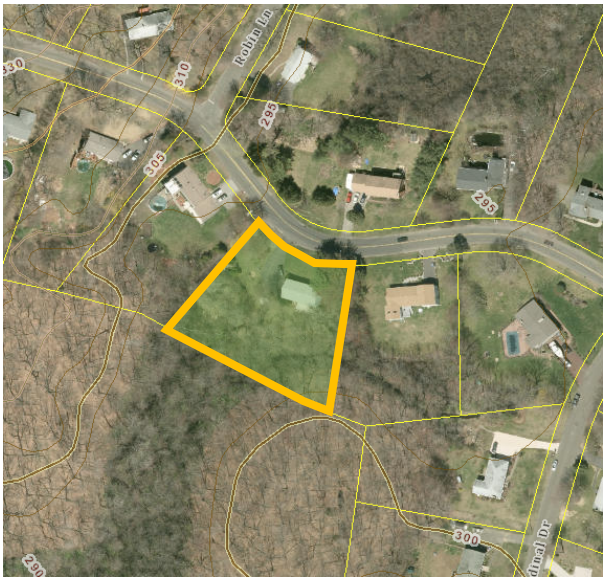
The site encompasses 20 acres, and is located on a moderate to steeply sloping site that slopes from southwest to northeast.

The developed portion of the site drains to a detention basin located at the bottom of the slope, below the lowest units, disconnecting the impervious coverage on the site with intermediate treatment.



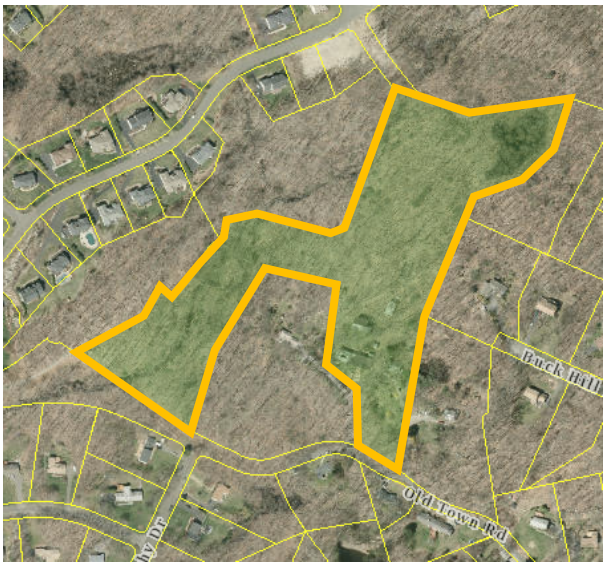
4.2.4 Meadowlark Drive Pump Station

The Meadowlark Drive Pump Station is located between 12 and 16 Meadowlark Drive on an easement between two residential parcels. The area around the pump station sheets off to adjacent woodland and is therefore considered to be disconnected.



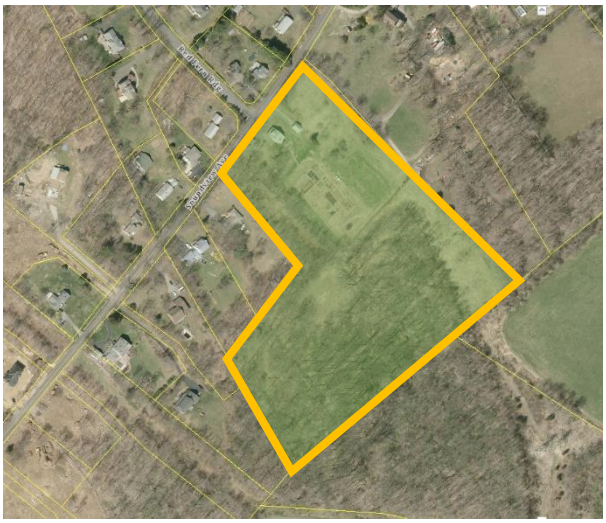
4.2.5 27 Old Town Road

The City of Shelton came into possession of this 13.14 acre parcel that has three residential buildings. The property is substantially wooded, and is served by a driveway that has no curbing. Runoff sheets off the driveway into the woodlands, and therefore, the property is already disconnected.



4.2.6 279 Soundview Avenue

The City of Shelton came into possession of this 13.91 acre parcel that has a residential buildings. The property is partially agricultural land, and partially wooded, and is served by a driveway that has no curbing. Runoff sheets off the driveway onto adjacent pervious areas of sufficient width, and therefore, the property is already disconnected.



4.3 Municipal Sites Not Suitable for Disconnection

4.3.1 Shelton Farmers Market Building

The Shelton Farmers Marker Building is Located at 100 Canal Street. The site is mostly impervious, covered by the building and a paver plaza, with some green space along the southern and western perimeter. The length of the green space along the permiter is shorter than the length of the paver surface, therefore the paver surface does not qualify as disconnected. Drainage appears to be directed to a single catch basin in the plaza.

The underlying soils are Hydrologic Soil Group D, which limits infiltration practices. A water quality swale could be used to intercept stormwater runoff in the green space west and south of the plaza, but it would disturb existing trees. It is unclear if excavation for stormwater management features would also impact any potential underlying environmental restrictions due to the site having previously been a brownfield. Therefore, we do not believe this site is suitable for stormwater retrofits.

Farmer's Market Building
100 Canal Street

Not suitable for retrofits due to:

- Poor Soils
- Potential Environmental Restrictions

4.3.2 DPW / WPCF / Bus Depot / Animal Shelter

The City owns several parcels between Myrtle Avenue and the Housatonic River. These parcels, covering a combined area of 12.72 acres, house the Department of Public Works Garage, Water Pollution Control Facility, Animal Shelter, Fire Department Maintenance Garage, Fleet Fueling Facility and the School Bus Depot. These properties are heavily developed.

The DPW parcel is located at 41 Myrtle Street, the WPCF at 25 Riverdale Avenue, the bus depot at 55 Riverdale Avenue, and the Animal Shelter at 11 Brewster Place.

The general slope across the properties runs from south to north, toward the Housatonic River. The underlying soils are primarily HSG B.

Our review indicated that these properties would be unsuitable for disconnection practices due to the extent of development that is necessary for their function, the fact that some of these operations involve the storage and handling of fuels and chemicals that are considered stormwater risks, and the overall slope of the property. The lower edges of these properties all sit at the top of very steep slopes, and introduction of large-scale infiltration practices could saturate the slopes and cause stability issues.

DPW – WPCF – Bus Depot – Animal Shelter
41 Myrtle Street
25 & 55 Riverdale Avenue
11 Brewster Place

Not suitable for retrofits due to:

- Stormwater “hotspot” uses
- Proximity to steep slopes

4.3.3 East Village Fire Department

The Easy Village Fire Department occupies a 2.29 acre parcel at the corner of School Street and East Village Road.

The fire station and the parking lot occupy the northwesterly half of the parcel, while the southeasterly half of the parcel contains a lawn area and woodlands.

The predominant grade across the site is from northwest to southeast, though the parking lot drains to a catch basin in the center of the parking. Although underlying soils are HSG B, and generally favorable to infiltration practices, disconnection would require the regrading of the parking lot to slope entirely to the southeast toward the lawn and wooded area, which would negatively impact the apparatus bays.

East Village Fire Department
2 School Street

Not suitable for retrofits due to:

- Potential grading impact on apparatus bays

4.4 Municipal Sites Disconnection Potential Unknown

4.4.1 Shelton Intermediate School

The Shelton Intermediate School is located at 675 Constitution Boulevard South on a 46.29 acre parcel. The school building and parking is located at the southern end of the parcel at the corner of Constitution Boulevard South and CT Route 108. The central portion of the site contains woods and three athletic fields, while the northernmost portion of the site is wooded and undeveloped.

The site is bisected by Curtiss Brook, which is impaired in its lower reaches, but is not impaired on the Shelton Intermediate School Property.

The school building and grounds opened in September 2001. Therefore, it is likely that there are existing stormwater BMPs in effect that provide disconnection, but we cannot verify that these BMPs exist.

Shelton Intermediate School
675 Constitution Boulevard South

Unknown potential:

- Cannot verify if BMPs already exist

4.4.2 Helen DeVaux Apartments

The Helen DeVaux apartments are located on a 1.72 acre parcel located at 91 Howe Avenue. The parcel extends through the width of the block to Myrtle St reet to the north.

The apartments, home to 40 units of elderly housing, received a state grant of $3.3 million in 2016 for upgrades. It is not known at this time if the improvements included stormwater management upgrades as well.

The underlying soils are HSG D, and therefore do not lend themselves well to infiltration. Although the site is located in a significantly developed portion of the City, it does not have any significant streetscape area that would enable the use of stormwater management practices used in highly developed areas, such as stormwater tree pits. The site is separated by a significant slope, with the lower

Helen DeVaux Apartments
91 Howe Avenue

Unknown potential:

- Cannot verify if BMPs already exist

portion supported on retaining walls, which limits the available area for infiltration practices.

4.4.3 Perry Hill School

The Perry Hill School is located on a 29.27 acre parcel at 60 Perry Hill Road. It is also adjacent to another City parcel of 1.38 acres at 58 Perry Hill Road that contains a residential dwelling.

The school is located on the northern half of the larger parcel, with parking in the front and rear, and additional parking to the west. Athletic fields are located to the south of the school, with the extreme southern portion of the parcel wooded.

The site slopes moderately from south to north, and gently from west to east, with a steep slope at the eastern end of the property.

The underlying soils are mostly Hydrologic Soils Group D, which make the area generally poorly suited for infiltration practices. There are numerous stone outcrops on the site.

However, there may be opportunities, but on-site soils investigation will be required. For example, the rear parking area has a center island which could be converted to a depressed parking island, but the underlying soil profile is unknown.

Perry Hill School
60 Perry Hill Avenue

Unknown potential:

- Further investigation of underlying soils needed

4.5 Municipal Open Space Properties

The City maintains a large inventory of open space properties in residential areas. The vast majority of these properties are undeveloped and contain no impervious coverage, and therefore are generally not conducive to helping the City achieve its disconnection goals under the MS4 General Permit.

In some instances, these properties may be suitable for best management practices to treat adjacent roadways where rights of way are not sufficient, but in order to be effective, the BMPs need to be located where they can be easily accessed and maintained, however, many of these properties do not lend themselves to ease of construction or maintenance due to the proximity of wetlands or steep topography. Furthermore, some open space areas may be protected by restrictive covenants that preclude construction of stormwater management best practices.

A listing of City-owned open space properties is located in **Appendix C**.

4.6 Prioritized List of DCIA Disconnection Projects

Based upon our analysis of the potential projects in Sections 4.1 through 4.5, using the criteria described in Section 3, we developed the following list of potential disconnection projects in the City of Shelton as outlined in **Table 4-1**.

Table 4-1
Potential City of Shelton DCIA Disconnection Projects

Rank	Project	Measure	Area Disconnected (acres)	Projected Cost	Score
1	Nike Site - Mohegan School	Water Quality Swale	1.33	$ 97,000	100
2	Community Center	Rain Garden	0.3	$ 33,000	95.89
3	Shelton High School	Rain Garden	0.16	$ 18,000	94.93
4	Shelton Board of Education	Rain Garden	0.12	$ 13,000	94.87
5	Shelton PD - Senior Center	Water Quality Swale	0.22	$ 16,000	94.75
6	Shelton High School	Water Quality Swale	3.92	$ 285,000	94.61
7	Nike Site - Mohegan School	Infiltration Trench	0.26	$ 42,500	92.05
8	Former Lafayette Elementary	Rain Garden	0.29	$ 32,000	90.05
9	Long Hill Elementary School	Water Quality Swale	0.26	$ 36,000	85.18
10	Community Center	Porous Pavement	0.47	$ 270,000	81.77
11	Bridgeport Ave. Pump Station	Infiltration Trench	0.07	$ 12,000	79.73
12	Booth Hill School	Rain Garden	0.66	$ 72,000	78.58
13	City Hall	Rain Garden	0.03	$ 4,000	76.56
14	Huntington Fire Company	Rain Garden	0.46	$ 54,000	76.07
15	City Hall	Drywells	0.63	$ 140,000	72.46
16	Booth Hill School	Infiltration Trench	0.36	$ 59,000	71.99
17	Pine Rock Park Fire Dept.	Infiltration Trench	0.16	$ 27,000	70.68
18	Booth Hill School	Porous Pavement	0.33	$ 269,000	63.47
19	City Hall Annex	Drywells	0.14	$ 32,000	52.27
20	City Hall Annex	Porous Pavement	0.33	$ 268,500	44.12
	TOTAL		**10.50**	**$1,780,000**	

The table indicates that by focusing on municipal properties, the City could eventually reduce its directly connected impervious coverage by 0.6%. The opinions of probable cost for each project appear in **Appendix D**, while individual scores for each project appear in **Appendix E**.

APPENDIX A

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

Shelton DCIA Summary

Basin Number	Main Watershed	Area (ac)	Total IC (ac)	% IC	Connectivity	DCIA %	DCIA (ac)	Primary land uses
6024-02-1	Means Brook	122.67	9.43	7.69%	Moderately	2.13%	2.61	1/2 acre residential
6024-03-1	Means Brook	161.59	10.04	6.21%	Somewhat	0.89%	1.44	Agricultural, 1 acre res.
6024-04-1	Means Brook	543.06	54.66	10.07%	Somewhat	2.03%	11.01	Agricultural, 1 acre res.
6024-06-1	Means Brook	502.83	78.16	15.54%	Moderately	6.13%	30.82	1/2 acre residential
6025-02-1	Farmill River	83.82	5.38	6.42%	Somewhat	0.94%	0.79	1 acre residential
6025-04-1	Farmill River	379.39	40.66	10.72%	Somewhat	2.26%	8.56	1 acre residential
6025-05-1	Farmill River	379.29	46.01	12.13%	Moderately	4.22%	16.02	1/2 acre residential
6025-06-1	Farmill River	365.05	55.4	15.18%	Moderately	5.91%	21.58	1/2 acre residential
6025-07-1	Farmill River	255.85	26.47	10.35%	Somewhat	2.12%	5.43	1 acre residential
6025-08-1	Farmill River	548.47	145.34	26.50%	Highly	20.41%	111.97	Commercial
6025-09-1	Farmill River	421.69	156.58	37.13%	Highly	30.60%	129.05	Comm
6025-10-1	Farmill River	234.63	25.98	11.07%	Moderately	3.68%	8.65	1/2 acre residential
6026-03-1	Pumpkin Ground Brook	27.57	4.69	17.01%	Moderately	7.02%	1.93	1/2 acre
6026-06-1	Pumpkin Ground Brook	40.58	5.55	13.68%	Moderately	5.06%	2.05	Wooded, 1 Acre
7104-01-1	Booth Hill Brook	85.46	13.69	16.02%	Moderately	6.41%	5.48	1/2 Acre, Woods
7104-03-1	Booth Hill Brook	22.73	2.93	12.89%	Moderately	4.63%	1.05	1/2 acre residential
7104-04-1	Booth Hill Brook	47.84	6.15	12.86%	Moderately	4.61%	2.21	1/2 acre
6000-00-5+L4	Housatonic River	594.65	82.62	13.89%	Somewhat	3.51%	20.85	Agricultural, 1 acre res., wooded
6000-00-5+R11	Housatonic River	411.51	47.59	11.56%	Moderately	3.93%	16.18	1/2 acre residential
6000-00-5+R12	Housatonic River	65.32	3.39	5.19%	Somewhat	0.66%	0.43	residential
6000-00-5+R13	Housatonic River	107.87	10.56	9.79%	Moderately	3.06%	3.30	1/2 acre residential
6000-00-5+R14	Housatonic River	429.22	33.73	7.86%	Moderately	2.20%	9.46	1/2 acre residential
6000-00-5+R15	Housatonic River	44.18	3.63	8.22%	Moderately	2.36%	1.04	1/2 acre residential
6000-00-5+R16	Housatonic River	21.16	1.81	8.55%	Moderately	2.50%	0.53	1/2 acre residential
6000-00-5+R17	Housatonic River	59.92	14.85	24.78%	Highly	18.84%	11.29	Dense residential
6000-00-5+R18	Housatonic River	78.75	41.29	52.43%	Fully	52.43%	41.29	Dense commercial
6000-00-5+R19	Housatonic River	295.83	121.02	40.91%	Fully	40.91%	121.02	Dense residential
6000-00-5+R20	Housatonic River	307.87	46.98	15.26%	Highly	10.53%	32.41	1/4 acre residential
6000-00-5+R21	Housatonic River	25.36	0.9	3.55%	Somewhat	0.34%	0.09	1 acre residential
6000-00-5+R22	Housatonic River	361.25	82.78	22.91%	Highly	17.15%	61.95	Commercial
6000-00-5+R23	Housatonic River	390.3	61.39	15.73%	Moderately	6.24%	24.35	1/2 acre residential
6000-00-5+R24	Housatonic River	269.5	41.17	15.28%	Moderately	5.97%	16.09	1/2 acre
6000-00-5+R25	Housatonic River	0.41	0	0.00%	Moderately	0.00%	0.00	1/2 acre
6000-63-1	Housatonic River	247.5	33.56	13.56%	Somewhat	3.36%	8.33	1 acre residential
6000-68-1	Housatonic River	515.12	41.53	8.06%	Moderately	2.29%	11.79	1/2 acre residential
6000-71-1	Housatonic River	765.98	87.92	11.48%	Somewhat	2.53%	19.41	1 acre residential
6000-73-1	Housatonic River	19.72	3.69	18.71%	Somewhat	5.82%	1.15	residential
6000-73-1-L1	Housatonic River	167.51	11.25	6.72%	Somewhat	1.02%	1.71	1 acre residential
6000-73-2-L2	Housatonic River	444.69	75.1	16.89%	Slightly	2.85%	12.68	Agricultural, wooded
6000-73-2-R1	Housatonic River	114.58	32.47	28.34%	Highly	22.13%	25.35	1/4 acre residential
6000-74-1	Housatonic River	251.02	13.11	5.22%	Somewhat	0.66%	1.67	residential, woods
6000-75-1	Housatonic River	571.61	135.11	23.64%	Highly	17.80%	101.73	Commercial
6000-75-1-L1	Housatonic River	70.32	3.43	4.88%	Somewhat	0.59%	0.42	1 acre residential
6000-75-2-R1	Housatonic River	240.07	74.41	31.00%	Highly	24.64%	59.15	1/4 acre residential
6000-76-1	Housatonic River	173.53	18.63	10.74%	Somewhat	2.26%	3.93	residential, woods
6000-76-1-L1	Housatonic River	34.58	2.26	6.54%	Somewhat	0.97%	0.34	1 acre residential
6000-79-1	Housatonic River	744.8	179.38	24.08%	Highly	18.20%	135.58	Dense reidential/commercial
6024-00-1	Means Brook	50.06	7.77	15.52%	Somewhat	4.23%	2.12	1 acre residential
6024-00-2-L1	Means Brook	558.14	50.61	9.07%	Moderately	2.73%	15.24	1/2 acre residential
6024-00-2-R1	Means Brook	444.68	32.39	7.28%	Moderately	1.97%	8.74	1/2 acre residential
6024-00-2-R2	Means Brook	62.51	4.89	7.82%	Slightly	0.61%	0.38	Agricultural, wooded
6024-00-2-R3	Means Brook	21.26	0.16	0.75%	Slightly	0.01%	0.00	Agricultural, wooded
6024-00-2-R4	Means Brook	231.64	2.81	1.21%	Slightly	0.01%	0.03	Agricultural, wooded
6024-00-2-R5	Means Brook	1,208.71	172.8	14.30%	Somewhat	3.68%	44.49	1 acre residential
6024-00-2-R6	Means Brook	366.64	69.76	19.03%	Highly	13.72%	50.30	Commercial
6024-02-1-L1	Means Brook	37.12	1.09	2.94%	Somewhat	0.25%	0.09	1 acre residential
6024-05	Means Brook	434.98	45.49	10.46%	Somewhat	2.16%	9.41	Agricultural, 1 acre res.
6024-06-1-L1	Means Brook	39.93	4.25	10.64%	Moderately	3.47%	1.39	1/2 acre residential
6025-00-2-R1	Farmill River	48.25	3.42	7.09%	Somewhat	1.12%	0.54	residential

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7/30/2021

Shelton DCIA Summary

Basin Number	Main Watershed	Area (ac)	Total IC (ac)	% IC	Connectivity	DCIA %	DCIA (ac)	Primary land uses
6025-00-2-R2	Farmill River	27.99	3.4	12.15%	Moderately	4.23%	1.18	wooded, 1/2 acre residential
6025-00-3-L2	Farmill River	594.17	57.13	9.62%	Moderately	2.98%	17.71	1/2 acre residential
6025-00-3-R1	Farmill River	52.04	6.73	12.93%	Moderately	4.65%	2.42	1/2 acre residential
6025-00-3-R2	Farmill River	106.59	16.35	15.34%	Moderately	6.01%	6.40	1/2 acre residential
6025-00-3-R3	Farmill River	962.26	160.37	16.67%	Moderately	6.80%	65.47	1/2 acre residential
6025-00-3-R4	Farmill River	56.34	5	8.87%	Moderately	2.64%	1.49	1/2 acre residential
6025-00-3-R5	Farmill River	732.39	165.54	22.60%	Highly	16.87%	123.54	Commercial
6025-00-3-R6	Farmill River	149.47	32.83	21.96%	Highly	16.30%	24.36	Commercial
6025-00-3-R7	Farmill River	110.3	19.97	18.11%	Highly	12.92%	14.26	Comm-Townhouses-Wooded
6025-00-3-R8	Farmill River	401.98	66.3	16.49%	Moderately	6.70%	26.93	1/3 - 1/2 Acre
6025-03	Farmill River	66.27	7.49	11.30%	Somewhat	2.47%	1.64	1 acre residential
6025-03-2-R1	Farmill River	236.04	30.97	13.12%	Moderately	4.75%	11.22	townhouses
6026-00-1-L1	Pumpkin Ground Brook	695.4	27.54	3.96%	Somewhat	0.42%	2.89	Wooded
6026-00-1-L2	Pumpkin Ground Brook	130.25	34.63	26.59%	Highly	20.50%	26.70	Comm-Res-Wooded
6026-03-1-L1	Pumpkin Ground Brook	36.12	4.58	12.68%	Moderately	4.52%	1.63	1/2 acre
7104-01-1-L1	Booth Hill Brook	450.33	63.33	14.06%	Moderately	5.27%	23.75	1/2 acre residential
7104-02	Booth Hill Brook	51.2	8.57	16.74%	Moderately	6.85%	3.51	1/2 Acre
	TOTAL	**20410**	**3098.85**	**15.18%**			**1591.96**	
							7.80%	

NOTE: %IC = percent impervious cover

Connectivity Level	Description of Contributing Area	Land use type	Equation	Example for a watershed with 20% impervious cover (IC)
1. Fully Connected (default)	100% storm sewered with all IC	High density mixed use, commercial	None. DCIA% = IC%	20% DCIA
2. Highly Connected	Mostly storm sewered with curb and gutter, residential rooftops connected to MS4	High density residential, commercial, industrial, institutional	DCIA%=0.4(%IC)^1.2	0.4(20)^1.2 = 14.6% DCIA
3. Moderately Connection	Mostly storm sewered with curb and gutter, residential rooftops NOT connected to MS4	Medium density residential, commercial, industrial, institutional, open land	DCIA%=0.1(%IC)^1.5	0.1(20)^1.5 = 8.9% DCIA
4. Somewhat Connected	50% storm sewered with some infiltration and residential rooftops not connected to MS4	Low density residential, open land	DCIA%=0.04(%IC)^1.7	0.04(20)^1.7 = 6.5% DCIA
5. Slightly Connected	Small % of urban area storm sewered or mostly infiltration	Agricultural, forested, natural areas	DCIA%=0.01(%IC)^2	0.01(20)^2 = 4% DCIA

Source: UCONN CLEAR

APPENDIX B

City of Shelton Directly Connected Impervious Cover Tracking

Project Information					Existing Conditions Summary			Proposed Impervious Cover			Post-Development Impervious Cover Treated by Stormwater Treatment BMPs (ac) Treatment requires the stormwater BMP be sized to meet WQV.																			Imervious Cover Change Computations			Total Change		Cumulative Totals				Notes & References
Date (1)	Watershed ID Based on CTDEEP Subregional Watershed Basin Number (2)	Street Number (3)	Street (4)	Description (5)	Site Total Impervious Cover (ac) Total amount of existing impervious cover on the property (6)	Area Treated by Stormwater BMPs (ac) Existing impervious area contibuting to existing stormwater treatment practices (7)	DIRECTLY CONNECTED IMPERVIOUS AREA (ac) Existing impervious area that discharges to the storm drainage system or waterways without treatment. (6) - (7) (8)	Project Type (9)	Site Total Impervious Cover (ac) Total post-development impervious cover proposed, regardless if treated or not (10)	Net Change in Impervious Cover (ac) Change in total impervious cover from existing to post-development conditions, regardless if treated or not. (10) - (6) (11)	11-P1 Stormwater Pond	11-P2 Stormwater Wetlands	11-P3 Infiltration Practices	11-P4 Filtering Practoces	11-P5 Water Quality Swales	11-S1 Dry Detention Pond	11-S2 Underground Detention	11-S3 Deep Sump Catch Basins	11-S4 Oil/Particle Separators	11-S5 Dry Wells	11-S6 Permeable Pavement	11-S7 Vegetated Filter Strops	11-S8 Grass Drainage Channels	11-S9 Catch Basin Inserts	11-S10 Hydrodynamic Separators	11-S11 Media Filters	11-S12 Underground Infiltration Systems	11-S13 Alum Injection	Total (ac) (12)	Impervious Area Disconnected by Reduction in Total Impervious Area (ac) Reduction in Total Impervious Cover from Existing to Pre-Development Conditions. (10) - (6) If impervious coverage increases from pre- to post-, this value is zero. (13)	Total Impervious Area Disconnected (ac) Sum of impervious area treated by stormwater BMPs shown in blue columns, **PLUS** any reduction in pre to post impervious cover, **MINUS** any existing impervious cover treated. (12) + (13) - (7) (14)	Total DIRECTLY CONNECTED IMPERVIOUS AREA (ac) Total impervious area discharged from the post-development site without any stormwater treatment. (12) - (10) (15)	Change in DIRECTLY CONNECTED IMPERVIOUS AREA (ac) Existing DCIA **MINUS** Proposed DCIA (8) - (15) (16)	Change in Total Impervious Cover (ac) Existing total impervious cover **MINUS** Proposed total impervious cover (10) - (6) (17)	Change in DIRECTLY CONNECTED IMPERVIOUS AREA (ac) Same as (16) (18)	TOWN-WIDE DIRECTLY CONNECTED IMPERVIOUS AREA (ac) Estimates the Town-Wide Directly Impervious After Project Completion (19) row above **PLUS** (18) (19)	TOTAL CHANGE FROM BASELINE DIRECTLY CONNECTED IMPERVIOUS AREA (%) Percent change in Directly Connected Impervious Area from Estimated Baseline. Goal: 2% Reduction by June 30, 2022. (20)	Total Impervious Cover (ac) Estimates Town-Wide Total Impervious Cover after Project Completion. (21) row above **PLUS** (17) (21)	Notes & References
Town Baseline DCIA / Impervious Cover																																				1591.96		3098.85	
23-Jul-20	7405-01	123	Fake Street	Redevelopment of former widget factory to gadget factory. Existing factory has a small area of stormwater treatment, proposed development has full treatment.	10.00	1.00	9.00	Redevelopment	9.00	(1.00)	7.00										2.00								9.00	1.00	9.00	0.00	(9.00)	(1.00)	(9.00)	1582.96	-0.565%	3097.85	
23-Jul-20	7405-02	20	Lazy Lane	Subdivision on previously undeveloped land. Proposed storm sewer system treats 1/2 of the stormwater, and the other half discharges untreated.	0.00	0.00	0.00	New Development	16.00	16.00	5.00			2.00	1.00														8.00	0.00	8.00	8.00	8.00	16.00	8.00	1590.96	-0.063%	3113.85	
23-Jul-20	7405-02	10	Competent Circle	Subdivision on former commercial site with no existing stormwater treatment. Proposed storm sewer system treats all proposed impervious area.	1.00	0.00	1.00	Redevelopment	12.00	11.00	6.00		6.00																12.00	0.00	12.00	0.00	(1.00)	11.00	(1.00)	1589.96	-0.126%	3124.85	
23-Jul-20	7406-02	1601	Pennsylvania Avenue	Conversion of large, paved brownfield with no stormwater treatment to park with 1.5 acres of walkways and parking, 1.25 acrs of which are treated.	12.00	0.00	12.00	Redevelopment	1.50	(10.50)			1.25																1.25	10.50	11.75	0.25	(11.75)	(10.50)	(11.75)	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	
							0.00	New Development		0.00																			0.00	0.00	0.00	0.00	0.00	0.00	0.00	1578.21	-0.864%	3114.35	

DIRECTLY CONNECTED IMPERVIOUS AREA TRACKING FORM

FOR OFFICE USE:
Application No: _____
File Number: _____

CITY OF SHELTON
ENGINEERING DEPARTMENT
54 Hill Street, Shelton, CT 06484
(203) 924-1555

The City is a registrant under the Connecticut Department of Energy and Environmental Protection's (CTDEEP) General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 General Permit). In accordance with Section 6(a)(6)(B)(ii)(a) of the MS4 General Permit, the City is required to track the amount of impervious coverage of directly connected impervious area (DCIA) that is added as a result of projects within the City. The City is maintaining a database of coverage to track changes in DCIA, which it will use in its Annual Report to CTDEEP.

Project Data	
Owner	
(2) CTDEEP Basin No. (XXXX-XX-X) https://cteco.uconn.edu/viewers/ctms4/	
(3) (4) Street Address	
(5) Brief Project Description	

Existing Impervious Cover Summary	
(6) Site Total Impervious Cover (ac)	
(7) Area Treated by Stormwater Practices (ac)	

Proposed Impervious Cover Summary	
(9) Project Type, check ONE	☐ New Development ☐ Redevelopment
(10) Site Total Impervious Cover (ac)	

Post-Development Impervious Cover Treated by Stormwater Practices (acres)

Note: Do not double-count treatment. If a particular area on the site is treated by two practices in series, for the purposes of the tracking form, credit that area for only the treatment practice closest to the source. Total of these columns shall not exceed the Site Total Impervious Cover.

11-P1 Stormwater Pond		11-S5 Dry Swales	
11-P2 Stormwater Wetlands		11-S6 Permeable Pavement	
11-P3 Infiltration Practices		11-S7 Vegetated Filter Strips	
11-P4 Filtering Practices		11-S8 Grass Drainage Channels	
11-P5 Water Quality Swales		11-S9 Catch Basin Inserts	
11-S1 Dry Detention Pond		11-S10 Hydrodynamic Separators	
11-S2 Underground Detention		11-S11 Media Filters	
11-S3 Deep Sump Catch Basins		11-S12 Underground Infiltration Systems	
11-S4 Oil/Particle Separators		11-S13 Alum Injection	
		Total all values, 11-P1 through 11-S13	

"Directly Connected Impervious Area (DCIA)" means that impervious area from which stormwater runoff discharges directly to waters of the state or directly to a storm sewer system that discharges to waters of the state. Impervious areas that discharge through a system designed to retain the appropriate portion of the Water Quality Volume (pursuant to Section 6(a)(5)(b)(i) or (ii) of the MS4 General Permit) are not considered DCIA.

"Treated by Stormwater Practices" or the purposes of this tracking form means discharge through a system that retains or treats: (a) half of the water quality volume for sites with an existing DCIA 40 percent or greater, or (b) the full water quality volume for sites with an existing DICA less than 40 percent.

APPENDIX C

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

City Owned Properties

Number	Street	Map/Lot/Block	Description	Acres	Zone	Buildings
0	Algonkin Rd	12C 83	Residential Vacant Land	1.9	R-3	0
0	Autumn Ridge Rd	46 87	Residential Vacant Land	3.98	R-1	0
0	Autumn Ridge Rd	46 122	Residential Vacant Land	0.3	R-1	0
0	Barn Hill Rd	155 1	Residential Vacant Land	32.12	R-1	0
0	Beard Sawmill Rd	29 16	Industrial Vacant Land	0.94	PDD1	0
0	Beardsley Rd	162 44	Residential Vacant Land	10.88	R-1	0
0	Beardsley Rd	162 61	Residential Vacant Land	6.36	R-1	0
0	Beardsley Rd	162 67	Residential Vacant Land	1.06	R-1	0
0	Beardsley Rd	162 68	Residential Vacant Land	2.05	R-1	0
0	Beech Tree Hill Rd	162 60	Residential	1.6	R-1	0
0	Beech Tree Hill Rd	168 1	Residential Vacant Land	4.29	PRD3	0
0	Beech Tree Hill Rd	168 21	Residential Vacant Land	4.56	PRD3	0
0	Big Horn Rd	167 49	Residential Vacant Land	32.15	R-1	0
0	Birchbank	179 1	Residential Vacant Land	91.49	R-1	0
0	Birdseye Rd	125 5	Residential Vacant Land	1.89	R-1	0
0	Blacks Hill Rd	105 14	Residential	2.57	R-1	0
41	Blacks Hill Rd	105 13	Residential	0.48	R-1	0
0	Blueberry La	36 34	Residential Vacant Land	2.92	R-1	0
0	Bridge St	129D 56	Commercial Vacant Land	0.52	CB-2	0
43	Bridge St	129D 36	Commercial Vacant Land	0.09	CB-2	0
51	Bridge St	129D 35	Commercial Vacant Land	0.07	CB-2	0
0	Bridgeport Ave	105 36	Commercial Vacant Land	0.5	CB-2	0
0	Bridgeport Ave	2 13	Residential Vacant Land	0.1	R-1	0
0	Bridgeport Ave	77 34	Commercial Vacant Land	0.33	IA-2	0
36	Brookpine Dr	126 22	Residential Vacant Land	1.24	R-1	0
37	Brookpine Dr	126 26	Residential Vacant Land	1.09	R-1	0
0	Bruce Dr	80 48	Residential Vacant Land	3.71	R-3	0
0	Brunswick Rd/Louise Dr	66 8	Residential Vacant Land	1.54	R-3	0
0	Buddington Rd	49 42	Residential Vacant Land	15.6	R-1	0
0	Buddington Rd	50 21	Residential Vacant Land	4.52	R-1	0
0	Buddington Rd	50 22	Residential Vacant Land	0.25	R-1	0
0	Buddington Rd	62 11	Residential Vacant Land	9.9	R-1	0
0	Buddington Rd	75 1	Residential Vacant Land	7.3	R-1	0
0	Buddington Rd	75 2	Residential Vacant Land	10.9	R-1	0
0	Buddington Rd	75 3	Residential Vacant Land	12.6	R-1	0
0	Buddington Rd	76 1	Residential Vacant Land	11.5	R-1	0
0	Buddington Rd	76 2	Residential Vacant Land	7.92	R-1	0
0	Buddington Rd	76 3	Residential Vacant Land	5.04	R-1	0
0	Buddington Rd	89 20	Residential Vacant Land	13	R-1	0
0	Cali Dr	46 100	Residential Vacant Land	2.62	R-1	0
0	Canal St	129 15	Industrial Vacant Land	0.03	IB-2	0
0	Canal St	130 4	Industrial Vacant Land	0.3	IB-2	0
0	Canal St	130 5	Industrial Vacant Land	0.59	IB-2	0
0	Canal St	130 6	Industrial Vacant Land	0.35	IB-2	0
93	Canal St	130 7	Industrial Vacant Land	1.08	IB-2	0
113	Canal St	129 31	Light Industrial	0.5	IB-2	1
123	Canal St	130 3	Industrial Vacant Land	0.39	IB-2	0

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

City Owned Properties

Number	Street	Map/Lot/Block	Description	Acres	Zone	Buildings
0	Canfield Dr	25 16	Residential Vacant Land	6.49	R-1	0
0	Canfield Dr	25 60	Residential Vacant Land	2.13	R-1	0
0	Clinton Dr	83 41	Residential Vacant Land	1.05	R-1	0
0	Clinton Dr	96 34	Residential	1.92	R-1	0
0	Clinton Dr	96 35	Residential Vacant Land	1.06	R-1	0
0	Columbia Dr	97 78	Residential Vacant Land	2.64	R-1	0
0	Commerce Dr	38 2	Industrial Vacant Land	3.89	PDD6	0
0	Commerce Dr	38 3	Industrial Vacant Land	12.66	PDD6	0
0	Commerce Dr	38 61	Commercial Vacant Land	1.8	PDD6	0
0	Commerce Dr	39 3	Residential Vacant Land	0.61	PDD	0
0	Constitution Blvd	104 31	Commercial Vacant Land	8.96	PDD	0
0	Constitution Blvd	105 7	Residential Vacant Land	0.95	R-1	0
22	Constitution Blvd	105 6	Residential	1.34	R-1	0
0	Constitution Blvd North	126 29	Residential	12.27	R-1	0
0	Constitution Blvd North	144 44	Residential	0.6	PRD	0
0	Constitution Blvd North	145 118	Residential Vacant Land	2.53	PRD	0
675	Constitution Blvd North	127 1	Elementary School	46.29	R-1	1
0	Constitution Blvd South	53 71	Industrial Vacant Land	0.84	IB-1	0
0	Constitution Blvd South	65 2	Industrial Vacant Land	2.96	IB-1	0
0	Constitution Blvd South	65 3	Industrial Vacant Land	6.23	IB-1	0
0	Constitution Blvd South	92 66	Residential Vacant Land	0.06	R-2	0
0	Constitution Blvd South	92 67	Residential Vacant Land	0.06	R-2	0
0	Constitution Blvd South	92 68	Residential Vacant Land	0.12	R-2	0
0	Constitution Blvd South	92 69	Residential Vacant Land	0.11	R-2	0
0	Constitution Blvd South	92 84	Residential	1.8	R-1	0
0	Coppel La	9 26	Residential Vacant Land	0.97	R-1	0
0	Copper Penny La	57 15	Residential	0.13	R-1	0
0	Coram Ave	129D 78	Commercial Vacant Land	0.02	CB-2	0
0	Coram Ave	129D 80	Commercial Vacant Land	0.11	CB-2	0
0	Coram Ave	129D 81	Commercial Vacant Land	0.12	CB-2	0
0	Coram Rd	93D 40	Residential Vacant Land	0.11	R-3	0
0	Coram Rd	93D 41	Residential Vacant Land	0.11	R-3	0
0	Crossroads	52 15	Residential Vacant Land	2.51	R-1	0
0	Dickinson Dr	177 83	Residential Vacant Land	5.85	R-1	0
0	Doe Pl	62 4	Residential Vacant Land	1.2	R-1	0
0	East Ave	105 144	Residential	0.17	R-4	0
0	East Ave	92 57	Residential	0.17	R-4	0
0	East Village Rd	152 65	Residential	6.48	R-1	0
0	East Village Rd	157 38	Residential Vacant Land	29.83	R-1	0
0	East Village Rd	158 10	Residential Vacant Land	105.06	R-1	0
0	East Village Rd	172 30	Residential Vacant Land	0.7	R-1	0
0	East Village Rd	173 31	Residential Vacant Land	1.14	R-1	0
0	East Village Rd	173 88	Residential Vacant Land	2.37	R-1	0
0	Emerald Ridge Ct	136 28	Residential Vacant Land	0.05	R-1	0
0	Emerald Ridge Ct	145 110	Residential Vacant Land	1.43	R-1	0
0	Emily Lane	56 8	Residential Vacant Land	2.68	R-1	0
0	Fairlane Dr	132 62	Residential Vacant Land	1.93	R-1	0

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

City Owned Properties

Number	Street	Map/Lot/Block	Description	Acres	Zone	Buildings
0	Far Mill Crossing	29 25	Residential Vacant Land	6.3	PDD	0
0	Far Mill St	70 37	Residential Vacant Land	31	R-1	0
0	Farmill St	57 68	Residential Vacant Land	6.55	R-1	0
0	Fawn Meadow La	83 86	Residential Vacant Land	5.93	R-1	0
0	Fawn Meadow La	83 87	Residential Vacant Land	0.2	R-1	0
0	Frank Dr	97 20	Residential Vacant Land	0.35	R-1	0
0	Golden Hill La	174 24	Residential Vacant Land	2.66	R-1	0
0	Golden Hill La	174 25	Residential Vacant Land	2.07	R-1	0
0	Golden Hill La	174 26	Residential Vacant Land	1.67	R-1	0
0	Golden Hill La	174 27	Residential Vacant Land	8.72	R-1	0
0	Grove St	106 27	Residential	1.2	R-3	0
0	Grove St	106 32	Residential	0.1	R-3	0
26	Grove St	106 26	Residential	0.29	R-3	0
54	Grove St	106 28	Elementary School	7.2	R-3	2
0	Hayfield Dr	135 21	Residential	1.63	PRD	0
0	Hayfield Dr	135 60	Residential Vacant Land	2.94	PRD	0
0	Hazel St	93B 52	Residential Vacant Land	0.34	R-3	0
0	Heritage Dr	104 25	Commercial Vacant Land	27.48	PDD1	0
0	Heritage Dr	104 28	Commercial Vacant Land	6.21	PDD	0
0	Heritage Dr	104 29	Commercial Vacant Land	6.48	PDD	0
0	Heritage Dr	104 30	Commercial Vacant Land	7.58	PDD	0
0	Heritage Dr	91 29	Commercial Vacant Land	6.3	PDD	0
0	Hiawatha Trl	177 61	Residential Vacant Land	0.22	R-1	0
0	Hiawatha Trl	178 17	Residential Vacant Land	2.17	R-1	0
0	Hidden Pond La	14 44	Residential Vacant Land	6.79	R-1	0
0	Hidden Pond La	14 45	Residential Vacant Land	1.03	R-1	0
0	Hidden Pond La	15 59	Residential Vacant Land	1.84	R-1	0
0	Hillside Ave	106D 11	Residential Vacant Land	0.14	R-4	0
0	Hilltop Dr	146 31	Residential Vacant Land	7	R-1	0
0	Honeybee La	14 27	Residential Vacant Land	1.68	R-1	0
0	Housatonic Rise	146 30	Residential Vacant Land	2.72	R-1	0
0	Howe Ave	138 32	Residential Vacant Land	3.9	R-4	0
0	Howe Ave	139 1	Mixed Use - Retail / Office	17.7	R-4	2
0	Howe Ave	146 12	Residential Vacant Land	7.6	R-1	0
0	Howe Ave	147 4	Residential	1.3	R-1	0
0	Howe Ave	147 15	Residential Vacant Land	0.11	R-1	0
0	Howe Ave	154 4	Residential Vacant Land	9.65	R-1	0
91	Howe Ave	106 14	Museum	1.72	R-4	4
392	Howe Ave	129D 45	Commercial Vacant Land	0.18	CB-2	0
0	Hubbell La	144 42	Residential Vacant Land	1.72	R-1	0
0	Huntington St	37 65	Residential Vacant Land	25.47	R-1	0
19	Huntington St	73 66	Commercial Vacant Land	1.55	R-2	0
216	Huntington St	48 68	Water Treatment Plant	37.7	R-1	0
0	Independence Dr	114 75	Residential Vacant Land	12.5	R-1	0
0	Independence Dr	114 76	Residential Vacant Land	16	R-1	0
0	Independence Dr	127 16	Residential Vacant Land	0.7	R-1	0
0	Isinglass Rd	16 20	Residential Vacant Land	2.65	R-1	0

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

City Owned Properties

Number	Street	Map/Lot/Block	Description	Acres	Zone	Buildings
0	Isinglass Rd	7 9	Residential Vacant Land	3.51	R-1	0
0	Ivy Brook Rd	65 4	Industrial Vacant Land	5.78	IB-1	0
0	Ivy Brook Rd	65 24	Industrial Vacant Land	4.2	IB-1	0
0	Kazo Dr	15 4	Residential Vacant Land	0.94	R-1	0
0	Kings Highway	76 11	Residential Vacant Land	6.4	R-1	0
0	Lake Rd	115 5	Residential Vacant Land	4.73	R-1	0
0	Lane St	60 40	Residential	0.11	R-1	0
0	Lane St	60 53	Residential	5.6	R-1	0
0	Lane St	61 10	Residential Vacant Land	3.49	R-1	0
0	Lane St	61 52	Residential	0.9	R-1	0
0	Lane St	61 53	Residential	0.9	R-1	0
0	Leavenworth Rd	146 16	Residential Vacant Land	10	R-1	0
0	Leavenworth Rd	152 57	Residential Vacant Land	2.75	R-1	0
0	Leavenworth Rd	154 6	Residential Vacant Land	8.4	R-1	0
0	Leavenworth Rd	154 13	Residential Vacant Land	4.6	R-A	0
0	Little Fox Run	178 74	Residential Vacant Land	9.25	R-1	0
0	Long Hill Ave	12 8	Residential Vacant Land	0.63	R-3	0
0	Long Hill Ave	12A 74	Residential Vacant Land	0.26	R-3	0
0	Long Hill Ave	21 67	Residential Vacant Land	3.16	R-1	0
0	Long Hill Ave	41 20	Residential	22.84	R-1	0
0	Long Hill Ave	41 21	Residential Vacant Land	19.16	R-1	0
0	Long Hill Ave	41 25	Residential Vacant Land	16.35	R-1	0
0	Long Hill Ave	41 38	Residential Vacant Land	29.04	R-1	0
0	Long Hill Ave	52 89	Residential Vacant Land	6.13	R-1	0
0	Long Hill Ave	52 94	Residential Vacant Land	5	R-1	0
0	Long Hill Ave	92 24	Residential	0.36	R-1	0
382	Long Hill Ave	92 103	High School	3.31	R-1	2
565	Long Hill Ave	52 2	Elementary School	20.2	R-1	1
722	Long Hill Ave	21 45	Fire Station - Staffed	3.08	R-1	1
764	Long Hill Ave	21 46	Residential Vacant Land	1.34	R-1	0
0	Longmeadow Rd	100 92	Residential Vacant Land	2.9	R-1	0
0	Longmeadow Rd	87 90	Residential	0.8	R-1	0
0	Maggie La	38 54	Residential Vacant Land	4.16	R-1	0
0	Maler Ave	102 1	Residential Vacant Land	5.82	PRD5	0
0	Maler Ave	88 80	Residential Vacant Land	3.82	R-1	0
0	Maler Ave	89 44	Residential Vacant Land	2.93	R-1	0
0	Manhassett Trl	5A 13	Residential Vacant Land	0.25	R-3	0
0	Maple Ave	125 42	Residential Vacant Land	3.99	R-1	0
0	Maple Ave	144 30	Residential Vacant Land	5.55	R-1	0
0	Maple La	36 23	Residential Vacant Land	0.71	R-1	0
0	Meadow St	137 15	Apartments General	20	R-1	17
0	Meadow St	137 42	Residential Vacant Land	1.63	R-1	0
0	Meadow St	137 116	Residential Vacant Land	40.25	R-1	0
0	Meadow St	144 24	Residential Vacant Land	4.5	PRD	0
120	Meadow St	127 2	Middle School	50.4	R-1	3
303	Meadow St	145 5	Residential Vacant Land	4.48	R-1	0
0	Meadow St (Rear)	137 22	Residential Vacant Land	23.8	R-1	0

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

City Owned Properties

Number	Street	Map/Lot/Block	Description	Acres	Zone	Buildings
0	Meadowlark Dr	35 6 1	Pump House	0	R-1	1
0	Meghan Ct	177 64	Residential Vacant Land	0.65	R-1	0
0	Meghan Ct (Rear)	177 98	Residential Vacant Land	0.22	R-1	0
0	Mill St	38 8	Residential Vacant Land	9.8	R-1	0
9	Mimosa La	99 17	Residential Vacant Land	1.5	R-1	0
0	Mohegan Rd	84 21	Residential Vacant Land	27.56	R-1	0
0	Mohegan Rd	84 71	Residential Vacant Land	2.49	R-1	0
0	Mohegan Rd	97 23	Residential Vacant Land	8.25	R-1	0
0	Mohegan Rd	98 41	Mixed Use - Retail / Office	18.17	R-1	2
47	Mohegan Rd	85 42	Elementary School	16.09	R-1	1
0	Mountain View Dr	65 9	Industrial Vacant Land	0.45	IB-1	0
0	Mt Pleasant St	107 23	Residential Vacant Land	1.81	R-3	0
0	Mustang Dr	20 34	Residential Vacant Land	2.11	R-1	0
0	Mustang Dr	20 58	Residential Vacant Land	5.95	R-1	0
0	Myrtle St	118 21	Transit Warehouse	2.8	R-4	2
11	Myrtle St	118 22	Distribution Warehouse	0.99	R-4	1
0	Nells Rock Rd	103 3	Residential Vacant Land	4.62	R-1	0
0	Nells Rock Rd	103 4	Residential Vacant Land	0.28	R-1	0
0	Nells Rock Rd	103 7	Residential Vacant Land	3.93	R-1	0
0	Nells Rock Rd	103 11	Residential Vacant Land	5.15	R-1	0
0	Nells Rock Rd	104 33	Residential Vacant Land	4.95	R-1	0
0	Nells Rock Rd	115 12	Residential Vacant Land	1.1	PDD	0
0	Nells Rock Rd	90 3	Residential Vacant Land	1.6	R-1	0
0	Nells Rock Rd	90 7	Residential Vacant Land	55.6	R-1	0
0	Nichols Ave	25 23	Residential Vacant Land	37.23	R-1	0
0	Nichols Ave	25 41	Residential Vacant Land	5	R-1	0
0	Nichols Ave	47 110	Residential Vacant Land	0.11	R-1	0
0	Nichols Ave	59 60	Residential Vacant Land	2.46	R-2	0
0	Nichols Ave	59 72	Residential Vacant Land	0.04	R-2	0
161	North Oak Ave	129A 8	Residential	0.27	R-5	0
0	Oak Glen Dr	98 79	Residential Vacant Land	0.9	R-1	0
0	Oak Valley Rd	89 22	Residential Vacant Land	3.4	R-1	0
0	Oak Valley Rd	89 23	Residential Vacant Land	1.2	R-1	0
0	Oak Valley Rd	90 9	Residential Vacant Land	25.3	R-1	0
0	Oak Valley Rd	90 20	Residential Vacant Land	2.24	R-1	0
10	Oak Valley Rd	90 11	Residential Vacant Land	13.58	R-1	0
0	Ojibwa Rd	12A 86	Residential	0.72	R-3	0
0	Ojibwa Rd	12C 89	Residential Vacant Land	0.34	R-3	0
0	Okenuck Way	174 11	Residential Vacant Land	20.6	R-1	0
0	Old Coram Rd	31 71	Residential Vacant Land	1	R-1	0
0	Old Coram Rd	31 95	Residential Vacant Land	0.95	R-1	0
0	Old Coram Rd	42 8	Residential Vacant Land	6.8	PDD	0
0	Old Coram Rd	42 15	Residential Vacant Land	2.4	R-1	0
0	Old Farm Rd	175 1	Residential Vacant Land	7.92	R-1	0
0	Old Farm Rd	175 2	Residential Vacant Land	26.13	R-1	0
0	Old Farm Rd	175 3	Residential Vacant Land	3.18	R-1	0
0	Old Mill Rd	40 40	Residential Vacant Land	0.03	R-1	0

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

City Owned Properties

Number	Street	Map/Lot/Block	Description	Acres	Zone	Buildings
0	Old Town Rd	61 90	Residential Vacant Land	2.7	R-1	0
27	Old Town Rd	61 88	Residential	13.14	R-1	1
31	Old Town Rd	61 89	Residential	2	R-1	0
0	Orchard St	117D105	Residential Vacant Land	0.43	R-5	0
0	Oronoque Trl	12A 40	Residential	0.38	R-3	0
0	Park Ave	113 67	Residential Vacant Land	9.91	R-1	0
0	Partridge La	19 27	Residential Vacant Land	0.01	R-1	0
0	Pasture La	136 38	Residential Vacant Land	21.8	PRD	0
0	Pawtucket Ave	93A110	Residential	0.11	R-4	0
0	Pawtucket Ave	93C 48	Residential	0.23	R-4	0
0	Pawtucket Ave	93C 49	Residential	0.13	R-4	0
0	Pawtucket Ave	93C 50	Residential	0.19	R-4	0
0	Pawtucket Ave	93C 53	Residential	0.11	R-4	0
0	Pawtucket Ave	93C 54	Residential	0.11	R-4	0
0	Pawtucket Ave	93C 55	Residential	0.11	R-4	0
0	Pawtucket Ave	93C 56	Residential	0.11	R-4	0
0	Pawtucket Ave	93C 62	Residential	0.11	R-4	0
0	Pearmain Rd	134 12	Residential Vacant Land	6.71	R-1	0
0	Pearmain Rd	143 18	Residential Vacant Land	7.78	R-1	0
0	Pearmain Rd	143 23	Residential Vacant Land	1.34	R-1	0
0	Pearmain Rd	143 29	Residential Vacant Land	0.2	R-1	0
0	Perch Rd	150 27	Residential Vacant Land	0.25	R-1	0
74	Perry Ave	129A 73	Residential	0.22	R-5	0
58	Perry Hill Rd	117 24	Residential	1.38	R-1	1
60	Perry Hill Rd	117 25	Elementary School	29.27	R-1	2
0	Philip Dr	98 78	Residential Vacant Land	9.64	R-1	0
0	Pine Tree Hill Rd	168 104	Residential Vacant Land	3.22	PRD3	0
67	Pine Tree Hill Rd	161 2	Residential Vacant Land	1.96	R-1	0
0	Plaskon Dr Ext	78 110	Residential Vacant Land	0.21	R-1	0
0	Plaskon Dr Ext	78 141	Residential Vacant Land	0.51	R-1	0
0	Plaskon Dr Ext	78 142	Residential Vacant Land	0.44	R-1	0
0	Plum Tree La	136 89	Residential Vacant Land	0.43	R-1	0
0	Plum Tree La	145 81	Residential Vacant Land	3.61	R-1	0
0	Plum Tree La	145 119	Residential Vacant Land	1.25	R-1	0
0	Poe Place	174 49	Residential Vacant Land	1.48	R-1	0
0	Red Fern Ridge	136 7	Residential Vacant Land	1.03	R-1	0
0	Ridge La	92 32	Residential Vacant Land	0.49	R-1	0
0	Ridge La	92 52	Residential Vacant Land	0.64	R-1	0
0	Ridge La	92 58	Residential Vacant Land	1.51	R-4	0
0	Ripton Rd	73 23	Residential Vacant Land	1.39	R-1	0
0	River Rd	107 29	Residential Vacant Land	3.83	R-3	0
0	River Rd	21 66	Residential Vacant Land	0.9	R-1	0
0	River Rd	66 87	Commercial Vacant Land	0.82	CA-2	0
0	River Rd	66 133	Residential Vacant Land	0.57	R-5	0
0	River Rd	66 135	Mixed Use - Retail / Office	14.55	R-5	3
0	River Rd	66 137	Residential	0.11	R-5	0
0	River Rd	94 93	Residential	1.59	R-3	0

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

City Owned Properties

Number	Street	Map/Lot/Block	Description	Acres	Zone	Buildings
418	River Rd	66 134	Elementary School	5.9	R-5	1
550	River Rd	53 55 1	Pump House	0	R-1	1
610	River Rd	42 2	Residential	1.67	R-1	0
0	Riverdale Ave	118 23	Kennel	0.34	IB-2	0
0	Riverdale Ave	118 24	Distribution Warehouse	4.34	IB-2	3
0	Riverdale Ave	118 43	Industrial Vacant Land	1.15	IB-2	0
0	Riverdale Ave	118 44	Sewage Treatment Plant	3.1	IB-2	3
0	Roberts St	128B 28	Residential	0.13	R-5	0
0	Rock Ridge Rd	135 9	Residential Vacant Land	0.45	R-1	0
0	Rock Ridge Rd	135 10	Residential Vacant Land	3.29	R-1	0
0	Rocky Rest Rd	53 73	Residential	17.63	PDD	0
0	Rolling Brook La	35 15	Residential Vacant Land	0.1	R-1	0
0	Rugby Rd	169 42	Residential	4.78	R-1	0
0	Sanford Dr	78 49	Residential Vacant Land	5.27	R-1	0
0	Sawmill City Rd	111 89	Residential Vacant Land	30.01	R-1	0
0	School St	152 17	Fire Station - Staffed	2.29	R-1	1
3	School St	152 25	Mixed Use - Retail / Office	0.75	R-1	1
0	Scotchpine Dr	61 14	Residential Vacant Land	15.65	R-1	0
0	Scotchpine Dr	62 13	Residential Vacant Land	30.85	R-1	0
0	September La	14 12	Residential Vacant Land	0.5	R-1	0
0	September La	25 68	Residential Vacant Land	1.15	R-1	0
0	Serene Dr	48 86	Residential Vacant Land	1.05	R-1	0
0	Shelton Ave	102 38	Residential Vacant Land	84	R-1	0
0	Shelton Ave	103 1	Residential Vacant Land	79	R-1	0
0	Shelton Ave	115 7	Residential Vacant Land	12.12	PDD	0
0	Shelton Ave	128 10	Residential Vacant Land	27.3	R-3	0
0	Shelton Ave	128 54	Residential Vacant Land	9.19	R-3	0
0	Shelton Ave	89 34	Residential Vacant Land	22.04	PRD1	0
234	Shelton Ave	115 1	Residential	41.98	R-1	0
0	Sherwood La	121 69	Residential Vacant Land	6.48	R-1	0
0	Shinnacock Trl	12A 3	Residential	0.16	R-3	0
0	Sims Way	117 47	Residential Vacant Land	0.89	R-3	0
0	Soundview Ave	101 99	Residential Vacant Land	6.23	PRD	0
0	Soundview Ave	125 60	Elementary School	34	R-1	1
0	Soundview Ave	126 47	Residential Vacant Land	2.37	R-1	0
0	Soundview Ave	136 10	Residential Vacant Land	2.23	R-1	0
0	Soundview Ave	136 37	Residential Vacant Land	1.58	R-1	0
279	Soundview Ave	136 23	Residential	24.69	R-1	1
0	Steep Brook La	92 154	Residential Vacant Land	0.59	R-3	0
0	Sterling Ridge	20 57	Residential Vacant Land	1.66	R-1	0
0	Stone House Rd	47 43	Residential Vacant Land	2.1	R-1	0
0	Sunnyside Dr	66 103	Residential Vacant Land	0.03	R-5	0
0	Ten Coat La	137 49	Residential Vacant Land	1.72	R-1	0
0	Ten Coat La	138A 16	Residential Vacant Land	0.36	R-1	0
0	Thoreau Dr	177 7	Residential Vacant Land	12.36	R-1	0
0	Thoreau Dr	177 82	Residential Vacant Land	1.93	R-1	0
0	Thoreau Dr	180 64	Residential Vacant Land	0.28	R-1	0

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

City Owned Properties

Number	Street	Map/Lot/Block	Description	Acres	Zone	Buildings
0	Thoreau Dr	183 9	Residential Vacant Land	10.61	R-1	0
0	Turning Leaf La	116 91	Residential Vacant Land	0.29	R-1	0
0	Tuxedo Ave	93B 29	Residential Vacant Land	0.11	R-3	0
0	Tuxedo Ave	93B 31	Residential Vacant Land	0.11	R-3	0
0	Tuxedo Ave	93B 32	Residential Vacant Land	0.11	R-3	0
0	Tuxedo Ave	93B 33	Residential Vacant Land	0.11	R-3	0
0	Tuxedo Ave	93B 54	Residential Vacant Land	0.11	R-3	0
0	Tuxedo Ave	93D 50	Residential	0.11	R-3	0
0	Tuxedo Ave	93D 53	Residential	0.11	R-3	0
0	Tuxedo Ave	93D 54	Residential Vacant Land	0.44	R-3	0
0	Tuxedo Ave	93D 55	Residential Vacant Land	0.11	R-3	0
0	Upper Birchbank	186 2	Residential	0.21	R-1	0
0	Vista Dr	172 25	Residential Vacant Land	8.14	R-1	0
0	Vista Dr	173 41	Residential Vacant Land	1.87	R-1	0
0	Vista Dr	173 117	Residential Vacant Land	2.37	R-1	0
0	Vista Dr	177 60	Residential Vacant Land	3.67	R-1	0
0	Wabuda Pl	152 69	Residential	6.05	R-1	0
0	Walnut Tree Hill Rd	58 74	Residential Vacant Land	8.55	R-1	0
0	Waverly Rd	45 123	Residential Vacant Land	2.53	R-1	0
0	Waverly Rd	59 6	Residential Vacant Land	0.17	R-2	0
0	Wellington Ct	126 36	Residential Vacant Land	0.8	R-1	0
0	Wenonah Trl	11B 63	Residential Vacant Land	0.34	R-1	0
0	Wesley Dr	61 83	Residential Vacant Land	4.54	R-1	0
0	Weybosset St	92 156	Residential Vacant Land	2.47	R-4	0
0	White Birch Ct	162 45	Residential Vacant Land	0.49	PRD3	0
0	White St	129D 31	Industrial Vacant Land	0.03	IB-2	0
0	Wigwam Dr	96 73	Residential Vacant Land	0.93	R-1	0
0	Wigwam Trl	12A 32	Residential	0.22	R-3	0
0	William St	127 15	Museum	9.3	R-3	2
0	Willoughby Rd	114 46	Residential Vacant Land	6.93	R-1	0
0	Winibig Trl	21C 67	Residential	0.17	R-1	0
0	Winibig Trl	21C 68	Residential	0.03	R-1	0
0	Winibig Trl	21C 69	Residential	0.28	R-1	0
0	Winibig Trl	21C 70	Residential	0.11	R-1	0
0	Wintergreen La	21 65	Residential Vacant Land	1.1	R-1	0
0	Winthrop Woods Rd	70 52	Residential Vacant Land	17.26	R-1	0
0	Winthrop Woods Rd	70 53	Residential Vacant Land	2.32	R-1	0
65	Wooster St	129A 34	Public Library	1.5	R-5	1
0	Wopowog Trl	21C 2	Residential	0.3	R-3	0
0	Yutaka Trl	11B 2	Residential	0.35	R-1	0
0	Yutaka Trl	11B 4	Residential	0.11	R-1	0
0	Yutaka Trl	11B 21	Residential	0.06	R-1	0
50	Yutaka Trl	11D 2	Residential	0.28	R-3	0
				2361.45		

Properties evaluated for disconnection projects

APPENDIX D

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

Disconnection Opinions of Probable Cost

Huntington Fire Dept.

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Rain Garden	CF	1800	$ 30.00	$ 54,000.00

City Hall Annex

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Drywell	Ea	4	$ 8,000.00	$ 32,000.00
Second	Porous Pavement	CF	11,931	$ 22.50	$ 268,453.13

City Hall

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Rain Garden	CF	108.9	$ 30.00	$ 3,267.00
Second	Drywells	Ea	17	$ 8,000.00	$ 139,658.02

Booth Hill Elementary School

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Infiltration Trench	CF	1,307	$ 45.00	$ 58,806.00
Second	Porous Pavement	CF	11,931	$ 22.50	$ 268,449.39
	Rain Garden	CF	2,396	$ 30.00	$ 71,874.00

Bridgeport Avenue Pump Station

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Infiltration Trench	CF	254.1	$ 45.00	$ 11,434.50

Shelton Community Center

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Rain Garden	CF	1,089	$ 30.00	$ 32,670.00
Second	Porous Pavement	CF	1,198	$ 22.50	$ 26,952.75

Former Lafayette Elementray School

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Rain Garden	CF	1,053	$ 30.00	$ 31,581.00

Typical Cost Range per CF	
Infiltration Trench	$13 - $38
Infiltration Basin	$7 - $19
Rain Garden	$16 - $46
Gravel Wetland	$9 - $27
Porous Pavement	$19 - $25
Sand Filter	$19 - $39
Wet Pond	$7 - $21

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

Disconnection Opinions of Probable Cost

Shelton Board of Education

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Rain Garden	CF	436	$ 30.00	$ 13,068.00

Long Hill Elementary School

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Water Quality Swale	CF	944	$ 37.50	$ 35,392.50

Pine Rock Park Fire Department

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Infiltration Trench	CF	581	$ 45.00	$ 26,136.00

Shelton High School

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Water Quality Swale	CF	14,230	$ 20.00	$ 284,592.00
Second	Rain Garden	CF	581	$ 30.00	$ 17,424.00

Nike Site Athletic Fields / Mohegan Elementary

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Water Quality Swale	CF	4,828	$ 20.00	$ 96,558.00
Second	Infiltration Trench	CF	944	$ 45.00	$ 42,471.00

Shelton Police Dept. - Senior Center

	Practice Type	Unit	Quantity	Unit Price	Total
Primary	Water Quality Swale	CF	799	$ 20.00	$ 15,972.00

Note: Measures sized to treat water quality volume, 1" over impervious area

Typical Cost Range per CF	
Infiltration Trench	$13 - $38
Infiltration Basin	$7 - $19
Rain Garden	$16 - $46
Gravel Wetland	$9 - $27
Porous Pavement	$19 - $25
Sand Filter	$19 - $39
Wet Pond	$7 - $21

Tighe&Bond

APPENDIX E

Tighe&Bond
Engineers | Environmental Specialists

7/30/2021

Project Prioritization Matrix

				Site Factors			70%		Cost and Maintenance		25%		Social/Education		5%			
Project	Measure	Area Disconnected (acres)	Opinion of Probable Construction Cost	Urbanized Area	Impaired Watershed	DCIA > 11%	Underlying HSG	Site Score	Cost	Area (acres)	Maintenance	Cost - Maintenance Score	Aesthetic Benefit	Educational Value	Public Engagement	Social - Education Score	Scaled Score
				Yes = 2 No = 0	Yes = 2 No = 0	Yes = 2 No = 0	A=3, B=2 C=1, D=0		Sliding scale based on most costly project	Area x 2 Max 3.5 pts	Low = 2 Medium = 1 High = 0		High=3 Med=2 None=1	High=3 Med=2 None=1	High=3 Med=2 None=1		
Nike Site - Mohegan School	Water Quality Swale	1.33	$ 97,000	2	2	2	2	560	2.31	2.66	2	174.22	2	3	3	40	100.00
Community Center	Rain Garden	0.3	$ 33,000	2	2	2	2	560	3.09	0.6	2	142.37	3	3	2	40	95.89
Shelton High School	Rain Garden	0.16	$ 18,000	2	2	2	2	560	3.28	0.32	2	139.97	3	1	3	35	94.93
Shelton Board of Education	Rain Garden	0.12	$ 13,000	2	2	2	2	560	3.34	0.24	2	139.51	3	3	1	35	94.87
Shelton PD - Senior Center	Water Quality Swale	0.22	$ 16,000	2	2	2	2	560	3.30	0.44	2	143.59	2	2	2	30	94.75
Shelton High School	Water Quality Swale	3.92	$ 285,000	2	2	2	2	560	0.00	3.5	2	137.50	2	3	2	35	94.61
Nike Site - Mohegan School	Infiltration Trench	0.26	$ 42,500	2	2	2	2	560	2.98	0.52	1	112.45	2	3	3	40	92.02
Former Lafayette Elementary	Rain Garden	0.29	$ 32,000	2	2	2	2	560	3.11	0.58	1	117.18	2	1	1	20	90.05
Long Hill Elementary School	Water Quality Swale	0.26	$ 36,000	2	2	2	1	490	3.06	0.52	2	139.45	2	2	2	30	85.18
Community Center	Porous Pavement	0.47	$ 270,000	2	2	2	2	560	0.18	0.94	1	53.11	1	2	1	20	81.77
Bridgeport Ave. Pump Station	Infiltration Trench	0.07	$ 12,000	2	2	2	1	490	3.35	0.14	1	112.32	1	1	1	15	79.73
Booth Hill School	Rain Garden	0.66	$ 72,000	2	2	0	2	420	2.62	1.32	2	148.39	3	2	3	40	78.58
City Hall	Rain Garden	0.03	$ 4,000	2	2	0	2	420	3.45	0.06	2	137.77	3	2	2	35	76.56
Huntington Fire Company	Rain Garden	0.46	$ 54,000	2	2	0	2	420	2.84	0.92	2	143.92	2	2	1	25	76.07
City Hall	Drywells	0.63	$ 140,000	2	2	0	2	420	1.78	1.26	2	126.02	1	1	1	15	72.46
Booth Hill School	Infiltration Trench	0.36	$ 59,000	2	2	0	2	420	2.78	0.72	1	112.39	1	2	2	25	71.99
Pine Rock Park Fire Department	Infiltration Trench	0.16	$ 27,000	2	2	2	0	420	3.17	0.32	1	112.21	1	1	1	15	70.68
Booth Hill School	Porous Pavement	0.33	$ 269,000	2	2	0	2	420	0.20	0.66	1	46.41	1	2	2	25	63.47
City Hall Annex	Drywells	0.14	$ 32,000	2	2	0	0	280	3.11	0.28	1	109.68	1	1	1	15	52.27
City Hall Annex	Porous Pavemnet	0.33	$ 268,500	2	2	0	0	280	0.20	0.66	1	46.57	1	1	1	15	44.12